

**(Genre) Systems view of research funding success:
Evolving a systemic longitudinal perspective on expert learning**

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To my parents

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As a single-authored monograph, the doctoral thesis is a myth. This work would have never materialized without the involvement of many dedicated people on a couple of continents.

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Abstract

This thesis contributes a rich in-depth perspective on how expert Canadian scientists build towards making their work sustainably grant-fundable. Research funding is crucial to an academic career, but so is the role of the principal investigator (PI) in building towards funding success. Yet, in this climate of research performativity, much of the scholarly attention has focused on the most measurable form of success, the genre of the grant proposal. This leaves the more occluded processes of the PI's evolving approaches to funding unattended. This study in particular contributes by exploring the experiences of PIs who successfully negotiated fundability of their research during perhaps the most challenging period in Canadian research funding, the 2005-2016 federal budgetary compressions.

Drawing on rhetorical genre theory and the concepts of researcher development and nested contexts, the study frames funding success as encompassing but not limited to the genre system of research funding, and informed by the PI's learning from participation in progressively larger social systems of knowledge and academic work. As the PIs learn to navigate and negotiate the intellectual, interactional, and institutional contexts of these systems, they draw on the knowledge they develop to evolve their own, PI-specific, genre systems of engaging with grant funding.

To examine how, over time, expert PIs evolve approaches to making their research fundable, the thesis employs a qualitative longitudinal multi-case study of three scientists. Connecting the bio-historical and ongoing experiences of these successful PIs in basic and applied natural sciences, it explores PI learning from experience and engagement in the nested contexts of research funding. The data were collected in 2006 and in 2016-2018 from a variety of sources that reflect the participants' engagement with grant funding. The principal data sources were semi-structured interviews with each PI, who also provided curriculum vitae, drafts of their recent proposals, funded and rejected, along with reviewer commentary and decision-related documentation. Other sources included funding agency, university and PI websites, and institutional activities designed to assist PIs with preparing their applications. These last included a research administration round table and researcher support events. The data were analyzed using a combination of a priori concepts and open coding, situated within genre and narrative analysis. First, the analysis was performed within cases, for themes of individuality in each PI's approach; and then across cases, for patterns of commonality in all three PIs' approaches.

The findings suggest that sustainable research funding success is not limited to the written proposal or indeed to the grant genre system alone. Rather, PIs build it over time through purposeful and agentic participation in the contexts that encompass and intertwine with the research funding system. The longitudinal developmental systemic perspective, developed in this thesis, sheds light on the commonalities and individual variation in how successful PIs learn to navigate and negotiate fundability of their work in the long term. Funding success emerges as fluid and requiring on-going effort but also as rooted in the PIs' across-systems thinking, research goals, and belief in themselves and their work.

Résumé

Une vision (genre-)systémique du succès du financement de la recherche: Évolution d'une perspective longitudinale systémique sur l'apprentissage par des experts

Cette thèse apporte une perspective riche et approfondie sur la manière dont les scientifiques canadiens experts s'y prennent pour rendre leurs travaux durablement finançables par des subventions. Le financement de la recherche est crucial pour une carrière universitaire, mais le rôle du chercheur principal (CP) dans l'obtention d'un financement est tout aussi important. Pourtant, dans ce climat de performativité de la recherche, une grande partie de l'attention s'est concentrée sur la forme la plus mesurable de succès, le genre de la proposition de subvention. Cela laisse de côté le CP et ses processus de l'évolution des approches en matière de financement, qui sont plus occlus. La présente étude apporte une contribution particulière en explorant les expériences des CPx qui ont réussi à négocier le financement de leur recherche pendant la période peut-être la plus difficile du financement de la recherche au Canada, soit les compressions budgétaires fédérales de 2005 à 2016.

S'appuyant sur la théorie du genre rhétorique et sur les concepts de développement du chercheur et de contextes imbriqués, l'étude présente le succès du financement comme englobant le système de genre du financement de la recherche, mais ne s'y limitant pas. Il voit ce succès comme étant informé par l'apprentissage du CP de sa participation à des systèmes progressivement imbriqués, ceux de la connaissance et du travail universitaire. Au fur et à mesure que les chercheurs principaux apprennent à naviguer et à négocier les contextes intellectuels, interactionnels et institutionnels de ces systèmes, ils s'appuient sur les connaissances qu'ils acquièrent pour développer leurs propres systèmes (de genre) pour s'engager dans le financement des subventions.

Pour examiner comment, au fil du temps, les CPx experts font évoluer leurs approches pour rendre leur recherche finançable, la thèse utilise une étude qualitative longitudinale multi-cas de trois scientifiques. En reliant les expériences bio-historiques et continues de trois CPx dans les domaines des sciences naturelles fondamentales et appliquées, elle explore l'apprentissage des CPx à partir de l'expérience et leur engagement dans le financement de la recherche. Les données ont été recueillies en 2006 et en 2016-2018 à partir d'une variété de sources qui reflètent l'engagement des CPx dans le financement de la recherche. Les principales sources de données sont des entretiens semi-structurés avec chaque CP, qui a également fourni son curriculum vitae, les ébauches de ses propositions récentes, financées et rejetées, ainsi que les commentaires des examinateurs et la documentation relative aux décisions. Parmi les autres sources, citons les sites Web des organismes de financement, des universités et des CPx, ainsi que les activités institutionnelles conçues pour aider les CPx à préparer leurs demandes. Ces dernières comprenaient une table ronde sur l'administration de la recherche et des événements de soutien aux chercheurs. Les données ont été analysées en combinant des concepts *a priori* et un codage ouvert, dans le cadre d'une analyse de genre et du récit. L'analyse a d'abord été effectuée au sein des cas, pour trouver des thèmes d'individualité dans

l'approche de chaque CP, puis entre les cas, pour trouver des motifs communs dans les approches des CPx.

Les résultats suggèrent que le succès durable du financement de la recherche ne se limite pas à la proposition écrite ou au seul système de subventions. Plutôt, les CPx le construisent au fil du temps par une participation intentionnelle et agentive aux contextes qui englobent et entrelacent avec le système de financement de la recherche. La perspective systémique longitudinal, élaborée dans cette thèse, met en lumière les points communs et les variations individuelles dans des façons dont les CPx experts apprennent à naviguer et à négocier le financement de leur travail à long terme. Le succès du financement apparaît comme fluide et exigeant des efforts continus, mais aussi comme enraciné dans la pensée systémique, les objectifs de recherche du CP et la confiance en soi et en son travail.

Contribution of author(s)

This dissertation draws on two major studies. The first was a pilot study (Phase I) which was supervised by Dr. Doreen Starke-Meyerring with participation from Drs. Lynn McAlpine and Anthony Paré. Its outcomes were presented at the annual meetings of the Canadian Association for the Study of Discourse and Writing¹ (CASDW) in 2006, 2007, 2008 and published as a book chapter (Yousoubova, 2011). I am the author of Phase I study and of its 2011 publication. During this time, I also co-edited a book on writing in an endeavor led by Doreen (Starke-Meyering et al., 2011)

The second study (Phase II) is represented by the present monograph. I am the principal investigator. As such, I am responsible for all aspects of the study-and its outcomes. Each chapter of the present dissertation was reviewed by and discussed with my primary supervisor, Dr. Lynn McAlpine. The drafts of the entire monograph were reviewed by my doctoral committee which consists of Drs. Lynn McAlpine (primary supervisor), Mela Sarkar (co-supervisor), and Karl Moore (committee member); additional feedback on candidacy papers was provided by Dr. Shaheen Shariff. Furthermore, Dr. McAlpine provided substantive feedback at our personal monthly meetings throughout the entire dissertation process.

Some of the findings of this dissertation were presented at the 2018, 2019, 2020, 2022² annual meetings of the European Association for Research on Learning and Instruction (EARLI) and the 2019 meeting of the American Educational Research Association (AERA). Two of these papers were subsequently submitted for publication in the Journal for the Study of Education and Development and Innovations in Education and Teaching International. The latter was an invited contribution. At the time of writing, two other submissions were in development. All but one are co-authored with Dr. McAlpine.

¹ Formerly, the Canadian Association of Teachers of Technical Writing (CATTW).

² EARLI conference of 2020 was cancelled due to the pandemic.

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1. Introduction

1.1 Statement of a problem

Grant funding has always played a crucial role in the academic career (Connor & Mauranen, 1999; Johns, 1993; Myers, 1990). To publish, present, and advance their intellectual contributions, researchers have to get grants in the first place (Myers, 1990). Across the world, the pressure on researchers to obtain grant funding has been steadily increasing (e.g., Lucas, 2006 in the UK; Feng, 2011 in China; van Arensbergen & van den Besselaar, 2012 in the Netherlands), which reflects the culture of performativity and competitiveness (Bornmann & Marx, 2012) now prevalent in academic research. As a result, in the current context of stagnating growth of public funding of research (Whitley et al., 2018; World Bank, 2018), grant funding remains highly competitive. The statement that all researchers should come to terms with grant writing sooner than later (Connor & Mauranen, 1999) has remained relevant.

However, despite the grant proposal being a high stakes genre (Tardy, 2003), understanding research funding success remains problematic. Writing studies demonstrate that proposal success is influenced by how principal investigators (PIs) address the genre and discipline expectations (Connor, 2000; Tardy, 2011). Fundability of PI submissions is also impacted by the policies and social processes that shape the context of grant funding (Serrano Velarde, 2018) and by the PIs' individual experiences with research funding (McAlpine, 2020). Jointly, these studies highlight the need to consider how PIs interact with the grant-funding system and how they enact their experience in these contexts to conceive persuasion in their proposals.

Compounding the problem is that applying for grants is increasingly associated with luck, especially among early-career academics (McAlpine et al., 2016). As a result, some hesitate to apply at all (Bazeley, 2003), while others do but not as often as they would have (Witteman, 2016) despite the overall relentless increase in application numbers (the participant PIs, in conversation 2016-2018).

Along with the researcher-perceived unpredictability of funding decisions (Graves et al., 2011), there are other reasons why individual PI engagement with navigating and negotiating grant

funding remains under-attended. Among them are concerns over the effectiveness of peer review (Avin, 2019; Guthrie et al., 2017) and perceptions of non-transparency of grant evaluating structures (Derrick, 2018; Lamont, 2009) which get complicated further in cross-cultural transition (Feng, 2014). Also prominent are issues of gender disbalance in the allocation of funds (Larivière et al., 2013), the need for increased time investment towards funding applications (Anderson & Slade, 2016), and the emotional toll this takes on the PIs (Chubb et al., 2017). As a result, researchers may subjectify the process by assigning the funding council with a personality (Casey & Fletcher, 2017; McGinn et al., 2019), rather than envision it in their writing as an interconnected social system of peer reviewers, government priorities, and institutionalized processes that work together to fulfil a purpose (van Nostrand, 1997).

Finally, research funding, which reflects government priorities (Laudel, 2006; Serrano-Velarde, 2018; van Nostrand, 1997), could be subject to comprehensive structural change. Indeed, this was the case in Canada when the cabinet transitioned from the Liberals to the Conservatives in the mid-2000s and back in the mid-2010s. Internal restructuring of the federal funding agencies during these transitions has impacted availabilities of funding, processes of peer review, and the PI trust in the system (Naylor reports, 2017). Many Canadian PIs expressed their frustration with the mostly negative outcomes on their proposal fundability (McGinn et al., 2019; Szaszi, 2015). But there were still many who remained funded. To understand how these PIs made their work fundable, one needs to look beyond the proposal and into the individual PI participation in the system of funding (Yousoubova & McAlpine, 2021a, 2021b). In other words, understanding variation in the PI response to the constraints and affordances of research funding would be valuable.

This thesis contributes by exploring in-depth how three expert Canadian science PIs develop and draw on their experiences in the federal funding system with the aim of enacting its affordances and constraints to make their research sustainably fundable in the long term.

1.2 The Pilot

The thesis grew out of a pilot I conducted in 2006, when enrolled in the first phase of my doctorate. The Pilot aimed to see how scholarly writing (re)produces a multitude of social processes in which it is situated and, more precisely, how it (re)produces particular local orders of a discipline and, concomitant with them, a particular kind of discursive scholarly identity. I had a personal reason for this. Being a text linguist, my finger by then had been on something odd, something I could not quite articulate. I felt I was writing not so much in a foreign language – I had long before then aspired to some degree of English proficiency - as in the foreign context of using that language. So I set off to find some other academics who wrote in English as a second language (ESL) with a view to obtaining and analyzing their perspectives on academic writing in the Canadian Anglophone research environment. Writing by scientists was an obvious choice, both as a tribute to my plant geneticist parents and as an extension of my early career translating in agricultural sciences.

The original purpose of the Pilot was to investigate how, in responding to and reproducing multiple practices of national academic traditions as well as those of institutions and disciplines, disciplinary writing “involve[s] innumerable local decisions” (Freedman and Medway, 1994, p. 11). These are not necessarily shared worldwide and are not therefore transparent for a newcomer trained outside the local national framework (Yakhontova, 2002). I approached two ESL scientists who transitioned to Canada from the former Soviet Union, just as I did. My aim was to elucidate their perceptions on transitioning in their disciplinary writing from the non-Anglophone academic contexts of the USSR to Canada. It was during the interviews that both participants, independently, stated that the most challenging aspect of their disciplinary transition to North America was writing for grant funding. One of the scientists reflected in some depth on how he adapted to writing for funding in a foreign language and in a foreign academic context. The other shared his grant proposals, one failed and one successful. From that point on, the pilot focused on their experiences and perspectives on grant proposal construction.

At the time of the Pilot, in 2006, one participant was an assistant professor of Engineering at one of Montreal's two English-language universities. The other was in mid-career, an associate professor of Biology at Montreal's other English university. Both of them received their doctorates in the USSR and transitioned to Canada with a track record of publications but not of grant funding. During their interviews it became increasingly evident that while their awareness of the proposal was shaped by the specifics of their epistemic domains, there was more to it. Their individual experiences in the academic contexts on both sides of the Atlantic played a significant role in how they were learning a new to them genre of the grant proposal. Their learning paths in the Canadian funding system led me to a question which at the time had no answer. As a genre, the proposal is discipline-specific (Myers, 1990; Tardy, 2011) and writing in genre-appropriate ways is essential to it being accepted by peers (Schryer, 2011). **But is learning to write the proposal genre in discipline-appropriate ways enough to become and remain funded?**

The key findings of the Pilot were published (Yousoubova, 2011) and concerned two things. One was about pressures and challenges which these ESL scientists faced in transition, when writing for grants in the competitively funded Anglophone context. The other was about how these ESL scientists developed an understanding of the proposal genre and how they projected it in their grant writing.

What I saw in the process was that my Pls' genre and system learning pathways differed in important ways that reflected their personal histories, their funding-related aims at the time, and their experiences with funding and with the proposal genre. This prompted me to re-focus the way I read literature. There were three things that stood out. One was that in the studies of grant writing the participants ranged across the career spectrum and across academic domains (Cheng, 2014; Feng, 2006; Tardy, 2003). Even individually, these studies had little inner consistency as to the levels of their grant writers' prior experiences or their epistemic expertise and worldviews, or the funding agencies to which they applied. Yet my pilot suggested that these would have impacted on how the Pls approached grant proposal construction. The

exception was Myers (1990); both his participants were biologist PIs of comparable experience applying within one agency. Myers (1990) has become a keystone in proposal writing studies.

The second thing that stood out was that the vast majority of literature focused on the proposal. That PIs navigate and negotiate a complex interconnected web of documents and interactions, which the proposal enacts and which Tardy (2003) defined as a genre system, was acknowledged. But these experiences were envisioned to support the writing of a proposal, not to make the PI's work fundable for the long term. Yet what Myers (1990) and Tardy (2003) demonstrated, albeit without highlighting it, was that while their participants navigated and negotiated the proposal in the same US grant system, the ways they did so were not the same. A further indication that there was more to grant success than the proposal came with Mehlenbacher's (1994) investigation of the grant writing system as a combination of written proposals, funding processes and academic research. The study indicates that successful PIs situate their writing in a complex interplay of multiple connected factors that shape the context of each submission. But there had been no follow up.

Finally, the lion's share of genre and writing studies were situated in the grant funding system of the US or focused on considerations that transcend the genre's national boundaries. But knowledge evaluation processes are not internationally shared, reflecting the specifics of national academic systems (Lamont & Huutoniemi, 2011; Lamont & Sun, 2012) which, in turn, translates into specific expectations when grant writing (Feng, 2014). Canadian context of funding academic research remains decidedly under-explored, with only a few studies to date (e.g., Feng & Shi, 2004). Yet globally, Canada is among the top state contributors to scientific research and development³, so understanding how Canadian PIs engage with grant funding to produce world-class research would be valuable.

³ Sample sources: World Health Organization, 2022 <https://www.who.int/about/funding/contributors/can>
Council of Canadian Academies, 2018 https://cca-reports.ca/wp-content/uploads/2018/09/Competing_in_a_Global_Innovation_Economy_ExecSumm_EN.pdf
Canadian Association of University Teachers, 2020 <https://www.caut.ca/resources/almanac/1-canada-world>

1.3 From the grant proposal to the nested contexts of research funding

Looking back, my Pilot had similar shortcomings. First, following Myers' (1990) now classic lead, it too assumed the primacy of the proposal in the funding system. Second, as a study of genre and writing, in many ways it paralleled the design of Myers (1990) and Tardy (2003)⁴. Each of them worked with two PIs in the sciences; so did I. Their PIs were in the US, three of them experienced, one new; all wrote in English as a native language. Mine were in Canada, both of them immigrants, one more senior than the other, writing in English as a second language. Individually, each of the studies offered value; the first two are the domain landmarks. Cumulatively though there was little consistency because when each of the six participant PIs responded to genre and system expectations in their proposal writing, it was more complex than addressing the genre conventions alone. They each navigated the opportunities and constraints of their respective systems in their own way, and they negotiated for funding in these systems in ways that reflected their personal experiences in academia and in knowledge making. In effect, getting funded looked to be more encompassing than learning to write a proposal and more complex than only responding to the system expectation in genre-appropriate ways. But it had not been articulated as such.

As I expanded my readings in search of new insight, with time it also became evident that much like the proposal genre cannot exist in isolation but is intrinsically linked to other genres in the funding system, the grant genre system is not isolated either. It is interconnected into a network of other, progressively larger nested contexts and systems of academic work (McAlpine & Norton, 2006; van Nostrand, 1997). For example, government policies, priorities and budgetary constraints (Naylor reports, 2017; Serrano-Velarde, 2018; World Bank, 2018) reflect into the grant genre system. So do the institutional and national processes of knowledge evaluation (Derrick, 2018; Lamont, 2009, Lamont & Sun, 2012). But these interconnections

⁴ Mehlenbacher (1994) is based solely on interviews, i.e. without an analysis of the participants' proposals, which is why my Pilot did not draw on his study for design.

could also influence how PIs participate in the system, with the result that their experiences of participation reflect into how they conceptualize their engagement in the funding system (Feng, 2014; Yousoubova, 2011).

In other words, to understand how PIs develop knowledge and awareness of grant funding (after Tardy et al., 2020), one needed to look more broadly into how they evolve their approaches to being funded in these nested and interconnected contexts of research funding. And one needed to consider in depth the significance of individual variation among the commonality of PIs' genre-appropriate responses to the expectations of the grant system. This study conceptualizes the agentic nature of expert learning and contributes an enriched perspective of expert PI engagement with grant funding. I posit that over time, expert PIs learn to conceptualize their individual participation in the research funding system by creating PI-specific opportunities. That is, expert PIs learn to inform fundability of their own work by engaging purposefully in the interactions that define grant funding and related genre systems.

In closing, I chose to focus on sustainably funded experienced PIs who could reflect on their paths of learning and building towards making their work fundable. What makes this study particularly interesting is that it encompasses PI experiences during the 2005-2016 federal budgetary compressions in Canada. This was also a period of high volatility in Canadian research funding due to rapid shifts in governments and policy. This, in turn, led to large-scale change and restructuring across the Tri-Council that proceeded at such a pace that the then lead of one of the councils likened it to changing an aircraft engine in flight (Crowe, 2016). Researcher success rates plummeted and stayed low⁵ yet my participant PIs continued to be funded, throughout. **How did they manage and what can be learnt from it?**

⁵ Government of Canada Tri-Agency funding 2013-2019 <https://www.canada.ca/en/research-coordinating-committee/services/publications/progress-reports/2019-2020/annex-2-early-career-researcher-data.html>

1.4 Research questions

The study described in this dissertation set out to explore how expert PIs navigate and negotiate the system of research funding to build towards sustained grant success. The study extends from my previous work (Yousoubova, 2011) and builds on the consensus arrived at by Myers (1990), Mehlenbacher (1994) and Tardy (2003): the need to conceptualize grant writing as situated in a complex communication system. Myers (1990) was first to recognize the interconnected social nature of writing for research funding. Mehlenbacher (1994) identifies interpersonal networking as one of the factors that influence the outcome of a proposal submission. Tardy (2003) demonstrates how grant writers navigate a larger system related to the grant proposal that involves documents as well as dialoguing with resources and individuals involved. Building on the above, this study considers how PIs' experiences in the structured nested contexts of this and related systems of academic work (McAlpine & Amundsen, 2018; McAlpine & Norton, 2006) inform their approaches to grant funding. More specifically:

- **(intellectual)** How do scientists use proposal writing to advance their research goals?
- **(institutional)** How do they draw on their institutional roles in grant funding?
- **(inter-textual)** How is their understanding of the decision-making drivers in research funding reflected in their proposal writing?
- **(inter-personal)** What is the nature of their **interactions** within and beyond the grant genre system and why do they engage in these activities?
- How do they integrate the institutional, intertextual, interpersonal and intellectual knowledge they develop into the grant proposal?

1.5 Contribution to knowledge

What can be learnt from the experts who successfully negotiated fundability of their research during perhaps the most challenging period in Canadian research funding? The findings and the conceptual framework developed as a result of this exploration facilitate an in-depth understanding of grant funding success. But in doing so, this study also offers encompassing

and novel ways to consider success as it may be understood in any field of knowledge work and researcher development. This longitudinal developmental systemic lens enables novel perspectives on genre as a vehicle that facilitates inter-systems thinking and on the transformative role of agency in expert learning.

What started as a writing study evolved into an exploration that extends far beyond the single genre of the grant proposal. The developmental theoretical framework underpinning this study enables a broader, more comprehensive and more encompassing view on the process of grant proposal construction. But this view is not limited to the proposal or proposal writing. It highlights the role of the PI's agentic learning in research funding success. Rather than being limited to one genre system, that of research funding, grant success is also informed by the PIs' learning from participation in nested and interconnected contexts of the larger social systems of knowledge and academic work.

The findings would be relevant in a number of educational domains. These, in no particular order, are: genre studies, researcher development, experiential learning, academic writing, discourse analysis, systems thinking, research funding policy, research administration, feedback, research policy, higher education research and development.

1.6 Brief chapter overview

Following this **Introduction**, I situate the study first via a light foray into the history of science research funding in Canada, followed by the conditions of the mid-to-late 2010s, when the study took place.

Next, the **Theory** chapter outlines my conceptual worldview. It grew out of the notion of dialogism developed by the Soviet Russian philosopher of language Mikhail Bakhtin (Bakhtin, 1981, 1986; Holquist, 2002). My adaptation of Bakhtin's original reflects his premise that no language utterance and - by extension - no communicative or social (inter)action takes place in isolation but instead echoes the multitude of inputs and voices of many other participants (see

Matusov, 2004). To consider how expert PIs engage with grant funding, I draw on the complementary input of the rhetorical genre theory (Miller, 1984; Bazerman, 1997; Tardy et al., 2020), sociology of knowledge (e)valuation (Knorr-Cetina, 1981/2013; Lamont 2009), and the multi-strand longitudinal conceptualization of researcher development (McAlpine & Amundsen, 2018). The overarching supra-concept is one of nested contexts of academic work (McAlpine & Norton, 2006), which posits that research work and researcher (PI) development take place in the inter-embedded and progressively larger social contexts of academia, government, and society. This enriched perspective reflects the recommendations of genre theorists to seek deeper understanding of genre work via a) complementing genre theory with related conceptual approaches (e.g., Artemeva, 2004; Schryer, 2011) to b) understand how genre participants learn from participating in situated interactions which define genre (Tardy et al., 2020). To this end, my exploration of expert PI engagement with grant funding is anchored within the interconnected systems of academic work that influence PI thinking and learning as they build towards making their work fundable.

A review of relevant **Literature** follows Theory. After that, the **Methodology** chapter substantiates my study design: a qualitative multi-case study of three expert PIs, with a built-in longitudinal aspect.

Findings are represented in the three following chapters, each dedicated to one PI. These are (aliases) Paul, Mark, and Phil, in order of their coming on board.

I then proceed to a **Cross-Case Analysis** of the Findings, followed by a **Discussion, Conclusion**, and reflection on Implications and on Future Research, including **advice** the participant expert PIs have offered to earlier career researchers.

1.7 The context

The study is situated in Canada and the time period covered is 2006-2018. At the federal level in Canada, the majority of funding for academic research is disbursed through the Tri-Agency, a

grouping of three funding councils. The Natural Sciences and Engineering Research Council of Canada (NSERC) mainly supports discovery research and innovation. The Canadian Institutes of Health Research (CIHR) prioritize translating new scientific knowledge into healthcare. The Social Sciences and Humanities Research Council (SSHRC) supports work focused on individuals, groups and societies (McGill University, 2019). Of the three, NSERC and CIHR focus on the sciences and fund the work of the participant PIs.

The PIs of the Pilot and the main study were institutionally distributed across both research-intensive and comprehensive universities in Montreal. The three PIs of the main study work at the same institution but represent differing epistemic domains, and the research they do ranges from fundamental to applied. This makes it eligible for differing types of science funding and necessitates individual PI choices in learning, writing, and interacting within the funding system. To this end, while the PIs share both the broader context of science funding in Canada and the narrower institutional one, their approaches to funding differ.

As already mentioned, there are no universal approaches to writing and evaluating new knowledge. Thus, consistency of the context enriches this in-depth exploration with situated insight into the roles of commonality and individual variation in how PIs build towards grant success. Understanding these is essential to understanding how PIs learn and inform their actions in particular geo-linguistic and -historic contexts of research funding (e.g., Feng, 2014). In this section, I provide a short overview of the defining aspects of the Canadian federal funding system which directly impacted the participant PIs. This is a starting point that frames my findings. I preface them here by incorporating a bit of history and the views on its modern day as expressed by the participant PIs.

1.7.1 Inside-outside view

The perspective on the modern-day NSERC and CIHR offered in this section stems predominantly from within the institution at which the PIs work, the study site. Indeed, it is my interpretation of the perspectives of the individuals who, in their institutional roles,

represented the federal agencies and university support during the events organized by the institutional office of research. Further input into this interpretation comes from my attending internal events at the research office which includes a forum for faculty-based research administrators. Unlike in the United States, communication between PIs and agency program officers in Canada is not direct; instead, it is facilitated by research administrators who tend to build considerable knowledge about programs and processes of a given agency. Finally, my interpretation includes perspectives of agency insiders such as PIs themselves in their roles of peer reviewers and recent agency-based program staff such as a former assistant director of one of the CIHR institutes with whom I had a private consultation. All in all, the view offered here is not entirely that of agency insiders or outsiders; rather it is an inside-outside hybrid interpreted by me. Its principal advantage is in that it helps frame the main lines of NSERC and CIHR funding directly within the contexts of the PIs' experience and of their home institution.

1.7.2 The funding of science research in Canada: a brief history

Federal funding of scientific research in Canada, as we know it now, took shape after World War II. Research and development (R&D) in physical, life and human sciences prior to and during the war concentrated within the national labs directed and funded by the National Research Council (NRC). Postwar growth of university-based research saw diversification of knowledge work away from only the NRC labs and eventually prompted the federal government to review the NRC position as an agency that both performed and funded scientific research. In 1973, Senator Michel Lamontagne chaired the review committee (NSERC, 2021). One of the recommendations of the Lamontagne report was to separate the funding of university science research and R&D work in the NRC labs. This, in 1978, led to the establishment of the Natural Sciences and Engineering Research Council (NSERC).

From 1978 to 1983 NSERC provided three main forms of funding to offset and pre-empt potential shortages of highly qualified research personnel in Canada: undergraduate fellowships, university research fellowships, and industry research fellowships (NSERC, 2021). Starting in 1983, newer, more diversified, forms of funding were being introduced. The most

notable of them is the University-Industry program, which enabled project-based research to be piloted in real-world contexts. One major advantage of this program was the requirement that the participating industry partners contribute to the effort financially (NSERC, 2021). This substantially enhanced the NSERC research support capacity. From the late 20th century onwards NSERC has established itself as the primary federal funder of fundamental and applied academic research in sciences and engineering.

In the area of funding of medical research, in 1999 the then Medical Research Council (MRC) was subject of a review by the National Task Force on Health Research, comprised of the representatives of the Canadian medical community (Spurgeon, 2000). The resulting report led to the transformation in 2000 of the MRC into the Canadian Institutes of Health Research (CIHR). The purpose of this transformation was in large part to develop Canada's capacity to attract top medical researcher talent. This had hitherto been difficult due to significantly unfavorable comparisons in the size of the MRC grants with those of its main competitor on the continent, the US National Institutes of Health (NIH) (Boulakia, 2000). From the inception, the CIHR benefitted from a significantly larger budget than was available to the MRC (Charbonneau, 2000). This enabled the CIHR, via its network of virtual research institutes, to pursue its primary goal of expanding the scope of medical research in Canada in basic, clinical and interdisciplinary fields. Modern-day CIHR supports investigator-led as well as strategic research, the latter being work targeting specific areas of health as prioritized by the Canadian government (CIHR, 2021).

1.7.3 The Tri-Agency today

Today NSERC, CIHR, and SSHRC form a triad of Canadian federal agencies whose mandate is to fund university research across the academic spectrum (Figure 1).

Figure 1: Canada Tri-Council

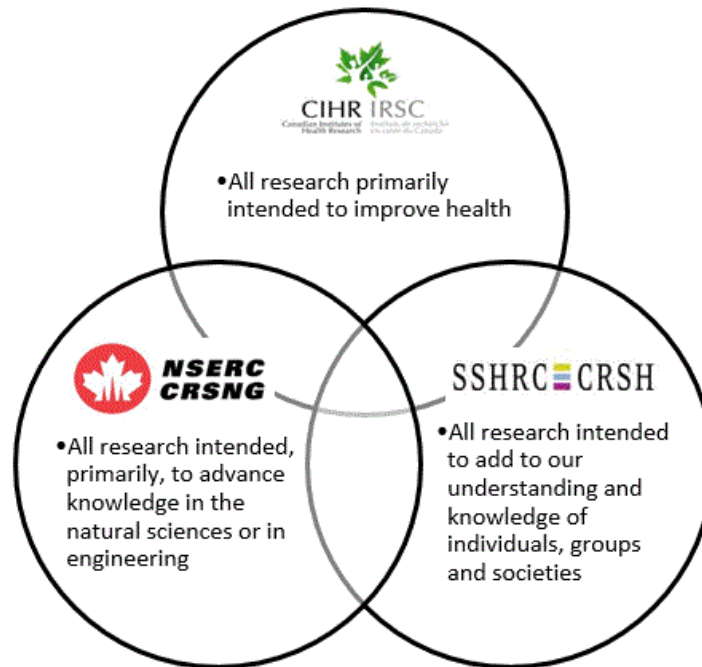


Image courtesy of McGill Research & Innovation Office

Source: <https://www.mcgill.ca/research/researchers/administering-tri-agency-funds>

From the mid-2000s to the mid-2010s, under the then Conservative government, the Tri-Agency had experienced a period of intense structural changes. They were intended to accommodate significant government-initiated cuts to the funding of academic research. The change was experienced at many levels: agency administration structures were paired down to recover some of the operating costs, often resulting in reduction of scientific program personnel and in the quality of services available to PIs (former Assistant Director of a CIHR Institute, private communication). Committee compositions were reconfigured across the board which resulted in new routing of applications due to revised designations and in reviewer frustration:

... I had these very “nice” conversations at CIHR with people, like what the hell is going on? SSHRC made a decision that anything that was related to [x] was ok but anything that was related to [y] was not. it’s a totally arbitrary line they drew in the sand ... so there was a whole bunch of people that were traditionally funded by SSHRC that were suddenly cut off and forced to go to CIHR.

Phil

But while some SSHRC applicants found themselves applying to CIHR, many of those previously funded by CIHR were sent to NSERC. The result across the board was a significant rise in numbers of applications which augmented the already challenging workloads of peer reviewers:

... the problem is there isn't a lot of money. ... When ... all the CIHR refugees ended up in NSERC's pool ... [my load] went from a total of maybe ... 14 on which I had to actually present and the other ones I had to vote on. You change that to 58, ... that's a huge influx. That's refugees. ... They had been funded by CIHR for 25 years and now suddenly the earth has opened up and they are falling.

Mark

Besides the significantly increased workload, re-routing of applications necessitated considerable adjustments among peer reviewers, who found themselves reading applications not only from unfamiliar fields but often constructed in accordance with the prior funder's requirements:

... a lot of times the really-really bad [proposals] have actually been from people that have come from a SSHRC background, switched over to CIHR and haven't really thought through the process. So they've written a SSHRC grant for CIHR and it's, you know, six pages, and [at CIHR] it's a 10-page competition. And you are like, right there and then it's a [reject candidate].

Phil

According to the official Tri-Agency statistics, during 2010-2015, average success rate for the key investor-led NSERC program was upwards of 30%, with the award average at CAD\$38K. Official success rates for the equivalent investigator-led grant line at CIHR were at 16%, with the

average award in the range of CAD\$700K⁶. But during the interviews, the PIs, all three of whom serve on CIHR review panels, quoted the then success rates for this grant to be at 6-7%⁷.

As the diagram above shows, there are areas of overlap in the agencies' scope. But it dates to 2019, by when the transitional confusion witnessed by the participant PIs had subsided. Until then, the situation was dire both for the writers and peer reviewers. Here is an example of their reaction:

LY: how do scientists survive in this?

Mark: by the skin of their teeth.

The Liberal government, which resumed office in late 2015, had pledged to inject funds into scientific research. Although at the time the data collection was completed in 2018, the situation was improving, in its then state it still reflected the general downward trend in the academic research budgets of the developed countries (World Bank, 2018) and in the case of Canada was at a plateau⁸. Funding from both NSERC and CIHR remained highly competitive at the time of writing in 2021-22.

⁶ Statistics retrieved from the agency websites on 22 October 2019:

CIHR <http://www.cihr-irsc.gc.ca/e/50582.html>;

NSERC http://www.nserc-crsng.gc.ca/_doc/Students-Etudiants/2014StatsDGP_e.pdf NSERC did not offer an average for 2010-15; the data above is for 2014, one of the years in the range and the year in which all three PIs submitted proposals.

⁷ A more detailed consideration of CIHR during this period in in Appendix A.

⁸ Canada's Science Vision, 2019 <https://ised-isde.canada.ca/site/canada-science-vision/en>

2. Nested systems of research funding (theory)

2.1 Introduction

This chapter situates the inquiry in the nested contexts of academic work (McAlpine & Norton, 2006). I draw on the notion of genre systems (Bazerman, 1994) and the concept of researcher development (McAlpine & Amundsen, 2018) to contextualize the interconnectedness of research funding and knowledge making in academic work (Knorr-Cetina, 1981/2013; Lamont, 2009). The worldview I adopt for this purpose is not limited to any singular conceptual framework. Instead, it is an epistemic dialogue.

The idea came from Thomas Kuhn (1962) and Mikhail Bakhtin (1986). Independently, they each highlight the interactive core of the development of science and language. For Kuhn, a philosopher of science, scientific progress is informed through critical considerations of epistemic merits of theories and worldviews which eventually leads to a consensus (Wray, 2010). On the surface, this may seem exclusive rather than interconnected but this is where the notion of dialogism, developed by the philosopher of language Mikhail Bakhtin, clarifies. For Bakhtin, any linguistic utterance reflects the input of many related utterances and voices, thus making sense only inasmuch as it is situated in their inter-embedded webs (Holquist, 2002). Both views converge on the dialogic and the inter-informative.

Conceptual dialogism seemed the most logical way to explore the inter-connected and interacting processes at the heart of fundable frontier science. It helped me consider intellectual movements and conceptual worldviews without having to subscribe to one over others. As a linguist by training, Bakhtin's for me was also the most relatable way to draw on what is relevant and inter-correspondent in each. The details of this thinking are discussed elsewhere⁹. Here I outline how this outlook situates my own exploration in their web.

⁹ In my comprehensive papers.

My epistemic heteroglossia encompasses voices from philosophy of science (Kuhn, 1962/1996; Latour & Woolgar, 1979/2013), of language (Bakhtin, 1981,1986; Voloshinov, 1973), and of rhetoric (Gross, 2006; Gaonkar, 1993). They help contextualize the meaning of interaction in scientific knowledge (Knorr-Cetina, 1981/2013), while bridging it with the specifics of the process of knowledge making. These are explored in genre studies (Bazerman, 1988; Miller, 1984; Paré, 2000; Stryer, 2011) and in the related work on discourse and writing (Bhatia, 2004; Swales, 1990, 2004; Hyland, 2009). These “voices” foreground the interactive nature of academic writing as the principal site of knowledge making. Yet, while this dialogic consideration puts the proposal at the centre of the discussion (Myers, 1990), it also acknowledges that these interactions do not and cannot take place without the PI (e.g., Ding, 2008, Feng, 2011). This thesis brings the PI, who enacts these knowledge making interactions, to the foreground.

Where it concerns the PI, the study’s dialogic conceptualization helps identify and frame the nested and inter-connected institutional contexts and social structures of grant funding. These play a role in PI development, for PIs must learn to navigate and negotiate them to persuade powerful peer reviewers of their work’s meaningfulness (e.g., McAlpine, 2016; McAlpine et al., 2016). As I explore the meaning of PI success, this conceptual dialogue helps me develop a more encompassing notion of how PIs navigate and negotiate success in these nested contexts.

As a sample, for social constructivists “[scientific] meanings are negotiated [by individuals] socially and historically [and] are formed through interaction with others” (Creswell, 2007, p. 21). This approach also allows for encompassing a complexity of individual perspectives (Creswell, 2007, p. 20). The process of construction of scientific knowledge is thus seen as historically shaped through individual and communal social relationships (Atkinson, 1999; Bazerman, 1988; Swales, 1990, 2004). For critical realists, social structures and relations are connected ontologically and are characterized by an emergent, evolving nature (Gorski, 2013). This facilitates seeing the process of being and becoming a researcher and PI as developmental (Evans, 2014; McAlpine, 2016), facilitated by the researcher's agentiveness in learning and

situated within the academic career trajectories (McAlpine & Amundsen, 2018), and learning within this process as agentive (Acker & Wagner, 2019). Dialogically correspondent, both worldviews also echo the most recent view of writing as life-long learning (Bazerman et al., 2018).

To sum up, my adopted conceptual worldview is not exactly a meta-theory in its traditional sense of an analytical framework composed of related concepts (Castelló et al., 2021). I see it as a blended theoretical lens, [a dialogue of worldviews](#), which contributes to developing a more systematic and integrative approach to studying how successful PIs learn to make their research fundable.

2.2 Genre as frame for social (inter)action

The origins of the rhetorical genre theory owe to the New Rhetoric (Perelman & Olbrechts-Tyteca, 1969; Burke, 1957; Bruffee, 1986). The New Rhetoric views discourse as a rhetorical act whose main purpose, as in classical rhetoric, is to effect change, but because the act is both constructed and constructing the situation through the agency of the rhetor, new rhetoric re-defines the rhetorical act as a rhetorical transaction (Hauser, 1986). This view of writing reflects the study on two levels. One, it frames the mutually interdependent roles of the rhetor and the context; and two, it emphasizes the agentive nature of both the rhetor and the discourse. Indeed, investigating funding proposal submissions to the US Department of Defense, Van Nostrand (1994) concludes that funding proposals are a site of rhetorical negotiation and knowledge development within their context is transactional.

Rhetorical Genre Studies (RGS) as a field of discursive inquiry was defined by Miller's (1984) re-conceptualization of genre as social action. Swales (2009) notes that this "definition centered on the accomplished rhetorical action itself" (p. 149) rather than on the written text which embodies the action. This is perhaps because Miller's aim was to frame genre as a constituent of the social processes which define but are also defined by normalized writing. For the purposes of this study though it would be useful to consider both textual and social dimensions

of genre. Grant proposal texts, Myers (1990) argues, not only accomplish the act of knowledge communication or validation, they “themselves [are] shapes of that knowledge” (p. 15). This is at once an evocative and practical way of seeing the proposal genre as social action.

The base theoretical concepts discussed by Miller (1984) and relevant to this study are rhetorical situation and exigence. We are able to learn and share common interpretation of rhetorical situations because they are recurrent, typified, socially defined events or occurrences (after Miller, 1984/1994, pp. 28-29). Moreover, we perceive a rhetorical situation to be typified/analogous/stable because of its recurrent core, exigence, defined by Miller (1984/1994) as “a form of social knowledge – a mutual construing of objects, events, interests and purposes that not only links them but makes them what they are: an objectified social need” (p. 30). This need is at the core of genre's responding and reproducing discursive practices of defined human collectives in recurring situations. Furthermore, it is not objective but objectified because exigence is perceived through the *mutual* alignment of genre participants. That is why, as Miller (1994) states, “we cannot fully understand genres without further understanding the system of commonality of which they are a constituent” (p. 72). The work of Van Nostrand (1994, 1997), Mehlenbacher (1994), Tardy (2003) maps out various aspects of the system of research funding.

Grant proposals then, like other genred writing, respond to “local conditions, historical processes, and the differing perspectives of [its] multiple participants” (Bazerman & Prior, 2005, p. 4). Blended stratification of this objectified reality of grant writing could be visualized through McAlpine and Norton's (2006) concept of multiple “nested” contexts. The success of any genre lies with its target audience whose values and expectations in large part shape the enactment of the genre (Paré, 2000). But these worldviews themselves are shaped within progressively larger social contexts such as departments, institutions, disciplines, and further socio-economic and political conditions. So genres reflect not only epistemic norms but also dominant ideology of their social context (Freedman & Medway, 1994; Berkenkotter & Huckin,

1995; Coe et al., 2002), which places expectations on the construction of an argument in a way appropriate for a particular audience.

Thus enabling the writer to address particular communicative situations in recognized and recognizable ways, genres also facilitate reading practices. Because genre conventions reflect the expectations which readers place on the writer (Hyland, 2004; Paré & Smart, 1994), the grant proposal provides the writer with discursive scaffolding so as to persuade reviewers to validate the proposal as certified, legitimate knowledge (Myers, 1990). This is where research into the practices of knowledge valuation (Lamont, 2009) enriches the genre approach as it maps out grant reviewers' scaffolding expectations.

To sum up, (re)producing institutionalized epistemic worldviews and practices, genres too are an academic institution. The essence of the above discussion is captured in the now classic definition of genre by Charles Bazerman:

Genres are not just forms. Genres are forms of life, ways of being. They are frames for social action. They are environments for learning. They are locations within which the meaning is constructed. Genres shape the thoughts we form and the communications by which we interact. Genres are the familiar places we go to create intelligible communicative action with each other and the guideposts we use to explore the unfamiliar (Bazerman, 1997, p. 19).

Genres thus are endowed with a capacity of being both a repository and a source. They are a historical track record of how disciplinary knowledge is shaped over time (Atkinson, 1999; Bazerman, 1988); a means of disciplinary acculturation and empowerment (Artemeva, 2008; Berkenkotter & Huckin, 1995), and of professional literacy (Le Maistre & Paré, 2004; Schryer, 1994; Schryer et al 2003). The job of the grant proposal as a rhetorical site of new knowledge is to validate the right of passage for this new knowledge to become mainstream science¹⁰.

¹⁰ In effect, grant proposals co-construct the disciplines, "for there to be a discipline there must be the possibility of formulating new propositions *ad infinitum*" (Foucault, 1981, qtd. in Hyland, 2009, p. 57).

2.2.1 The role of genre in building consensus

How does genre frame both the familiar and the new? Research writing is an epistemically normalized “code for reaching agreement” (Hyland, 2004, p. 19). In other words, it is a peer-validated practice performed via discursive means and structures on which the writers rely in order to make meaning with their writing. But as Bazerman and Prior (2005) state, only part of this meaning resides in text, while to a considerable degree it is shaped by the socio-historically defined contexts and interactional activities that genre participants engage in. Indeed, Myers argues that the funding process begins before the proposal reaches the reviewers and grant writing is only “part of th[is] consensus building essential to the development of scientific knowledge” (Myers, 1990, p. 42).

To facilitate peer consensus, the PI needs to address the exigencies of these contexts on multiple levels: proposal construction, interpersonal interactions, and institutionalized activities and structures. Informed projecting of these in proposal writing is essential as the writer and the reader who are distanced by the text have “no opportunity for immediate mutual alignment or correction” (Bazerman & Prior, 2005 p. 3). Because of this distance, failure of the proposal genre to align discursively with the expectations of their readership compromises the writer’s chances of having their knowledge claims validated (Paré et al., 2006; Prior, 1998/2013; Sullivan, 1996). In fact, researcher membership in the production of disciplinary knowledge is in large part due not to what they write but *how* they write to address the particular world views of their community when seeking rhetorical consensus (Bizzell, 1982; Blakeslee, 2001; Hyland, 2004).

This highlights the role of the PI in consensus seeking [and PI agentiveness](#). As proposal writers, PIs need to engage in the interactional activities within the grant funding contexts. Indeed, to inform their proposals, successful Ivy League PIs in Mehlenbacher (1994) seek in-person networking with potential corporate sponsors. Van Nostrand (1997) further demonstrates that all activities of research funding are genred and highly interactive and interconnected.

Purposeful PI engagements then play a role in their constructing peer persuasion, further substantiating the view that the success of the proposal is interdependent with the PI seeking to participate in these activities (e.g., Tardy, 2003).

2.2.2 Evolving site of (inter)action: genre structure and variation

Rhetorical situations and context exigencies are not static. They evolve, and as they do so do the attendant genres (e.g., Bazerman, 1988). Because of this fluid relationship genres as sites of action are seen as dynamic, “stabilized-for-now or stable enough” (Schryer, 1993, p. 200). Short term temporal stability of genres allows the writer PI to achieve their purpose in a recognized way but does not stop genres from evolving, a notion echoed by Bazerman (1994) later in this section. In her later work Schryer elaborates that genre evolves each time it is invoked because it addresses “different context, audience and time, [so] it involves a different set of strategies within an [acceptable](#) (to participants) range” (Schryer, 2011, p. 34). Hence her definition of genres as “abstractions or ever-changing sets of **socially accepted strategies that participants can use to improvise their responses to a particular situation**” (Schryer, 2011, p. 34). Schryer’s (2011) view of genre corresponds to that of Swales (2009): each proposal is a site of evolving discursive strategy.

Schryer’s sketch of structure and variation in genre brings into view two important notions: genre as an evolving entity and rhetor as agent. In an example of “highly regularized and regulated” US legal system, Bazerman (1994) asserts that lawyers re-enact the system through their participation in the inter-connected genres which constitute the system and thus enable its relative stability. At the very same time these participations prevent the system from becoming “ossified because it only exists in its constantly recreated strategically motivated instantiations” (p. 97). The system thus evolves as “lawyers never stop looking for new angles, new strategies, new interventions that transform the [acceptable](#) moves to unexpected outcomes, that ... open pathways to more favourable lines of actions” (Bazerman, 1994, p. 97). Moreover, lawyers deliver these new means of enacting the system within the legal structure readily recognized by the system’s participants. Bazerman sees this as Giddens’ concept of

structuration in action – and a game. I see it as a way to address the conformance and creativity dilemma in grant funding. Admittedly, it would require a certain mastery but deploying the proposal genre structure (the familiar) while “improvis[ing] strategically” (Schryer, 2000, p. 456) (the new) could facilitate an [acceptable](#) way for the proposal to stand out from the crowd.

Informed by the above, this study sees the proposal genre as a site of evolving PI strategy which reflects how the PI learns to and navigates and negotiates the interactional activities of grant funding.

2.3 Genre systems

Two points brought up by Bazerman’s (1994) above are essential for this study. One is that, although each is individually recognized by the users on its own merit, genres in a social system are inter-related and in their inter-relatedness they enact the system. This is precisely what Van Nostrand (1994, 1997) demonstrated in his analysis of seemingly disparate genres of R&D procurement. Two, by enabling “a certain range of appropriate generic responses by others” (pp. 96-97), genres draw on and influence each other in a constant dialogue. Bazerman argues that because each genre is in part framed by “identifiable conditions of success” by the other genre participants, it pre-conditions appropriate interpretation by these very others. This is an outcome, a consequence of the genre’s action in the interconnected environment of the system.

The repercussions of the PI failing to meet the conditions of success are especially obvious in the system of research funding. Grant writers must, to name a few, abide by the documentary specs and agency priorities; they have to convince the reviewer of the validity of the research and prove the ability of researcher, all the while projecting a collegial disciplinary persona and writing the proposal in the language understandable to disciplinary non-specialists – and all this has to be done just so. Yet in itself, meeting or even exceeding these and other criteria for success is not a guarantee of the proposal being funded.

Bazerman suggests that some social systems allow for a wider range of consequent actions than others, and the highly structured US legal system, for example, limits “the sequencing and consequences of actions” within its frame (Bazerman, 1994, p. 98). Lamont’s (2009) findings of customary rules of grant proposal evaluation – especially cognitive contextualization, or adapting evaluation criteria to the disciplinary norms of the proposal, deferring to evaluators’ disciplinary expertise and decision making in the atmosphere of deliberative democracy - may point out a more lenient system with a wider array of response moves. The rules also indicate that the discipline takes priority, the view shared in the studies of academic writing (Hyland, 2009, 2012) and of the proposal in particular (Myers, 1990; Tardy, 2011) It is then to be expected that to elicit a favorable response from the reviewers, PIs need to develop insider perspectives on both disciplinary knowledge making (Hyland, 2009) and knowledge evaluation (Lamont, 2009).

What Bazerman’s (1994) picture of the legal game does not take into consideration is *how* lawyers develop their new strategies for intervention. But then this was not the point of his article. What Bazerman (1994) does focus on in defining genred activities of a social system is their dialogic nature, which is manifested through genre’s relational quality, addressivity (after Bakhtin, 1986; Miller, 1994). Addressivity, an instrumental mechanism, is relevant to this study because of its function of structuring interaction between “individual communicative action and social system” (Miller, 1994, p. 72). So understanding how the grant proposal relates to the other constituents of the research funding system would help understand how these constituents may influence the evolution of the PI’s strategy for both system participation and for proposal construction. Indeed, Bazerman (1994) identifies “interrelated genres that interact with each other in specific settings” as a genre system (p. 97). Interconnectivity of a genre with other genres in a particular social context has also been variously theorized as genre sets (Devitt, 1991), genre ecologies (Spinuzzi, 2003, 2004), genre networks (Swales, 1990, 2004), and genre constellations (Schryer, 2000). Without going into detail, each of these concepts, due to differences in either genre membership or in the nature of their connectivity, would have value for a genre analytic inquiry of corresponding focus. This study, investigating evolution of a

strategy, would require input from multiple constituents of the social system of research funding. A genre system as defined by Bazerman (1994) encompasses all the related genres - and all manner of genres – in their enactment of a social system.

Viewing the social system of research funding as a genre system is useful for two reasons. One, the term allows to define the entire social system as genred. That is, it presupposes each inter-connected activity of the system, whether intertextual, interactional, intellectual or institutional, to be a genre, both structured and variable. In this way, the grant proposal can be related to the other constituents and participants of research funding (power dynamics, peer reviewing, research networking, feedback, etc.) as well as to the PI's evolving own expertise and strategy. The study thus views the game of research funding as an inter-connected system of genres, interactions and participants (after Prior, 2009). For example, “documents such as letters of intent and grant writing guidelines, as well as face-to-face interactions with program officers, are all interconnected genres within the grant writing process” (Tardy, 2003, p. 11). Other modalities of genred interactions are discussed in Mehenbacher (1994) – political talk, in Myers (1990) – facilitating genre learning for junior lab personnel when proposal drafts are handed out for comment, in Yousoubova (2011) – reliance on antecedent genres for proposal construction, in Feng (2014) – compliance and resistance to the system when seeking research funding.

Two, a genre system as defined by Bazerman (1994) localizes all the related genres in a particular social context - the US legal system (Bazerman, 1994), R&D procurement system (van Nostrand, 1997), academic research funding system (Tardy, 2003), – which for this study would meaningfully situate the PIs and their evolving approaches to research funding, including proposal construction processes, in the similarly dynamic context of a system. In essence, the social system and the genre system are one and the same representing the complex, blended, and nested contexts of research funding.

2.3.1 Learning to navigate and negotiate the grant genre system

A genre system view of research funding (Tardy, 2003) has evolved from the genre theory work discussed above. Like the majority of writing studies, it is focused around the grant proposal, which Myers (1990) refers to as the flagship genre of research funding. In this perspective, the proposal genre is seen as situated within an interconnected system of other, related genres. This means in their proposal construction the PI draws on other research funding genres such as written documents, agency policies, reviewer comments, and on their own knowledge and interactions within the relevant activities of grant funding. The PI and the proposal then are closely linked to a multitude of other genres and interactions, which together inform the PI participation in the system, their proposal writing, and their approaches to making their research fundable.

As such, it is logical that in its rhetorical aim to have the new knowledge accepted into the mainstream (Myers, 1990), the proposal reflects how the PI learns to and engages with the system. The interconnectedness of the proposal within a system of related genres is most readily observable through textual traces. The grant proposal is linked to other texts through citations, headings, etc. But it also draws on generic traditions of other genres. These could be reflected through structural elements of antecedent genres such as research article introductions (e.g., Yousoubova, 2011). Their reflections can also be found in the genre character; for example, the proposal echoes some overtly promotional genres such as job application letters (Bhatia, 1993; Connor & Mauranten, 1999) and marketing materials (van Nostrand, 1997).

Further traces of other genres in the proposal may be of epistemic nature, reflecting disciplinary norms of knowledge making. These, in Bakhtin's (1986) words, dialogic overtones may pay homage to what in the discipline counts as knowledge, what evidence or argument has value, and how these are constructed discursively (Tardy, 2003). Because intertextual traces imbue a genre with meaning (after Bakhtin, 1986), recognition and acceptance of disciplinary writing is in large part due to how it is constructed (Blakeslee, 2001; Hyland, 2004). However,

successful proposals do not draw solely on written text. Intertextual interaction extends to the extra-textual level. Conversations with program officers and university administrators (Tardy, 2003), in-person visits by grant reviewers (Myers, 1990), and developing long-term interpersonal networks (Mehlenbacher, 1994) are all such encounters that find their way into the proposal.

PIs develop knowledge of the constituents of the funding system through experience of participation, initially as writers (Myers, 1990). As their participation gradually evolves from peripheral and sometimes guided to more central and experienced (e.g., Ding, 2008; Feng, 2011), they learn about documents, people and institutions which interact and enact the funding system. These interactions, identifiable in that they bear specific features and perform particular functions, are genred and stable yet evolving with each re-instantiation (e.g., Schryer et al., 2003). They are also dynamic and discursively interconnected in consistent ways (Tardy, 2003). In their stability and evolution they perform the process of research funding and together form a system of genres which defines it.

These genred interdiscursive activities influence and guide the PI navigating and negotiating the funding process. But knowledge of these is not a given; indeed, enacting them in the proposal is a career-long learning process (Connor, 2000; Myers, 1990; Tardy, 2003; Feng, 2014). As a result, individual PI experiences in the system influence their perspectives and interpretation of the grant proposal and those of research fundability. There is value then in exploring those of sustainably funded expert PIs. How best to do so?

2.4 Nested (genre) systems of research funding

Genre researchers agree that genre analysis benefits from being combined with other conceptual input (e.g., Artemeva, 2004; Schryer, 2011) as well as from integrating varying genre traditions (Swales, 2009). This study was initially inspired by the work of the applied linguist Greg Myers, whose keystone perspective of the grant proposal drew on the principles of literary criticism and sociology of science while also integrating the social view of genre. The

integrative lens has also benefited more recent research, blending the notions of social construction of science and discourse analysis with activity theory (Ding, 2008; Feng 2011, 2014; Tardy, 2003); text analysis (Connor, 2000; Connor & Mauranen, 1999), and pragmatics of discourse (Tseng, 2011). This study follows in the tradition of constructing a conceptual framework by blending genre analysis with research in other fields, in this case with studies in researcher development and sociology of knowledge (e)valuation.

2.4.1 Knowledge making and (e)valuation

In academic work, production of new knowledge and its peer assessment evolves in multiple interconnected dimensions (Camic et al., 2011; Knorr-Cetina, 1981/2013; Lamont, 2012), highlighting the social in knowledge work. Inquiries into grant evaluation specifically (Lamont, 2009, 2013) demonstrate that intellectual aspects of evaluation of new knowledge in the proposals are intertwined with the interactive process drawing on both interpersonal contact and intertextual dialoguing; and that although rules of deliberation are tacit, they are part of nationally situated institutionalized practices. It is logical then that PIs with experience of serving on funding panels draw on it to inform peer acceptance of their own grant proposals.

2.4.2 Researcher development

From the perspectives of studies in higher education, researchers navigate and negotiate academic contexts on an ongoing basis. As their contribution and participation in the discipline evolves within socially situated contexts of change (Evans, 2014; Nguyen, 2012) so do their notions of research and being a researcher (Åkerlind, 2008; Skakni, 2018). These developmental processes are informed by researcher goals and experiences and enabled by their agentiveness, with learning from experience central to these perspectives – as represented in the concept of identity-trajectory (McAlpine & Amundsen, 2018).

Identity-trajectory is a longitudinal perspective which examines researcher development from within one's life experiences. In a nutshell, its primary characteristics are three-fold. First, life experiences are understood to include all aspects of life that impact on one's becoming and

being a researcher. The biographical, geo-linguistic, professional and personal are all within this frame, with the researcher's work seen to be embedded within the rest of life. Work is characterized as encompassing three inter-related and developing strands related to key aspects of work, with greater emphasis given to particular strands at different times. Second, the concept is dynamic. It reflects both the evolving and historic aspects as it understands the researcher's present actions and future hopes and intentions influenced by past experiences. Furthermore, the dynamics of researcher development are not limited to individual historicity; they also reflect the larger societal developments in which the researcher's life is immersed, i.e., interacting macro-, meso- and micro- nested contexts. These would be economic and political and other situational factors that have impact on one's choices and decisions. Third, the individual within this concept is seen as intentional. That is, the researchers draw on past and present experiences to negotiate present life-work relations to build a future career and life. Learning from experience is aimed at informing the researcher's thinking and at achieving future goals. Overall, the perspective is defined by the interactive embeddedness and inter-influence of all its aspects.

Within this study, I draw on the notions of identity-trajectory and nested contexts, alongside genre systems of knowledge, to explore the PI's journey to being research funded. Wider life experiences here concern PI cv milestones, such as education, and the geo-linguistics of their journeys to becoming PIs and making their work fundable¹¹. The PI journeys are seen as a) evolving, b) nested both within these institutional and societal structures, and c) informed by these evolving and embedded experiences. I also understand the PIs to be purposeful in their learning from these experiences in building and enacting their future success. Of particular note given the focus on work, I emphasize the development of the intertwining work-related strands

¹¹ The PIs' personal life-stories, such as family life, are not part of this investigation, at least not overtly. The same applies to their teaching and administrative service as within the study site grant funded researchers are entitled to partial release from these. Rather, the acknowledgement of the potential impact of these factors on the stories of the PI's grantsmanship is subsumed.

as the PIs navigate the evolving nested contexts through time. In the next section I tie it all together.

2.5 Integrated developmental perspective

Although genre analysts emphasize the interactional aspect of research funding (e.g., Ding, 2008; Mehlenbacher, 1994), the process has so far been viewed solely along the *writer - reviewers* nexus. The integrated framework of genre, peer evaluation studies and academic career development enables a richer, encompassing perspective. I will consider how experience serving on review panels shapes the writer's discursive strategy for a competitive/successful proposal and how writer's interpersonal network influences the writing. But I will also attempt to understand these aspects of negotiating for funding in an integrated way. I want to see how the writer-reviewer-networker – all in one - draws on a multitude of their experiences to evolve a strategy in negotiations for funding.

Genre researchers agree that genre studies benefit from a blended approach, when genre analysis is combined with other conceptual input (e.g., Artemeva 2004; Tardy et al., 2020). Indeed, most notable grant writing research has drawn on literary criticism and sociology of science (Myers, 1990), activity theory (Ding, 2008; Feng, 2011; Tardy 2003); text analysis (Connor, 2000; Connor & Mauranen, 1999), and pragmatics of discourse (Tseng, 2011) to advance the understanding of the proposal writing process. Following the tradition, to consider how expert PIs learn to make their research fundable, I expand the broadened notion of proposal intertextuality by drawing on the concepts that define the wider nested contexts of research funding. These, as already discussed, come from the sociology of academic work as related to knowledge (e)valuation and to researcher development.

The structure for this integrated framework echoes that of my research questions and is based on the key constituents, or strands, of researcher development (McAlpine & Amundsen, 2018, above): intellectual, institutional, and interactional (intertextual and interpersonal). Hereafter I refer to them as iStrands.

The intellectual strand here is limited to PI research goals and thinking, although in the broader concept goals include both career and life goals. Intellectual goals here correspond to PIs' developing and advancing their research thinking. These include how PIs evolve their research programs, collaborate with peers, disseminate their research findings, seek and address the evidence of their thinking, e.g., in peer community reviews of their contribution, and how they train future researchers. Individual agency in this regard is conceived as variation in intentional effort in overcoming challenges related to writing, thinking, and feedback. While the role of individual agency in working towards these goals is essential, they are embedded and pursued in institutional contexts of progressing magnitudes. These - the institutional strand - are departments, universities, national academic (and funding) systems, as well as international academic contexts. In highlighting the interconnectedness of the individual and institutional, PIs' engagement with funding their research - the interactional strand - comes into focus. The interactional strand refers to PIs building and drawing on networks of peers to develop possibilities for collaboration and support, interfacing with administrators or with fellow grant evaluation panelists to deliberate over funding decisions. It also encompasses PIs' inter-textual participation in their disciplines as they read and contribute to literature, review and write grant proposals, and, increasingly, participate in social or traditional media.

Trajectorial emphasis also highlights the role of previous experience in the individual PI's achievement and future intent (McAlpine, 2016). As an analytic concept, the iStrands are integrative, meaning that, although individually identifiable, they are intertwined. This concept then can facilitate consideration of how, through integration, each of the strands facilitates their inter-development in each PI's case. For example, depending on the PI's disciplinary status, national academic system(s) and previous experiences, research goals, and discipline-specific contexts which frame their participation in making and (e)valuating knowledge, the strands would develop each other in differing ways. Building towards funding success then would be defined by how PIs engage with their experience in the academic systems of knowledge and its funding.

As successful PIs evolve their expertise throughout their career, from early (Ding, 2008; Feng, 2011; Yousoubova, 2011) to advanced (Mehlenbaher, 1994; Myers, 1990; Tardy, 2003), this integrated perspective facilitates a robust and encompassing framework for considering the meaning of individual variation towards commonality in successful PI approaches to make the knowledge they produce fundable.

3. Literature

3.1 Overview of grant funding research

Inquiries into grant funding represent many fields. The principal studies in academic writing, including genre and discourse analysis are referenced within this chapter. Studies in other fields are acknowledged in a non-exhaustive list. I should note that papers related to the effects or impact of funding as well as advice on how to write proposals are continually produced under various disciplinary umbrellas and nationally and internationally sponsored projects. Since they do not bear direct relevance to the study, they are not included in the chapter.

Instead, before I proceed to the review, I acknowledge here studies that critically consider grant funding in the field of higher education at large. In itself, the scope of these studies reflects the nested nature of grant funding (after McAlpine & Norton, 2006), and their macro-, meso-, and micro-level situatedness lends support to the conceptual perspective of the inter-systems approach developed by the PIs in the study. At the macro level, these studies reflect the national and supra-national funding contexts. These are analyses of funding policy (Serrano Velarde, 2018; Falkenberg, 2021), talent development (van Arensbergen & van den Besselaar 2012; Laudel & Gläser, 2014), and sociology of knowledge evaluation (Derrick, 2018; Lamont, 2009, 2012, 2013), including mathematical analysis of the grant peer review (Avin, 2015). At the meso level, institutional and workplace contexts of funding are considered in studies of research administration (Porter, 2005, 2007), sociology of gender disparities in grant allocation (Urquhart-Cronish & Otto, 2019) and their biblio-statistics (Larivière et al, 2013). Finally, at the micro level, that of the researcher, there are studies that explore researcher development as PI (McAlpine, 2020; McAlpine et al., 2016) and individual or collective PI experiences with grant funding (Casey & Fletcher, 2017; McGinn et al., 2019; Szaszi, 2015).

Such a range is indicative of two things. One is that the need for scholarly attention to grant writing and research funding is clearly recognized. Two, despite this breadth there is a pronounced lack of consistency and systematic effort in the existing research. This may be due to many factors. Among these are the national specifics of research funding (e.g., Lamont &

Huutoniemi, 2011) and the highly competitive nature of research funding (e.g., Tardy, 2003). Other factors that likely contribute to the issue are the secretive nature of the proposal review processes (e.g., Lamont, 2009) and discipline specific affordances and rhetorical constraints that govern the process of grant proposal construction (Myers, 1990; Tardy, 2011).

3.1.1 The focus of this review

In this chapter I review and problematize the literature on grant funding as reflects qualitative work in genre and writing studies. Given the purpose of my thesis, my aim here is to synthesize these contributions by first identifying their value and then defining the areas where knowledge is inconsistent or lacking. Ultimately, I argue that, one, the existing literature is almost singularly focused on the grant proposal, thus rather ignoring the PI. As such, two, it lacks the perspective connecting the PI, the proposal, and the grant funding system in a meaningful web of interdependence. And therefore, three, prior studies have not addressed the issue of how PI system experiences help produce fundable knowledge.

What stood out in my wider analysis of the studies that approach grant funding from the perspectives discussed above was that in grant literature the PI is largely sidelined. In-depth genre and writing studies favor the proposal construction process; linguistic work is interested in fine-grained text analysis; large-scale policy studies focus on funding and peer review as societal institutions. The PI fades in and out of focus. In this chapter, I provide a selection of this wider review¹². The principal criterion for the selection is informed by the aim of this study to understand the PI role in grant funding success.

For policy studies, the PI is an institutional attribute and not more than that, so while this research provides a backdrop for my review, it is not analyzed at the individual study level. Neither are text-linguistic studies, where the PI is a supra-textual entity but not a pro-active

¹² Not included in this review are studies that are outside of my study's focus such as those in non-academic fundraising (e. g. Connor & Gladkov, 2004, Goering et al., 2009) or in non-peer-reviewed crowdfunding of science (e.g., Mehlenbacher, 2019).

participant. Genre and writing studies, while encompassing the PI, mainly privilege the proposal which has and continues to be the flagship genre of the grant funding system (Myers, 1990; Bellés-Fortuño, 2021). I see the reason for this to be two-fold. One, the proposal is the most readily visible of the funding genres, so it continues to claim the analyst attention (e.g., Kessler, 2020; Reilly, 2021). Two, as a genre the proposal itself is seen as social action (Miller, 1984), so the PI here is a writer navigating and negotiating the system to address the genre constraints (e.g., Tardy, 2011; Tseng, 2011). But this representation of the PI is not necessarily of someone who seeks to participate in the system purposefully so as to make their work fundable beyond a given proposal. Within this analytical lens, the agency of the PI aiming to achieve research and career goals through grant funding is either assumed, obscured, or absent. Problematizing this is the focus of this chapter¹³.

A note on historicity of the principal cites

The work which defines the field of inquiry into the genres and the system of research funding dates between 1990 and 2011. These studies shape this chapter. To the best of my knowledge, new work of similar conceptual magnitude has yet to emerge despite the ongoing change in the contexts of research funding. The recent-most historical review identifies many, not all, works discussed in this chapter but adds nothing new in terms of the advancement in understanding of the field (Bellés-Fortuño, 2021)¹⁴. Latest writing studies tend to consider particularities of proposal construction, seeking text indications of what may make the proposal fundable (Cotos, 2019; Fazel & Shi, 2015; Flowerdew, 2016; Kessler, 2020; Markowitz, 2019; Matzler, 2021). There are updates on teaching proposal writing (e.g., Lawrence et al., 2019). National and geo-linguistic specifics of writing for funding (Hoover, 2009; Feng, 2014; Pascual & Unger, 2010), of

¹³ With this in mind and reflecting the conceptual framework of the study, I adopt a systems lens, initially informed by the genre system view of grant funding (Tardy, 2003) and later enhanced by the concept of systems thinking (Senge, 2006). The first helps situate the proposal and the PI; the second the PI's approach to funding. The review will seem uneven because I dwell on systems navigating (the proposal) longer than on systems negotiating (the PI), since there is a lot more literature on the proposal than there is on the PI.

¹⁴ For example, van Nostrand (1994) is mentioned but van Nostrand (1997) is not, yet the 1997 is a conceptually wider and deeper exploration of what was first introduced in 1994.

peer review (Lamont & Huutoniemi, 2011; Lamont & Sun, 2012; Lamont, 2013), and of grant funding (Harsh et al., 2018) are increasingly coming into view. Of relevance also is the emerging work on disciplinary differences in grant peer review (e.g., Lamont & Guetzkow, 2016; Lee et al., 2013) and on the potential of private, rather than governmental, funding of academic research (e.g., Rasmussen, 2021). Given this increasing fragmentation and rapid evolvement of grant funding, it may no longer be feasible to produce work that transcends these contexts.

3.1.2 The system(s) of research funding

Grant writing is a high stakes academic genre (Tardy, 2003) but so far it has attracted surprisingly uneven researcher attention. Only just over 20 systematic studies about the genre and the overarching system of academic research funding have been published since Greg Myers first looked at the grant proposal in natural sciences (Myers, 1985).

The conceptual framework to inform the landmark inquiry into grant writing (Myers, 1985, 1990)¹⁵ encompasses theories of social construction of science and rhetorical and literary analysis. Since then, writing for funding has been regarded as fundamentally social in nature and shaped within the interconnected and overlapping contexts of related activity (Ding, 2008; Feng, 2011, 2014; Tardy 2003, van Nostrand, 1997).

To illustrate, exploring the social processes behind the construction of proposal texts Myers (1990) outlines the broader contexts, or social system, of research funding. He is interested in how grant proposal text is shaped through numerous and interconnected activities, conversations, documents and interactions in which PIs participate when applying for grant funding. In effect, Myers demonstrates that these overlapping genres and activities constitute a complex social system. Later, Bazerman (1994) would define such social systems as genre systems and would show how genres interacting within the system shape and develop it. Genre

¹⁵ The study of two biologists' social construction of grant proposals first appeared as Myers (1985) and was later reprinted whole as Chapter 2 in the book-length investigation of social processes of knowledge making, *Writing Biology* (Myers, 1990). It is the 1990 version that is most referenced in research on grant writing.

theorists understand all activities within such systems to be genred, i.e., recognizable due to their fairly stable yet dynamic nature (Johns et al., 2006; Schryer et al., 2003).

The dynamic nature of the genre system of grant writing derives from it being subject to constant shifts in the research environment, such as development and implementation of new government policies, updates to strategic research priorities, changes in the operating and evaluating processes of the funding agencies, budgetary constraints, etc. In Myers's words, "government changes reverberate through science" (Myers, 1990, p. 58), and genre analysts are interested in how these coexisting and overlapping contexts influence the writer's participation in the genre system of research funding (Feng, 2011, 2014; Tardy, 2003; van Nostrand, 1997). That is, PI knowledge of textual features and structure of the proposal is essential (Connor & Mauranen, 1999; Connor, 2000). But genre mastery (Tardy & Swales, 2008) is more encompassing. It depends on how writers deploy their knowledge of other genres, communities, and activities that surround the proposal and form the grant genre system (Ding, 2008; Feng, 2011; Mehlenbacher, 1994). Yet even then, genre mastery in grant writing is elusive, and grant writers reassess their genre expertise every time they receive reviewers' comments or a letter of rejection (Myers, 1990; Connor & Mauranen, 1999; Tardy, 2003).

These are the main concerns explored textually as well as contextually in just over 20 published studies. They may be seen as having evolved from the foundational work of three analysts: Greg Myers, Ulla Connor, and Christine Tardy. Having approached grant writing from three complementary perspectives, their research has defined the field. In it, the proposal is seen as socially constructed and constrained within a rhetorical structure (Myers, 1990; Connor & Mauranen, 1999; Connor, 2000), and grant funding as a system of interconnected genres and activities (Tardy, 2003). Valuation of these studies by the research community can be found in the reference sections of research published in central journals. Their recurrence is at once indicative of their core status and of the dearth of systematic research to date.

More recent work has surfaced through several other search channels: forward-citation records of the core research, key word searches, tracking publications by individual authors (Greg Myers), networking with some of them (Haiying Feng, Brad Mehlenbacher), and recommendations from senior colleagues (Lynn McAlpine, Catherine Schryer). This opening section of the review is limited to papers which investigate the grant proposal and the genre system of academic research funding which the PI enacts in the processes of proposal construction.

3.2 Systems navigating: the proposal as system participant

The grant proposal is the most fundamental of the academic writing genres (Myers, 1990). The reason for this is that research funding is essential for enabling the PI to carry out work that leads to research articles, conference presentations, key notes, and other possibilities for making and disseminating new knowledge (Myers, 1990). As such, the proposal has and continues to play a high-stakes role in the researcher's career (Anderson & Slade, 2016; Connor & Mauranen, 1999; Tardy, 2003). As discussed, due to its high visibility the proposal is seen as flagship genre of research funding (Myers, 1990). But creating a fundable proposal has always remained challenging for the PIs across the career spectrum. The challenge, as Myers (1990) identifies it, is due to two controversies embedded in the rhetorical make-up of the grant proposal as a genre. In Tardy's (2003) words:

Myers looks specifically at the contradictions posed by proposals, where writers must position their work as original, but closely related to current research concerns, and assert themselves as researchers within a format, syntax, and persona that work against such self-assertion (Tardy, 2003, pp. 7-8).

The constraints or positioning and persona have since proven to be the trademark features of the genre; their various aspects tend to emerge as focal points in later studies. Depending on the conceptual grounding of a given study the approach to these issues understandably varies. Given their prominence in grant writing research, my overview extends from the same roots.

3.2.1 The flagship genre of research funding

Co-situating his own close reading of text as a discourse analyst with studies in sociology of science (Latour & Woolgar, 1979/1986, Gilbert & Mulkay, 1984) Myers (1990) adds to it the perspective of rhetorical approach to writing (Bazerman, 1988). This complementary conceptual scaffolding informs Myers's conclusion that the proposal is shaped by the disciplinary specifics and by the writer's disciplinary status, as well as by policy-driven local contingencies. Subsequent research concurs on all three points.

Myers posits that grant proposal construction is a socially situated rhetorical process which unfolds through the writers' discursive interactions with, and negotiation of, the social system of research funding; and that these interactions are multimodal. At the intertextual level, the writers cite literature in their fields in ways that both ground and foreground the proposed research; they use self-citation to show commitment to their research and "to present [themselves] as accepted contributors to literature" (p. 58). Interpersonally, scientists who have served as reviewers anticipate the expectations of the review panel and draw on the comments provided by reviewers and colleagues to give prominence and appropriate grounding to their knowledge claims. During a site visit by the review panel they use the opportunity to re-iterate how their work contributes to the disciplinary consensus and to re-assert their research capacity. Intellectually, advancing their research goals is convergent with their building disciplinary reputation. Finally, Myers posits that to persuade, proposals "have to be made exciting" (p. 42), the main caveat here being that the rhetorical means afforded for this by the genre are highly restrictive.

As a result of his analysis, Myers finds that, rhetorically, the proposal is a controversial genre. To resolve the dichotomy of having to present the research as original but closely aligned with the disciplinary consensus and to assert one's competence without overt self-promotion, Myers claims, the main rhetorical appeals in the proposal have to be concealed. Each feature of the proposal is meant to persuade without seeming so (Myers, 1990, pp. 41-42). Interpreting this from the cumulative perspective of later writing studies (e.g., Hyland, 2009; Salager-Meyer,

2011), the proposal claim and PI self-assertion are linguistically hedged rather than obscured. Yet Myers also foregrounds the proposal's promotional nature, for "the meek shall not inherit the grants" (p. 49). This is a challenge in itself, and it is further complicated by the disciplinary and national specifics of proposal construction (Feng, 2014; Tardy, 2011; Tseng, 2011). Given that, generally, such challenges are greater for less experienced writers (Swales, 2004), understanding how PIs develop knowledge of the genre and its system becomes crucial.

In the following sub-sections I consider how, through focusing on the aspects of genre knowledge and awareness (Tardy et al., 2020), literature in grant genre and writing can help understand the continuity in PI genre learning and navigating the funding system (after Bazerman, 2013, 2020; Miller et al., 2018).

3.2.2 Constructing persuasion in the proposal

Myers (1990) is a book titled *Writing Biology: Texts in the Social Construction of Scientific Knowledge*. Chapter by chapter it explores rhetorical ways in which biologists negotiate acceptance of their knowledge claims by disciplinary peers. The book itself covers a large territory extending from grant proposals to research articles, to scientific popularizations, and then to the analysis of a debate over disciplinary disagreement, but this review is concerned with the chapter on grant proposals only.

Myers's conceptual approach to analyzing scientific texts is informed by the work in sociology of science and discourse analysis, complemented by literary criticism and rhetorical theory. Alan Gross, one of the most influential gatekeepers in rhetoric of science, gives the work a somewhat tongue-in-cheek appraisal. Dismissing the title as "jargon-ridden", Gross goes on to say that "[r]eaders will be pleasantly surprised by ... the interesting stories the author tells" as well as by their value "in such thoroughly rhetorical matters as the manner in which biological claims are negotiated during peer review" (Gross, 1991, p. 82). This last statement validates the issues identified by Myers as central to "the making and remaking of grant proposals to the

federal and private agencies that fund biological research” (Gross, 1991, p. 82). These issues, as mentioned, have since become keystones of grant writing research.

For Myers rhetorical importance of the proposal derives from it being “part of the consensus building essential to the development of scientific knowledge” (Myers, 1990, p. 42). Research in philosophy and history of science considers consensus seeking to be at the core of disciplinary knowledge making (e.g., Kuhn, 1962; Foucault, 1980; Atkinson, 1999). Discourse analysts see much of this consensus to be achieved through scientific writing (e.g., Bazerman, 1988; Hyland, 2009) because, as Myers states:

“[Scientific discourse] turns tensions, challenges, and even bitter controversies into sources of strength and continuity. Scientific texts help create the selectivity, communality, and cumulativeness that both scientist and nonscientists attribute to scientific thought” (Myers, 1990, p. x).

Peer persuasion thus is central to building disciplinary consensus, and Myers demonstrates that, like other academic genres, grant writing is closely tied to disciplinarity, that is to the specific ways of persuasion acceptable and appropriate in a particular field of study (Sullivan, 1996).

Reflecting on his analysis of the proposal drafts, reviewer comments, refutation letters, and other documentation Myers demonstrates how, this being not immediately obvious, the proposal contains all three types of classic rhetorical appeals: to logos, to ethos, and to pathos. Aristotelian logos is an appeal to the intellectual, the ability of the speaker to invoke in the audience the perception of truth and logical validity of what is being argued. Ethos is about the speaker’s success in conveying to the audience the perception that they can be trusted; and pathos is the ability of the speaker to awaken in the audience the emotions to accept the views being advanced and also act in accordance to them (Kennedy, 1991, p. ix). Rhetorically speaking, the proposal must persuade the reader of one’s ability to do the proposed research (ethos), of potential significance of the research to the disciplinary community (pathos); it also must (logically) demonstrate that “one is right” (Myers, 1990, p. 42). Exploring how the

biologists address these issues, Myers identifies the main rhetorical features which make the grant proposal a difficult genre, both writers as well as analysts:

The writer describes the work so as to create a persona (a presentation of the author in the text) and insert the work into existing body of literature. ... The process of writing a proposal is largely a process of presenting – or creating – in a text one’s role in the scientific community (Myers, 1990, pp. 42-43).

In other words, Myers posits that the proposal knowledge claim is peer-assessed at two levels. One is situating the proposed work with relation to the literature in the field, and the other is constructing in the text a research persona, that of a competent contributor to the field. Both evolve through revisions to the proposal text in which the scientists respond to the reviewers’ comments and expectations and which “can be seen as negotiation of the status that the scientific community will assign to the text’s knowledge claim” (Myers, 1990, pp. 64-65). Aiming to address both is thus indicative of the writer’s genre awareness. I will now briefly zoom in on persona and positioning from the point of view of genre knowledge.

3.2.2.1 Scientific persona

Myers states that the “funding process starts before the panel even sees the proposal” (p.42). He understands this to be due to the writer’s institutional association, previous funding, and publication and citation track record; these factors shape the perception of the writer’s place and status in the disciplinary community (p. 48). While scientists may not be immediately able to change these pre-conceptions with one text, “the tone of almost every sentence of the proposal [needs to] show that one is cautiously but competently scientific” (p. 48). What is particularly interesting is that in line with the controversial nature of the genre, PI’s caution in the proposal goes hand in hand with risk.

3.2.2.1.1 Being cautious

Myers finds that the biologists in his study are “unabashedly enthusiastic about their research” (p. 59). But tacit norms of the proposal genre proscribe outright claims of research originality, and “criticisms of opposing views can seldom be explicit” (p. 59). Yet peer reviewers “look for

the excitement of ideas” (Myers, 1991a, p. 230), and, as Myers (1991a) points out, are willing to negotiate if the quality of science is superior to the quality of the proposal. More recently, studies in research policy find that “reviewers disagree, and the further a researcher is in his/her career, the more the reviewers disagree” (van Arensbergen & van den Besselaar, 2012, p. 402).

A solution is to hedge the proposal claim to mitigate its being perceived as too forthright (Myers, 1990, p. 48). The challenge here is to tone down one’s language without devaluing the claim (p. 48). Myers finds that understatement is the most effective means of asserting one’s research competence (p. 48). At the sentence level, grammatical devices of modality and voice plus modifications to syntax, vocabulary and phraseology all help temper claims while effectively projecting disciplinary authority and previous achievement. Later research in applied linguistics terms this approach hedging and boosting (Hyland, 2000). Feng’s corpus-linguistic research (2002, 2008), for example, finds that hedging one’s claims through modal verbs is prevalent in the PIs’ construction of research persona and their relation to the community.

If the proposed science kindles interest or debate, the proposal has done its job of standing out. In cases like this, reviewers may extend their effort beyond textual assessment by calling for an interview or a site visit (Myers, 1990; van Arensbergen & van den Besselaar, 2012). These are opportunities for the PI “to enable this group [of reviewers] to come to an agreement within itself” (Myers, 1990, p. 58). But since in such situations the PI and the reviewers are no longer distanced by the text, PI “persona and relation to the literature and the discipline are crucial” (Myers, 1990, p. 58). It is essential then that both in textual and interpersonal presentation of the proposal the scientist reproduce the tacit norms of the genre.

For the most part, PIs acquire this genre knowledge by ‘doing’ (Myers, 1990; Tardy, 2003; Feng, 2014; Yousoubova, 2011), yet there are almost no studies that consider grant genre knowledge acquisition longitudinally. A rare example is Ding (2008), a year-long study grounded in genre and activity theories, of a graduate course in grant writing. Ding draws on multiple sources to

road-map the process of genre acquisition by novice scientists. In so doing she also compiles a list of attributes of the funding genre system. For me, the value-add of Ding's (2008) study is in considering the institutional aspects of the grant genre system in relation to the writer. The scope of her study precludes Ding from exploring in depth the connections between these aspects and the individual graduate writers' conceiving of related activities that would constitute or support their grant proposals. But the participants indicate that being informed about faculty and institutional resources, expectations and practices gives meaning to their learning of the complete life cycle of the grant proposal.

3.2.2.1.2 Taking risks

Myers (1990) also points out, unfortunately without elaboration, that proposal writers are sometimes expected to take risks. At certain points in their proposals his participants foreground their claims as explicit predictions. Myers only hints at the persuasive power of this tactic. It risks drawing potential fire from the reviewers by admitting that the proposed "hypothesis is, in Karl Popper's term, falsifiable" (p.49). But at the same time, properly framed as an outcome of previously published data or of the writer's related achievements, it helps the reviewers see that the hypothesis is also "testable" and not un-realistic (p. 49). Doing this forces the writer "to go out on a limb" (p. 49) but it is also quite likely that, if deployed appropriately, it is an effective way to stand out from the crowd in an acceptable way.

In fact, calculated risk taking is often part of strategy planning, especially in highly competitive contexts such as the military, where it enables the desirable effect through the element of calculated surprise (Sun Tzu, 513 BC). The same is true in business (Mintzberg, 1987), where it has led to luck being perceived not as a hit or a miss but as a matter of the entrepreneur's own making (Guiliano, 2009). Rhetorically, there is a parallel here with "surprise value" in academic discourse (Berkenkotter & Huckin, 1985), especially in forward-facing genres like abstracts (e.g.,

Huckin, 2001). In essence then what Myers (1990) discusses is not entirely new. But he demonstrates how risk taking in an informed way may contribute to shaping proposal success¹⁶.

My view is that only experienced PIs, like those in Myers' study, may be in position to afford overt rhetorical risks, or, importantly, do so in an informed way. If so, it makes logical the absence of a conceptual follow up on risk in grant writing literature. Much of it focuses on novice writers or on PIs with disparate experiences or on the aspects of grant writing with more pronounced visibility, all normally in an array of disciplines at the same time (Cheng, 2014; Cotos, 2019; Dorpenyo, 2015; Flowerdew, 2016; Hoover, 2012; Koutsantoni, 2009). Because of this and due to complex contextualization of "going out on a limb", is not explicitly taught in grant writing courses such as those discussed in Ding (2008). In other words, risk is not part of the writers' rhetorical repertoire and so not really a part of PI genre knowledge. This is also logical as, in line with the discussion of genre mastery (e.g., Bhatia, 2004), risk taking is the privilege of a genre expert, and at that, to be used judiciously.

It would have been good to see risk in grant writing to be discussed in more detail, especially with a view towards its place within the genre norms, disciplinary specifics, and appropriate use by grant writers at various stages in their careers. But even though Myers asserts that "the meek shall not inherit the grants" (Myers, 1990, p. 49), his later work on grant proposals (Myers, 1990, 1991a & b, 1993) does not delve into risk taking any further. Such a discussion has yet to surface, even though there is a clear need, given that grant writing is strongly associated with luck (e. g. van Arensbergen & van den Besselaar 2012; McAlpine, 2016). The

¹⁶ Going out on a limb may achieve the effect of a paradox, both rhetorically (attention is drawn to the unexpected) and intellectually (an intrigued reviewer would be, in Hyland and Tse's 2005 term, hooked). There could be a connection to creativity here but likely of the kind afforded only to the experienced grant writer. Constructing a paradox would presuppose the writer's strong sense of timing (rhetorical kairos) and knowledge of permissible boundaries within already restrictive norms of the proposal genre. Myers does not unpack risk taking but it would be worth a try to look at it from e.g., Mintzberg's (1987) position of 5Ps.

only other study which considers the point is van Nostrand (1997); I discuss it later, in the aspects of the funding system.

In his discussion of research persona in the proposal, Myers refers to both scientists' reviewing experience. Unfortunately, this experience is not expounded on much either. Rather, from the informed way the authors consider their text revisions, it is assumed. Yet it would have been interesting to see if and how these writers shape their claim and (and risk it) with the knowledge of the review process in mind.

3.2.2.2 Positioning of work

When considering the proposed work in relation to existing literature, Myers posits that "the definition of scientific importance requires both that the work be original and that it be closely related to the concerns and methods of current research" (Myers, 1990, p. 46). Since a scientific claim acquires significance only in the context of existing disciplinary research, Myers investigates how the biologists situate their proposals within such literature. He finds that they do so in two ways: through the use of citations and scientific vocabulary (p. 50).

3.2.2.2.1 Citation of sources and...

Citation of sources in the proposal is seen as a way "to strike the difficult balance between group identification and self-assertion" (Connor & Mauranen, 1999, p. 49). It is a powerful intertextual tool used by the writers to "negotiate the power dimensions that operate within the larger genre system" (Tardy, 2003, p. 21). Myers' PI participants, occupying differing positions within their disciplinary community, draw on existing literature differently to enlist support for their own research. Each scientist's citation behavior in the proposal is unique and derives from their respective career situations, disciplinary status, and the nature of the proposed claim.

Analyzing reviewer comments and changes in the proposal drafts, Myers posits that unlike the research article, which interprets contributions by mostly others, "the proposal ... is expected to

bring coherence to one's own previous work" (p.51). Very briefly, both PIs are experienced. But one is entering a new, for him, area of research, the other is striving for an interdisciplinary connection. Their work with citations reflects these intellectual goals. Drawing on conflicting reviewer comments, the first builds his argument citing diverging scholarship to situate his own and is subsequently peer-praised for considering alternative explanations. This indicates that the PI succeeded in "present[ing] an untried theoretical approach as potentially productive of new data" (Myers, 1990, p. 51). The other mostly draws on his own work, re-interpreting it as a bridge between two disciplines. Both approaches prove appropriate for the PIs' purposes as their re-submissions get funded.

3.2.2.2.2 ... and specialized terminology

Another means of positioning one's work in literature is the judicious use of specialized vocabulary. Word-level analysis is not within the scope of this study but the point is of value when considering the meaning of PI genre knowledge. It is also useful in considering how PIs may draw on their genre knowledge as a vehicle for thinking and for advancing both disciplinary knowledge and their own research goals. So vocabulary use merits a token mention.

Without going into detail, Myers maintains that including or omitting terms whose connotations may vary in disciplinary fields is a subtle way for the writer to claim a place in the disciplinary consensus (p. 51). He shows how modifications in the writers' use of specialized terminology may help facilitate building reviewer agreement. When constructing their knowledge claims his participants do not change their research, they use the vocabulary to subtly re-draw its context (p. 56). Consideration for terminological choices in a proposal then can help relate the work to the reviewers' epistemic worldviews and to the priorities of the agency. Knowledge of how to use terminology in the proposal is one of the writer's discursive currencies, with a potential to devalue or appreciate the proposal's worth in the eyes of the reviewers.

3.2.2.2.3 Relation to this study

Clearly, there is a connection here with the PI's research goals and thinking forward, so the proposal is a genre that helps legitimize but also inter-connect the PI's work as contribution to and co-construction of frontier knowledge. And Myers offers a glimpse of how one's own intellectual curiosity may be framed within a contribution to the disciplinary consensus. This may well be a source of "the excitement of ideas" which the reviewers long to see in the proposal (Myers, 1991a, p. 230) and which may facilitate the emotional aspect of the reviewing process in a fundable way (Lamont, 2009).

As far as I know, later research into citation practices in grant writing does not consider their interconnectedness with the PI's research goals and thinking. This would presuppose a focus on the PI in relation to the proposal but, as already mentioned, in the existing grant literature the PI tends to be peripheral to the proposal. Considerations of referential behavior in grant writing concern a typology of textual uses of citations (Feng, 2011) or disciplinary differences in citation use (Tardy, 2003). Where Feng stands out in relation to this study is in seeing PI citations behavior as a means of creativity in the proposal and likely a privilege earned by experienced writers (Feng, 2011, p. 222). This is consistent with the view in genre theory that "[t]hose who are recognized as most expert are the most successfully creative" (Bhatia, 2004, p.139).

As for the writer's use of specialized vocabulary, no research, to the best of my knowledge, has considered it from the point of view of bridging the PI and the proposal. This reluctance may be due to the fact that disciplinary terminology and its uses, especially in the sciences, are difficult to interpret for a non-specialist. Given that most studies of grant writing span several disciplines, close scrutiny of the meanings and persuasive power of scientific vocabulary may be out of reach for a non-specialist discourse analyst.

To sum up, citations and vocabulary are ways to situate the proposed research (the new) with the established disciplinary consensus (the familiar). Each PI addresses the constraints of the genre and of their research goals through a unique angle on literature. Their more immediate

aim here is to associate themselves with the existing disciplinary consensus and to advance their new work into the research mainstream (Myers, 1990, p. 51). Projecting forward, Myer's conclusions lend support to my position that each researcher's proposal strategy draws on their unique experiences and is, therefore, idiosyncratic.

3.2.2.3 Primacy of the discipline

The conclusion Myers draws from his analysis of the discursive construction of the scientists' proposals is that both persona and positioning are "largely specific to the field" (Myers, 1990, p. 43). Subsequent grant writing research in both linguistics and genre studies also understands the proposal to be discipline-specific (e.g., Connor, 2000; Tardy, 2003, 2011). Later studies in disciplinary writing and sociology of knowledge have validated this point. Hyland (2009) asserts that the way an epistemic community recognizes knowledge is "instantiated in a community's discourse conventions ... mean[ing] that claims for the significance and originality of research have to be balanced against the convictions and expectations of colleagues, taking into account their likely objections, background knowledge, rhetorical expectations and processing needs" (Hyland, 2009, p. 13). Knorr-Cetina (1999) and Lamont (2012) share the view that valuation and validation of knowledge in the disciplines is framed by their social, cognitive and epistemological norms. Adhering to these shared interpretations of discursive norms facilitates having one's knowledge claim accepted (Sullivan, 1996). Indeed, in a study of the grant proposal evaluation processes Lamont (2009) points out that in potentially conflictual situations over proposal assessment, reviewers defer to the expertise of fellow panelists who specialize in the field of the proposal.

It could be projected then that evolution of a PI's approach to funding is comprised both of idiosyncrasies of their research goals and of the epistemic worldviews they share with their peers.

To sum up, Myers (1990) remains one of the most influential works in grant writing research. It is seen in the field as having "legitimized the grant proposal as a genre" (Connor, 1996, p. 135).

Myers (1990) has inspired virtually all existing literature on the subject, and the significance of his findings have yet to devalue. Myers (1990) focuses on the proposal text, but his work also explores aspects of the grant genre system. Most of the subsequent grant research has focused on the issues Myers identifies in this work. Textual composition of the proposal was taken up by linguists in the field of applied linguistics; genre knowledge accumulation and the processes of grant writer interaction with other genres of research funding proved of some interest to researchers in Rhetorical Genre Studies (RGS). Having touched on the former above, I now focus on the latter.

3.2.3 Intertextual interaction in proposal construction

Rhetorical genre studies (RGS) view the grant proposal as part of the interconnected genre system of research funding (Ding, 2008; Feng, 2011; Tardy, 2003). RGS conceptualize the entire social system of research funding as genred through sets of interconnected, discourse-based activities. The priority is given not to the proposal text but to the proposal construction process. RGS aim to understand how the writer's develop knowledge of the proposal genre. The intent here is to facilitate the learning process of new writers (Johns, 2015).

The value of RGS research for this study is in situating the proposal and all other genres and interactions of research funding in an interconnected web. They do not exist in isolation but draw on each other in discursive interaction within the system of research funding (Tardy, 2003). The main RGS learning outcome for the PI is in that "knowledge of a genre system may differ in important ways from knowledge of an isolated genre" (Tardy, 2003, p. 7). Although not necessarily always in written form, genre interaction is most often referred to in RGS as intertextuality, which I discuss in sections that follow.

3.2.3.1 Addressing the proposal's disparate readership

A key RGS inquiry into grant writing is Johns (1993). The study is pedagogically motivated as Johns is interested in "teaching audience awareness ... in crafting arguments" (Johns, 1993, p. 87). More specifically, she considers inter-relevance of audience and argumentation, that is,

how successful grant writers may perceive concerns and expectations of proposal reviewers. Johns draws on her teaching experience in the engineering sciences, where, she states, the grant proposal a genre of prime significance (Johns, 1993, p. 78). In subsequent linguistics research, for example, Swales and Feak (1994/2004) consider audience to be one of, if not the most, important aspects of genre writing¹⁷.

Primarily concerned with raising novice ESL writers' audience awareness when crafting a task- and community-specific argument (Johns, 1993, p. 76), Johns draws on Stephen Toulmin's (1958/2003) model of an argument, and specifically on one of its constituents, the claim. Very briefly, Toulmin's claim is understood to be the proposition and/or a conclusion of the argument (Andrews & Herzberg, 2009). Johns, in effect, corroborates Myers' point that appropriately framing and positioning of the PI's knowledge claim is of prime importance in the grant proposal. She considers the knowledge claim in two ways. The first is its location in the proposal text. Johns traces the knowledge claim to two sections of the engineering proposal, the abstract and the introduction (Johns, 1993, p. 82). She also identifies a difference in how the claim is presented in the two sections: the abstract emphasizes the experimental process whereas the introduction stresses the originality of research. However, Johns does not consider possible disciplinary origins or interdiscursive dependencies which may govern this particular textual feature.

John's second consideration for the claim is related to both intertextual and interpersonal interaction. Interviewing two most successful scientists at the College of Engineering at San

¹⁷ In an interesting interdiscursive twist, the main reviewer of Johns' paper is Ulla Connor, whose grant writing research dominates the linguistics field. Johns' conceptual approach is informed by composition theory (Flower & Hayes, 1981) and the study of argumentation and reasoning (Toulmin, 1958). The latter was a suggestion from Connor (Johns, 1993, p. 87). It seems then that much like genres do not exist in isolation but are interconnected (Tardy, 2003), RGS and linguistic genre studies are not stand-alone but interconnected approaches to studying the complex concept of genre as social action. From the intertextual influence of Connor as reviewer on Johns as writer it also surfaces that it is through drawing on studies of argumentation that Connor and Mauranen (1999) arrived at the definition of the genre of grant proposal as persuasive. There is no allusion to Toulmin's work in Connor (2000) and Connor and Mauranen (1999).

Diego State University who work in tandem, Johns explores their practices of preparing a proposal. Review of current publications in the discipline, recently accepted proposal topics, and conversations with senior colleagues and agency personnel all help the scientists identify funding priorities and associated with them ongoing disciplinary research. This is consistent with later RGS research (Mehlenbacher, 1994; Tardy, 2003) although unlike it, Johns does not emphasize the importance of interpersonal navigation of the genre system, nor does she consider how textual framing of the claim may be linked to these activities. Rather, Johns posits that development of a “potent argument for the funding of [a] grant derive[s] from the planning for audience ... throughout the grant writing process” (p.79). In an interesting example of such planning, the two scientists identify review panelists of the year by name (Johns, 1993, p. 81). What follows is a review of the panelists’ research agendas with the aim of incorporating references to some of the reviewers’ work in the proposal. Johns considers citing the reviewers’ recent work to be a discursive strategy that helps the writers “not to stray too far from their readers’ interests and values” and to position the proposed research as current and incremental rather than outdated or revolutionary (Johns, 1993, p. 81).

Johns (1993) and Myers (1990) then offer complementary perspectives on situating original research within disciplinary literature in order to appropriately position the claim “among the powerful grant reviewers” (Johns, 1993, p. 79). In other words, the PIs in their studies have an understanding that to become knowledge their research claim “has [to be] rhetorically organized” (van Nostrand, 1997, p. 7).

I should mention that Johns is likely the first to point out the problem of the grant proposal’s “disparate readership,” that of disciplinary experts as well as scientists outside the PI’s immediate subject area (Johns, 1993, p. 81). This range of peer reviewer expertise creates one of the key constraints of the genre, the need to construct the grant proposal so as to be “sufficiently expert and current to appeal to the insiders, and sufficiently readable and

accessible to those with more general backgrounds” (Johns, 1993, p. 81)¹⁸. To delve deeper into the rhetorical construction of persuasiveness, I consider the genre-system perspective.

3.2.3.2 Transacting in fundable knowledge

The term ‘fundable’ knowledge was first introduced by A. D. van Nostrand (1994, 1997) in his work on funding of research proposals for technology transfer. Van Nostrand expands on Myers’ conclusion that writing for funding is a matter of negotiation. But while Myers came to this considering academic research grant proposals, Van Nostrand explores the process by which the US Department of Defense (DoD) funds research and development (R&D) of defense technologies. As both types of proposals originate in university labs, van Nostrand observes that due to the specifics of negotiations between the university lab and the DoD the process of procurement of contract funding generates a substantial share of new knowledge “prior to the project’s formal beginning” (van Nostrand, 1994, p. 136). This is in some contrast with the grant proposal which, although advancing from a recognized knowledge base, is a substantiated promise to generate new knowledge upon the receipt of funds. One may say that despite the differences in the degree of knowledge production within each process, or perhaps because of them, van Nostrand enriches the meaning of Myers’ point about asserting the PI’s competency in carrying out and delivering the proposed research. Drawing mostly on genre theory, he approaches the issue from an unusual perspective.

First of all, van Nostrand identifies the likely origin of the notion of negotiation as it applies to research funding. Analyzing the process of research funding by the agency outside the immediate area of scholarly inquiry van Nostrand, unlike most discourse analysts, is not bound to their traditional reluctance to compare writing for funding with a commercial transaction. In

¹⁸ Proposal readability is now recognized as integral to constructing a convincing argument and has become an area of interest in writing for grants or for fundraising. Corpus based studies, for example, consider text formatting and syntactic means of facilitating readability (Connor & Upton, 2004) as well as metatextual reader guidance (Crismore, 2004). Studies in communications and evaluation highlight the role of visuals in the proposals in facilitating readability by simplifying dense text and drawing the reviewer attention to its particular aspects (Giannone, 2015; Goeringg et al., 2009).

fact, he holds that the “[Department of Defense] buys research and development” (van Nostrand, 1994, p. 133) thus instituting the culture of customer and vendor relationship with the labs. This premise enables van Nostrand to consider corporate practices such as marketing in his analysis of transactional interactions between the participants of the R&D genre system. Of them, the genre of capability statement, makes direct parallels with the need, identified by Myers (1990), for researcher self-assertion.

While capability statement in R&D procurement is a genre diversely enacted through documents ranging from policy statements to annual reports to specification papers, they all share a common communicative core. The rationale behind the capability statement is to convince the customer that the vendor possesses “the knowledge of how to produce knowledge” (van Nostrand, 1997, p.172). Van Nostrand maintains that to attain this goal the vendor engages in marketing to reinforce advantageous reception of the proposal by the customer. To this effect, in R&D procurement or in research grants, the vendor must “convey a vision of future attainment based on past achievements” (p.173). Valorization of both parts of this vision in the customer’s mind is a delicate task; but if achieved, it imbues the vision with a momentum of success (van Nostrand, 1997, p. 173).

I argue that van Nostrand’s (1997) notion of creating “inertial [riding-the-momentum] success” (p.173) helps understand and address the two key controversies the PI faces in proposal construction. How so? A vendor-customer transaction is a sale, and funding of defense R&D is competitive. But so is the funding of academic research. The role of marketing is “to position [the research] advantageously from a customer’s point of view” (p. 172). Genre-appropriate marketing then could be a way of addressing the need for PI self-promoting the credibility of their research and of themselves as researchers.

To facilitate the task of marrying the past evidence and the future claim, and then “getting the customer to agree to that marriage” (p.173), the vendor resorts to advertising. As van Nostrand mentions, advertising is only one of marketing operations, but “it is the one that the customer

usually sees first” (p. 172). In parallel, the grant proposal is the first instance of the new knowledge claim that the reviewers see. And of course, to credibly project it forward, the proposal must situate the new claim in the context of prior work. Assuming the vendor has identified the customer’s needs, they will need to craft the proposed knowledge claim as it relates to those needs (p.172).

Van Nostrand argues that under these conditions “to forgo advertising is not an option, since advertising reinforces the product’s positioning” and “translates it to the customer’s perspective” (p.172-173). In R&D the task of positioning and translation is the job of the capability statement, as in academic research it is that of the proposal. But the product each of them positions does not exist. Rather, it is promised, and so is the vendor’s and the PI’s capability to deliver it. In effect, the customer is in the market to purchase a capability that is promised, or as van Nostrand puts it, presumed, and has to choose among many on offer. Then, reverting to genre terms, the communicative purpose of the proposal and the capability statement is “to convert a presumption into the conviction” in the customer’s mind (p. 173). As Ulla Connor states, the proposal is a genre aimed at persuasion.

Profiling several R&D projects, van Nostrand singles out the following properties of the capability statement that help achieve a persuasive marriage of “past evidence to a future claim”:

- the vision is declared and then re-iterated through “periodic interpretations of information intended to verify it”;
- all supporting evidence must be made “as relevant as possible to the claim”;
- support for the claim is diffused throughout the proposal (p. 180)

The theme here is relevance and re-iteration. Both are discursal means of facilitating readability and both help accommodate the proposal’s disparate readership (Johns, 1993, above). Relevant supporting evidence helps the reader connect the vision, the claim, and the prior literature, thus positioning the proposed research as original but closely connected to the recognized disciplinary mainstream (Tardy, 2003), while at the same time paving the way for

the proposed research to become mainstream (Myers, 1990). Relevancy of the supports is part of the signal to the reader that the genre conventions of the proposal are respected and therefore reproduced, making this particular instance of the genre legitimate and acceptable (Schryer, 2011).

3.2.3.3 *Telling a story*

However useful technology props may be for proposal readability, they can only enhance the narrative. And a narrative, although instrumental to producing coherent text, “does not by itself guarantee persuasion” (Van Nostrand, 1997, p. 180). Van Nostrand maintains that narrative is chronology, for it recounts the events or supporting evidence and arranges them in some sort of order. But on its own chronology will not facilitate “the crucial inference that links past performance to future capability. To get the reader to make this leap the narrative needs a plot” (Van Nostrand, 1997, p. 181). A plot provides causality behind the narrative; it gives meaning to the chronology. Quoting from E.M. Forster’s *Aspects of the Novel* (1927), van Nostrand gives a powerful definition of both:

Here is a narrative [Forster] says: the king died, and then the queen died; and here is a plot: the king died and then the queen died of grief. (van Nostrand, 1997, p. 181)

Linking the events in a meaningful way, the plot creates a story that makes the narrative plausible; or, more precisely, “[i]f a narrative alone can link past events to a future vision, then narrative with a plot can weld them credibly together” (van Nostrand, 1997, p. 181).

This is where I come to break the conventions of the genre of literature review. It is not expected that a doctoral literature reviewer should refer to unpublished proceedings of a research event or pointedly consider one’s own work. Yet telling a story is what the PIs in the 2006 Pilot said was most important in the proposal. Precisely how a grant writer tells a story had, to me, remained unclear. But van Nostrand analyses texts of two military proposals, showing how a vision is stated first and then causally linked to the supporting evidence. When a diagram visual is presented later in the text, the accumulated “rhetorical thrust of the vision statement has long won the battle for reader’s endorsement” (van Nostrand, 1997, p. 182). The

sequencing of the R&D proposals is consistent: a vision comes first and is followed by evidence. Variants may include fictionalization, where a dramatic fictional episode may be substituted for a vision statement. This is a creative way to simultaneously express a vision, create a setting for a problem in need of solution, and to engage, or “hook the reader” (Hyland & Tse, 2005). Attracting and holding the proposal reader’s attention has surfaced a necessity in the grant writing (Yousoubova, 2011). Telling a story then is key to constructing persuasiveness in the proposal. End of breaking genre conventions of literature review.

3.2.4 Intertextual situatedness of the proposal

In essence, the value of van Nostrand’s *outré-mer* view of research funding is in that it relates the research grant proposal and the R&D capability statement rhetorically. One would not take the likeness literally; funding of defense R&D and that of academic research are distinct processes, and so proposals written within each context would be shaped by its constraints (Tardy, 2003). But the rationale behind the construction of the R&D capability statement builds on the conclusions reached by other hallmark grant writing research (Myers, 1990; Johns, 1993, Connor & Mauranen, 1999; Tardy, 2003). The proposal needs to persuade (Connor & Mauranen, 1999) - van Nostrand specifies how persuasion is achieved, textually. The proposal needs to credibly situate the future in the past (Myers, 1990) - van Nostrand offers a perspective on the textual logistics of this linkage. The proposal needs to address uneven readership (Johns, 1993) - van Nostrand exemplifies what is acceptable in R&D procurement and how it is addressed. The proposal reflects the interconnected web of other documents and interactions of research funding (Tardy, 2003) - van Nostrand assigns transactional value to R&D procurement documents, demonstrating how they interact and are shaped by the context and the social system of defense R&D. In effect, what van Nostrand produces is a high-resolution portrait of a genre system.

With this in mind, I look at how intertextual interaction is manifested within the proposal and between the proposal and the funding system.

3.2.4.1 Intertexting within the genre

Connor and Mauranen (1999) and Connor (2000) are usually credited for their painting a detailed portrait of the grant proposal as a text-genre. Connor and Mauranen (1999) identify typical textual features in the grant proposal texts constructed by scientists in Finland in a range of scientific and engineering disciplines. Conceptually, the paper draws on the view of genre as developed by Swales (1990). They thus identify genre analysis as “the study of texts as social phenomena where recurrent patterns of structure and behavior help organize structures and behaviors into comprehensible and effective forms” (Connor & Mauranen, 1999, p. 48). The authors assume the social nature of text construction, but their work focuses on how “writers manipulate genre structures depending on the situation and the purpose of writing” (Connor & Mauranen, 1999, p. 48). Hence purely textual focus of their analysis.

As a contribution to this study, they document the intertextual nature of the grant proposal. They trace the rhetorical make-up of the textual features of the proposal to the guidelines for grant writing published by the European Union (EU) (Connor & Mauranen, 1999, p. 51). In another intertextual link, Connor and Mauranen identify the genres which have likely served as antecedents for and influenced the grant proposal as text. These are explicitly promotional genres examined by Vijay Bhatia (1993) such as sales letters and job applications, and research article introductions studied by John Swales (1990). Both share with the grant proposal in their communicative purpose. Just as the overtly promotional genres, the grant proposals “need to capture the attention of the reader, describe the idea, show the need, and establish the writer’s competence” (Connor & Mauranen, 1999, p. 60). And similarly to research article introductions, grant proposals “need to establish the importance of the field, show the problem or gap in the field, and show how the proposed research will fill the gap” (Connor & Mauranen, 1990, p. 60). Subsequent research traced how novice PIs draw on their knowledge of research article introductions in proposal writing (Yousoubova, 2011).

The authors disclaim, however, that at least some of the features of the proposals in their study are likely to be specific to the EU. Later research by Connor (2000) confirms this, thus

anticipating an important relationship between key genres of the system of research funding. Recent work in writing studies and in sociology indicates that proposal evaluation practices differ considerably across national academic traditions (Feng, 2014; Lamont & Huutoniemi, 2011; Lamont & Sun, 2012). Thus, Connor and Mauranen's identification of the proposal features unique to the EU reflects the intertextual responsiveness of the genre to national specifics, or nestedness, of grant funding.

3.2.4.2 Intertexting with the genre system

Interaction with other written genres which generate, sustain and reflect the system of research funding is also critical for the proposal construction process. As Tardy points out:

PIs, for example, make extensive use of grant-application guidelines, previous successful grant proposals, boilerplates, and feedback from prior peer reviews each time they prepare a new grant. (Tardy, 2003, p. 27)

Tardy's point reflects van Nostrand's (1997) emphasis on the importance of understanding and addressing the agency's needs. These are "situated in a constantly revised web" of various other related documents (Myers, 1996, p. 7). If one considers that research councils are themselves subject to changing government policies, priorities, budgetary allocations, restructuring, etc., interpreting their documentary output makes for a challenging task. Cambrosio et al. (1990), for example, determine that government policy making – a source for agency documents - relies on authority of credible sources citing reports and statistics produced by legislative bodies such as OECD¹⁹, central banks, etc. Thus, although invisible to the grant writer, agency documentation is infused with value and power which results from its intertextual connections with institutions of recognized status.

But Myers also notes that "[a]cademic researchers need to be aware that research council documents do not reveal in any direct way the internal workings, conflicts, and intentions of

¹⁹ The Organization for Economic Cooperation and Development (OECD) is an international organization with a focus on improving economic performance. Source: <https://www.oecd.org/about/>

research councils” (Myers, 1991, p. 234). This means that personal interaction within the system would have considerable bearing on the PI’s interpreting of such documents.

3.2.5 Re-cap

Before I consider the PI, it would be useful to refresh the perspective with which this study approaches the literature. Van Nostrand’s (1997) precision in detailing and substantiating the constituents of the capability statement effectively expounds Myers’ (1990) statement, left rather under developed, that the proposal contains all three rhetorical appeals. Like Johns (1993) and Myers (1990), van Nostrand (1997) intertexts between the linguistic and genre-rhetorical worldviews, which makes them the strongest examples of genre-based research in the field. Alone, linguistic studies tend to focus on text-based properties of the proposals; genre-rhetorical research is reluctant to consider text beyond its role of reproducing social norms. As a result, both risk losing in caliber.

By prioritizing the proposal in their studies, both Myers and van Nostrand underline its primacy within the systems of funding. Their close examination of the proposal texts also positions the proposal in the center of the social context of the research funding system. To add to this a situated understanding of how the PI engages with this system, and the proposal, to produce fundable knowledge would be valuable.

3.3 Systems negotiating: the PI as agent and participant

In writing studies, the interpersonal aspect of grant funding is discussed under the notion of negotiating the system (Feng, 2011; Mehlenbacher, 1994; Myers, 1990; Tardy, 2003; van Nostrand, 1997). But the notion itself is lacking in definition. Mehlenbacher’s (1994) respondents emphasized that practical applicability of their research was very important to them (p. 160) since as often as not they sought funding from corporate as well as academic funders. Some of Mehlenbacher’s respondents were in engineering sciences and at the time the paper was published (1994) technology transfer was a new way to make academic research applicable off campus. Negotiating in this context seems about its principal dictionary meaning,

reaching the mutually agreeable. But one of Tardy's (2003) participants points out that being funded by the US military results in having to subsume the intellectual direction of one's research, which seems more about complying than finding a middle ground. Although the very notions may go against the scientific ideal, it is the reality of university-based research (Hyland, 2009).

I come to terms with the idea of negotiating in a somewhat unorthodox way, through negotiation. It appears that when considered in the context of grant writing, the Mertonian ideal of science and John Nash's game theory are both relevant. But - in grant funding - both seem equally unattainable. Why not?

In a largely quantitative study which spans several countries, van Arensbergen and van den Besselaar (2012) discuss the applicability of the scientific ideal to evaluation of scientific talent, or awarding of research grants:

...there is the Mertonian sociology of science, which prescribes how scientists should behave according to the norms and values of science ... One of these norms is universalism, which means that the judgment of knowledge claims should be based on scientific criteria only, without interference by personal or social backgrounds of the reviewed and reviewers (Merton, 1973 [1942]). Applied to talent selection [awarding of grants], access to scientific careers should be based on scholarly competence alone (van Arensbergen & van den Besselaar, 2012, p. 383).

Indeed, Merton's view of science was a keystone of Myers' (1990) conceptualizing the proposal as a genre. But are grants evaluated on the basis of their scientific merit only? In a recent obituary, The Economist summarized the famous Nash equilibrium as:

In a zero-sum game (ie in which mutual benefit is possible) he worked out what happens when players compete not in isolation, but in anticipation of and in response to others [*which is what happens in grant writing* - LY]. Such a game, he proved, ends in a result where no player can gain by changing his strategy (The Economist May 30th, 2015, p. 90).

Mathematically speaking, and reflecting the Mertonian ideal, grant evaluation should be construed as an ideal zero-sum game environment in which, the PI notwithstanding, only the quality of the proposal matters. In this environment, PIs cannot enable their success by engaging with the system and interacting with decision makers because in the mathematically sterile context of a game there are no decision makers. The rules of such a game are pre-determined and axiomatic, and the evaluation criteria would be universal and adhered to universally by the evaluation players.

But even so, in a sterile mathematical environment, evaluation of quality would remain purely quantitative. When the players adhere to the rules prescribed and proscribed by the game, the outcomes are calculated rather than deliberated. But in the real world this is not the case because peer emotions and their epistemic worldviews are part of the evaluation canvas (Lamont, 2009, 2012), as is the projected quality of the PI as researcher (Myers, 1990). Nor is peer review impartial. As van Arensbergen and van den Besselaar (2012) note, peer reviewing is a subjective process in which “the outcomes ... are affected by who is conducting the review and how the committee is composed” and “relations between reviewers and applicants influence the ratings” (p.384).

Taken together then, does this mean that securing research funding will always remain a hit or a miss? Although it is believed to be impossible to eliminate (van Arensbergen & van den Besselaar, 2012), the matter of funding luck is negotiable. The more experienced of the two scientists in Tardy’s (2003) study emphasizes the crucial role of interaction in the grant funding process:

Thompson explains that his style of interactions within the system has had a great impact on his funding success. He comments that if he were more aggressive in meeting people and making the necessary connections, he would have likely been a more successful grant writer (Tardy, 2003, p. 27).

This is not simply a matter of retrospective wisdom. This scientist’s experience highlights how intrinsic interaction is to the production of new knowledge. As posited by the philosopher of

science Bruno Latour, whose work informed Myers (1990) and van Nostrand (1997), the quality of science in the proposal is as important as the quality of the PI's network:

Advancing a claim to the status of fact entails a continuous process of developing alliances. [Bruno] Latour once told a class I was teaching that science without alliances would be like a cathedral without towers (Van Nostrand, 1997, p. 135).

Interestingly, van Arensbergen and van den Besselaar (2012) indicate that evaluation of proposals by experienced researchers causes more disagreement between the reviewers than evaluation of the novices' proposals. This makes sense as the further one advances in one's academic career, the more expertise one develops (Bhatia, 2004). Presumably, one also becomes more connected within the community of peers, building more alliances but also incurring opposing opinions. In fact, van Nostrand (1997) states that the polemical nature of the scientific argument presupposes contention. But "[w]ithin the system of scientific discourse, contention is not noise; it is part of the signal" (van Nostrand, 1997, p. 135); and as such, it is part of the process of validating a new knowledge claim. This makes explicit the reason why PIs need to build alliances in the genre system.

It is reasonably evident then that, in grant funding, the factor that stands in the way of the Mertonian ideal and Nash's equilibrium is interpersonal interaction. Its impact on grant funding success cannot be underestimated.

3.3.1 Interpersonal dimension of research funding

Brad Mehlenbacher's (1994) rhetorical analysis of grant proposal construction by experienced academics at an Ivy League University in the US broadly revolves around three themes. These are "written proposals, funding processes, and academic research" (p. 161). Mehlenbacher's analysis does not look at the grant proposal. But his interviewing 15 experienced and successful scientists leads to the key finding that "[p]roductive academic researchers often juggle multiple funding relationships to best leverage their own research situations" (Mehlenbacher, 1994, p. 161).

One of the Mehlenbacher's respondents coined the term "political talk" when discussing the importance of developing one's interpersonal networks, both with fellow scientists and with funding agencies. Other respondents corroborate by stating that working with different funding agencies "represented very distinct types of interaction" (p.160). Tardy (2003) also determines that, although always genred, forms of interaction between the writer and the agency vary greatly depending on the agency and on the composition and operating processes of the review committee. This echoes the already discussed findings of van Arensbergen and van den Besselaar (2012). Thus the writer's knowledge of the affordances of interaction with particular agency and review committee would enable them to conceive of an interpersonal communication strategies to increase their chances of success. On the basis of her interviews, Tardy (2003) posits three main aspects of interaction within the grant genre system: procedural, political and social (p. 31). More specifically:

Successful writers need to know who to talk to in a funding agency and what to say, who to cite in a proposal, which meetings to attend, and who to network with at conferences (Tardy, 2003, p. 31).

The PI's collaborative connections also need to be made known to the peer community. These could be publications, presentations, and other recorded venues. Documenting collaborations contribute to the PI credibility, proving that their ideas make others want to work with them. Willingness of others to collaborate also indicates the PI's ability to seek agreement with the colleagues, and it contributes to the researcher's track record (Yousoubova & McAlpine, 2021b). Indeed, Mehlenbacher's (1994) respondents indicated that when working collaboratively "proposal writing required an ability to achieve group consensus" (p.159). Lamont (2009) mentions that in many review panels researcher track record is a dominating factor. Participating researchers in Feng's (2002) proposal analysis stated that grant writers need to get others in their field excited about their work, even to the point of willingness to speak up for it at the review table. Agencies policies may exclude panelists who personally know the applicant from the discussion of their proposal. But knowing *of* a colleague's work can be just as useful in gaining allies.

Mehlenbacher (1994) further defines the interactional in the funding process via another key finding that “successful [PIs] have well-developed managerial, organizational, and communication skills” (p. 157). Both participants in Tardy’s (2003) study also “emphasize the importance of spoken over written communication” (p. 19) when it comes to connecting with program officers at funding agencies. Mehlenbacher (1994) goes further to stress that rather than an occasional effort “funding relationships ... are fostered by constant attention to their parties’ mutual needs” (p. 162). Grant writing is a career-long undertaking (Connor & Mauranen, 1999) and researchers find themselves continuously applying for new grants in constantly shifting circumstances. But, as Moeller and Christensen (2009) point out in their genre mapping of the NSF funding process, “successful grant proposal writers foreground their approach by thinking of the relationships they need to cultivate (or have already cultivated) in order to negotiate the system successfully” (p. 69-70).

There is then a considerable degree of agreement in literature on the importance of sustained interaction in the negotiating the system of research funding. In this light, the proposal can be seen as “a synthesis emerging from a series of interactions between participants” (Tseng, 2011, p. 2256). However, to the best of my knowledge, there is little to no discussion in the literature about how PIs build their alliances and networks. Yet it is evident from the discussion above that successful grant writers evolve discursive strategies to make their *proposals* fundable. In the next sections, I discuss how this concept contributes to the study and how the study will build on it.

3.3.2 Improvisational strategies

Although funding success is the focus of this study, strategy per se has thus far been conspicuous by its absence from the discussion. Here, I consider the notions of strategy both from genre studies and organizational management. Then I adapt them to denote my notion of *approach*, i.e. of how successful expert PIs build towards making *their* work fundable.

From the perspective of genre theory, in their proposal construction process PIs can be seen as enacting a set of improvisational discursive strategies (after Schryer, 2000, 2011). Within this view, genre strategies are ways in which the proposal writer (re)produces the institutionalized practices of knowledge making. That is, this view is concerned with how the PI constructs an argument in ways recognized and accepted by their discourse community of peers. Schryer et al. (2003), however, argue that within this received framework of genred writing there is room for creativity, which they liken to structure and variation in jazz. The analogy derives from the commonly accepted fact that although distinctly structured, jazz music lends itself to a wide variety of improvisations. At the same time, these variations, however creative they may be, do not render the core music genre unrecognizable. An informed listener would not mistake jazz variations for a chamber suite. As variations stem from and draw on the established structure, the familiar nurtures the new. The genre evolves but does not mutate.

Both Schryer's propositions, that of structure and variation and that of improvisational strategies, have a direct bearing on this study. From a strategic viewpoint of advancing both one's discipline and one's career, the PI would foreground the new while reliably situating it within both the familiar genre structure and the familiar knowledge base. Institutionalized norms of the proposal genre, as Myers (1990) demonstrates, enable both construction and advancement of a new knowledge claim. The received status of these norms outlines a distinct grant genre terrain, thus guiding the writer in their construction of a knowledge claim in appropriate and acceptable ways (after Schryer, 2011; Bazerman, 1988).

But the normalizing role of the genre is not limited solely to the constraints of the proposal construction. Genre norms also institutionalize affordances (after Tseng, 2011) and thus endow the PI with a capacity for improvising from within, a capacity essential in grant writing because of the need to stand out from the crowd. In this study Schryer's (jazz) structure is relevant in two ways. One is that since the notion is applied to genre, it can be explored equally within the context of all genres of research funding, including PI interactions in the system. Two, it can be expected that while structure must be respected by all genre users, improvisation is likely a

matter of individual approach. This makes it logical to seek out practices of individual system participants, and at that, of those who stand out successfully by being funded.

Myers (1990) notes that the grant proposal is associated with risk taking. A proposal is an offer, a promise. Its vector is aimed forward, into the future, and a promise of a future achievement is associated with risk. The proposal is successful only when it has won over its competition, and to do so it has to stand out. When the genre constraints have been addressed, viability of research ascertained, qualifications of the applicant deemed sufficient, what makes the promise stand out is creativity with which it is brought about. Risk and creativity then are legitimate features of the funding system because they are intrinsic to the genre of the proposal.

Indeed, genre literature indicates that creativity in writing is directly proportionate to the writer's mastery of a genre (Bhatia, 2004; Tardy, 2004, 2009), so (re)producing established genre norms with a difference is the privilege of expertise. Yet mastery of the grant proposal genre remains elusive even for disciplinary experts (Connor & Mauranen, 1999; Tardy, 2003). This indicates not only multiple contextual constraints imposed on the PI by the research funding system but also a situated nature of persuading one's peers to accept a new claim. This situatedness is multi-faceted. It derives from the disciplinary norms (Myers, 1990; Tardy, 2011), from the writer's level of genre and system expertise (Tardy, 2003), from the networking investment (Mehlenbacher, 1994), and from nationally specific constraints of knowledge communication (Feng, 2011, 2014) and grant reviewing practices (Lamont & Sun, 2012; Lamont & Hutoniemi, 2011).

3.3.3 Emergent strategy

To help understand creativity and risk within the grant system, one could consider Henry Mintzberg's concept of emergent strategy (Mintzberg 1987; Mintzberg et al., 2009). Without going into detail, the concept was developed for the corporate world. In it, the organization is the strategist, taking into consideration real-time developments and integrating them into

strategy formation on an on-going basis. This strategy is not preconceived but one that “emerges over time as intentions collide with and accommodate a changing reality” (Moore, 2011). What is being implemented may not be the same as what was originally intended.

What makes Mintzberg’s view relevant here is its fluid nature. Strategy as he presents it allows for new intakes as well as for discarding ones that are not viable in the particular context where the situation unfolds. There is a streaming quality to it, a sense of direction and exploration simultaneously. Mintzberg charts it as an evolution of a large arrow culminating in a strike point. It resembles a feature of a military campaign map. Strategy is what allows one to take purposeful action, making use of one’s limited resources and of the affordances and constraints of the situation. Mintzberg’s arrow helped me visualize the development of a PI’s strategy as a river, with its inflows and outflows, purposefully carrying its waters towards the ocean. Its estuary takes in sea water and at times has its flow reversed by the tide. There is give and take everywhere along the way - interaction. And through this interaction the river (new knowledge) joins the ocean (certified legitimate knowledge).

PIs may start with a deliberate, defined idea of their research goals and the corresponding proposal drafts. But they (re)consider and modify these as they interact with the system and its genres and participants. Their considerations would be evident in the palimpsest of proposal drafts, each synthesizing the PI experiences, interactions, and thinking. The proposals would reflect the evolution of the PI’s approach to constructing fundable knowledge. There is a confluence here with genre theory. Richard Coe, a theoretician of ideologies of genre, states that “[t]raditionally, we think of genres as *forms*, but to understand how they work, we must think of those forms as embodying *strategies* that have evolved for responding effectively to particular types of situations (Johns et al., 2006, p. 245, emphasis in the original).

In this study, genre-system-related strategy is understood to be about achieving one’s aim with the means one is limited to. By delimiting a framework for perception and defining expectations genre creates a recognizable structure as well as recognizable patterns with which

to navigate it. In order to make affordances for variation the PI must first situate the pattern within the familiar. The structure accommodates the familiar and enables shifts inside the pattern. Variations respecting and reproducing the requisite constraints of the structure are recognized as both legitimate and creative. It is their reliance on the familiar that makes PI variations in the structure acceptable to peer reviewers.

Finally, the arrow and river analogies evoke a strong association with purpose-mindedness, frontier advancing, and determination. It takes stamina to effectively address the challenges of the rapidly shifting contexts of grant funding. Even the most strategic and creative of thinkers must continually evolve their ways of responding. Without the PI being purposeful and resourceful it would not be possible. I discuss these aspects of PI systems participation in the sections that follow.

3.4 Systems approach: towards PI research goals

3.4.1 Systemic thinking

“We live in webs of interdependence”²⁰ – the idea of systems thinking (Senge & Sterman, 1992) originates from research on interaction-based systems dynamics (e.g., Forrester, 1968).

Conducted at the Massachusetts Institute of Technology, the original field of this work was cybernetics; later, it was taken up in management studies and organizational sociology. The two main principles of the systems theory, that of interdependency of constituents within and across corresponding systems and that of their interactivity, are at the foundation of Senge’s concept of analytic-synthetic thinking to facilitate success and continuous learning in managerial practice.

For Senge, the system as a term is an abstraction. But its intent, in close approximation of his words, “is to facilitate our understanding of complexity of these interdependencies; to help us

²⁰ Senge, P. (2017). Navigating webs of interdependence. *Keynote for the Summit on Improvement in Education*. Carnegie Foundation for the Advancement of Teaching. <https://www.carnegiefoundation.org/newsroom/improvement-voices/what-were-watching-peter-m-senge-navigating-webs-of-interdependence/>

understand how intransigent problems come about, and to get a perspective on these problems that gives us some leverage and some insight as to what we might do differently”²¹. By us Senge means not individuals but an organization which he conceives as a learning entity.

The concept of systems thinking as an organizational approach has come under pressure for shortcomings in both theoretical worldview and practical outcomes (e.g., Caldwell, 2012). It is particularly criticized for failure to be representational. One of the expectations was that systems thinking would enable - *en mass* – the change-agentiveness of corporate employees. It did not, and so critics focus on failure of the approach to deliver sustained positive change at the level it is aimed at, the organization. Given that the timing of the criticisms coincides with the global economic downturn of the late 2000s, there may have been more factors at play than conceptual weaknesses alone. But relevant to the scope of this study is a more recent attention that the approach drew with regards to personal achievement in business.

The workings of systems thinking were recently examined by The Economist (2018). Their discussion of success achieved by the innovative entrepreneur Elon Musk, whose vision disrupts current business practices, concludes that “systems thinking can be strategic” (The Economist, 2018, p. 22). This underlines the strength of the would-be shortcoming of the systems approach in that it fails to realize itself on a mass organizational scale. Mr. Musk’s achievement highlights individual nature of success precisely because “understanding all the linkages and dependencies in ... a system is a huge challenge” (The Economist, 2018, p. 22).

3.4.2 Agency

At the same time, the systems of corporate leadership and business practices within which Mr. Musk pursues his goals are comprised of many other participants who also aim to be successful. Mr. Musk navigates the systems purposefully, and in doing so he relies on his own critical

²¹ Senge, P. (2011/2014). Introduction to Systems Thinking. Retrieved on 21 April 2018 from <https://www.youtube.com/watch?v=eXdzKBWDraM>

thinking to negotiate them in order to achieve his goals. In effect, he has evolved his own vision of success and negotiates the corporate contexts to operationalize it. This suggests that his thinking facilitates and is facilitated by his being agentive. Indeed, systems thinking skills are thought to be critical for developing a sense of agency (Acaroglu, 2020).

But Mr. Musk is not the only globally successful entrepreneur. Nor is he the only maverick. In just the English world Messrs. Brin, Bezos, Buffet²² and the like have long become household names of success. So aside from the individuality of his own approach there must be commonalities Mr. Musk shares with other system participants who are achieving their goals. Their thinking, which facilitates their learning and participation in the systems, must stem from their determination to pursue their goals. Presumably, “[i]t also has to do with participants optimizing their capabilities as opposed to maximizing them” (Morgan, 2005, p. 20). Or, as Peter Senge puts it, it is about purposeful personal growth through “continually clarifying and deepening [their] personal vision” to “realize the results that matter most deeply to them” (Senge, 2006, p. 7). In other words, systems thinking goes hand in hand with being purposeful, intentional, agentive.

PI agency then could be seen as developing and being exercised within an established but dynamic institutionalized structure of the research funding system. Because interactions within this system are also institutionalized and represent and (re)produce established orders of producing new knowledge, these interactions are genred. That is, participating in the system PIs need to address the expectations of the collective of participants who enact it, and “the interactivity in this large social system is complex, nonlinear, and full of variables” (van Nostrand, 1997, p. 7). Navigating and negotiating these requires the PI to be agentive about developing “knowledge of how to produce knowledge” (van Nostrand, 1997, p. 172).

²² Founders and leaders of Alphabet (Google), Amazon, Berkshire Hathaway, respectively.

Integrating the discussion of literature on the grant genre system, I project that successfully funded PIs purposefully navigate and negotiate not just the genres but webs of funding system interdependencies. This is how *approach* is understood in my study.

3.5 What we still need to know

In this review, I posited that to problematize the PI, the proposal, and the system as intertwined and interdependent, the PI has to be conceptualized as intentional in enacting the proposal genre. To do so, I argue for a more comprehensive system lens that provides for embeddedness of research funding in larger socio-academic contexts, plus a developmental perspective that reflects that successful PI engagement with funding evolves alongside and is embedded in the ongoing change in research funding.

Nearly every study discussed here uses the terms strategy and/or negotiation. Tardy (2003) also identifies navigating and negotiating as the primary mode of PI system participation. But neither of the terms is defined and their use seems study-specific and intuitive. In this review, I have interpreted the notions individually with regards to the proposal and the PI as I understand them seen in the current literature. However, my position is that PI participation in the funding system is not neatly dividable into navigating and negotiating. In this chapter, I argue for an integrated notion of participation through navigating and negotiating as an integrated *approach*. I began defining it here on the basis of the literature reviewed and will carry on developing it in full in this thesis. In broad terms, PIs have to understand the affordances and constraints in navigating the system successfully and then plan how to negotiate these to achieve their ends.

To re-cap, the reviewed literature fundamentally understands the grant proposal as well as activities and processes of grant writing and reviewing to be interconnected into a genre system. The genre system of research funding is seen to be a social framework for production and evaluation of new knowledge. Analysts agree that PI system participation is key to their developing knowledge and awareness of the proposal genre. PIs writing for funding negotiate

for acceptance of their knowledge claims within this system. However, success in these negotiations is not well understood. A key outcome of this analytic review is that to understand how PIs learn to make their work fundable, one needs to look beyond the immediate context of grant funding. PI ongoing and purposeful participation and learning from a larger social system of academic work, wherein grant funding is embedded, is likely to have impact on their engaging with research funding. Research in this area is inconsistent or lacking, which suggests this thesis would make a meaningful contribution.

I will now discuss how this broader-than-in-the-past perspective on research funding, the proposal, and the PI informed my research questions and the study design.

4. Research Design and Methodology

4.1 Overview

I first discuss how my conceptual lens and the existing methodological approaches in the discursive fields of study of grant funding substantiate my study design. After considering my epistemic lens for the study, I lead off to operational concerns.²³

4.2 Methodology rationale

The basic premise of qualitative research is that objective reality is impossible to capture and could only be understood through representations of *a* particular reality (Denzin & Lincoln, 2000). Not dissimilarly, genre research understands representations of reality achieved through writing to be not objective but objectified (Miller, 1994). What this means in terms of disciplinary writing is that it addresses, responds to and (re)produces institutionalized epistemic norms established over time and eventually endowed with a normative status to produce knowledge. That is, disciplinary writing does not just document an observable phenomenon but

²³ The structure of this chapter draws on the second edition of John W. Creswell's *Qualitative Inquiry & Research Design* (2007). Creswell's quest for rigor in qualitative research, where "there are no 'right' stories, only multiple stories" (Creswell, 2007, p. 44), provided the parameters which gave shape to my research design.

renders it to be perceived a fact through adhering to the disciplinary norms of advancing a knowledge claim.

In studies of discourse as socially constructed this objectifying viewfinder would encourage "qualitative researchers [to] study things ... attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 2000, p. 3). This study aims to make sense of grant funding success through exploring the approaches of competitively funded senior scientists: to approximate a whole via a particular (Merriam, 1998).

Qualitative approach seems particularly suitable to this study as it attempts to address the four main concerns of qualitative research (as suggested by Creswell, 2007, p. 75). One, there is a conspicuous lack of consistency and continuity in studies of grant funding and writing. Two, the proposal and the grant funding system have yet to be considered in the light of newly emerged research which indicates that both grant reviewing and the PI's academic career unfold within the same three dimensions; this research bears direct relevance on the grant proposal. Three, a need for more studies of grant writing has repeatedly surfaced in literature. The value-add of this study is in that it also attempts to elaborate an integrative conceptual framework for situating the PI, the proposal, and the grant funding system with the progressively larger nested academic contexts. Four, as some research attempts demonstrate, quantitative approach to studying grant writing and grant funding, while providing valuable auxiliary data, does not seem to be well suited to understanding the highly contextualized phenomenon of how a PI evolving a strategy. Not unlike studying the exploits of outstanding military strategists, making one's research fundable may be best understood via exploring individual success stories.

4.3 Research questions

In a brief re-cap, the study will consider how experienced and successful PIs build their research fundability. More specifically I look at how these PIs' grant funding experiences, nested in the structured contexts of knowledge (e)valuation (Lamont, 2009) and academic work (McAlpine & Amundsen, 2018; McAlpine & Norton, 2006), inform their approaches to research funding.

4.4 Case study as research approach²⁴

The keystone research funding studies (Myers, 1990; Tardy, 2003) are framed within the social constructivist outlook which enables representation and interpretation of individual-multiple perspectives without striving for absolute values, thus recognizing that there is no right answer. Or, perhaps that there are many right answers. These studies are designed around the experiences of a few scientists and rely on individual case studies.

4.4.1 Definition and focus

The evaluative approach I chose to address the above research questions is the case study. Case study research is geared towards exploration of a particular “bounded system” (Creswell, 2007; Merriam, 1998; Stake, 1995; Yin, 2014), an issue or a context with defined boundaries. Creswell (2007) notes that not all methodologists agree on what exactly case study is; Stake sees it as a study choice within a bounded system, whereas Merriam and Yin as a methodology or even research strategy. Rather than dispute these views, Creswell (2007) refers to case study as a qualitative approach. As far as my own inquiry is concerned, case study is a pragmatic choice, and below I discuss why I believe this approach is the right one. I consider methodological paths taken by Myers (1990) and Tardy (2003) and follow up with my own.

The unique strength of a case study is in “its ability to deal with a full variety of evidence – documents, artifacts, interviews and observations” (Yin, 2014, p. 12). Yin sees case studies to be an appropriate way of addressing research questions of how or why type as well as for focusing on contemporary situations and events (Yin, 2014, p. 14). But more importantly, the case study as an approach seems particularly suitable to the investigation of the participants’ evolving strategy because of an interesting characteristic that also facilitates the longitudinal nature of the process and its investigation:

²⁴ Headings structure of this section has been adapted from Creswell’s (2007) discussion of the case study.

The essence of a case study.... is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result (Schramm, 1971, qtd. in Yin, 2014, p. 15).

In the next section, I briefly consider the thinking that led me to retain and then expand the scope of the case study design from the Pilot to the main study.

4.4.2 Pilot to Main: from being text-centered to drawing on text as artefact

The pilot was a writing study and at its core was the grant proposal. In assigning the prime role to the proposal text I was following in the footsteps of Myers (1990) and my interviews with the writers were designed to supplement my text analysis. But as the pilot data collection and analysis progressed, I began to see that the proposal and the PI are inseparable. I also saw how proposal writing reflected the complex and inter-connected contexts of research funding *and* the way the PI makes sense of them. I needed to expand my lens.

The pilot confirmed that the textual instantiation of a grant proposal is an important part of a larger mosaic, a complex communication situated in a social system of research funding (Myers 1990, Tardy 2003; Mehlenbacher 1994; Feng 2011). My main take-away was that to try to understand the sources of the proposal's competitiveness is to understand how the writer engages with the system and how this engagement is reflected in the proposal text. This is how the notion of evolving strategy which draws on the writer's iStrands expertise came to be considered.

Could I have arrived at the same understanding without the participant's grant proposal texts, failed and successful? They were tangible instantiations of his genre learning. But by themselves they were not conclusive. As he read his reviewers' comments, as he continued editing his journal, as he talked to his colleagues, and as he himself became a proposal reviewer, the PI was building grant genre knowledge and genre awareness (Tardy et al., 2020). But we had not discussed his progression in these terms. We were focused on his proposals.

Still, the pilot case study elicited meaningful results. It also generated valuable further questions, so I decided to retain the case study as overall approach. Aiming to understand research fundability beyond one proposal though, I prioritized interviewing PIs about their system interactions. I would still draw on proposal texts but they shifted from being a core concept (Creswell, 2007, p. 46) to an artefact reflecting the PI's approach at a certain point in time. And I situated the PI and the proposal in a wider social frame, where the grant genre system is itself nested in the progressively larger contexts of knowledge evaluation (Lamont, 2009) and academic work (McAlpine & Amundsen, 2018).

4.5 Participants, sites, and disciplinary domains

To facilitate the aim of this study - to understand how individual PIs make their knowledge fundable - I sought experienced and successful PIs who could offer informed reflection on the dynamics of individual response to challenging funding situations.

4.5.1 Expert PIs

In genre and literacy studies expertise is defined through domain knowledge and rhetorical knowledge (Tardy, 2005; also Bazerman, 1994; Bhatia, 2004; and Geisler, 1994 as reviewed in Feng, 2011). Domain, or subject-matter, expertise is understood to progress from knowledge-telling by disciplinary novices, e.g. undergraduates, to knowledge-transforming by the more expert. Anthony Paré used to refer to the novice stages of knowledge telling as 'ventriloquating,' meaning that retelling of the already known does not generate new knowledge. However, when disciplinary novices move on to generating new knowledge, e.g. a publication, they often find it challenging to persuade their intended readership to accept it (e.g., Vora & Boellstorff, 2012, Tardy 2005). Thus, as both Hyland (2004) and Tardy (2005) point out, validation and acceptance of disciplinary writing is in large part due not only to what is being said but also to *how* it is said.

Rhetorically-appropriate construction of knowledge constitutes the *how* of genre expertise. Literacy studies suggest that expert writing subsumes an understanding of the epistemic

community as interactive and composed of shifting alliances, and is thus aimed at real people (Geisler, 1994; Tardy, 2005) but also co-constructed together with real people (after Bruno Latour qtd. in van Nostrand, 1997). Tardy (2005) further posits that “[e]xpert writers see texts rhetorically, existing within social activity” and that they write as members of a particular social community (Tardy, 2005, p. 327).

However, although genre studies do put forward the idea that experts differ from novices in how they deploy their genre expertise (e.g., Bhatia, 2004; Tardy & Swales, 2008), overall there is no definition of the term expert. To define PI expertise for the purposes of my participant selection I drew on the studies outside the genre domain.

4.5.1.1 Development through deliberate practice

A quantitative measure of expertise is originally attributed to a psychology study of the role of effortful activities in developing domain expertise (Ericsson, Krampe, & Tesch-Römer, 1993)²⁵. In a nutshell, the study suggests that rather than being a result of innate talent expertise evolves through deliberate, systematic, domain specific practice. The authors approximate that in concert pianists over 10,000 hours, or a minimum of 10 years, of sustained practice is required to become an expert.

Will ten years of disciplinary activity make the scientist an expert? I suppose some of the difficulty defining expertise is in that it is domain specific. Each domain is unique, requiring particular skills and particular levels of mastery of these skills to qualify as an expert. As Hoffman (1996) points out, in some domains individuals considered novices can be highly experienced. But there must be a commonality somewhere in how expertise is perceived both in academic and non-academic communication. The term expert at the very least usually

²⁵ The study has been popularized by Malcolm Gladwell in his book *Outliers*. While the book has made the concept a bestseller, it generated controversy. Ericsson (2012) states that Gladwell attributes the number 10,000 with a magic value while not recognizing the role of deliberate, dedicated practice. Gladwell retorts that Ericsson et al (1993) recognize only practice but do not budget for the role of talent in developing expertise. Source: <http://www.bbc.com/news/magazine-26384712>

presupposes a high level, extensive domain knowledge. Are these only measurable in years of practice?

4.5.1.2 Knowledge structure

Exploring the problem of defining expertise from the perspective of cognitive psychology Hoffman (1996) considers research into such diverse domains as radiology, livestock judging, physics, architecture, and chess. Hoffman suggests that in terms of knowledge structure, “experts draw more complex conceptual distinctions than novices” (Hoffman, 1996, p. 85). In an attempt to give the notion of expertise a frame, he references terminology of craft guilds from the Middle Ages:

Figure 2: Stages of Expertise Development

Naivette:	One who is totally ignorant of a domain.
Novice:	Literally, someone who is new—a probationary member. There has been some (“minimal”) exposure to the domain.
Initiate:	Literally, someone who has been through an initiation ceremony—a novice who has begun introductory instruction.
Apprentice:	Literally, one who is learning—a student undergoing a program of instruction beyond the introductory level. Traditionally, the apprentice is
Journeyman :	Literally, a person who can perform a day’s labor unsupervised, although working under orders. An experienced and reliable worker, or one who has achieved a level of competence. It is possible to remain at this level for life.
Expert:	The distinguished or brilliant journeyman, highly regarded by peers, whose judgments are uncommonly accurate and reliable, whose performance shows consummate skill and

economy of effort, and who can deal effectively with certain types of rare or “tough” cases. Also, an expert is one who has special skills or knowledge derived from extensive experience with sub-domains.

Master:

Traditionally, a master is any journeyman or expert who is also qualified to teach those at a lower level. Traditionally, a master is one of an elite group of experts whose judgments set the regulations, standards, or ideals. Also, a master can be that expert who is regarded by the other experts as being “the” expert, or the “real” expert, especially with regard to sub-domain knowledge.

(Hoffman, 1996, pp. 84-85)

As the medieval definitions suggest, acquisition and development of expertise is a matter of apprenticeship and continuous honoring of one’s skills. Interestingly, literacy studies concur that rhetorical genre knowledge evolves through an apprenticeship process known as legitimate peripheral participation (Lave & Wenger, 1991). According to this view, by being involved in the activities of a community, novices gradually acquire requisite skills for tasks performed by the community and are progressively trusted with more independent and transformative tasks (e.g., Paré, 2000; Tardy, 2005). In grant writing specifically, grant genre knowledge is understood to develop over time as PIs engage in the situated activities of the grant genre system (Tardy, 2003; Ding, 2008; Cheng, 2014; Feng, 2011), so I expected that my participants’ approaches to funding may be changing as their genre knowledge evolves. This enabled me to focus on both how their knowledge develops over time and how they draw on their expertise to construct success.

4.5.1.3 Reasoning processes

The *how* of deployment of expertise touches on the primary focus of my study so it would be useful to be aware of what it may entail. Hoffman (1996) suggests that aside from knowledge structure, expertise could also be understood in terms of reasoning processes. These include

problem solving, forming conceptually rich problem representations, perceptual processing, and case-based and flexible reasoning. Below I take a look at each.

Citing cognitive research in problem solving, Hoffman (1996) suggests that while drawing on the fundamental divide-and-conquer and means-end analysis, “the flow of expert reasoning is definitely shaped by the tasks that are involved in the domain” (Hoffman, 1996, p. 88). This supports the notion of situated, community bound knowledge (Carter, 1990) as well as those of genre knowledge and awareness in genre studies (Tardy et al., 2020).

Furthermore, when assessing a problem experts invest time in conceptualizing it, forming abstract/deep rather than concrete/shallow representations that rely on their critical (deep) understanding of the domain and its functionality (Hoffman, 1996, p. 88). This may facilitate accuracy in the assessment of the scope, nature and intensity of a problem.

Hoffman also suggests that expert reaction in critical or high-stakes situations owes to their perceptual skill. That is, rather than generating and evaluating solutions, “experts often make decisions through rapid recognition of causal factors and goals” (Hoffman, 1996, p. 89). Instead of considering isolated aspects or features experts also attend to patterns not detected before, which further develops their perceptual ability. Cumulatively, expert perceptual processes “permit the rapid search, discrimination, recognition and comprehension of complex informational patterns” (Hoffman, 1996, p. 90). This is the junction where I see my participants’ iStrands expertise, as well as their experiences writing and reviewing grant proposals, merge into evolving a strategy.

Expert reasoning is also often shaped by referencing past cases. As Hoffman says, experts “like to tell stories” (Hoffman, 1996, p. 90). Case-based reasoning is fundamentally pragmatic: a case encapsulates a considerable amount of expert knowledge in a situated example. This must help experts with conceptualizing representations when addressing a new problem.

Finally, expert reasoning is defined by its flexibility. Expertise develops over time, which endows an expert with “an increased ability to form multiple alternative interpretations or representations of problems, and an increased ability to revise old strategies and create new ones as problem solving proceeds” (Hoffman, 1990, p. 90). Thus encountering a unique situation, experts mobilize and deploy their knowledge critically. Hoffman notes that treating such cases as learning experience experts are distinct from novices, who may tend to rationalize a failure rather than learn from it. I suppose then the key to becoming and being an expert is never to stop learning from one’s experiences.

4.5.1.4 Expert or master

Guilders in Hoffman’s table distinguish between an expert and a master. Genre literature indicates that the writer’s mastery of a genre is directly linked to creativity (Bhatia 2004, Tardy 2009). But as Tardy (2003) and Connor & Mauranen (1999) point out, in grant writing the stage of genre ownership - the apex of genre competence - is elusive. Even a highly accomplished and extensively funded experienced scientist in Tardy’s study did not feel he had mastered the genre of grant proposal. Instead, as Feng suggests, one seems to constantly negotiate with the system of research funding by deploying the genre of the proposal in both standard and innovative ways (Feng, 2011, pp. 222-223). Indeed, knowledge of genre and writing is increasingly seen to be developing through situated social interactions on a long-term continuum (Bazerman et al., 2018; Tardy et al., 2020). This corresponds to Hoffman’s note about the learning continuum and the development of flexibility in expert reasoning.

Thus, my choice of participants for this study is from the range between Hoffman’s expert and master. Projecting that it takes at least ten years to become an expert but the mastery of the proposal genre is near-unattainable, I sought scientists with more than ten years of experience. I aimed for 15+ years of post-graduate experience, looking for PIs with substantial experience who were actively engaged in the genre system as both grant writers and system stakeholders. In addition to the participants’ gate-keeping status I looked for sustained success with research

funding. This manifested either through a high funding net-worth or consistency at being awarded competitive funding in the last ten years or more, or both.

Proposal genre expertise constitutes only part of the notion of experienced participants for my study. Genre competency, while essential for the grant proposal, on its own is not enough to understand how one may successfully negotiate the research funding system (after Tardy & Swales, 2008; Tardy et al., 2020). My participants' proposal genre knowledge is well advanced. But their funding success is also informed by the related experiences and attributes (Yousoubova & McAlpine, 2021b). Which are meaningful?

4.5.1.5 Additional criteria of expertise

In a follow up to Hoffman (1996), Chi (2006) considers identifiable characteristics of an expert. She suggests that experts could be singled out via a number of approaches, all of which measure performance. Although primarily focused on ways in which experts do and do not excel, Chi's study lends method to my criteria for inviting participants. These include retrospective, concurrent, and independent perspectives on expert performance.

A retrospective allows to consider how well one's performance has been received (Chi, 2006).

In grant writing these could be:

- application success rates
- grant funding net-worth
- percentage of grants funded as PI or co-PI
- competitiveness of funding – external, internal, corporate/industry, co-sponsored

By concurrent Chi (2006) means more immediate, ongoing achievements and recognition.

Given my criteria above these would be about disciplinary standing (gatekeeper status) and institutional involvement:

- extensive peer reviewing experience, including grants

- nominations to lead in the peer review process (e.g., as panel chair)
- key note invitations
- invitations to lead other gate-keeping activities (e.g., consulting, mentoring for the agency)

Finally, Chi (2006) suggests using a form of independent perspective. In my study this could be about peer recognition:

- research related awards and nominations
- a form of institutional distinction, e.g. research chair
- honorary/seconded membership at other universities or R&D contexts

In essence, while looking for PIs with experiences in the grant funding system, I had built in criteria for situating these experiences within the larger social systems of knowledge valuation and academic work. But even though my criteria are concrete, they were not fully driven by percentages, rates and dollar amounts. My perspective on PI success is more qualitative, informed by the PI's own research goals and the many roles they take on in the system and the ways these play out in individual careers. So my view on expertise, while informed by that of cognitive psychology, is mostly in line with the more holistic one of the genre and writing studies.

4.5.2 Purposive sampling

To define a unit of analysis (a case) in qualitative research, it is recommended that one draw on one's research questions and literature and theory that informed the questions (e.g., Stake, 1995). The purpose of this study is to explore the meaning of success in research funding; and it is framed theoretically within the notions of researcher development in the nested contexts of knowledge making and valuation (genre) systems in academia. As such, because the focus here is on the individual PI and the aim is to build an in-depth understanding of how they develop fundability of their work, the sampling was purposive (Maxwell, 2012).

4.5.2.1 Rationale

Purposive, or purposeful, sampling research enables one to identify and select information-rich cases while maximizing the use of limited resources (after Patton, 2002). This is beneficial here in terms of participant and site selections given that the prime limited resource in this context is a one-researcher-band and a novice at that. Additionally, purposive sampling also risks my being vulnerable to my own subjective judgement and thus being unable to generalize the results (Maxwell, 2012). To address the first of these issues, I have decided on criteria-based sampling (Palys, 2008) extensively informed by relevant literature, as discussed in the previous sections. As for the second, also discussed, this study does not aim for representativeness. Given that success in research funding is considerably more atypical than typical, purposive sampling enables me to explore how pathways to success evolve, and what about them may be unique and what common.

Finally, to inform the participant-specific criteria discussed in the previous sections, I applied the higher-level considerations for purposive sampling, namely seeking to establish a range of similarities and differences between the participants (Glaser & Strauss, 1967/2017); and seeking PIs who were not only knowledgeable but willing to share their knowledge and address a range of viewpoints and perspectives (Rubin & Rubin, 1995).

I proceed by first considering the disciplinary domains and study sites, then the participants.

4.5.2.2 Domains and sites

The study focuses on expert PIs in natural sciences. The reason is composite. One, majority of existing grant research considers PIs of disparate levels of seniority, expertise, and success rates. Two, despite grant writing being discipline specific (Myers, 1990; Tardy, 2011), most studies look at a mixed rather narrowed range of disciplinary domains (e.g., Chen, 2014 music & biophysics, Tardy, 2011 math & language) or stay within the social sciences (e.g., Feng, 2014; Flowerdew, 2016). Such an approach may be valuable for investigating how PIs, in general, develop grant genre knowledge (e.g., Tardy et al., 2020). But, overall, due to the inconsistencies

in participant cohorts and in disciplinary fields, these studies rather enhance the perception of inevitability of luck inherent in grant writing. Three, research on seeking funding in the sciences has been under-represented since the initial interest peaked in the 1990s (Pascual & Unger, 2010). Yet the need for understanding science funding has become increasingly pressing (Naylor et al., 2017).

The choice of the research sites in Phase I and Phase II was in part driven by their location. Since academic “arguments are only locally valid”, genred writing “involve[s] innumerable local decisions” (Freedman & Medway, 1994, pp. 8-11). This study is focused on federal funding of university research in Canada, so Phase I took place at the Anglophone universities of Montreal, McGill and Concordia; Phase II at one of them. Being a student at the former and staff and faculty at the latter, for me the sites also made for a practical choice.

However, this choice is also meaningful in terms of applicability of research findings. Both universities are representative of the Canada-wide federal research funding context in that both are on the list of Canada’s top 50 research universities. In 2012, sponsored research income of McGill university exceeded \$480M, making it fourth-most-sponsored in Canada. Concordia attracted a relatively modest \$44 million in the same fiscal year (Research InfoSource, 2013). In 2020, McGill moved up to the third place in Canada, with \$606M, while Concordia also augmented its income to \$62M (Research InfoSource, 2020).

Phase II, main study, took place at one of the two. This upwardly mobile university is large and actively working towards the strategic goal of upgrading its current institutional status from comprehensive to research. Its institutional dynamics and research support practices capture those of both types of institutions and as such, could be seen to be characteristic of many other universities in Canada.

Principally, within the framework of a single study site and a narrowed epistemic domain, the aim is to facilitate coherence a) in the patterns of commonality and individuality in PIs’

navigating the funding of research and b) in the institutional support structures PIs could draw on.²⁶.

4.5.2.3 N of 3

Qualitative case study methodologists do not prescribe the optimal number of participants (Miles & Huberman, 1994). But the researcher is expected to enhance the study's potential for the understanding of the issue being explored (after Stake, 1995). Below is my rationale for doing so via working with three participants.

Landmark studies of grant writing demonstrate that case-based approach renders the data to be rich, situated and connected in multiple ways within the grant funding system (Myers, 1990, Tardy, 2003). When a study is large-scale and involving multiple methods or multiple participants (e.g., Ding, 2008; Feng, 2011; Tseng, 2011), individuality of the grant writer's relationships and decisions is not in full focus. Such studies are better suited to exploring the scale and complexity of the system itself. Although the relationships they portray are assumed to originate with individual grant writers, the individuals themselves represent the system by navigating and negotiating it. Tseng's (2011) analysis of a small corpus of grant proposals, for example, is focused on promotional features of the text but it does not give a sense of complexity of the writers' reasoning behind its construction. Ding (2008) follows a post-graduate grant-writing course to see how its participants learn about the grant genre system. But again, her focus is on the process of knowledge acquisition overall and teachability of the system rather than on each of the students in depth. Feng (2011), on the other hand, illustrates her corpus-based findings through several individual case studies. But even here, a case study as an illustration does not necessarily enable an in-depth perspective on its participants approaches to funding.

²⁶ Limiting aspects of this approach are discussed in Limitations.

The number of the participants in both Myers' (1990) and Tardy's (2003) studies is two. It addresses the purposes of each. Myers (1990) is not interested in how his respondents have acquired their grantsmanship skills. His focus is on persuasion in science as socially shaped and necessitating discursive responses that reflect the social nature of scientific knowledge. Myers argues that the rhetorical work of such persuasion is best observed and most evident in texts that harbor controversies. Hence his focus of scientists who aim not just to advance potentially controversial knowledge claims but have them funded (unusual/extreme sampling). These biologists face the necessity to articulate their high-risk arguments in a high-stakes genre of the grant proposal. Myers thus wishes to witness and unpack high-stakes conversations of the academy, the sort that through its polemic nature imbues science with credibility. To paraphrase van Nostrand (1997), it is part of the picture. What this means in more practical terms is that the picture, while internalized by disciplinary experts, is not yet likely perceived as such by the novices. It would not be logical to expect expert levels of reflecting on grant writing from a novice academic.

On the other hand, to understand how academics develop knowledge of grant genre and of the web of social relationships in which the genre operates, a contrast between an expert and a novice can be illuminating. Hence, Tardy's (2003) choice of participants who are writing for funding from differing positions on the career spectrum. While Myers is probing how the social reverberates through the scientific, Tardy is interested in the range of genred interactions the grant writer engages in. So her choice of respondent diversity (maximum variation sampling) is fitting. Differing disciplinary fields, respondent experiences as well as their career status in her study aim to maximize the study's findings.

In summary, both Myers' (1990) and Tardy's (2003) choices of the number of participants, the "n of 2" (Myers 1990, p.38), effectively facilitates meaningful explorations of individual experience. The aim of this study is to understand the Individuality in the successful PIs' approaches but also to see if there are any commonalities in how they build towards making their research fundable. With two participants, it would be impossible to consider whether a

given pattern is a variation of the unique or something the PI's approaches may have in common. Hence my choice of three participants. It enables my considering the likelihood of both individuality and commonality in the patterns emerging from data analysis. And as discussed, given the scope-related constraints that I as researcher bring to the study the “*n* of 3” is doable.

4.5.2.4 Procedure for purposive sampling of participants

Upon securing the ethics approval, I contacted five expert PIs based on the following specifics complementing the criteria discussed above: their post-PhD academic and funding experience exceeded 15 years (Ericsson, 2014); they had been grant-funded and active as writers, peer reviewers, and agency-based committee members for most of this period. The participants were recommended by their colleagues, introduced during research development events, or profiled in university web-publications. Three provided formal consent to be interviewed and to share some of their proposal data.

Table 1: Participants Recruitment Timeline

When	2006 Pilot	Early 2016	Early 2016	End 2016	Mid 2017	Early 2018
Who	Paul & Greg	Greg	Paul	Mark	PI-4	Phil
Response	yes	no	yes	yes	no	yes

The first two PIs to be contacted in 2016 were those who had participated in the Phase I Pilot. One of them, Paul, agreed to continue and to reflect on how he evolved his approach to funding since Phase I 2006, which set the tone for a longitudinal exploratory perspective of this study. A fundamental scientist, he was holding a University research chair and offered a significant range of agency-bound expertise with NSERC and CIHR while prioritizing NSERC. He extended his acceptance by recommending several of his colleagues “because I know these people will talk [i.e. be willing to share]”. Of them one, PI-4, had agreed provisionally but due to

his schedule could only commit in about 16 months from the time we made contact and eventually had to decline.

I continued searching for other PIs and upon attending one of the university research office events in late 2016 approached their consultant. Mark was a PI as well as advisor to the research office and both a fundamental and applied scientist involved with CIHR and NSERC in near-equal measure. By agreeing to participate, he offered a wide range of epistemic and institutional expertise, both intra-university and situated within both federal agencies that fund science research. With the interviews and their analysis well on the way I still needed one more PI.

In early 2018, the University media made an announcement of a federal research chair recognized for innovation and upon reading it and looking him up I approached the PI who was profiled. Phil accepted and by doing so offered a distinct perspective of an applied scientist whose primary funding focus was CIHR, the most competitive of the Canadian federal funding agencies.

I thus achieved a selection of participants whose expertise varied epistemically and ranged in duration, across basic and applied science, and who had various multi-role academic and institutional involvement.

A name alias was chosen at random for each PI and the choice is not in any way reflective of their identities. Details that may inadvertently reveal their research specifics were carefully redacted. The aim was to prevent identifying the participants yet retain sufficient attribution to situate their approaches.

Table 2: Participant Principal Investigators (PIs) Main Study

PI	Research	Field	Applies to	Grant funding system experience				
				Writes since	Peer reviews since	Committee member	Reviewer Canada	Reviewer intl ²⁷
Paul	Basic	Bio	NSERC	1997	2004	CIHR	NSERC	NSF, ERC
Mark	Basic & applied	Neuro	NSERC CIHR	1992	1993	NSERC chair CIHR	NSERC CIHR	NSF, NIH
Phil	Applied	Health	CIHR	2001	2006	CIHR	CIHR	-

Like most academics, the three PIs spend a lot of time writing for funding. But they are distinguished by the fact that over the course of their careers they have evolved approaches for sustained fundability of their work. As mentors, they also seek to share their expertise in creating fundable knowledge in ways that benefit both the PIs and their epistemic communities.

4.6 Ethical considerations

Working with interview transcripts and proposal texts necessitated emphasizing to the participants the potential difficulties of anonymity. As my early life experience showed, epistemic sub-fields may be narrow enough for participating scientists to know at least of each other, which may lead to their feeling over-exposed. I also re-iterated this as a risk when organizing initial PI meetings. The approach I proposed was to redact a maximum of the PI personal and research-specific details, while retaining broad epistemic attribution. The aim was to impart meaning to data analysis and the findings but protect the PI identity. The PIs had no objections. The consent forms reflected this approach and received REB-II approval.

²⁷ ERC - European Research Council, EU; NSF- National Science Foundation, USA; NIH - National Institutes of Health, USA.

4.7 The data

My choice of data sources was informed by my readings in genre theory, especially genre systems and the social and situated nature of genre writing, knowledge valuation, researcher development, as well as in sociology and rhetoric of science. This literature emphasizes various modes of interaction the researcher engages in, so I sought to understand how, in the process, my participant PIs make the front-line knowledge they produce fundable.

4.7.1 Data considerations

Two things need to be noted with regards to my data. The first is about *data collection from multiple sources*. Although I do draw on many, these individuals, events, and genres are not in the main of the study and are not to be profiled in detail. Their role is to situate and enrich the participants' perspective. I consider this in detail in the section that follows.

The second note concerns *data analysis and validation*. Ensuring data accuracy and its interpretation, along with data triangulation, emphasizes the rigor of one's approach (Creswell, 2007, p. 46). So I established the process at two levels. The first was to invite the participants to comment, if they wished, on my interpretation of the data (e.g., Keranen, Encinas & Bazerman, 2012). Due to the intensity of their work schedules and the differences in our research goals, the PIs expressed preference for doing so by addressing my follow-up questions. Indeed, they seemed to welcome this as an opportunity to reflect on their experiences or perhaps validate their meaning, or both. The second was to validate my interpretation of the data through my discussions with Dr. McAlpine, my primary supervisor. These were monthly and focused on situating the emerging categories in the nested social contexts of funding, knowledge and academic work. This mode enhanced the depth of the resulting interpretation of findings and the subsequent contribution of this thesis²⁸.

²⁸ In the process, both Dr. McAlpine and the PIs ended up mentoring an epistemic newb (me).

4.7.2 Data sources

I collected data from many sources – PI interviews, their proposal drafts and other writings, agency websites and documents, and system related events and stakeholder interactions. Each type of data is considered below.

4.7.2.1 System-related events and stakeholder interactions

A number of key constituents of the grant funding genre system as well as the institutional strand of PI interactions within were illuminated through my attending several university-based events coordinated by the research office. These took place early on in the study, during 2016, and informed my preparations for contacting and interviewing PIs. Through these events I was able to observe the workings of some of the nested contexts of grant finding. In effect, they facilitated my learning of and framing the study within the institutional contexts of funding at the university and agency levels. These events were: Tri-Agency information sessions, research administration round table, and consultations with the research office director and with a recent program director of one of the Tri-Agencies.

4.7.2.1.1 Tri-Agency information sessions

Information that frames my PIs' participation in the system of grant funding stems from two 2016 information sessions related to federal funding. These open-access sessions were organized jointly by the Tri-Agency and the university research office. The ones I attended were designed respectively for PIs in natural sciences and engineering and applied sciences. Each session featured a presentation prepared by the agency and delivered on their behalf by the office director; it focused on the logistics of the submission process. The presentation was followed by a keynote delivered by an in-service agency committee member. These were senior PIs working at the university, with a track record of both funding and committee memberships. Their key-notes provided in-depth perspectives on proposals expectations and the evaluation process. The sessions concluded with administrative clinics where representatives of the university units liaising with funding agencies or involved in administering research funds offered support to the attendees.

These sessions helped embed the participant PIs' perspectives into a broader context of peer evaluation and critical junctions of deliberation. They aided in framing these PIs' views on proposal feedback. Because the events addressed mixed audiences, from novice to mid-career to more experienced PIs, the presenters were explicit about proposal evaluation process and in some cases went over it step-by-step. This helped me to solidify my understanding of how finding decisions tend to be reached.

[4.7.2.1.2 Research administrators' round table](#)

The research administration round table I attended in 2016 was one of the regular bi-weekly meetings that bring together faculty-based research administrators and the related staff of the research office. The meetings are meant for discussion of routine issues in the funding and proposal submission cycles, for dissemination of new information issuing from the funding agencies and the university. But also, these meetings are a place for problem-solving and brainstorming of the concerns the administrators encounter in their contact with PIs. Most often these issues are related to proposal writing or PI responses to feedback, so the round table was particularly useful for my understanding of several things.

One of these was the logistics of PI-facing institutional support. Another was the dynamics of how the PIs and research administrators interact on a day-to-day basis. Interconnected with this all was insight into the nature of the research administrators' work. But most interestingly, I gained insight into how PI responses to the proposal genre and grant funding overall are perceived by system members other than peer reviewers.

I also learnt about some Canada-specific aspects of research administration management. In Canada, as in the US, program officers may be involved in selection of panelists and reviewers. Unlike in the US however, they do not directly affect the funding outcomes. That is, while Canadian program officers may provide advice if approached by applicants, their advice is logistical in nature and does not extend to the proposal draft. Instead, the PIs in Canada are

expected to contact their faculty research administrators. This was brought up during the research administration round table event, thus providing me with a high-level institutional perspective on the workings of the Canadian vs US science funding agencies. But more specifically, this source of data has given me a sense of why my expert participants, in their capacity as writer-PIs, do not tend to interact with agency program personnel.

Additionally, research administration events helped me understand how PIs may interact with their university research offices. Faculty-based research administrators can reach out to PIs for feedback on proposal writing in terms of structure, formatting, content weighting at evaluation, and other forms of institutional advice on drafts. While research officers may have an overall and up-to-date knowledge of how the grants are evaluated, their perspective is that of an editor rather than author. But in it is their strength as this service could be useful to writer-PIs. For my expert participants, some of whom consult for the research office, this was definitely peripheral, which explained why their contact with research administrators was minimal. On the other hand, I learnt about an institutional source of proposal writing support for less experienced or less successful PIs.

4.7.2.1.3 Consultations with research administrators

To be admitted to the 2016 information sessions and the round table I asked for the research office permission. This was how I came in contact with the director of the R&D unit that coordinates the work of all PI-facing research administrators, including those based in faculties and research centres. The introductory meeting with the R&D director provided me with more than a permission to attend research events. I was given a comprehensive tour of the unit. In effect, I obtained system-related data on the nature of the unit's work in supporting grant writing PIs, on the advantages and challenges of as-institution dispersed network of research administrators, on the role of the unit within the larger scope of the research office and in relation to the university's strategic research goals. And I learnt about the unit's interconnectedness within the grant funding system and the significance of it for the PIs.

Finally, the R&D director introduced me to a recently retired associate director of one of the CIHR institutes. This was particularly helpful as both agency information sessions I was invited to were NSERC-led. At the time of my interactions with research administrators the university had not had a faculty of health, so CIHR was not as present on campus as NSERC was. But the former CIHR administrator became a source of information on how CIHR as an agency worked, how its evaluation processes were structured and how the agency operated while these processes were being re-structured during the mid-2010s. As the agency insider, this administrator also had insight into the competitiveness of the CIHR grants and reasons for their famously high rejection rate. This consultation gave me a sense of differences between NSERC and CIHR and therefore helped to situate the participant PIs' discussions of how they write for each agency and how they architecture their interactions with and within each.

These events and individuals could have become more prominent if I were, like Tardy (2003), focused on the grant funding system itself. But my study focuses on the PI, as situated in the progressively embedded systems of funding, knowledge and academic work. As such, I did not seek personal perspectives of the research administrators. Nor did I aim to delve in depth into their roles in the system although the insight I gained is worth investigating further. For now, these individuals represent the funding system and provide samplings of the relevant PI interactions in and with this system.

4.7.2.2 Proposal drafts and other PI writings

The participants were asked to share some of their recently funded and rejected proposals along with reviewer commentary and a curriculum vitae. The choice of other documents, if any, was left open to their own decisions. The purpose of this request was to build a perspective of how the participants enact their multi-role engagement in the system in their own proposal writing. Each participant provided drafts and final versions of several accepted and rejected grant proposals. Reviewer comments and agency decisions were shared along with most of the proposals; there were also research articles and one rebuttal.

Proposal writing shared by the PIs covers the following years and agencies: 2012-13-14 for Paul, NSERC and CIHR; 2010-11-18 for Mark, NSERC and CIHR; and 2008-12-13-18 for Phil, CIHR.

These texts were called on by the PIs when discussing their participation in the funding system, so they reflect the evolvement of the PI's learning and thinking about fundability of their work.

These shared submissions are illustrations of particularly significant moments – negative and positive - in the PIs' grant funding histories. For example, one of the grants shared by Phil had been rejected by CIHR seven times before being funded. Its construction process was what Phil drew on to consider how he had developed his stamina as PI, how he learnt to advance the new knowledge he co-creates drawing on collaborative input to pre-address CIHR peer review concerns.

These texts are also reflections of how the PIs draw on their experience of multi-role participation in the system to conceptualize their peer reviewers. The submissions shared by Paul and Mark, for example, demonstrate how they learnt to address the differing worldviews of NSERC and CIHR reviewers. But if in Paul's case it was reviewer commentary itself that was truly revealing, in Mark's case it was his presence at CIHR committee restructurings that gave meaning to the reviewer commentary.

In other words, the writing shared by the PIs was not subject to text analysis in the way it was in Phase I Pilot. Here, in the main study, it provides insight into the interconnectedness of the PIs' research thinking, purposeful participation in the system, and ongoing learning from all their experiences with the goal of making the front-line knowledge they produce fundable. The texts they shared are time-captures of particularly significant moments in their journeys.

4.7.2.3 Interviews: considerations and challenges

Participant interviewing has long been one of the traditional methods in social sciences and education research (Maykut & Morehouse, 1994; Merriam, 1998; Denzin & Lincoln, 2000, Rubin & Rubin, 2005, Seidman, 1991/2006). Because conversation is fundamental to human

experience (Lamont & Swidler, 2014), the interview in these domains has come to be viewed as an increasingly valued method. One of the main advantages of interviewing particularly relevant to this study is that it can encourage an interviewee “to evoke a variety of interactional settings, social contexts and institutional situations” (Lamont & Swidler, 2014, pp. 159-160). The discursual value of the interview is in eliciting “individualized articulations of shared understandings” (Gubrium & Holstein, 2012, p. 40). Since interviewing yields highly contextualized data, it enables the researcher to combine “depth of understanding with purposeful, analytic, systematic research design” and thus to address theoretically motivated questions (Lamont & Swidler, 2014, p. 159).

Like any other method, however, interviewing has its limitations. I do not mean to attempt an exhaustive list of interviewing pros and cons here but rather look at some issues that had potential to affect this study.

Reflecting on his own experience of being interviewed about writing, John Swales considers interviewee “tendency, in these mental retrospective reconstructions, to rhetorically embellish or over-intellectualize the thought processes presumed to have taken place” (Van Bonn & Swales, 2007, p. 106). Lamont and Swidler (2014) further caution about retrospective narrative coherence in interviews, which could encourage the researcher to see order where unpredictability and contradiction may have been the case. As they put it, an experience “told from present backward almost certainly will appear to have inevitability and direction that it did not have when it was lived” (Lamont & Swidler, 2014, p. 163). Although I firmly believe this was not the case during my interviews, I opted to build in a margin for what the former director of the British Museum Neil McGregor (2010) calls a poetic dimension of reflecting on past experience. Hence multiple sources of data to mitigate any poetics.

Interpretation of interview data also poses challenges. One such challenge would be to “accurately explain meaning-making within the interview situation with reference to larger, historically shaped” system of research funding (after Lamont & Swidler, 2014, p. 161). To

address this, I grounded the study in a conceptually wider frame than the pilot's which enabled more informed data collection and interpreting. Exploring evolving strategy as a situated process contextualizes my analysis in the progressively larger systems of funding, knowledge (e)valuation, and academic work. This enables a distinct contribution to the knowledge generated by the landmark studies of grant writing.

Robust theoretical triangulation helps me address another potential caveat. Interview-based explanations are easy to silo within an individual attribute (e.g., discipline, career status, gender) instead of seeing them as reflecting the institutionalized character of the interviewee's experiences and worldviews (after Lamont & Swidler, 2014, p. 162). I was able to observe an example of this at a research seminar on grant writing in 2015. Discussing the idea of textual coherence, one of the presenters illustrated with excerpts from her own Submission 1 (failed) and Submission 2 (successful). The two excerpts were interpreted within the context of writing for funding in educational studies. The information was praised for being most useful due to its visual quality and was perceived as new. But for one person in the room it was a "yes!" moment. This interpretation of textual coherence through text excerpts was a near-exact replica of what I did in the pilot, whose outcome was thus validated (Yousoubova, 2011, p. 146-147). In my eyes this fortunate incident in a different discipline had also confirmed the solidity of the pilot's methodological frame and findings.

In essence, I have built a base for "complementary mobilizing of various kinds of evidence" (Lamont & Swidler, 2014, p. 165). Aside from the main interviews, I snowballed (Patton, 2002) to system events and participating stakeholders to enrich the information provided by the primary participants, e.g., program chairs, research administrators, review panelists, support personnel at research office events.

4.7.2.4 Interviews and other data collection: procedure

The PI interviews were conducted in 2006 and 2016 for Paul, in 2016 and 2018 for Mark, and throughout 2018 for Phil. The first interviews were semi-structured, the following interviews

semi- to fairly unstructured. I chose this mode so as to encourage the expert PIs to reflect on and identify the issues that they themselves found most significant for their funding success. Reflecting the study's emergent design, the interview questions were also conceived to evolve, if and as necessary, for each participant. However, this did not affect the core of the interview questions which aimed to shed light on the study's research questions.

There were two to four interviews with each participant. The initial aim, respecting the PI wishes, was to have two interviews with each. However, to accommodate their changing schedules or immediate availabilities as well as to address remaining or follow up questions or seek clarifications, adjustments were necessary. Because of their limited availability and the nature of the follow up questions, which required reflection on their part, all three PIs preferred to address these in person. It was also clear that talking and thinking out-loud was their preferred way. Hence, given that follow up questions and PI availabilities and preferences varied, the outcome was a varying number of interviews per PI. To illustrate, if within-question follow ups took up the allotted interview time, PIs would ask me to come again (Paul and Mark). Or, they would ask me to email them with the follow up so they could think about it before the next meeting-interview (Mark and Phil).

In other words, I strove for maximum flexibility in the approach as it was clear all the PIs aimed to be thorough in both understanding my questions and addressing them. The PIs gave me as much of their time as was necessary to address the questions I had or issues they thought were important to emphasize. In the end, they had gifted me with a lot more time that was planned originally. This is another indication of these PIs fitting the criteria outlined by Rubin and Rubin (1995).

I prepared, discussed and agreed each set of questions with Dr. McAlpine ahead of the first interviews. I then emailed the questions to the participant to be interviewed. Follow-up interviews were arranged to address the questions remaining or arising from the previous interviews and from the shared texts. The principal criterion for question development could be

summarized in two parts. The first was “What did this PI emphasize especially prominently about his own approach and the funding situation?” The second was “What stood out as out-of-ordinary about this PI?”. The process for this adjusted-to-individual approach was thus iterative, with the experiences of the previous PI informing data collection for the next.

All interviews and other data collection took place sequentially, i.e. there was no overlap in interviewing the participants. After completing the interviews of a participant, I would analyze the data, then write a draft of the corresponding findings chapter and discuss it with Dr. McAlpine. The within-case analysis informed the interview questions for the next participant. Any adjustments to interview questions were discussed with Dr. McAlpine. All interviews were audio-recorded and manually transcribed. During follow up meetings I also took notes by hand, then added them to the transcriptions.

Table 3. Data collection and analysis

	Paul	Mark	Phil
In contact	2006 + 2016	2016-18	2018-19
Total contact hrs, apprx	15	12	8
Interviews	4	3	2
Informal contact	n/a	Minimal	n/a
Correspondence	logistics, scheduling, etc. - not research		
PI docs & sources			
Proposal drafts	2 x NSERC 1 x CIHR	2 x NSERC 2 x CIHR	3 x CIHR
of them accepted vs rejected	1 vs 1	2 vs 2	2 vs 1
year(s) submitted	2012-13-14	2010-11; 2018	2008; 2012-13; 2018
Peer reviewer comments			
PI rebuttals	n/a	1	n/a
Agency decision letters			
PI websites			
PI project websites			
PI lab websites			
PI public outreach	n/a		
PI social media	n/a	n/a	
System docs & sources			
NSERC & CIHR websites	2015-21		
University websites			
Uni Research Office website	2016		
Uni Director of R&D consultation			
Uni research admin round table			
Uni / NSERC info sessions			
CIHR program admin consultation			
Within-case analysis	2016-19		
Cross-case analysis	2020-21		

Legend: green = applicable; white = non applicable

At the start of the initial interview, the PIs were asked to reflect on the role funding plays in their research work, on their funding history, and on their experiences of learning and of grantsmanship. They were not directly asked to describe their current participation in the nested contexts of funding, knowledge, and academic work. Rather, they were asked to consider, in fairly undirected ways, the roles they assume in these systems and how these reflect into their own approaches to funding and proposal construction. The aim was to elicit these PIs' reflections on how their continual participation over time has informed their approaches. Open-ended questions sought to reflect and respect the duration, extent, and scope of their involvement in these systems. Probing questions aimed to expand on the information PIs were providing. Each set of interviews is thus fairly unique but, through cross-case analysis, provides for identifying commonalities as well as individual variation in the PI approaches.

I maintain that the above approach facilitated my collecting rich sets of data that reflects each PI's lived experience in considerable depth. It should be noted that each data set is situated within the funding context specific to the PI and is PI-specific due to individual details. But overall, each set of data remains focused on the research questions of this study.

4.7.2.5 Agency, university, and other documents and websites

While I collected and analyzed the data and wrote findings drafts, during 2016-2021, the [CIHR](#) and [NSERC websites](#) were a source of detailed information about the funding lines which support the PIs and the proposals shared by each. The sites were also a source of success rates statistics and of insight into the agencies' structures and opportunities for researcher involvement.

The additional sources of data outlined below were not provided to me by the PIs. I have looked up the information that was openly available on the web. These sources enabled me to consider some concrete instantiations of the PI approaches in the wider context of knowledge valuation and academic work.

Each PI had been profiled in the [university media](#) more than once. Publicity articles and interviews about their funded research had been published both before and during the data collection phase. For me, they served to validate the meaningfulness of their approaches to the concrete circumstances of the study site as their workplace and as such to their careers. But these sources were also indicative of the significance an academic institution attaches to the grant success of individual PIs.

At the time of data collection and analysis, [each PI had a website](#), or several, that pertained to their ongoing research. These addressed, without being limited to, industry partnerships (Paul), interdisciplinary research outreach (Mark), or globally networked research platforms (Phil). Additionally, Paul's work was profiled on the Canada Foundation for Innovation website; Mark's in university and popular media; and Phil's highlighted on the CIHR site. These sources provided insight into the breadth of knowledge valuation of these PIs' work.

Further public sources included [social media](#), specifically Twitter and YouTube. I was informed by Mark and Phil that academics do not have much time to create original content for social media but to maintain presence and grow networks they occasionally re-tweet posts by other academics whose work or statements they find meaningful. YouTube videos featuring the PIs were mostly records of the PIs giving key notes or being interviewed at their own and other universities. These sources did not prove significant for my purposes. To understand their meaningfulness for this study one had to be familiar with the subject matter. My intake here was limited to observing that the work of these PIs is networked into their communities of knowledge on a social level. This may speak to a wider impact of the PI's approaches but it remains a guess at best and is not part of the analysis.

[4.8 Analysis: a blended approach](#)

The analysis of each case was mostly concurrent with the data collection, aiming to inform my own thinking and to refine the collection of further data (Miles et al., 2014). At the monthly

meetings, I sought Dr. McAlpine's informed feedback on the data progress. These meetings formed the base of the mainly open-coding approach adopted for the data.

4.8.1 A priori concepts and emergent coding

My coding of the data was guided by the purpose and the research questions of this study. Aiming to understand how the PIs develop their approaches over time, I situated the analysis within the narrative approach (McAlpine, 2016; Riessman, 2008). I relied primarily on emergent (inductive) coding which had its base within the *a priori* (deductive) codes from literature (Creswell, 2013).

4.8.1.1 A priori concepts

The scope of the *a priori* codes was informed by the principal categories of my theoretical framework (Creswell, 2012). Specifically, it focused on PI engagement with the grant genre system evolving within the strands of researcher development and situated with the nested systems context of research funding (after Bazerman, 1994; McAlpine et al., 2013; McAlpine & Norton, 2006). The researcher development strands – intellectual, interactional, institutional - (McAlpine et al., 2013) identified how PIs develop as researchers within the nested contexts of academic work (McAlpine & Norton, 2006). The constituents of the grant funding genre system identified the related PI interactions in system of grant funding and included written and online documentation and the perspectives of the system stakeholders (Tardy, 2003),

But rather than coding *a priori* in the received way of approaching data with a pre-determined set of codes (Saldaña, 2014), I drew on these notions to evolve and inform my emergent coding process. This reflects Creswell's (2013) recommendation for imparting flexibility to coding so as to facilitate identification of emergent patterns.

4.8.1.2 Emergent coding

Emergent, or open, coding as a method is well suited for exploratory qualitative studies (Creswell, 2013) since it enables a continual inductive development of the coding categories.

Categorizing and connecting via open coding (Maxwell & Miller, 2008) also include a recursive element which served this study well. As I read through the transcripts, documents and drafts and discussed them with Dr. McAlpine, patterns and questions and more questions would emerge. I would seek possible interpretations or answers or further ideas, and these would often send me back to the literature or to the participants. As already mentioned, this process enabled the study's evolving design (Creswell, 2013) and a continual assessment of the interview questions.

4.8.2 Narrative, genre and text analysis

Narrative analysis, originally devised to explore life histories in anthropology and sociology, is defined by storytelling. And because experts communicate through stories (Hoffman, 1996), a synergy suggested itself between my choice of participants and the method.

As a method of inquiry, narrative analysis is suitable for exploring many forms of storied narrative, including oral and textual, and due its capacity to consider a problem as a holistic whole, for "conducting case-centered research" (Riessman, 2008, p. 11). Several other factors have contributed to my considering it for this study. One is that as a form of inquiry narrative analysis is inspired by Bakhtin (1986) dialogic perspective on any utterance reflecting many other related utterances, which lends it the genre's sense of interconnectedness. Additionally, respecting narrator-specific features that characterize individual stories, narrative analysis has embedded capacity for "honoring individual agency and intention" (Riessman, 2008, p. 12). That is, rather than seeking to sub-divide an account into codes, it encourages the researcher to consider it globally, i.e. enabling a case-based macro perspective. Given that I sought to foreground intentionality and agentiveness in the expert PI journeys to research funding, the above aspects of the method made it a reasonable choice.

At the same time, had it been a sole method adopted for my inquiry, it would have limited my analytic scope. The very benefit of narrative analysis in respecting an individual story as a unique whole can be challenging in moving to a cross-case analysis looking for patterns. But

narrative analysis can be composite in nature, encompassing input from other forms of inquiry including text and discourse, so it lends itself to being combined with methods that could generate such categories (Riessman, 2008, p. 12). This is where I saw the affinity of narrative and genre analysis.

Not only does genre analysis enable situated understanding of text, discourse, and writing (Swales, 1990, 1998; Bhatia, 2004; Tardy et al., 2020), but it is premised on Bakhtin's (1986) notion of the dialogic as regards the nature of writing and genre learning. This suggests that both narrative and genre inquiries operate via the lens of interaction, which in turn is the core of the concepts of researcher development (McAlpine & Amundsen, 2016) and expertise development (Ericsson, 2014). Given that learning occurs when genre system participants interact with the related genres, people and system constituents (Bazerman, 1994), methodologically I have built towards being able to construct rich and valid descriptions that would lend themselves to potentially being applicable in broader, relevant contexts (after Creswell & Miller, 2000).

The analysis foregrounded the PIs navigating and negotiating an embedded social system. Because the process involves PI interaction with genres, stakeholders and structures of the system, proposal text does come into play as a core system constituent with which PIs engage. This is why here I regard the texts shared by the PIs as artefacts capturing particularly significant moments in their learning journeys. As such, text analysis here is supplementary to the narrative and genre system core. I draw on texts to illustrate the PI stories and to build mine.

Finally, genre analysis prioritizes a developmental lens when seeking to understand how writers develop genre knowledge, awareness, and mastery (Tardy et al., 2020; Tardy & Swales, 2008). Developmental perspective is another core concept of researcher development, so together genre and narrative enrich my analytical capacity to consider individual PI stories, their proposal writing and system participation, and the bigger picture of funding success. That is to

say, this fusion of synergetic approaches helps me address the treacherous “so what?” question (Myers, 1991b) that looms over every research inquiry.²⁹

4.8.3 Within case analysis

The intra-case analysis was focused on identifying individual patterns emerging in each case. For each case, I first noted each PI’s past and present experience with research and funding. Then, I began noting the themes that impact the fundability of their work and connections between these. Most of these had been identified by the PIs themselves, so I focused on the meaningfulness for success that the PIs ascribed to these categories and on how they perceived the interconnectedness between the categories. Coding was inductive and on-going so as to contextualize the emerging categories within each case and within the funding system and the larger contexts it is nested in.

To illustrate, the in-case analysis for Paul was performed in two steps; this resulted in identifying an emergent notion that defines Paul’s approach. The first step was to map the history, nature, and extent of Paul’s engagement in academia. Because of his participation in the 2006 Phase I Pilot some of these data were already on hand, so I put the emphasis on how Paul’s path as a PI evolved since 2006. He focused on his learning about the diverging priorities of NSERC and CIHR and his navigating these contexts to ensure fundability of his research which is *his* priority. The second step was to consider his interactions in these contexts and the role they play in the interconnectedness of his engagement and of the process he evolved for funding his research. Trends emerging from the analysis were categorized and interpreted via open coding which, as discussed, is a method often relied on in exploratory qualitative research

²⁹ In the studies of writing for funding, the concept of *narrative* is also associated with construction of a text. In this, textual, sense it could be juxtaposed with a *plot* and associated with a potential shortfall of lacking the plot’s structural scaffolding and therefore meandering without direction (van Nostrand, 1997). Mintzberg’s concept of emergent strategy helps me address this when projecting the notion of narrative onto a larger-than-text canvas of PI case studies. That is, regardless of whether the PI’s evolving approaches and narratives about them had an embedded plot, they never lacked the sense of direction, in parallel with Mintzberg’s projected strike point. That point, making their work fundable, vectors onto the “so what?” question.

(Creswell, 2013). Through this process, I identified several themes related to identity-trajectory; of them, those explicitly connected to research funding by Paul or those recurring consistently through the data were selected for substantiation. These were: 1) his assuming various roles in the funding system, 2) his seeking and reciprocating input on his work by peers, 3) his targeting the likeliest sources of funding for *his* research, and 4) his striving to prioritize quality of science in all his interactions related to knowledge (e)valuation. The supra-theme connecting these four was learning, in part because Paul also emphasized it. Further analysis focused on identifying patterns in the data related to Paul's continual learning from his academic interactions; I also identified and selected quotes from interviews that illustrated Paul's overall, historical and ongoing, engagement with the funding system. As a result, this helped me identify the core emergent notion that encompasses the themes patterns and characterizes Paul's approach in relation to the research question. I named it "everything is feedback". Throughout this process, I regularly conferred with Dr. McAlpine in an on-going review of coding and interpretation of data.

4.8.4 Cross-case analysis

Secondary analysis sought thematic commonalities, while preserving differences, across the cases. Several themes situating the PIs' research thinking and approaches to funding were identified in the process of the within-case analysis. Those consistently and independently prioritized by each of the three PIs as relevant to making their work fundable, although the particularities might be PI-specific, were selected for further analysis: a) openness to learning and purposeful multi-role participation in the funding system, especially via b) peer-reviewing service and c) stakeholder interactions.

To illustrate, the earliest among the patterns to consistently emerge across the themes was research networking. Although its particularities were PI-specific, developing and nurturing intellectual networks as part of participation in the funding system was clearly a priority for all three PIs. This emergent notion was enacted by each PI in an individual way, reflecting their research goals. Phil emphasizes traditional interpersonal contact, while more experienced Paul

and Mark often network in more occluded ways. Similarly, the networking pattern is more explicit in Phil's proposal construction because the input of his collaborators is integrated throughout his writing process. Paul and Mark also reflect the input of their research networks in their writing but rather internalizing it, which is different from Phil, and in distinctly different ways from each other. That is to say, in this example the cross-case analysis enabled me to a) identify networking as a pattern applicable to all three PIs, yet also b) see that each PI has their own way about it, and c) each projects their ways of networking into their thinking about and constructing proposals.

In other words, at this stage of analysis I identified the patterns to consistently emerge across cases – referring to the relevant data as appropriate – for the themes above. The primary criterion here was their meaningfulness for research fundability with which the PIs endowed them. I then looked for each pattern being reflected in the PIs' thinking and proposal construction processes.

4.8.5 Data management

As I was collecting, transcribing and analyzing data for each case, I continually (re)interpreted it as I carried on collecting, reading, and thinking. This facilitated my connecting of the categories, identifying their inter-related themes, and considering their more abstract dimensions (Creswell, 2007). While I mostly analyzed the data manually, the initial steps of the analysis were facilitated by Scrivener, a free-writing software with capacity for process and story mapping. As the analytical flow began to take shape in each case, Scrivener's storyboarding helped me question my process and enrich it. It helped me tell a story with and through my data, something a researcher is encouraged to do but something where concrete guidance is sparse.

All in all, I believe my process of data analysis facilitated an organic portrayal of the complexity of the findings. Narrative and genre analysis enabled rich portraiture of the PIs and their approaches, both evolving over time. Manual coding facilitated nuanced contextualization of

details, categories and patterns. Story-boarding gave me the flexibility to consider the PIs' stories while building my own; it also helped me see how the PIs make sense of so many moving parts of research funding. Their navigating and negotiating of these reflects the nestedness of funding, knowledge making, and academic work.

4.8.6 Establishing quality

To enhance adherence to rigor in qualitative research, Creswell (2007, p. 46) recommends considering such characteristics of it as a) evolving design, b) multiple levels of data analysis ("from narrow codes to broader inter-related themes to more abstract dimensions"), and c) data analysis using multiple levels of abstractions, e.g., from particular to general. As detailed above, I implemented all three.

Due to their limited availability, the three PIs elected to address member checking during interview follow-ups. To accommodate this, I included read-back questions into the interview process and offered my brief interpretations of the data during interviews. I would then integrate the PI feedback into the drafts. To address the issues of rigour and data validation I relied on two strategies. The first was to ask my supervisor to act as an outside reader. Throughout the process of interview and question design and through the collection, analysis, and interpretation of data I conferred with Dr. McAlpine monthly in an on-going review. Another key source of validation was submitting part of the findings for conference presentations and journal publications. Anonymous reviewers provided extensive feedback on the data and my interpretation of it. Having an experienced supervisor and senior colleagues as outside readers enriched and informed the process, challenged and expanded my research thinking, and evaluated and validated the findings.

The breadth and depth of my data at times was overwhelming. But cycling back to the research questions helped me regain perspective. The encompassing span of the main and sub-questions made it possible for me to consider the multiple directions the data were taking me in. At the same time, the streamlined nature of the questions kept my thinking fairly focused. It enabled

me to explore along the lines of Creswell's (2007) recommendations. The principal value of this guided but time-consuming exploration has direct bearing on the study findings. I captured both the unique and the shared in each PI's approach, rendering their stories relatable and, in the process, demystifying grant success.

4.9 Limitations

There are several issues which stand out with regards to research design and sampling.

One of these is *gender*. Connor (2000) found that although all her interviewees had considered self-assertion to be a challenge, female grant writers felt less confident about it than the male writers. It so happened that at the pilot stage, even though I was not concerned with the gender issue at the time, both my interviews were with male scientists. I kept the gender consistent for the present study as I believe this is useful in streamlining the interpretation of the findings. Recent work in the studies of higher education finds that gender disbalance, especially in the sciences, extends far beyond the concerns over women as PIs (Handley et al., 2015; Huang et al., 2020; Larivière et al., 2011; O'Connor, 2020).

Another issue is the *epistemic range* under exploration. In my study this refers to both the participants and the funding agencies. Because I worked with three scientists, the agencies in focus are those supporting science research, NSERC and CIHR. This leaves the third member of the federal Tri-Agency, SSHRC, out of the picture. There are two things to be said in this regard. One, although focus on the sciences may seem narrow, epistemically their range is very wide. The three participant profiles are testament to this. So given that the grant proposal as a genre is defined by the epistemic field (Connor & Mauranen 1999, Connor, 2000; Tardy, 2011, Tseng, 2011), spreading across the sciences, social studies, and the humanities would have resulted in an unmanageable, for a thesis, scope.

The third issue is the scope of the *study sites*. As already mentioned, the Pilot took place in the two Anglo-universities of Montreal, the main study in one of them. I stand by my earlier point

that in tandem with a narrowed epistemic range this facilitates coherence within and across the findings. However, although the study does not aim for national representativeness, a wider scope of Canadian study sites - Anglophone, francophone, and a combination - would considerably broaden the impact of findings, as would, eventually, expanding the study internationally.

The fourth issue is that this is not a conventional writing study as such are generally understood in two respects. Given my interest in *genre knowledge development*, grant writing, as an integral component of the PI's academic expertise, was also about developing genre knowledge, or competence (Bhatia, 2004). The *how* of this particular development is the focus of Tardy (2003), Ding (2008) and Feng (2011), and I proceeded on the premise that writers evolve their proposal genre knowledge on an on-going basis (after Connor & Mauranen, 1999; Tardy, 2003; Tardy et al., 2020). But I was also concerned with how they deploy this ever-evolving knowledge in conjunction with their other experiences in the funding system to make their work sustainably fundable. This approximates what Tardy et al. (2020) term genre awareness. I considered proposal construction from a macro perspective, with my primary focus on the PI.

Finally, while *peer review* is *the* modus operandi in research funding (e.g., Avin, 2015; van der Meulen, 1998), grant reviewing processes are not standardized across the funding agencies, Tri-Agency included. As the PIs' knowledge of the review process had considerable bearing on the success of their proposals (van Arensbergen & van den Besselaar, 2012), this necessitated an exploration of the practices at NSERC and CIHR. While this meant augmenting the data to be collected in order to maintain the study scope, the peer reviewing considerations here are limited to NSERC and CIHR and peer reviewing per se is not part of the study.

4.10 Brief re-cap

I noted that the majority of research investigating grant writing looks into the experiences of PIs of disparate levels of seniority, expertise, gender, and success rates. Furthermore, despite grant

writing being discipline-specific (Myers, 1990), most studies consider grant proposals in a mixed set of epistemic domains. Such an approach may be valuable for investigating how PIs, especially novice PIs, across the board develop and deploy grant genre knowledge. But, overall due to inconsistencies in participant cohorts or in the epistemic fields within a given investigation, these studies rather enhance the perception of inevitability of luck inherent in grant writing.

As noted above, this study's focus on experienced PIs in natural sciences. But the stakes are high regardless of expertise. Grant failure rates (only 14% CIHR proposals in 2014 were funded – personal communication) indicate there are plenty of PIs, experienced and less so, who are not successful. All the more value then in considering the research funding approaches of those who are successful and who may approximate Myers' portrayal of the atypical.

To illustrate, when David Crews, one of the two biologists whose writing Myers analyzes, likens the study to ethology, Myers does not disagree. Ethologists study human behavior and social organization from a biological point of view, and Myers perceives a parallel with construction of persuasion in science:

Like ethologists, we should not only observe and categorize the behavior of individuals, we should also consider the *evolution* of this behavior in its ecological context and compare it to behavior of other species in other environments. And I agree with Dr. Crews that *atypical subjects may provide the best means of reexamining received ideas* about behavior (Myers, 1990, p. xiii, italics mine).

Here, one may perhaps hesitate to fully appropriate the term atypical. But as an analogy, if 86% failure rate is a norm, the 14 successful percent of PIs may be seen as having done something unusual - atypical - to stand out, and stand out in fundable ways. What this means is that even though knowledge production in academia will always remain an idiosyncratic process, an understanding of how experienced *and* successful PIs evolve approaches to address the risk of funding failure would be valuable.

The same analogy may be useful in considering the somewhat muddled outcomes of the large-scale and/or multi-approach studies. The value of their contribution is in framing and effecting the received ideas about grant funding. These studies map the land. But to understand how PIs evolve effective strategies for success, case-based studies of experienced and successful few would be more productive. Given the PI-specific circumstances of proposal construction and low levels of funding success, consistency in attribution of how PIs build pathways to success would be useful. It may facilitate the means of re-examining a received idea. Or is it, perhaps, a myth-conception of luck?³⁰

³⁰ Asprin, R. L. (1980). *Myth Conceptions*. New York, NY: Ace Books.

5. Findings: the preface

Dans les champs de l'observation le hasard ne favorise que les esprits préparés

Louis Pasteur, l'Université de Lille, 1854

Each of the three individuals in this study is unique. To present them with coherence yet preserve their uniqueness I chose to structure their cases, each a chapter, around my research questions. Each case is loosely centered around the iStrands - intellectual, institutional, and interactional (intertext and interperson) - of researcher development, with different strands interconnecting differently in each PI story. I have also aimed to respect each PI's story while telling mine. PI cameos open the way to detailed exploration of each case. Individual case chapters are followed by cross-case analysis in which I tease out themes and patterns shared across cases and serving as foundation for the emergence of the study's conceptual contribution.

5.1 Constructing the findings

The discussion in the PI chapters is recursive, revolving around several main themes because in lived experience the themes are not separable. That is, a theme, just like the PI's grant work, may be nested within one or more nested contexts. To facilitate making sense of the material at hand, I follow in the Bakhtinian tradition of informed intertextual interpretation. That is, my approach has assimilated many expert voices heard or read in the course of my studies and, adding my own voice to the conversation, I now participate in other dialogues with other people about other things.³¹ The need to be recursive in the discussion of my findings is in large part due to inseparability of the iStrands in academic work. Their nature, as that of academic work, is integrative. They interweave and resurface, together building up to a bigger picture.

³¹ Drawing liberally on Matusov, E. (2004). Discussion thread about M.M. Bakhtin at <http://www.lchc.ucsd.edu/MCA/Mail/xmcmamil.2004_01.dir/0142.html>. Retrieved 22 November 2006.

As I progress from Paul's case to Mark's and then Phil's I become increasingly more focused on the integrated nature of the PI's research thinking and less on their proposals. A more detailed consideration of the meaning of this progression is in the Discussion. Here I only mention that progressively, from the first case to the third, the proposal moves away from a central to a supporting role. In the process of analysis, it became increasingly clear that the proposal alone is not enough for funding success (Yousoubova & McAlpine, 2021b). On its own the proposal is not sufficient to understand how the PIs evolve their approaches to funding and what role their thinking plays in them. This move reflects the evolution of my initial aim of looking into the success of the grant proposal genre to building a systems approach to understanding sustained grant funding success.

The above became possible because data collection for the cases was successive, not simultaneous. I worked with Paul in 2006 and 2016; with Mark end-2016 through early-2018; and with Phil in 2018. As I completed the data collection and initial analysis for each case, the questions for the next case would evolve. Each set of the PI interviews is thus unique but interconnected in that the questions that shaped these interviews are reciprocally informative of each other. And together, they all are at the core of my recursive and nested approach to studying research funding success.

I aim to situate funding success by looking at what each PI foregrounds as meaningful in their own perception of the approaches they developed. From these details I strive to create a coherent mosaic to represent their approaches and ways in which each PI has and continues to develop them. Samples of the analysis of the PIs' proposal construction processes are in Appendix B. They would hold their own in the field of writing studies but here they illustrate their overall approaches to grant funding.

The chapter about Mark is longer than those about Paul and Phil. The principal reason for this is that Mark is the most experienced of the three PIs in grant peer review and his roles in the funding system are more diversified. Additionally, Mark applies to and serves on both NSERC

and CIHR, so Paul's focus on NSERC leads to Mark's comparative perspective, which in turn helps situate Phil's focus on CIHR. Finally, Mark's service as peer reviewer is at once more expansive agency-wise and more extensive time-wise, and he also involved at his university level. Neither Paul nor Phil had served as peer review committee chair or as consultant for their university research office, so Mark's perspectives add considerably to the depth of the overall contribution of the thesis.

5.2 Situating the findings

The chapters that follow explore in detail how Paul, Mark, and Phil, in order of their coming on board, navigate the nested contexts of research funding to negotiate peer acceptance of their work and how they have evolved their approaches.

Propositions advanced here on the basis of this analysis are my interpretations of the views expressed by the PIs, both textually and verbally. The analysis pertains to NSERC Discovery and CIHR Operating Grant funding lines. The former supports long-term research programs in fundamental science and is applied for by Paul and Mark. The latter is aimed at development and knowledge translation of research in health sciences and applied for by Mark and Phil, and occasionally by Paul. The targeted nature of these funding lines may limit applicability of the findings of this study. But the strategies and approaches evolved by the three PIs provide valuable insight into how successful researchers navigate and negotiate the contexts of grant funding.

Highlighting the nestedness of grant funding in the systems of knowledge and academic work, I also consider all PI findings in light of the in-study exploration of their institutional aspects, including those of the study site. Particularly relevant here are two system considerations, as expressed by active Tri-Agency review panel members and research administrators at various levels. One is that many PIs still tend not to regard institutional research support as a system resource. These PIs may be self-marginalizing instead of benefitting from the expertise of networked system insiders. This interaction may present new opportunities to advance their

research that enhance its fundability. The other is that some experienced PIs do not keep up with the change that influences the awarding of research funds; nor do some of these PIs consider it necessary.

The change pertains most often to the ongoing, policy driven updates in the priorities and functionalities of the Tri-Agency. During the time period addressed in this study these, from a high-level overview, took place at two levels. One was the rebalancing in the nature and intensity of competition for funds; the other was a considerable increase in the workload of peer reviewers and staff. Both were due to the structural reorganization of the agencies and to budgetary fluctuations in the key research grant streams. This had resulted in new and ongoing constraints, but also opportunities, for the PI and for the proposal. But failing to address the evolving situation and working on the assumption of infallibility of one's prior track record may significantly undercut the chances of success for previously successful PIs. For, as the findings below demonstrate, grant success is fluid and unstable and depends in large part on how PIs navigate and negotiate the rapid shifts in the nested contexts of research funding.

6. Paul

...[it]is about different levels: university, meetings, reviewer panel sessions. Put together they create important feedback about your research, questions that directly affect your application because you would... synthesize.

Paul

6.1.1 Paul: Advancing his problem through an encompassing view of feedback

Table 4: Paul, Profile Highlights

Paul's research goal	Primary funder(s)	What stands out	Trope for the proposal
To have his work accepted into the foundations of the discipline	NSERC	Longest academic career	History of intellectual processes

Paul is a fundamental molecular biologist with 30+ years of experience in fundamental science. The outreach of his research program is relevant to all cell-based organisms and includes impact on human health. Following a doctorate in Eastern Europe, Paul completed two post-docs, one in Western Europe and the other in Canada. His experience of writing for funding commenced during his second post-doc in Canada, in the late-1990s; he had not been writing for grants until then due to varying conditions of the other national academic systems or of his participation in them. His experience as PI has thus all been acquired in Canada, during which time he has written for and held competitive grants from various federal and provincial councils.

English for Paul is a second language but due to his grant writing experience now spanning over 20 years, all of them in English, for the purposes of this study he is not considered an ESL writer. His 10-12-hour work days, seven days a week, have consistently included a lot of writing. In 2006, when participating in the pilot (Phase I) for the present study, he stated that any time he could spare for reading was dedicated to English-language disciplinary literature.

Paul is now a full professor and a research chair at the study site. Since coming to the University in 2002 he had consistently held competitive external funding. As a fundamental scientist, Paul's primary funding source is NSERC. But his grant funding history includes CIHR and the Canada Foundation for Innovation (CFI). In Canada, Paul has served as a review panel member for CIHR and NSERC. He was invited to CIHR College of Reviewers, an initiative designed to improve the quality of scientific peer review. His service as external reviewer is very extensive. At the time of data collection, Paul had had a total of 10+ years of reviewing, including for CFI and NSERC in Canada, for National Science Foundation (NSF) in the US, for a number of research funding organizations and councils in Canada, the US, and internationally in Europe and Asia.

As such, he assumes a number of roles in knowledge making and (e)valuation. The diversification of his service on the granting boards across the globe serves to advance his research thinking ("it's learning") and to maintain up to date his understanding of what peer reviewers see as fundable knowledge. This experience informs and is informed by Paul's goal of advancing his research program. Paul regards all his involvement within the discipline and academic work as feedback on his research. As the quote above shows, this entails both direct and indirect considerations of his work by others academics.

Although such multi-feedback may seem diversified to the point of being disparate, Paul's engagement with it is highly focused in that he filters all knowledge resulting from his academic interactions towards the development of his research program. This input is central in how Paul has evolved a way to make his research fundable from sources that prioritize *his* line of work. Below I explore how, through purposeful participation in the nested contexts of funding, Paul interweaves the iStrands for the purposes of advancing his research problem.

6.2 Everything is feedback

6.2.1 Data sources and analysis

The chapter draws on several documented sources. Four in-depth interviews with Paul, one in 2006 and three in 2016, the latter performed over the period of one month. The interviews are complemented by his CV; three full drafts and final versions of one accepted (NSERC) and one rejected (CIHR) grant proposals, submitted to different agencies during 2012–13–14; written reviewer comments, agency and university events, documents, and websites.

Paul is an experienced and established researcher in field of molecular biology. The focus of his research program, which he calls his *problem*, is a cellular process fundamental to all mortal organisms. It is my understanding that the topic of his research is situated within the disciplinary core and from my data analysis I project that Paul's goal is to advance his problem into the foundations of disciplinary knowledge. This is in some variation with the received understanding in the grant funding literature (e.g., Myers, 1990) that the rhetorical purpose of the grant proposal is to have the new knowledge accepted into the disciplinary mainstream. My interpretation is that Paul's research has at this point been acknowledged by his peers to be part of the disciplinary mainstream and that he now aims his further contributions to form part of the foundations of this knowledge. From the perspective of genre theory, this may be a minor point and well within the traditional view but in the framework of this study this factor has significance. That is, however slight the differentiation between aiming for the disciplinary mainstream vs disciplinary foundations may be it a) helps frame Paul's situatedness within the genre system of grant funding and b) offers a lens on the meaning, for Paul, of grant funding success.

Propositions advanced here on the basis of this analysis are my interpretations of the views expressed by Paul. The analysis thus pertains mostly to NSERC Discovery funding, which supports long-term research programs in fundamental science. The targeted nature of NSERC Discovery funding may limit applicability of the findings of this chapter to other sources of funding of science.

6.3 Constructing the concept of *feedback* as success factor

6.3.1.1 *Paul's grantsmanship: history and present*

Paul credits his Canadian post-doc with the development of his proposal construction skills. He maintains that working with his Canadian advisor was essential for him to gain an informed perspective on the anatomy of a winning proposal. In Eastern Europe Paul did not need to write for grant funding. As discussed in the pilot (Yousoubova, 2011), research funding in many of these countries was a top-down allocation of an annual government budget. One may expect that during his first post-doc in Western Europe in the early 1990s Paul would have exposure to grant writing. However, as a participant in the large-scale research mobility program funded by the EU as part of economic aid to post-communist countries, these funding applications were the responsibility of partner universities, not that of individual scientists. Participants in the EU funded projects were selected by their Eastern European universities as program contributors, so during his first post-doc in Western Europe Paul had not been introduced to grant writing either. One of the reasons was that while all project operations and research activities were conducted in English, the language of writing for funding was local. He did not speak it.

Paul first participated in the grant writing process during his post-doc in Canada. The PI who was his advisor and in whose name grant applications were submitted was *"a very experienced person in writing and I [Paul] was using his experience"*: Paul was included in the writing process and eventually assumed responsibility for entire sections. His advisor also offered comments and shared final versions with his post-graduate collaborators:

[My advisor PI] was not sitting with me and teaching me how to write these kinds of things. I looked through other, old applications, [and].... his final application[s] ... gave me an idea of how the almost ideal application would look

Paul's main takeaway from working through sample applications was attention to brevity. When discussing constraints of both writing and reviewing proposals, he highlighted brevity to be - for him - the main one. He captures it using the verb *to crystallize*; to crystallize a problem,

a hypothesis, questions. It is also something he looks for in the proposals he evaluates as panelist and reviewer, which I will discuss later.

Working in his post-doc advisor's lab, Paul was immersed in some key interactions that define the grant writing genre system. As Myers (1990) points out, (post)graduate researchers are an integral part of a leading Pi's lab and are immersed in all its activities from preparation of manuscripts to grant review panel visits to conference presentations and networking. The process of learning the art of grantsmanship through participation in some of these interactions has clearly contributed to Paul's developing his own path to grant funding and grant writing:

It was a very important experience which definitely stimulated my own experience later on. I got a grant in my first year. ... And ... I had some feedback from the [advisor] PI, ... there was always feedback.

Another key outtake is that now Paul defines *all* his academic interactions as feedback. Any and all academic activities he undertakes within the nested contexts of knowledge work are for him a potential source of feedback on his research. One may suggest that for Paul, from his post-doc onwards, the notion of feedback has become an interdiscursive concept, i.e. interacting both in writing and beyond writing, on text-external levels (Bhatia, 2012), with a multidimensional meaning.

It could be suggested that the experience of 'always [having] *feedback*' *became a defining point* of Paul's approach to research funding. In a nutshell, Paul engages in a wide range of interactions to constantly negotiate disciplinary valuation of his research program. His interactions, be they interpersonal, e.g. through face-to-face dialogues, or intertextual, e.g. through writing for publications and for funding and through evaluation of proposals and manuscripts, all pursue one purpose. It is his research goal of advancing his research program, his *problem*. Grant funding offers him a means to (re)validate both the problem and his approaches to it on a regular basis.

It is well established that as academic practice, grant funding is navigated and negotiated (Tardy, 2003). Moreover, the participants' engagement in such a practice is interdiscursive. That is, PIs engage with the genre system of grant funding beyond the proposal. Paul evidently approaches grant funding from this interdiscursive perspective but his also stems from the wider contexts of grant funding:

... it's based on many different things: your personal experience within the agency, within these panels, the experience of [other] people, what you read about the success rates and funding situation and so on. ... in total it creates a certain type of understanding of how it works.

Paul pre-faced the above statement with "*it's experience.*" Experiential learning, both as a graduate researcher acquiring grant genre knowledge through legitimate peripheral participation (Lave & Wenger, 1991) as well as learning later in the researcher's career are an established tenant of the genre theory. But itemizing some of his experience, Paul highlights that this participation is multi-dimensional and that his list is only partial ("*... and so on*"). This disclaimer emphasizes how highly interdiscursive Paul's approach is when it comes to his research funding.

By the same token, the diversity of Paul's experience within the funding system will help understand his funding success. Over 15 years of service on a wide range of peer evaluation panels and committees have fused into a certain, specific to him, understanding of the process. Paul writes for funding with a view that peer evaluation on the whole (*in total*) prioritizes quality of science. This reflects the findings of Arensbergen & van den Besselaar (2012). Based on personal experience, Paul posits that good science in an appropriately constructed proposal can overcome the complexities of personalities and politics of the reviewing panel. In brief, the summative effect of Paul's "*understanding of how it works*" results in *his depersonalizing of the peer evaluation* process for the purposes of writing his own proposals. What helps Paul in his objectifying the peer reviewer – any peer reviewer – is that that he sits on CIHR, external-reviews for NSERC but writes mainly for NSERC. He thus experiences discussions and argument building by disciplinary peers in a number of fields related to his. This enables Paul to

extrapolate the evaluative points that not only occur most often in the reviewing process but also have the most significance. Having thus *crystallized* for himself *in total...how it works*, he addresses his writing to the extrapolated, objectified, *total* peer reviewer.

Feedback and the objectified approach are the themes of significance in Paul's success. They recur throughout this chapter.

6.3.1.2 How Paul is funded

Since 2003, Paul's most consistent source of funding has been NSERC, specifically NSERC Discovery and NSERC Research Tools and Equipment (RTI) grants. The focus of the chapter being his large-scale Discovery funding, I will mention the RTI program only briefly. NSERC RTI are one-year-long grants conceived as supplementary technical support for researchers and/or research teams already funded for their research. RTI grants are often applied for collaboratively, especially if equipment previewed for purchase would serve the needs of several researchers or teams. They are considered to be auxiliary funds. But designed to enhance the efficacy of primary grants, RTIs re-confirm NSERC recognition of disciplinary value of a PI's work and therefore hold a certain significance. NSERC Discovery, on the other hand, are large-scale primary grants aimed at long-term research programs; their funding cycle is four to five years. The Discovery program supports fundamental science and is conceived to advance blue-skies research.

Paul is a fundamental career scientist, and NSERC Discovery funding provides backbone support for the development of his research. This grant is matched to a degree by his Research Chair funding from within the University. In addition, Paul is concurrently involved in two other funded research streams. One is research projects through which he is implicated in development of research infrastructure and research technology to enable advanced research programs such as his. These projects are funded by Canada Foundation for Innovation (CFI) and NSERC Engage. CFI and NSERC Engage are short-to mid-term grants. Very broadly speaking, they are conceived for capacity building and fostering research innovation. Paul's other funded

stream is industry testing and development for applicability of some of his research findings. These are mostly funded through his industry partnerships as well as through NSERC Engage, which allow Canadian-based companies to engage with cutting edge university research.

Earlier in his career, Paul had also been funded by CIHR and medical industry. During his tenure track and early tenure period in 2004-2009 he held both CIHR and NSERC simultaneously. CIHR Operating and New Investigator awards as well as NSERC Discovery grants all support large-scale work in research development, in health applications and fundamental science respectively. As his research program evolved, Paul has primarily targeted funding of fundamental science. However, while mainly funded by NSERC for over a decade now, Paul has not turned away from CIHR. From 2009 onwards he has served as a committee member on CIHR evaluation panels. Within the same time frame, Paul has been an external reviewer for NSERC. He maintains a distinction between his roles as a panel member and an external reviewer:

... it's my subjective understanding of the process – each agency is trying to use as [panelists] people who are not necessarily funded by this agency, to avoid potential conflict of interest.

As a result of this diversification, he is an insider in both agencies.

To sum up, having been funded consistently throughout his tenure track career Paul has gained a funding track record and considerable experience with various funding councils. He maintains his engagement with the grant funding system as both a writer and an evaluator. As for his current sources of funding, while lending his expertise to potential program off-shoots, Paul maintains focus on the development of his research program. To this end, NSERC Discovery program has been his principal supporter.

6.3.1.3 How Paul navigates the genre system of grant funding

In every genre system, its affordances and constraints influence how participants navigate its practices. Paul's participation in the funding system is constituted by his engagement as writer, reviewer, review panel member, and committee member on various councils nationally and internationally. He is also actively engaged on several publication boards. The latter is part of his engagement in knowledge work in a wider academic context and is also a source of feedback, including on his grants. But the focus of this study being funding, I will discuss only his service on funding councils.

Paul's grant reviewing service is extensive both geographically and conceptually as he serves in various reviewing capacities with agencies supporting fundamental and applied research in his field. He thus maintains a presence in the conversations of his discipline. He also approaches this service as a form of epistemic input (feedback) towards the advancement of his research program. Besides staying attuned to the most recent disciplinary developments, this helps Paul anticipate reviewer concerns and criticisms over his own future proposals. This enables him to build an anticipation of the *total* peer reviewer into his grant proposals. At the same time, this reviewer is specific to *his* grant proposals. This seems a definitive factor in shaping Paul's approach to both constructing and evaluating grant proposals. That is, as a grant writer he addresses a depersonalized, objectified *total* reviewer; as peer reviewer, he strives for an objectified approach in his own assessments.

To conclude, the intensity, duration and breadth of Paul's peer review service provides him with an encompassing perspective on both the advancement and fundability of his *problem*. Evaluating frontline knowledge in his field, he remains engaged intellectually. He is also engaged inter-textually, for he "*always read[s] like a writer*", and reading in the discipline helps him enrich his "*own writing style*". Participating in face-to-face panel discussions he is engaged institutionally and interpersonally. Through these interactions, he maintains his knowledge of the agency, of the latest policy developments and of the likeliest outcomes of these developments on the funding situation. He also assimilates the outcomes of these interactions

into the *total* reviewer he addresses in his own proposals. Together these engagements facilitate both his funding success and provide indirect feedback on his *problem*, which ultimately enhances his capability as PI of contributing to knowledge in a fundable way. For Paul and, one may suggest, for his discipline this is a win-win.

6.3.1.3.1 Giving back

Paul views his institutional involvement, especially his service as a peer reviewer, as “*a social responsibility of a scientist*”. It seems to achieve a dual purpose. With regards to his own funding success, this service is one of the ways in which he engages with feedback on his research program. But it is also about his engagement with academic work in a broader sense.

Outwardly, Paul is a reserved person. In conversation, on and off record, he projects a research persona, very likely a close approximation of his objectified peer reviewer. But he is clearly passionate about his *problem* to which he has been dedicated for 30+ years. Disciplinary recognition of his work, not least of it in the form of continuous research funding, indicates that his disciplinary peers assign considerable value to Paul’s intellectual contribution to knowledge. But also, because NSERC Discovery is the sort of funding that supports both research and student training (HQP), his being funded signals that his peers support his advancing of the problem *and* encourage its further development. This is an indication that, in the iStrands terms, the intellectual strand has evolved to dominate Paul’s career and informs his networking. Paul, in other words, is driven by his *problem*, and in this, too, he is consistent in how he gives back.

Paul pays his social dues intellectually. In the academy, where intellectual contribution is assigned the highest value, this is normal. But what is interesting in Paul’s case is that in giving back to the discipline he seems to prioritize external networks. His reviewing service is extensive, but in a very large part it is being carried out through institutions external to Paul’s university. His internal institutional involvement, within his university, does not seem as pronounced. That is to say, Paul fulfills the service aspect of his workload by serving on

requisite committees, etc. He also lends his intellectual expertise to projects that originate internally. Most of these are either peripherally related to or result from his program. Some of them are internally bound, such as collective grant applications for research development (NSERC Engage) or for research tools and instruments (NSERC RTI). Some are industry partnerships whose results may be applicable commercially. Paul's primary focus internally is student training, fostering high quality personnel (HQP). As he involves students in the development of various aspects of his research he both enculturates them in the principals of fundamental research and disseminates his research worldview.

Paul finds that the benefits of his involvement with HQP are reciprocal. He gives back to the discipline by helping to build its future but in doing so he – and his research program - also receive:

...your student presenting a seminar at the department or in your lab and obviously getting questions regarding the research supervised by you. This sort of networking would create new ideas, new questions.

This “*indirect*” feedback for Paul is one of the many “*different layers*” of interaction he is engaged in in his academic work. Aside from being another example of how Paul navigates the nested nature of grant funding, one may suggest that Paul has found balance in that he draws on fulfilling his social responsibilities as yet another source of feedback on his research. And as student work generates yet more feedback on Paul's *problem*, its fundability benefits from being further informed.

6.3.1.3.2 Consistency and continuity

As I demonstrate above, NSERC has not always been Paul's primary source of grant funding; rather, it evolved to be so. Paul states two main reasons for why NSERC Discovery has assumed a central place in supporting his research. He calls the first reason historical. During his tenure-track, Paul was mostly funded by CIHR and health industry. This project-specific research was extending from his pharma-based post-doctoral work in Europe and in Western Canada which had put his name on the disciplinary map. As such, his tenure-track benefitted from highly

competitive funding. When preparing grant applications as a new faculty at the time, however, Paul was not limiting himself to funders interested in directed pharmaceutical research only. Hired when new faculty were already expected to “hit the ground running” (provost, verbatim, new faculty orientation September 2001) Paul was applying across the board of funders supporting his line of work:

... as a new faculty in 2002 I was applying for two different agencies for two different kinds of grants because I needed to get some funding. One of them was CIHR and the other NSERC. And thinking of course [that] when applying for two, there are more chances of getting at least one.

Within two years he was awarded over 100K by both CIHR and NSERC. Besides performance pressures brought in part by change towards corporatizing university (Gould, 2003), Paul was also opportunistic and aggressive when hedging against failure. Crucially, however, he approached seeking grant funding as a learning process. On one hand, he considered his grant applications to be integral to developing his research profile. On the other, he saw them as opportunity to assess the nature of funders willing to support his work. In fact, in my eyes Paul’s critical assessment of his overall academic experience as well as its particular instances has come to define him as a participant of the grant funding system. Throughout the chapter I explore the significance of this characteristic for his finding success. His rationale for pursuing particular funding pipelines is a good example.

Paul’s research has always drawn on principles governing fundamental molecular processes, and since 2002 his profile has evolved steadily towards those associated with one of them. Correspondingly, so did his approach to seeking research funding. Having been continuously funded by CIHR from 2002 to 2009 and serving as external reviewer and panelist for a number of councils and funding organizations, Paul has defined an optimal funding path for himself:

[CIHR] is [about] research that indicates an immediate connection to human health ... [and] ... there is a significant proportion of the proposals which are dedicated to work with human objects, or at least with very well-developed mammalian objects which are closer to humans. And the other stream is looking into fundamental principles,

understanding the mechanisms that underline complex biological processes, some sort of philosophical fundamental approach, which is NSERC. That ... is a very important reason for me to apply to NSERC.

In effect, Paul has capitalized on an opportunity to define the nature of support prioritized by each NSERC and CIHR. So this reason is historical in a sense that Paul's rationale for targeting funding opportunities has evolved in the course of his career. His own emphasis on the '*philosophical fundamental approach*' has shaped his rationale for seeking large-scale and long-term NSERC funding of blue-skies research supported through their Discovery program.

His other reason for targeting NSERC is continuity. Fundamental science is a long-term investment, and as fundamental scientist, Paul is fully committed. His research capacity and that of his lab, his capabilities as scientist, mentor, writer, and speaker have been honed for years towards developing an encompassing perspective on a deep fundamental process underlying the life-cycle of all cellular organisms. His research has developed momentum, and he needs his funding not only to support this momentum going forward but also to serve as a form of renewed disciplinary recognition of his program. NSERC Discovery is a program of renewable funding which *expects* demonstrated continuity in research submitted for funding and renewals:

... every four years I apply in order to renew my [NSERC Discovery] funding. There is a tendency at NSERC that if a PI is doing well in terms of publications and continues to work efficiently, ... there is a certain percentage of funding increase. But it depends specifically on the productivity of a PI, [and] on the quality of the proposal as well. But ... chances of funding increase are significant if a PI met [these expectations].

As I will discuss later, research funding is one of the forms of disciplinary recognition which Paul seeks in order to sustain his long-term continuous effort. Paul architectures all his academic interactions towards (re)validating his research. He views research funding to be a significant means towards enabling it. This clarifies the obvious, necessary and significant nature that funding assumes in Paul's eyes. He invests into funding his research because funding is integral

to advancing it. For this reason, funding pipelines he seeks have to correspond to his research goals.

That is to say, Paul's research program is his longest-term investment. And as such, he is highly focused in that he directs every effort towards furthering his problem. This enables Paul to re-purpose even bureaucratic tasks like reporting as opportunities for critical reflection on his research. By the same token, all related work such as disseminating, teaching, writing for funding, co-developing industry applications, etc. in his case is approached as possibilities for feedback, and therefore, for advancement of his *problem*.

To re-focus the above with respect to this study, as measurable monetary recognition goes, for Paul grant funding counts. But more than its dollar value it is about disciplinary (re)validation of his work, and his negotiating for funding in the grant genre system is interdiscursive and multidimensional. He draws on his engagement in disciplinary conversations, intra- and extra-textually, to inform his problem. He also critically assesses this feedback. What is of particular note is that *his engagement with this feedback is not periodic; it is continuous, and it informs his proposal construction process*. The multi-feedback he receives on his research from the nested academic contexts of funding is embedded in his proposals. In fact, it would be reasonable to suggest that because Paul is constantly engaged with feedback, in his proposals he is able to anticipate the reviewer. This is his way to ensure that his proposals, and therefore his research *problem*, are fundable. But importantly also, that research funding serves to help him advance *his* problem.

6.3.2 Engaging with *feedback*

That the nature of Paul's success stems from his multi-role interactions in the nested contexts of knowledge work came through very clearly in the course of the interviews. Paul is constantly engaged, with colleagues, students, industry partners, new proposals and publications. He peer-reviews or edits some of these publications, he partakes in decision making on funding review panels, he reviews proposals, he consults on various research funding committees, he

leads a lab of his own, and manages experimental projects with industry partners. And the list is not exhaustive. In the natural sciences, he is not atypical in how and with whom he interacts. But he made it clear that, the primary purpose of these interactions being to inform his research program, they also inform his approach to making the program fundable.

I have already touched on the intellectual and institutional aspects of Paul's engagement with feedback when discussing the meaning of his funding success. Naturally, this brought forward the inter-linked with them aspects of his interpersonal and intertextual involvement. I will now revisit, as promised, these last two aspects in more detail. In this section I will look mostly at how Paul synthesizes his reviewer and panelist experience towards his own grant proposal construction. In the section that follows I will look more closely at how it is reflected in his proposals.

6.3.2.1 Diversifying reviewer experience

As already mentioned, Paul's peer reviewing engagements are extensive and ongoing. In Canada, he serves as an external reviewer for NSERC and as a review panel member for several panels at CIHR as well as a member of the new CIHR College of Reviewers. Internationally, he serves on several granting boards in Europe, Asia, and North America, including the National Science Foundation (NSF) in the United States. His service on NSF is of some additional interest to this study.

NSF is the prime US government funder of scientific research whose support is as prestigious as it is competitive (Tardy, 2011), and as their core missions are support of blue-skies research, NSF and NSERC may be viewed their respective countries' counterparts. This means that Paul has positioned himself to participate across the range of scientific research funding in North America, where his lab is located and where his funding originates. He gains an additional perspective on funding of scientific research from his participation on review boards globally, where many of his collaborators are located.

The breadth of his participation in the valuation of front-line science allows Paul to consider how scientific research is prioritized and funded in various national contexts. For example, through his engagements both with CIHR and NSERC he has an insider perspective on the current climate of research funding in Canada. But he is also possibly positioned to anticipate future shifts in funding of basic science.

I also always follow the situation in the States; they are in a worse situation because their success rates at NIH is 7% and at some agencies is 6%. ... it used to be different but....
Anyways, the tendency is a significant decrease in success rates and also the total funding [\$\$] per successful application is decreasing as well.

It is interesting that in conversations off record some participants in this study mentioned that with a more advanced economy and a more advanced technology base, the US funding of science research is more extensive than that in Canada. They also suggested that Canada, with a few years' delay, may follow US federal funding models. If this opinion is to be considered, then first-hand experience with reviewing for NSF gives Paul, who is funded by its Canadian counterpart, at least two things. One is an insightful perspective on new knowledge under development in highly advanced labs; the other is a possible forward perspective on the potentially forthcoming developments in the funding of scientific research in Canada.

Paul's engagements in reviewing and decision making are a significant part of his participation in the grant funding genre system. To a large extent, they define his participation. Diversifying his experience in the grant assessment process, Paul gains a number of important insights which contribute to his approach to research writing and proposal writing in particular.

6.3.2.2 Approximating objectivity

6.3.2.2.1 NSERC reviewer experience

Paul's service for NSERC is that of an independent reader who evaluates proposals and provides comments for inclusion in review panel discussions. He feels that by not proposing his candidacy for membership on a review panel, the agency is avoiding a conflict of interest over someone who has been successively funded by them. Instead, having validated his work for a

considerable amount of time, at the very end of the 2000s NSERC invited Paul *“to review on permanent basis as a member of different kinds of committees”*. He has since been receiving several applications annually for review.

One immediately evident outcome of this involvement is about up-keeping his knowledge of the agencies. Unlike some of the long-term fundees of NSERC who, in the opinion of research administrators, may in their complacency lose a sense of connectedness to the agency and often miss out on understanding shifts in the grant funding context, Paul’s perspective is current. His reviewing connections to NSERC help him maintain his agency-institutional knowledge up to date. Importantly also, his reviewing practice facilitates his perspective on the national funding climate and science support policies:

The previous conservative government had this idea that all this fundamental research has nothing to do with Canadian people. So they were cutting the budget of all funding agencies, including NSERC and CIHR. It was not a pleasant period Before that the funding envelope was double, so this is reflective of the position of the government ... with respect of how much money to spend on [research] funding.

An up-to-date perspective on budgetary fluctuations in research funding helps to prevent Paul’s becoming complacent. He does not take fundability of his own work for granted. Indeed, he *“always doubt[s] whether or not [he] will be successful.”* Rather, he needs to stay informed on the changes in the funding climate because it helps him situate his own approach. But it also facilitates his understanding of potential implications of historic and current policies on grant funding. His forward awareness helps, for example, manage his own funding expectations as well as those of his students:

And it seems this year [2016] was the first one when the trend reversed ... [and]... there is an increase of 10-15% for each of the agencies’ budgets. So that will maybe be even reflected in (higher) success rates as well the average [\$ per application]. It’s a flexible situation.

However, along with a cautious upward change in the federal research budgets all the agencies are also facing a surge in the application numbers. Paul has experienced this as an applicant and reviewer (*"I remember a few years ago there was 100 applications and this year there was 350"*) and as a mentor whose students apply for fellowships (*"[some] years [ago] there were 300 applicants from Quebec and now I see 1500"*). In the short run, Paul and his lab benefit from an informed perspective on the associated with the surge decrease in funded averages. But through his involvement with grant proposal assessment Paul also benefits from an insider understanding that agencies are under pressure *"to equalize"* budgetary fluctuations with the on-going increase in the demand for funding:

... it's a very delicate game. It's not like all things are well explainable but you have an idea that [funding] depends on many different things.

Paul's informed awareness of the fluctuating nature of research funding is not a privilege reserved for academics who serve on review boards. Or at least, it is not meant to be. The dependence of research funding on changes in the government, which represents a social context in which funding is embedded, has long been documented (Myers, 1990; van Nostrand, 1997), and Paul's views above reflect those of other participants in this study. That Paul takes a longer-term perspective may not be something new either. He sees an increase in applications to be an organic part of any augmentation in funding, with a positive change in budgets facilitating more research output; but it also leads to higher numbers of PhD and post-PhD researchers who graduate to become PIs. This in turn contributes to a significant further increase in applications, creating an upward spiral of competition for the limited pools of budget-based research funding.

But what he does *"crystallize for himself"*, if I may borrow his expression, is how he can navigate and negotiate these conditions and what would be, for him, the best way of addressing these current constraints. Ultimately, it is in part with this outlook that he constructs his proposals for a de-personalized *total* reviewer. In his experience, applications for funding must appeal to a highly diversified and heavily overloaded body of peer reviewers. In

this light, his on-going interdiscursive engagement with feedback from a multitude of the interconnected academic contexts becomes strategic for both viability and fundability of his research program.

When reviewing grant applications Paul reads critically. He says he always reads as a writer. But in the last 10 years his approach has evolved. If in 2006 he said he read and thought *'How would I say that? or Can I say it this way about my problem?'*; in 2016 he reads to consider how it would help him with his problem. That is to say, Paul as a writer has evolved from thinking of writing as linguistic expression to considering it as an epistemic tool in framing his research.

As peer-reviewer, Paul extends to consider key publications of the applicants under his review. In another nod to the contextual inter-embeddedness of funding with other knowledge work, he regards **publications as a form of intellectual networking** as they give him a more complete picture of an applicant or a colleague as a researcher. While this may not be unique to Paul, in his case publications help him understand a colleague's worldviews and, thus, where the colleague comes from when asking Paul a question. Or, in the context of assessing this colleague's grant proposal, how coherently the proposal reflects and thus far published advances of the applicant's research program. Paul often gets to know people in his field through publications before he meets them in person and may seek contact intentionally, expecting to obtain an additional perspective on his problem through a discussion with that person. (*"...so then by the time you met them, you already know about them"*).

And finally, he considers his peer-reviewing service to be his social responsibility. He reviews extensively, both to learn new things and as a duty of a scientist to fellow scientists who give their time to reviewing his papers and applications. In doing so, Paul fuses the interpersonal and the intertextual. Writing and reading publications and grant applications for him are beyond text, these are also forms of interaction with participants and stakeholders of the funding system. And they are a form of feedback.

6.3.2.2.2 CIHR review panelist experience

Myers (1990) states that the purpose of peer review in grant funding is to help a group of reviewers to come to an agreement within itself. Paul, now with an extensive experience of serving on grant review panels, has come to the same conclusion:

It's about people coming to a consensus. It's not a mathematical kind of consensus ... but rather it's about making their case.

As review panel member for CIHR, Paul makes his cases during decision-making sessions which take place on-line and face-to-face in Ottawa. He says that the dynamic of these sessions is different from *"just writing a review - reading someone's application and submitting it and done"*. As a panel member, *"you are working very intensively"* with other panelists. The value of being a panelist is different for him from that of being a reviewer in that *"you have feedback from different people and you see different points of view"*. The live aspect of bringing forward potentially diverse views on the same proposal provides for a *"different experience"* because it sharpens Paul's understanding of how individual opinions, government policies, and interpersonal politics of the panel are woven into a disciplinary evaluation.

I want to stress that live panel discussions do contribute to his understanding of how new knowledge is validated. But at this stage of his career he is very experienced with this process. The main value of his ongoing panelist service is in maintaining his perspective up to date. It also serves as a valuable reminder that disciplinary opinion is constructed from individual voices and that reviewer subjectivity plays a role in the final, designated as disciplinary, decision. Studies of academic work and writing may objectify validation of a researcher's work by a collective disciplinary community. But Paul's participating in grant panel discussions highlights the notion of individuality and subjectivity in grant evaluation:

... this synthesis [of individual opinions into a group evaluation] is much more subjective because different reviewers would have different opinions, for whatever reason.

This may sound like a contradiction to my idea of Paul's depersonalized *total* reviewer. But it is not. This was the way, during my conversations with him, Paul considered the evolution of his

approach to grant writing. In juxtaposing subjectivity and depersonalization, he is consistent with his overall strategy of critically encompassing all available constraints and opportunities of the genre system, however challenging these juxtapositions may appear on the surface. He assesses all immediately evident options and then decides how he can navigate within with a maximum benefit to his *problem* and to keeping it funded. He has already demonstrated this approach when discussing the value of hostile questions.

In this light, it is not surprising that Paul is fully aware that that the meaning of disciplinary evaluation is in part “*depend[ent] on the kind of people*” involved in the process, and so a given proposal may be evaluated differently depending on the composition of a panel. The process of seeking consensus could be lengthy (“*a discussion can be 45 minutes, an hour about one application*”) and not necessarily straightforward (“*because there is also politics*”) but through his involvement in these discussions Paul crystallizes several things for his own practice.

As a result of his 15 years of diversity of individuals, opinions, and panel compositions Paul extrapolates that divergence of individual opinions on a panel is very much an invariable. It is impossible or near impossible to satisfy every one of the decision-makers. The response Paul has evolved and is finding effective is to go beyond the individual:

... during these discussions you develop an understanding of what is likeable by all the reviewers, or most of the reviewers. So you create a... not a personality-based but rather a logically-based picture of what is most optimal way to write an application ... It's practically impossible to be 100% successful all the time. But you create a sort of total picture of what is most appreciated by many different kinds of reviewers.

I note that he looks at his approach not as an accomplishment but rather an on-going commitment. He does not state that he has developed an understanding. He situates the process in the present (“*during these discussions you develop ...*”), which suggests continuous effort. With every participation on a panel he takes an opportunity to (re)assess the layers of meaning of the collective opinion he has developed. Once again, he operates as a writer, critically and continuously.

At the same time, the only way Paul can appeal to the *total* reviewer is through the fault-proof quality of science in the proposal and quality of the proposal itself. At least, this is how Paul sees it. He believes in precedence of quality of science over politics. As a principal reader he needs to ‘*make a case*’ for the proposals assigned to him on the panel. Because building an argument may be “*a subjective moment*”, his practice is to seek a full spectrum picture of the applicant, a *total picture*. He reads the applicant’s key publications and says he knows reviewers who read the entire body of the applicant’s published work when preparing their case. When building his argument Paul also factors in other disciplinary input of the applicant’s work:

... you try to tie up to the application what the successful number of [prior] applications is, what kind of journals, high end, what kind of grants, etc. ...

One may suggest that in his assessment of the proposal as a stand-alone submission, Paul approximates objectivity by situating the proposal in the overall peer validation of the applicant’s work. It would be hard for fellow panelists to refute an argument as subjective or biased if it draws on the applicant’s history of being “*able to reflect on [how their] achievements ... lead into understanding of the problem*”. From this perspective, Paul then focuses on how the applicant “*crystallize[s] for themselves the key questions*” and on how the proposal “*fit[s] into [this] single understanding*”. Paul refers to this as creating a big picture.

The big picture enables him to build a rhetorical base from which he would make his case in a panel discussion or in a written evaluation. But, as he also points out, “*the [idea] is to elevate the application by itself*.” In other words, yes, the proposal has to extend coherently from within the applicants’ overall research but it also has to stand on its own. If the proposal itself is strong and consistent with the applicant’s overall research approach, it makes Paul’s job of “*making a case*” that much easier. And it is with this outlook that Paul constructs his case: if the application stands by itself, that is good; but if other panelists have questions, Paul has informed support of *the big picture* he has built for himself. This is what leads me to state that to build an objectified argument, it is both quality of science and of the proposal that matter for

Paul as reviewer/panelist. This is also why I stated at the start of this section that the proposal text which separates the writer and the reader can also facilitate their intertextual contact.

It is also characteristic of Paul that he constructs his own proposals with the same outlook. The continuum of Paul's service as a reviewer and panelist plays a significant role in his own writing:

... attending reviewer panels ... provides a[n] ... experience of funding situations, strategies of writing, and other aspects.

His proposals are addressed to an objectified decision-maker. Their aim is to coherently and cohesively integrate the frontline and the body of his research. And they stand on their own. How does Paul help his reviewers to *evaluate the application by itself*?

6.3.2.3 Feedback and quality of the proposal

When asked if he would consider giving advice to early career academics, Paul's response was:

...always try to think about your problem and create new challenges, new questions ... it's constant work, thinking about it. Because when the time comes to... put it on paper, you must be prepared. [What] I am saying [is] obvious. Most scientists, that's the way they operate.

The notion of being ready to "put it on paper" may look simplistic. But much like his thinking process, Paul's writing process is a continuum. Overall, it takes him between nine to ten months to complete and submit a proposal. For NSERC Discovery, he back-plans his submission from the date in the middle of October, when applications must be sent to the research office for institutional approvals and processing so as to make the NSERC deadline of November 1.

So [I] start[] in January; thinking about it, maybe writing some pieces already, a plan, and ending this entire process in October.

Although he is not fully committed to writing proposals during winter and spring months, he continues to sketch because the proposal is "*on my mind*". In his experience, one of the most challenging aspects of writing a proposal is keeping it within the allotted page and word limit.

NSERC Discovery grants are five pages long, so when he starts writing in earnest sometime in June, he knows that a long way separates his initial drafts from his final one:

... because there is no space you need to be concise, so therefore you need figure out - for yourself - what is the most important thing that you would like to say in order to characterize what you achieved, what is your knowledge, what is the hypothesis, what is the future research. In just five pages, right?

His technique is to work on “*various pieces*”, drafting during winter and spring and going into it more comprehensively as of sometime in June. The goal is to have a near-submission draft ready in September. The bulk of the writing work is done during the summer months, when his teaching and administrative load lightens up. As he puts it, “*it’s coincidental but well, no it’s not coincidental*”.

This walk through his timeline gives meaning to Paul statement about being ready to write “*when the time comes*”. What may initially seem like a notion of a write-up is in fact a long and involved process. When in January of the last year of a current grant the PI starts thinking about the future proposal, his lab is still generating data. These new data will need to be assessed and integrated into the future hypothesis and questions, and this “*obviously ... takes a significant portion of time*”. What is surfacing here is that Paul’s intellectual and intertextual processes are tightly intertwined. He sees all his early-term preparatory work to be part of his writing.

Furthermore, even as he works on his drafts he is intertexting (“*I always initially work alone, without any feedback from others. Although it’s all relative, right?*”). He draws on two sources, his own experience as reviewer and feedback from colleagues. His reviewing and panel member service play a significant role during the early stages of shaping a new proposal. As reviewer he wants to see that the applicant has “*crystallized*” for themselves what their key questions are:

... from my experience as a reviewer and a writer, that has been important, and it is especially important for grant applications.

Paul says he does not always see this in applications sent for his review or discussed during panel meetings. Yet for him as reviewer it is of primary value as it has the potential to qualify or disqualify the entire proposal. He says that questions properly crystallized from disparate experimental observations should lead to a maximally plausible hypothesis. And if the experimentation to test this hypothesis is adequately designed, together they form a solid base. A tight correlation between the hypothesis and the experimentation to test its validity is what he strives for as a writer because:

[For NSERC] you need to put your proposal in terms of 'here is my hypothesis and here is an experimental way of testing the validity of this hypothesis'.

This is why in the early stages of preparation of a new proposal he is “*crystallizing*” in “*various pieces*” to ensure that by June he is ready to “*combine in a ... very compact way*”, i.e. to focus more on the constraint of brevity of formulation rather than on the formulation itself. This is how he text-interacts with many of his disciplinary peers whose applications for funding he has reviewed. This also demonstrates continuity of his writing process and spells out the meaning of *being prepared when the time comes to write*.

On another level, Paul also interacts with colleagues who, prior to his starting the proposal, would have been asking him questions and engaging in discussions about his research. His drawing on it may be retrospective and indirect but Paul assigns it with a value-add:

You present your research at a meeting and there is always some kind of feedback, someone's asking questions that you are not necessarily thinking about but you are creating in your mind a[n] ... impression that the research you are doing is valid research

Feedback received in direct face-to-face interactions is an important part of his “*crystallizing*” and he aims to work it into his drafts. However, at a certain point, when the draft is “*coherent?* – *yes, that would be the right word, not really perfect but coherent*”, he seeks live feedback from colleagues.

...my choice is based on people who can think and read critically. Not only that but it also coincides with their being themselves successful applicants. So it's connected but not

based only on their professional closeness to a particular topic. ... I am looking only for those people who I know will find something to criticize [critique] and therefore to contribute.

Given Paul's aim to creating a big picture, the principle on which he selects his initial readers is not a surprise. Paul aims to have an encompassing perspective on his proposal from people who are familiar with his work to varying degrees. The value of their aggregated comments, besides the obvious feedback on content, is in that allows Paul, through outsiders' eyes, to see how well the proposal could stand on its own.

His way is to ask several people within his department and several outside of his department. He thus casts the net wide right from the onset of his application preparation because *"in the process of writing ... fresh point of view is important"* and because *"different people have different perspectives on different aspects"*. Colleagues in his department read as disciplinary specialists and those outside of his department can be seen as representative of a diverse group of non-specialist scientists.

Paul, in other words, is critical not only in how he builds his proposal text; he is also critical in how he navigates the system to negotiate its fundability.

6.3.2.4 Feedback and quality of science

It is fairly evident now that Paul's extensive experience as a reviewer and review panelist facilitates his constant seeking of new angles for approaching his problem. Having served for over 15 years on a number of publications and grant review panels in Canada and internationally, he assigns high value to questions and diverging points of view. Rather than perceiving these to be opposing his research he sees them as opportunities to develop additional perspectives from which to consider his problem. He actively seeks interaction and remains highly engaged at all levels: institutionally, interpersonally, intertextually and intellectually.

Interpersonally, he sees the value of interaction in being asked questions which help him gain an encompassing view of his research:

... people [may] ask questions which you never really thought about, which definitely enriches [your] understanding of the entire problem.

He does not silo interpersonal from intellectual; in his work one informs the other. His relentless drive for learning with a focus towards his research program is one of the most striking characteristics of this PI. However, striving to advance intellectually would not be something unique to Paul. Academic work is mostly of intellectual nature, and continuous learning is at the core of the drive that enables intellectual advancement. But what is interesting about Paul is the way he welcomes questions about his research from would-be hostile reviewers:

... a question can come from a person who is not necessarily sympathetic but it's an extremely important question. ... it is the quality of questions that is most important, not who is asking them.

For this PI maintaining balance in interpersonal research interaction is important. He values both questions and people who ask them. He seeks to interact face-to-face with colleagues of his disciplinary community who work outside his institution as well as with colleagues outside his immediate disciplinary community:

...it's important to establish relationships with people who are working in areas which are close. ... It's not necessarily directly related to your own research ... but you are learning new things.

He is also intentional about constructing relations with colleagues within his own institution:

...this ... involves different layers: you asking people to read your application and getting a type of reviewer feedback; also for instance, your student presenting a seminar at the department or in your lab and obviously getting questions regarding the research supervised by you. This sort of networking would create new ideas, new questions.

What stands out in Paul's case is that while actively seeking and constructing relations with colleagues intra- and inter-institutionally, **he does not tend to engage institutionally** beyond the level of colleagues. He regards the university research office and research administration services useful only insofar as attending to the formalities of the application submission. His interaction with the faculty research facilitator is negligent to non-existent. This, as the research office indicated, tends to be the case of established, experienced researchers. They find it more productive to rely on their own research networks, whereas novice PIs tend to engage with research facilitators in the proposal construction process. As for Paul, for example, his contact with the newly established research support service called knowledge brokering is limited to institutionalizing the partnership agreements he has established outside of their purview. As far as the partnerships themselves are concerned, he takes a lead over developing and managing them.

To sum up, Paul has *crystallized for himself* an optimal way of facilitating his research funding success. He is consistent in the objectified approach he has evolved through his participation in the funding system and its wider contexts, as writer, peer reviewer, mentor, and consultant. His approach helps him achieve his research goals and make them fundable.

6.3.3 Situating Paul's success

Like many PIs, Paul navigates the genre system of research funding through interaction (Tardy, 2003). Similarly also, his interactions in the system encompass texts, people, and institutions. Paul is engaged with the grant genre system and its wider academic contexts in a multitude of roles and interactions all of which provide him with feedback on his research.

What stands out about Paul is the way he enacts these interactions. Paul draws on all his academic engagements to inform advancement of his research and to enable its fundability. More specifically, he looks at these as feedback. When using the word feedback, Paul refers to its traditional forms such as comments by reviewers on grant funding decision letters or during

the process of publication or commentary by colleagues on his proposal drafts. But in illuminating his grant funding practice Paul also considered how he draws on other interactions. Learning from experience, Paul has come to see all his academic interactions as feedback towards his research success. These include citations of his work and their critique in the publications of others, departmental meetings where colleagues talk about their own research, questions Paul and his students receive during conference presentations, his service on research funding panels and committees nationally and internationally, his peer-reviewing grant applications for fundamental and applied studies, his participation in review panel discussions, and his collaborating with industry partners on commercially applicable findings from his work. They are all for him sources of feedback.

That is to say, at this point in his career Paul has a richer understanding of feedback than he did before: all his academic engagements are potential feedback towards his research goal. This feedback is interdiscursive in nature and diachronic in character because its value builds on itself over time, and Paul draws on it critically to make his research sustainably fundable. Paul's approach to feedback is thus broader and more comprehensive than that traditionally represented in the writing studies literature. It expands the concept of one-time consultative or corrective critique or opinion on a particular instance of writing or learning (e.g., Hyland, 2016).

Centrality of feedback to Paul's success in funding his research is the focus of this chapter. Feedback is the interdiscursive thread - the inter-thread - of Paul's navigating and negotiating the genre system of research funding. Feedback defines how Paul contributes to the system as reviewer and panelist and how he draws on its opportunities and constraints to inform fundability of his own *problem*. What enables his expert navigation of the system is that Paul's engagement is very focused in that he considers all knowledge gained from his interdiscursive interactions from the point of view of informing his research. Thus, ***Paul is intentional*** in how he engages with the disciplinary feedback. In particular, his encompassing perspective on feedback enhances his ability to anticipate peer-review criticism of his proposals. And finally, ***Paul is critical*** in his assessment of both the feedback he receives or seeks and of funding

opportunities for which he could compete with an elevated chance of success. Paul, in his own words, “*synthesize[s]*”.

First framing the meaning that Paul assigns to funding success and then tracing his participation in the genre system of research funding, in this chapter I have aimed to conceptualize the notion of interdiscursive feedback as a decisive factor in Paul’s funding success. Below is an interpretative summary of this discussion.

6.3.4 The meaning of Paul’s funding success

My interpretation of Paul’s view on funding success is based on the discussion above and stems from the two issues which came up recurrently throughout the interview process. They are continuity and consistency. That is to say that for Paul it is of considerable importance to maintain continuous and increased funding from sources whose mission prioritizes or includes research which defines his own disciplinary niche.

There are several definitive aspects to the issue of **continuity**. The first extends from an accepted view that grant funding achieved in competition is a form of measurable disciplinary recognition of a PI’s contribution to knowledge. What Paul’s case adds to this view is that in a current climate made highly competitive by reduced agency budgets and simultaneously increasing researcher demand for grant funds, continuity of funding that is directly pertinent to a PI’s line of research is a demonstration of on-going disciplinary endorsement of his work. In other words, grant funding is a means of carrying forward the legitimacy of knowledge Paul is producing. Continuity of funding creates a track record, while renewing and augmenting it legitimizes the promise of future knowledge which his proposals contain.

The second aspect connecting continuity of funds and Paul’s research program concerns one of the purposes of the grant proposal as a genre. Myers (1990) states that to have one’s proposal funded is to have the PI’s contribution accepted into the disciplinary mainstream. Paul is an established researcher in his field, and at this point in his career he seeks to cement rather than

initiate this acceptance. Yet being grant-funded also indicates that the work he does is at the frontier line of knowledge making. Continuity is a keystone in a long-term research program, so an on-going and increasing disciplinary commitment to supporting his work is one way for him to be creating a research legacy.

It is also my interpretation that Paul may aim deeper than the mainstream. He already is an established disciplinary insider. But what the depth and breadth of his disciplinary engagements points to is that he is likely to seek acceptance of his research not just into the mainstream but into the foundations of the disciplinary knowledge base. He reviews extensively (diverse funding and publishing committees internationally), his commitment is sustained and intense (15+ years of continuous service on multiple funding and publishing boards), he advances his research worldview by training next generations of researchers (he supervises large numbers of students from the entire tertiary range, undergrads to post-doc), he collaborates widely (conceptually, with multiple colleagues, and experimentally, through industry partnerships). In other words, he is intentional about ensuring inclusion of his conceptual worldview and approach into other people's research and R&D. Through this multitude of routes he is advancing his work into the root system of received disciplinary knowledge. Here again, grants from pertinent research funding pipelines are a means of disciplinary recognition of his intent.

Secondly, besides connectedness in continuity of his research program and its funding, Paul also sees significance in **consistency** between the research program he has developed and is advancing and the sources and types of funding he holds. The fact that the funding he receives supports *his* approach to advancing the problem conceptually and experimentally signals disciplinary recognition of his program, his approach, and his findings. Cumulatively, with every instance of funding which he is awarded and which re-confirms support for *his* line of work his status of disciplinary mainstay is re-ascertained. To an extent then for Paul funding success may also provide a sense of self-recognition. At the same time, his correlating the nature of funding and his research program also indicates that Paul, being an established researcher, prioritizes his research line over what may be fundable at the moment. At the same time and unlike some

other established scientists, he does not lose touch with the funding momentum by keeping his knowledge of it up to date through active reviewing service. This allows me to suggest that Paul holds the notion of research funding to be at once essential and ancillary to advancing his problem. Hence my statement that funding success for him is meaningful only insofar as it enables him to advance his problem.

To sum up, for Paul success in research funding per se seems to be a two-fold concept. It is important for him to have achieved and to be maintaining both recurrence and augmentation of his research funding as well as consistency between the nature of his research program and that of the funding pipelines supporting his work. What also seems to emerge is that for Paul, formal disciplinary recognition and cognitive satisfaction jointly facilitate his commitment and motivation to sustain further research effort. But what is particularly interesting for the purposes of this study is that Paul's continuous effort to re-ascertain disciplinary recognition of his work indicates that success in grant funding is fluid and requires continuous sustained effort.

6.3.4.1 Fluid and ongoing

During interviews, Paul used the word *success* only when considering annual statistics of funding rates at a particular agency. When discussing his own research grants, the formulation he most commonly relied on was "*I was funded*". He had spoken about advancing, deepening and otherwise globally developing his research program, which he refers to as his problem. He made it very clear that the driving vector of his academic career is his research, his problem. It is with this highly defined sense of direction that he approaches the question of grant funding. A multiple-times winner of various research funding pipelines and holder of industry partnerships, this PI regards research funding as a means to advancing the problem which constitutes the core of his academic career.

As a result, Paul's discussion of grant funding is not so much that of money but more that of peer recognition of the work he does, of validating disciplinary knowledge he is producing. To

paraphrase Myers (1990), for Paul grant funding is tangible confirmation that the knowledge he produces is continuously (re)certified by his peer reviewers to be legitimate. With this in mind and with an understanding that the discussion below is based on materials and conversations related mainly to NSERC Discovery grants, I project that for Paul funding success may hold the following tri-partite meaning:

- a) to be grant-funded in competition, within the current constraints of research funding, for the research of one's own choice and making;
- b) to be funded in competition, on a recurrent basis;
- c) to be funded in competition, on a recurrent basis, at an augmented scale.

There are several factors that led me to this view of success in Paul's case. One, for Paul the choice of ***an agency corresponding to the nature of his research*** is a way of ensuring legitimacy of recognition of his research.

Unlike CIHR ... NSERC is looking for ... research ... [of] ... fundamental character. ... So this is the second important factor [in my choosing to apply for NSERC].

In Canada, federal funding of research is disbursed by several funding councils which prioritize various research directions within both applied and fundamental domains. Although still needing to adapt to their funding conditions, Canadian scientists retain relative flexibility in having an opportunity to consider which of the councils is most likely to fund their research program. This is in some contrast to e.g. European countries, where state control of research financing may play a more pronounced directive role (Whitley et al., 2018).

This flexibility, however, comes at a price. NSERC, the largest Canadian funder of fundamental research, expects significant advancement in proposals submitted for renewal. It validates the PI's progress with a percentage of increase, decrease, or refusal of funding. So, two, for Paul ***research funding success is measurable:***

...if in re-applying the reviewers consider my progress significant – [they] increase funding. and every time I've been getting 20-25% increase.

Paul is highly realistic about the competitive nature of research funding and the ensuing need to re-asertain one's disciplinary worth with each new proposal. His understanding of a continuous need to prove oneself with each grant application enables his realistic expectations:

I am never 100% certain that my proposal will be funded. But ... I know when I think I did my best. But it's not like you are absolutely sure that it's in the fundable range.

In 2006, during Phase I Pilot, Paul indicated that in every application he submits he tries to do his best. In 2016, still always striving to do his best he benefits from extensive service as peer reviewer, and he is unambiguous about the basics of a fundamental proposal:

"... the most important thing is to be very concise [but] express every single aspect – what is the problem, what are the achievements, what is the progress of my research, the hypothesis, the experiments that are planned to test it. ... that's basically it."

Paul partly credits the evolution of his grantsmanship to disciplinary reading. During Phase I Pilot he mentioned that, at the time, he only read disciplinary literature. His work schedule being 10-12 hours a day seven days a week to this day, reading scientific literature was a way to perfect his mastery of disciplinary writing in English. But since Paul has always been reading as a writer, (*"When I read, I always think 'How would I say it?'" 2006*), it was also a way for him to acquire genre fluency. A critical approach to reading is one of Paul's defining characteristics. This is not at all to say that other scientists do not read critically. Rather, because of Paul's ESL background an additional effort was required on his part to internalize the conventions of writing accepted in the English-language conversations of his discipline. Paul has not acquired these genre conventions by osmosis (Paré, 2000); he has only been immersed in this learning process briefly in his post-graduate studies. Nor has he been explicitly taught the genre system of research funding (Ding, 2008; Eissenberg, 2003). It is his own effort as an ESL writer to understand and (re)produce genred disciplinary practices in a medium of a foreign language that enables him to externalize – to explicate – them even now, over ten years later.

Another major contributor to fundable quality of Paul proposals is his extensive long-term engagement as reviewer of grants and publications and service on grant review panels. It will

be considered in more detail later in the chapter. For now I will only note that Paul regards this service as an opportunity to give back to his discipline, *“a social responsibility of a scientist”* (2016). One would be inclined to say that paying his social disciplinary dues has proven to be a good investment.

Three, Paul’s ***ongoing effort to maintain disciplinary recognition*** indicates that he does not take his expert insider status in the discipline for granted. Along with the expectation for the disciplinary peers to challenge him he seeks to challenge himself, always looking to evolve, always striving to be one step ahead. This is in contrast with some PIs who, as described by research administrators, when losing renewals of their NSERC funding claim that “[NSERC] should know what I need”. I think then for Paul success is also to know that one is funded, in competition, recurrently and potentially with an increase, for the research program of one’s own choice and making. For developing and occupying a research niche from where to uniquely contribute to knowledge. It gives one a sense of self-realization, achievement, and self-credibility:

... this reflects the tendency of NSERC to see the difference between two main streams, two main ways of conducting research [applied and fundamental]. And one of them is... well, it’s my life.

Success then is also a sense of self-worth as a researcher, of proving oneself right. This realization must contribute to Paul’s motivation to sustain the effort in pursuing what has developed from natural interest and inclination. In other words, it is a source of intrinsic motivation for the PI as a writer, to persevere along one’s chosen research life-path. One therefore could suggest that at least in the Canadian funding conditions, informed perseverance enables success, and success helps PIs sustain self-motivation.

All in all, success as it is outlined above seems fluid and continuously to-be-achieved. It is more quest than victory. One may suggest, after Schryer et al. (2003), that a PI is only successful-for-now, for the duration of a grant. For Paul, success in grant funding is an on-going effort to

secure continuous and, ideally, increasing funds awarded in peer-reviewed competition, to enable Paul to advance *his* research program.

Importantly, in Paul's case being awarded research funding acquires meaning synonymous with success only insofar as it enables him to advance his problem. One may suggest that research funding contributes to Paul's overall success as a scientist, which for him means being able to go on developing and advancing his research program, his *problem*. This allows me to specify that insofar as continuous research funding is consistent with Paul's research program goals and thus enables him to advance it, he is successful.

6.3.4.2 *Supporting his problem*

Comprised in the issue of ongoing effort Paul is also that of **consistency**. That is, consistency of funding with Paul's own research priorities but also with his worldview as researcher. Paul works tirelessly towards broadening and deepening disciplinary perceptions of his problem and associated issues. A significant part of it for him is supervision of new fundamental scientists in his lab. That NSERC Discovery prioritizes supervision of students and student involvement in the PI's research under the rubric of high-quality personnel (HQP) corresponds closely with his own priorities:

[HQP] is another strategic direction of [NSERC] towards making sure that trainees ... develop a deep understanding of theories as well as methods which are used to investigate a particular kind of a biological process. And because of this NSERC pays significantly more attention, at least in my opinion, as compared to other agencies, towards quality of education and involvement of personnel.

In the framework of NSERC Discovery program, as in many other lines of funding in general, HQP is one of the main criteria weighted in the panel decision making. According to the statements of the key-notes at the research events I attended, NSERC HQP valuations account for a third of the final outcome on fundability of a Discovery Grant proposal. Paul supervises extensively and students in his lab range from bachelors to post-docs. All his students are

engaged in the on-going work and projects initiated out of Paul's lab. These include fundamental research as well as industry, technology and equipment development projects. Most of his students also hold various forms of disciplinary recognition, which, as stated by NSERC panelists in the previous chapter, further strengthens validity of a PI's research program in the eyes of panel evaluators. As an example, of the eight graduate students working in Paul's lab in 2016 all eight were funded through external and internal competitions. As such, NSERC Discovery's focus on HQP has not only a high degree of relevance to Paul's own values and priorities but also serves, for him, as a means of broadening and deepening his research program and approach.

Paul's involvement with students and his approach to HQP also provides a rare, in his case, insight into how he tends to engage internal institutional resources. As head of a lab and student supervisor, Paul ensures his students take university-run courses and workshops to satisfy basic pre-requisites of working in a laboratory environment. These include but are not limited to materials, chemical, and environmental safety. At the same time, in doing so, he formally adheres to institutional regulations governing the grant proposal submission process. His acknowledgment of the regulatory functions of the research office, discussed earlier, is one of the few explicit instances of his engagement as PI with the university-institutional aspects of the grant funding system:

... we must make sure that [as PI] you and especially the trainees, all have the training in the safety rules with respect to working with ... it was not like that before. And it is now the responsibility of the office of research to make sure that all of the members of the research unit, the lab, when the application is submitted they all have clearance from the office of safety. So it's a certain type of help from them [the research office].

Paul also encourages his students to enroll in courses and workshops on soft skills and academic writing including writing for funding. These at the study site, as in many other universities in Canada, are provided through the centralized graduate and post-graduate studies unit. Considering how Paul draws on institutional resources for student training essentials to support his HQP work, it could be suggested that he delegates basic HQP training

tasks to the institution. At the same time, he contributes in a way to these institutional structures by supplying student clientele to institutional initiatives.

In sum, Paul has invested and continues to invest much of his time into considering how research funding can work *for* him. For the last several years, Paul has found the closest correspondence between his academic priorities and those of the NSERC Discovery program. At this time, NSERC focus on supporting fundamental research on a long-term basis is optimal for Paul's long-term - lifetime - exploration of his fundamental molecular process. I suggest that ***in Paul's case critical assessment of his funding options is one of the factors contributing to his success***. It is also likely that this may be one of the factors that contributed to Paul's approach to grant funding.

Significantly also, Paul's critical approach demonstrates his intentionality as a researcher in exploring multiple options; and identifying and pursuing those that are currently optimal. Paul remains open to negotiating for funding of his research in venues other than NSERC as long as it would meaningfully advance his problem. He is strategic about streamlining his choices of applications and partnerships to address his main intellectual goal. Paul is also strategic about ensuring continuous visibility and feedback on his work through engagement in multiple disciplinary venues. He considers all forms of this engagement to be feedback: face-to-face dialogues and discussions, written reviews of his work including reasoned refusals, reading research published by others in his and surrounding fields, his service on multiple review boards and panels, etc. He welcomes open criticism, regarding it as a way to further inform his problem. Paul is also interested in assessing validity of his findings in real life, through industry partnerships. He further seeks to enhance the effectiveness of his experimental process and thus his value as PI, which is one of the valuation criteria at NSERC, through involvement in technology development projects. The expected outcome of such projects is new technology that may be employed in his or related experimentation processes. One may suggest that Paul is highly interdiscursive.

In other words, Paul's approach is driven by his problem. How does he make it fundable?

I have attempted to answer this question from two angles. First, I demonstrated how, through purposeful participation in the funding related contexts, Paul interweaves the institutional, interpersonal, intertextual, and intellectual for the purposes of advancing his research problem. Together these interdiscursive interactions form the encompassing feedback on his *problem* with which he engages on a continuous basis. He then synthesizes.

Second, the synthesis could be best observed in his proposal texts. Paul and his readers are distanced by the proposal text (after Bazerman and Prior, 2005) and so in review the proposal has to persuade the panel and the reviewers on its own (after Myers, 1990). At the same time, the proposal is the point of writer-reader contact, or it can facilitate this contact. And this is what happens in Paul's case, whereby the wealth of his ongoing engagement in the grant system results in his approach of anticipating peer feedback on his proposal texts (See Appendix B).

6.4 Lessons learnt

6.4.1 Synthesizing

This chapter demonstrates that a successfully funded researcher does more than adapt to the funding conditions (Laudel, 2006). Paul learns to understand these conditions and navigates and negotiates them via purposeful interactions at the intellectual, institutional, interpersonal, and intertextual levels of academic work, knowledge valuation and funding. All his interactions are geared towards enriching and advancing the program of his fundamental research, his *problem*. But through his ongoing engagement in a variety of stakeholder roles, Paul has also evolved an approach towards making his work fundable.

Paul is purposeful in the interactions that help him advance and fund his research problem. The multitude of roles Paul assumes in the grant funding system plays an important role in informing his approach:

Interpersonally/intellectually: serving on agency-based review panels and committees; disseminating his research through scholarly venues where he interacts with peers and students

Intertextually/intellectually: serving as external proposal reviewer; reading widely in his and related disciplines; publishing and serving on publication review boards;

Intellectually/interpersonally/intertextually: extending his peer reviewing practice internationally, in a range of agencies related to his research; seeking funding from a variety of sources related to his research; establishing industry partnerships.

This categorizing of Paul's interactions intends to facilitate the notion of interdiscursiveness in Paul's navigating and negotiating the grant funding system and in his approach to feedback. Segregating them is reductive and aims only to sum up the discussion. Together, these forms of engagement, on an ongoing basis, help Paul evolve his approach to making his work fundable. At the same time, he regards them all as sources of disciplinary feedback to inform his *problem*.

Paul's intellectual thread is much more developed now than it was earlier in his career, and he is clearly passionate about his research to have been so singularly dedicated to it for 30 years. What helps Paul facilitate success of grant funding his research is both his openness to applying to a diverse body of funders as well as his selectiveness in terms of their choice. He prioritizes councils and committees which support fundamental science. Paul's experience serving as reviewer and panelist inform his belief that quality of science and of the proposal prevail over the inevitable panel politics. To this extent, Paul has evolved an effective, for the purposes of his applying to selected funders, objectified research persona. In his proposals, Paul appeals to the depersonalized, objectified peer-reviewer whose individual worldviews form part of what Paul terms a *total* picture. He has found this approach to be the most effective for his practice as both grant writer and peer reviewer.

Peer reviewing service is a particularly important contributor to Paul's grant funding success. As peer reviewer, Paul is part of this ongoing shifts in the research funding context. He is not simply privileged to an insider perspective on how the agencies are changing and how the change is implemented. He participates in initiating some of these changes. This process is reciprocal in that it facilitates his giving back to the system, doing his "*duty of a scientist*", and informs his positioning his research for further advancement and funding.

At the institutional level, the majority of his commitments are outside of his university and involve mostly disciplinary peers. At his university, Paul also for the most part interacts with colleagues (peers) and with students. He regards student mentoring as a way to give back to the discipline. At the same time, training next generations of scientists in his world view helps him advance his *problem*.

To sum up, through his interdiscursive engagement Paul informs both his research and its fundability. His interdiscursive scholarly interactions are a decisive factor in constructing his funding success. He sees grant funding as an ongoing effort rather than achievement that acquires meaning only if it enables advancement of his *problem*.

7. Mark

When the game shifts, you've got to figure things out.

Mark

7.1.1 Mark: Transcending disciplinary boundaries with an *über-focus*

Table 5: Mark, Profile Highlights

Mark's research goal	Primary funder(s)	What stands out	Trope for the proposal
To expand acceptance of his work into the knowledge mainstream of the relevant domains of fundamental and applied natural sciences, with the reach-over to social sciences	NSERC CIHR	Most experienced as a grant writer and peer reviewer	A symphony in which the use of rhetorical 'instruments' is curated to demonstrate how the proposed research contributes to frontline knowledge in a given domain

Very broadly, Mark is a neurobiologist. His post-PhD scientific career approaches 30 years, all of them in Canada. Mark is a North American Anglophone with a doctorate obtained in Canada. He writes in English as a first language. Working at disciplinary intersections of several epistemic domains Mark is the most interdisciplinary of the three PIs, which makes his case the most complex of the three but also very informative. His research, in his own words, “has the widest spread” and capacity to bridge to related work in social sciences. For most of his long career Mark has been funded by NSERC. But as he is ever-expanding his presence in the related fields and seeking recognition beyond fundamental science, he has made an effort to acquire funding from the CIHR, with varying but recently steady success.

Despite its defined potential for cross-disciplinary collaboration, Mark's research explores the phenomenon which the majority of moral and religious traditions designate as a sensitive subject. As a result, in his proposals Mark has to address an added constraint. That is, besides having to convince epistemically diverse sets of peer reviewers of the credibility of his research he faces a near certainty that his reviewers would hold varying views on the subject itself. In other words, in every proposal he submits, Mark has to address the risk that his subject matter would render the reviewers highly skeptical. An amateur musician in his spare time, he does so through the metaphor of symphony, comparing himself as a writer to a composer who, with each piece, has to reach a new audience but in reassuringly familiar ways.

Mark singles out his peer reviewer service as a key to evolving his persuasion approach. By his own account, he has spent half of his career on reviewing and committee and panel service at both NSERC and CIHR. As chair of one of the largest NSERC committees his role is largely mediative with the goal of establishing a constructive work environment among its members. Negotiation and conflict resolution are organic to the role, and Mark's has learnt that at times a committee decision can be swayed by what he terms a "bully". A bully is a researcher of mid-range achievement who sees it as their academic duty to challenge every grant they read or every positive decision made by the committee members. In the course of his peer review service Mark has observed that the majority of the panelists tend not to stand up to a bully. That is, if the bully is not convinced, they are capable of singlehandedly swaying the panel into a negative decision. So Mark writes for the bully.

This understanding of panel dynamics informs Mark's perspective on the proposal. He aims to get the readers excited but not provoked over his proposals. In his writing, he is simultaneously assertive and accessible and *"asking questions outside the box but squarely within the phenomenon"*. He exerts continual effort to connect with his readers by personalizing his writing and making it memorable. But he is the only one of the three PIs who takes this risk.

Genre creativity is Mark's trademark which, given he has the most grant-funding and peer reviewing experience of the three PIs, makes studying his path to genre mastery valuable.

7.2 Transcending boundaries

Mark, in a very broad sense, is a neurobiologist. He works at the intersections of several fields of both fundamental and applied science. Innovative but not necessarily controversial, his research centers around a matter the discussion of which had been restricted in the majority of moral/religious traditions. This nestedness of his work in a wide social context leads to Mark's assuming that his reviewers hold varying views on the subject. The added complexity here is that the matter likely renders these reviewers more skeptical than normal.

7.2.1 Data sources and analysis

This chapter draws on several documented sources. Three interviews with Mark about his research funding were audio-recorded and manually transcribed. Mark's curriculum vitae provided further specifics of his engagement as a reviewer and member of grant review panels. Finally, a total of four proposals, their abstracts, and one research publication were analyzed in conjunction with the interviews. Two of the proposals were for NSERC (funded) and two for CIHR (one funded conditionally, one in review). Propositions advanced here on the basis of this analysis are my interpretations of the views expressed by Mark. I make an effort to correlate these with my findings documented in the previous chapters about the grant funding system. The analysis pertains to three funding streams. The first two are CIHR Foundation and Project grant programs, which support, respectively, long-term research programs with focus on knowledge translation and short-term clinical research projects. The third is NSERC Discovery program, which supports long-term research programs in fundamental science. Although broader in scope than the findings in the other PI chapters, the scale of applicability of this chapter's findings remains limited to Canadian federal funding of science.

As Mark's ways of participating in the grant system, two main streams surface from my analysis: his adaptability and agentiveness. They are closely interrelated and I refer to these

assertions in whole or in parts throughout the chapter. For the sake of readability, I will highlight certain ones over others at different times. I will start with an overview of his funding sources and their role in shaping his response to the exigencies of the grant funding system. In the sections that follow I will outline a) how Mark's adaptability contributes to his funding success and b) how his success in navigating the system of research funding is further enabled by his assuming an active institutional position. I will thus consider the meaning of Mark's success within the framework of his funding sources and of his institutional engagements. Wherever possible, I will accompany Mark's statements by excerpts from his proposal texts. A closer analysis of his proposal writing is in Appendix B.

7.3 '*...being entirely translational*'

The time frame addressed in my interviews with Mark is a period between 2014 and 2017. During this time Mark applied to and was funded by grants from NSERC and CIHR. His research program is grounded in fundamental science but also has potential to be applicable to human health, so he applies to both science councils. He was also considering in the near future to apply to SSHRC as some aspects of his research are eligible for grant programs that fund social sciences. If he succeeds within each of the Tri-Council agencies, he will become what he terms a "*triple-crowner*", an unofficial but prestigious status recognized among Canadian researchers. Within the time-frame of near future Mark is also considering an application to the US National Institutes of Health (NIH). These intents, which I will consider in some detail later, are as much a way he operates as a researcher (experienced, resourceful, and ambitious) as they are a way into understanding his thinking and his funding success.

NSERC Discovery grants support the fundamental basis of Mark's research, but many aspects of it are also eligible for funding from the CIHR. I have considered the context of NSERC funding in Paul's chapter. In this section I mostly focus on some key comparative aspects of NSERC and CIHR and then on the CIHR, or rather on the aspects of its environment which Mark highlighted as particularly defining for his participation in the grant funding system.

7.3.1 From NSERC to CIHR

Because of its applicability to healthcare and human wellbeing Mark's research can also be funded by CIHR, where two options are open to him. One is the Project Grant Program and the other is the Foundation Grant Program. Each program is comprised of several committees, called groups, which represent particular disciplinary clusters.

As stated on the CIHR website, the Project Grant Program welcomes incremental, innovative or explicit knowledge translation proposals as long as they are focused on “a specific purpose and a defined endpoint.”³² The Foundation Grant program is focused on more in-depth research approaches and sponsors high-impact programs of “integrated, thematically-linked research, knowledge translation and mentoring/training components.” The goal of Foundation grants is to advance “established health research leaders”³³. It is possible that because of the specific angle of the program's focus on high-impact, recognized research innovators its assessment processes, at least in the years of the Conservative government, had been dominated by representatives of a handful of leading medical centers:

... at one point I remember behavioral sciences A, which had 12 members of its committee or 14 members of its committee, more than half of them all came from the Douglas Research Center. And it was maybe kind of astonishing that more than half the grants were allocated to the Douglas Research Center people. They got the name 'The Douglas Mafia'.

At first glance, CIHR Foundation Grants may seem to be a health-sciences parallel to NSERC Discovery. But the key difference is the focal points of each of the programs: translation of foundational knowledge to specific health issues vs fundamental blue-skies discovery. Taken as a starting point, this difference would offer an additional perspective on the role Paul's and Mark's work plays in their funding strategies.

³² CIHR Project Grant <http://www.cihr-irsc.gc.ca/e/49051.html> Retrieved 28 Dec 2017.

³³ CIHR Foundation Grant <http://www.cihr-irsc.gc.ca/e/49798.html> Retrieved 28 Dec 2017.

Mark's failure to secure a Foundation grant in 2015 stems from a different issue. Mark did not make it past the first stage, researcher assessment (i.e., of the researcher, not the proposal), since one of the five reviewers did not believe that Mark *"had done all the things that I'd done"*.

I had one person who slapped me down, and that slap down was sufficient to make me not get a CIHR Foundation. Not even go beyond the first round. Because this person just didn't believe what I said ... I had papers to prove it. But the person just didn't want to believe it. And I don't think there is anything you can do for the people who don't want to believe something.

Since the other four reviewers had put the proposal in the 99th percentile, Mark maintains that the abrupt dismissal from the fifth was arbitrary. It was understood that the reviewer had not looked at Mark's publications to cross-check Mark's claim. But because of one negative review, the application's rating was lowered and it was rejected. In Mark's opinion there are at least two problems in the CIHR pre-2017 assessment processes that this incident highlights. The first has to do with the then review procedure which was not configured to consider outlier proposals like his. The panelists could not change their initial, documented, opinion after a discussion of a proposal:

... you can't change your bet. And with CIHR ... once you made a determination that this is a bunch of [nonsense], you can't change that after the fact. In the old days, you might say, "I don't understand this" and somebody on the committee would tell you, "oh actually that's really blah-blah-blah-blah-blah", and you'd be like, "oh, ok". And then they would change the rating system. But now they don't do that. And so what you say in the beginning, you know, your initial intuition, now is maintained.

Mark was thus disqualified on the basis of one reviewer's disbelief. He seems to have encountered truly bad luck resulting from the procedural flaws of the CIHR review system. This may stem from the second of the two problems highlighted by Mark, CIHR's own struggle for institutional ethos:

CIHR under the previous administration [pre-2016-17] had a problem defining itself. It did not know what it was, it did not know what it was doing. Do we do [animals] or do we not do [them]? Do we do people or transgenics? What's the value-add for [Canadian] people?

But it did not stop him applying to CIHR again. He re-oriented to a different sub-committee and got funded (*"better be a big fish in a small pond than a small fish in a big pond especially when a big pond is all [messed] up"*).

Mark's research may be somewhat unusual in that it could appeal to different funders but its versatility is not necessarily a built-in advantage. The advantage, if any, is man-made. Mark's insider experience in the system of research funding, critical approach, agentiveness, and communication skills all combine to make his research fundable. He had reoriented and succeeded. But circumstances in which he first failed and then succeeded were in large part due not just to competition among applicants but to problems internal to CIHR. Mark points this out as a second problem. He removed himself from competing in a large and inconsistently staffed pool whose administrators had considerable trouble finding qualified reviewers (see Appendix A for a briefing on the CIHR institutional change in the mid-2010s).

7.3.2 Situating Mark's success

Mark has been funded on a consistent basis and often simultaneously through several sources since his being hired on tenure track in 1992. This chapter focuses on Mark's relatively recent experiences. My focusing on the last four or so years as a timeframe during which Mark evolves his strategies for success may at first seem to lack depth. But Mark has been a participant of the Canadian system of research funding since the very late 1980s and so has witnessed multiple shifts in government funding priorities, institutional policies, and system exigencies. The formative effect of these experiences on how he constructs his success was summarized by Mark himself as *"when the game shifts, you've got to figure things out"*. In his approach to funding he draws on the past but focuses on the present while estimating near future. In this chapter I follow his lead.

The ultimate risk of not figuring things out in the present is to be left out of the game, and the game of science funding has gone through rapid and significant shifts in the last few years. As the university research officers pointed out, inability or unwillingness of many experienced PIs to address change had left them unfunded. It stood out during my interviews with Mark how current he is with the state of the grant funding system. Two key components of his being *au courant* are a) his active involvement in the system, both at funding councils and at his university levels, and b) his analytical and opportunistic approach to navigating the constraints and opportunities that the system – no matter the government and time period - presents to its participants. I start with the second.

7.3.2.1 Critical, opportunistic, resilient

Mark takes informed advantage of the present by being tuned into its particular challenges. This prepares the ground for understanding the meaning he gives to his grant funding success. At first sight it may be due to the nature of his research program. But Mark is ***purposeful in imbuing his research program with versatility***. This particular strength of his research, to be fundable from multiple sources, is a result of both long-term investment and his ability to identify and act on an opportunity which enables him to occupy a research niche. Being critical and opportunistic about how one's work may benefit from zeitgeist can seem mercenary; indeed, it is a strategic move favored in the corporate world. But in the intensely competitive context of research funding it is also a matter of survival of the fittest, and funding fitness is PI-specific. If Paul aims deep, Mark goes wide. Among the assets which help him achieve this goal are his agentiveness in maximizing possible opportunities, his ability to communicate science to specialists, non-specialists and general public, and his stamina which facilitates his recovery from failure. Below I take a brief look at each.

Mark is ***intentional in identifying existing opportunities***. His critical assessment of current situations enables him to be flexible. His is not a flexibility of adjusting his research to what is being funded now. It is that of identifying aspects of his work which will be most appropriate

for and attractive to a given funder at a given time, and framing them in ways that would address the funder's core mission and current priorities.

You got to put on a different focus for a CIHR grant than you would for an NSERC grant. And I presume, for a SSHRC grant. So focus is different, the way you present is different. ... in the CIHR that I got..., I made it very clinical in a sense that I've got ideas as to why there are non-responders for some of the drug treatments for the [...] disorder. Some of these are genetically based, or epi-genetically based things so ... I just raised a bunch of questions: why is it that [...] are attracted to certain [...], why is it that [...] and [...]. And that was the hook.

... NSERC is a little bit different. You are hooking it at the basic science of understanding [...] response. That there is still a lot left to be understood that we don't understand. In this version of my NSERC I will go after this system ..., like 'here are the things I am going to do epigenetically to figure this out, and if I go on a fishing expedition to do it here to look at a million different genes, it might be related to something. How does that figure, are there any inquiries built into that? And if there are, which ones and why? And then, then you got it.

He is also proactive in discerning potential opportunities:

Now, we've done a lot of work with [...] and have some pathways that are likely to be activated by that whole set of circumstances that bring it out. So that could potentially translate to humans, it would be something that SSHRC would be interested in.

In addition, Mark ***strives to make his research understandable and interesting to the wider public***. Aside from contributing somewhat to widening the appeal of his work, this is also his way of doing due diligence with regards to addressing Tri-Council intent to inform the taxpayers of how their money is put to work. But being opportunistic also means that in doing this Mark finds an advantage that would help *him*. He finds that communicating with journalists has a direct impact on his ability to articulate his grant proposals in a fundable way.

... scientists need to talk to press because when the press want an interview about something, a lot of people loath to do it. ... But what you are missing by not doing it is learning how to, in a 15-second soundbite, tell people what you are doing. And if you can

do it and get people to go "wow, it's really cool", then you've got NSERC and CIHR and grants in general sussed because you know exactly how to spell it out as to why it's interesting.

Finally, being opportunistic requires taking risks as well as being able to reconcile with both positive and negative outcomes of risk taking. Mark, while aggressively pursuing opportunity, is ***aware and accepting of high probability of failure***, including recurring failure. In his repeated submissions to CIHR during the period of 2010-2015 he was rejected three times. The third of the three, in 2015, came after CIHR had invited him to serve as a panelist on the committee he applied to ("... I got kicked out in the first review ... That was a big smack in the face ...").

Failure is part of the game but what Mark's experience at CIHR shows is that it could be both unreasoned, as above, and reasoned, as below. However, as the proposal is subject to multiple circumstances out of the PI's control, it also seems that failure can also be expected to be purely random, and probability of this is high. Situations like the one Mark faced in 2010 and 2011 (below) only intensify the notion of research funding being a game:

The first time [in 2010] I was 13th. They funded 12. And one of the reviewers was jovial but said ..., why did I change [x] for [y]. And I was like, Ok that's a sign that I should put [x] back in and downplay [y]. We had two pages to respond to previous reviewers so I did that. Unfortunately, the next year whoever those reviewers were, [were] not back on [the panel]. Two new people got in and one of them asked me quite rhetorically, how on earth I would even be studying [z] ... because [z] are this way and not that way? So I went from being 13th doing what they asked me to then being 49th and being triaged. ... I was really livid ...

There is no denying that grant failure causes deep frustration. There is a lot at stake to take it lightly. But Mark stresses that it is important to deal with frustration by facing it. In his experience, researchers who do not address negative emotions caused by rejection of their proposal undermine their ability to recover and go on:

...[some] people don't seem to be able to. They get a rejection and they really take it personally.

Mark's observation was independently corroborated by the university research administrators and this emphasizes the significance of my next point. Over time Mark has developed his own way of facing failure. Playing a musical instrument in his case helps him both think and calm down. It is his way of "*getting the useless energy out*" which enables him to overcome and let go of negative emotions and then to re-focus and stay productive:

... you just have to take it out, and some people drink, some people wail on their guitar, like I do, and then you have to buy new strings because you break strings because you are so mad. But it gets it out of your system.

Making music is among the sources of his sustained resilience. His stamina is a result of both career-long experience and making a habit to always face failure, in the way that is right for him and, ultimately, constructive. More specifically, his research stamina has a lot to do with his ability to eventually distance himself from taking rejection personally:

I try to teach my students not to take their writing personally, that's a hard concept for them to grasp. Because their writing is them. And it's not. It's just stuff on paper, and you can modify stuff on paper. Even if it's now all in virtual space, you can still modify this stuff on paper...

It may not be impossible that during the interview Mark was putting a brave face on a negative situation. But throughout my contact with him over a period of 15-18 months I had observed consistency in his overall positive demeanor. He is open to admitting deep feelings when faced with funding failure (*'I was livid'*) but he is also deeply committed to his work and determined to succeed. What is significant about this is that following repetitive and random failure to secure a CIHR grant, he had not given up. Moreover, he had gone on to be invited by CIHR to do panel adjudication in the context of turbulence and uncertainty which CIHR faced at the time. His attitude to trying, failing, and trying over and over again remained the same. He had been exasperated over repeated, sweeping changes to CIHR submission requirements, evaluation

procedure, and the resulting near-guaranteed random outcomes yet it did not stop him from continuing to submit. This means that in the game of research funding Mark assigns equal value to de facto failure and hopeful change.

To sum up, construction of Mark's research stamina evolves around resilience-building blocks which work for him. Among them are not taking rejection of his writing personally and addressing frustration to enable future productivity. Together they add to the considerable longevity of his funding success. Moreover, he maintains resilience building on an on-going basis in the face of ongoing and shifting variables of the review and decision-making process.

7.4 Engaging institutionally

To consider how Mark participates in the grant funding system, I will look at his service for both NSERC and CIHR. While doing so, I will also draw on some of the institutional experiences of Paul. Bringing Paul into Mark's chapter is unusual but I believe it helps highlight both Mark's unique ways of navigating and negotiating the funding system and some key commonalities he and Paul share. Within the context of the discussion here, these would be framed most effectively. I will then consider Mark's institutional involvement on the level of his own University.

7.4.1 Inter-institutional involvement

Mark's program of basic science research makes him eligible to apply for NSERC Discovery program. I have discussed the key specifics of Discovery grants in some detail in the previous chapters. This funding pipeline prioritizes long-term programs of research which are assessed via a trident of criteria covering quality of science in the proposal, quality of the PI submitting it, and quality of the PI's training of future researchers. Mark is a veteran NSERC reviewer and panelist with his latest-most round served as panel chair:

... with NSERC you do a three-year stint and then two years off. So I've done basically four of those, which ... means that half of my career I've sat on NSERC and a portion of that been chair of that committee.

Unlike Paul, who reviews for but does not serve on the NSERC committee he applies to, Mark submits to and sits on the panel for the same committee:

... some people argue that that's a conflict of interest, that because you are on the committee and some people like you and because you are physically there, people will be more prone to giving you the grant. Maybe that's true. I don't think... In fact, it behooves you to write much better and since you will be there, you don't want to embarrass yourself. So if you are writing a better grant and you actually get it, it has nothing to do with the bias of the committee because you were present. It's just that you didn't want to be embarrassed [laughs].

I should note that while Mark serves on the same NSERC panel to which he submits, he is physically elsewhere at the time of the review of his proposal. So even though he refers to being '*present*', he is not in the room when the rest of the panel is discussing his submission:

You are just not there. I mean, you will be with some other group when the group with your [proposal] is discussing yours.

It seems individual PI perceptions on what constitutes conflict of interest may and do vary, as is the case between Paul and Mark. But both PIs were positive in stating that federal agencies are vigilant in managing and preventing conflict of interest. Thus, if Mark sits and submit to the same committee, from NSERC's standpoint there is no conflict.

In addition to long-term and ongoing service on NSERC committees, Mark actively shares his knowledge of the agency and of the NSERC Discovery Program with colleagues within his university. NSERC supports the fundamental base of his research, and a key piece of advice Mark gives to beginner PIs during his talks is to accept an invitation to serve on a panel committee without hesitation:

I think it's fantastic to do it. I mean, you know what's going on, you know how your grant is going to be looked at, and you know what is going to be looked at in your grant ... [As a

PI] You really have to figure that out and [on your own] it's a difficult thing to figure that out.

The advice, although given in the context of NSERC, is applicable across the Tri-Council if not across most government funding agencies. It is especially valid in the context of rapid changes federal agencies have been experiencing throughout the 2010s. As an example, in 2015 and 2016 NSERC was faced with steeply rising numbers of applications by refugees from the other two Tri-Council agencies, CIHR and SSHRC (see system chapter). In Mark's opinion, although the demand was overwhelming NSERC was not overwhelmed because of its procedural stability, which Mark characterized as '*an amazing balancing act*'. However, the demand had its toll: '*people got less money than they expected and less money that they had [before]*'. As a result, in 2017 "*a lot of these people [refugees] we were told to treat as new, even if they were established researchers*". Without access to insider information this change, however swiftly introduced at the agency level, would become known to applying PIs only in a matter of time, which means many applicants were not able to anticipate this in their 2017 applications.

Aside from the obvious practicality of gaining competitive advantage of insight into agencies' internal processes, being part of decision-making enables one to participate in change. Mark is purposeful and articulate about this opportunity in his role as NSERC committee chair, as illustrated by his approach to the 2017 challenge of evaluating applications by researchers who are established in their fields but are outsiders to NSERC:

... how do you weigh that against somebody who is just coming into the field? I had to be on top of people to remember that, that is not a new person. This is a new person to NSERC but not a new person to research.

That he '*had to be on top of people to remember*' indicates that many committee members may approach their service as a task, complying with directives issued by the agency. In doing so they are still contributing to the discipline. But this is in some contrast to Mark, who in the course of his service aims to make a difference. At the same time, Mark does not necessarily

perceive himself as change agent, not because he is not willing to be but because there is only so much he as an individual can do within a system:

... we are part of it but we are not. Especially process-wise. I don't think we are part of the process of that change. We are part of the, you know, zeitgeist changes and "what gets interesting" changes

In the specific instance of change in processing refugee applications it is possible that this is NSERC's way of encouraging outsiders to consider their traditional funders. If so, it is a higher end process change and to counter it panelists advocating for outsider applications would have to be prepared to stand up for each in articulate and reasoned support. This requires effort and is time consuming, which, given the constraints of committee size and application numbers (*'it's a huge committee 60-some people'*) and of limited time (*'you are given very little time per grant and it's over a whole week'*), does not look sustainable beyond short term. So yes, agency service enables participation in change but to an extent.

Being constrained by the system, however, does not stop Mark from assuming an actively engaged position when it comes to being part of both process and zeitgeist. In his role as NSERC committee chair his primary concerns are not necessarily change in the process that is already in place and institutionalized but rather fairness and transparency within it:

And as chair I would go and make sure that the vetting is done properly and what not, that they don't engage in ad-hominem attacks on the individual.

As a panelist at CIHR and NSERC, Mark is one of those who may stand up for a particular application and because of that, influence funding decisions. What drives him mostly is quality of proposed science. In an example below he discusses how applications that are not necessarily aligned with what is trendy at the moment could fall victim to the panel's being collectively carried away by what is. In Mark's field a certain low-input / high-visibility experimentation process has recently gained prominence (*'it's sexy. Looks cool...'*). What adds to its popularity is attractiveness of the associated visuals (*'pictures look cool'*), which, as part of

technology integration in academic communication, is in itself a trend (Lamont, 2012). But at its essence this is a tributary to the main stream of the field:

The problem is that if this is now the new bar – that everybody has got to be doing it or is talking about doing it – and you are on the committee called [Subject] Sciences A, where is the [subject matter]? The first reviewer was totally dis-sing because “Well, it follows from the previous work and it’s important because it’s never been shown, backing up the things ad nauseam but it doesn’t seem very sexy”. I just had to chime in and said, “Look, are we [subject] sciences A or are we sexy sciences A?” I said that. I said, ‘With all due respect, I feel that this person is doing straight-up classic [subject matter work]. There is a lot of [it] in it, so if we are [subject matter]-A why would we diss something that is our mainstay bread and butter?’

Two issues arise in relation to this situation. They are, more likely, two sides of the same coin. One is the peer-reviewers’ side: how their critical involvement with zeitgeist can positively influence institutionalized change. This especially concerns change, as in the case of the CIHR in 2015 and 2016, that is not necessarily for the better.

Yes. And that’s why it’s such an important thing to do. People that resist doing that I think are ... it’s not that are resisting their patriotic duty but they are really not in the know. And it’s important to be in the know, it’s important to add your voice to that and know how things are.

The second side of the coin is the applicant’s side, albeit framed through the involvement of the peer reviewers: the extent to which luck may factor in the review process, the relation between committee members’ engagement in decision making and the applicant’s luck, and *au fond* the meaning we ascribe to luck in the context of the grant funding system.

Considering the story above, was it this applicant’s luck that Mark stood up for her proposal? From Mark’s perspective, this was about doing his duty. Interestingly, Mark sees it as something for which he is responsible personally. So it was not Mark, who is forthcoming and outspoken, who formulated this position but Paul, who is reserved and reticent:

[S]omeone [engages with] my applications, doing their social responsibility, and the same with me. (Paul)

There were no further explicit verbal indications during interviews, beside the one above, that both PIs expect fellow committee members to be as responsible. As for Paul and for Mark themselves, I believe that in the course of their long careers their sense of duty as scientists has evolved into a personal one.

For both PIs, quality of science in the proposal is paramount and they emphasize this when discussing their own approaches to reviewing and committee service. As a result each one of them, by being involved in zeitgeist, contributes to a higher end process: Mark as NSERC committee chair, Paul as member of the CIHR College of Reviewers, and both as committee members. Through these involvements they make a difference using their individual voices, as Mark does above; or collectively with fellow members forming a decisive consensus which eventually serves as a base for the agency's institutional voice, as Paul does on the College of Reviewers. That is to say, if they do not exactly drive change, they co-construct it, to the extent possible.

Getting involved is a choice and there are many ways of doing so, Paul's and Mark's being select examples. But perhaps not all PIs on active agency service take up an engaged position. Mark does and his direct involvement can influence decision outcomes:

And the chair of the committee said "You know you are right, we do get seduced by sexy paradigms but we should be thinking about what we are doing and what previously been the thing that produced the highest return for the investment".

The meaning and meaningfulness of committee member engagement with the review process may be worth a study of its own. Individual PIs stories of involvement (or not) could demonstrate how the grant funding system, which we tend to perceive and represent in literature as an institution, consists of individual voices and that with effort, one's own voice can make a difference. This brings one to the question of the meaning of luck, as something

outside of one's control that may yet end up positively, and the extent to which luck factors in the review process:

That's the thing: if you don't do the sexy, then people wouldn't [want to fund you as readily]'.

Was it that applicant's luck that her proposal got funded? Or was it the committee's luck that Mark was on it and did not hesitate to call attention to disciplinary bread and butter, refocusing as a result the direction of review outcomes? And if it was luck, in either case, what is the extent to which an applicant, any applicant, can make their own? This chapter is not the place to divert to a discussion of luck, but considering the meaning of luck in research funding and PI engagement in system change could be a valuable stand-alone study. Here I will look only at some aspects of the issue as informed by Paul's and Mark's cases.

Much like the grant funding system, luck, at least among early career PIs, tends to be perceived as a defaced concept, or what McAlpine et al. (2016) call the randomness factor. But presumably, if a researcher takes up committee service it is because, as Paul indicated, it helps fulfill their need to give back to the discipline. If this stands, committee service comes through as conscientious response to the call of duty. Perhaps not all PIs joining committee service do this selflessly. But the value-add of this service, besides helping one become a more informed proposal writer, offers PIs capacity to enable their decision-making agentiveness. Paul and Mark each act on this opportunity. Their ways of involvement are different but both are valued enough by their peers to be not only accounted for but also for both PIs to be invited and re-invited for committee service.

One of the outcomes of Paul's and Mark's long-standing and ongoing committee service is that they do not perceive the funding system to be either defaced or de-individualized. The system for them consists of fellow peer reviewers with whom they engage on committees intellectually, procedurally, and occasionally socially. This helps them see beyond the institutional façade of the system and understand what is important to those who constitute it

and how they work within an agency-imposed framework. It also helps see how agency frameworks are in turn affected by government priorities and how it may be reflected at committee levels:

There were a lot of MDs [medical practitioners, as opposed to academic PhDs] on the committees that were reviewing things [and] that didn't really understand the value of ... pre-clinical research, as they call it. A lot of it got dinged, even for drug addiction, which is kind of crazy. So in reconstituting the committees [CIHR] re-evaluated what the value of [the pre-clinical] is. They re-affirmed their belief that there is value in [pre-clinical] research ..., and that's good.

Paul and Mark, in other words, are connected: to fellow committee members, to administrators and, through them, to the system. Their in-depth understanding of the dynamics of review, however, does not guarantee that every proposal Paul and Mark submit gets funded. Yet none of them invoked luck in their interviews.

Within a very limited scope of this study, I venture to posit that for these two PIs luck, if one may apply the term to Mark and Paul, is something they construct or something they work to influence since one is not in control of luck, and their institutional involvement plays a role in informing their approaches. To start with, their view of the system is at once encompassing and specific. That is, they see the system as being representative of the individuals that comprise it, with their individual researcher identities and agendas, which I will consider later in this chapter. At the same time, they recognize that the system is an entity that has evolved from these representations enough to have gained its own system(ic) identity; hence, as above, a possibility to distinguish between institutionally distinct ethos of NSERC and CIHR.

Furthermore, both PIs indicate that systems, NSERC or CIHR, are not static and evolve continuously with the influx of government changes, reviewer and panel rotations and renewals, new trends, directions and approaches to research, etc. These contexts are intertwined and nested (McAlpine et al., 2016) and together they assume meaningfulness as affordances and constraints that frame how individual reviewers, committee members and,

therefore, committees make funding decisions. Being part of these contexts helps Paul and Mark to rationalize what otherwise may seem as purely random.

To return to the issue of institutional involvement, as committee chair and committee members Paul and Mark in part represent the system. At the same time and at both levels they act as individuals whose sense of duty and disciplinary commitment may not exactly make for change, but they make a difference. These PIs do so because they can and because they choose to act on this affordance of the system. Becoming a committee member already signals a PI's involvement with the system but it is their conscious choice to engage critically rather than conform to routine tasks or pursue their own agenda that helps them rationalize the seeming randomness of funding decisions.

It also means that no matter the format, quality of every individual's involvement counts. In the case of Mark's service as NSERC committee chair and CIHR committee member, the outcomes may be more immediately visible in decisions over specific applications during a given review cycle. In Paul's case, changes he helps bring as a member of CIHR College of Reviewers may materialize more slowly and be more institutionalized in their appearance, e.g. as policy, but his contribution is undisputable. In other words, Paul's and Mark's experiences demonstrate that within the boundaries of the system(ic) limitations which PIs on agency service have to contend with there are also opportunities, and that being agentic within those boundaries matters.

To sum up and to refocus the discussion, the meaningfulness of a PI's institutional involvement is multifaceted. Examples of Paul's and Mark's experiences must be only some of the many equally meaningful ways in which PIs on agency service engage with and enact the system. Similarly, there must be other ways in which PI engagement impacts the system and ways in which it evolves. For applicants whose proposals are under review, such understanding of PI-as-peer-reviewer engagement matters because it could help them de-randomize the notion of luck and consider instead ways of constructing their own.

But more in line with the focus of this study, PI engagement with the system matters significantly for PIs themselves in more ways than one. It provides PIs with experience of seeing how review panels perceive and receive active involvement of their members. It also allows PIs to observe the ways in which fellow member get involved in decision making beyond routine procedure. It allows PIs to see what matters and why, and it enables PIs to consider and frame their own involvement in ways that would maximize its acceptance. But ultimately, this experience helps PIs shape their own response - in the proposals they submit as applicants - to the exigencies of the review process. It will not guarantee their being funded at all times but over a long term of an academic career, institutional involvement has significant implications for PI funding success.

7.4.2 Intra-institutional involvement

Mark has been involved in agency service right from the start of his career and has no plans to scale back. The opposite is in fact true since in 2017 he expanded his committee membership by agreeing to serve at the CIHR. In accepting agency invitations he follows his own advice (*'don't even think of it. Say yes'*). It may be that not all university researchers receive invitations for committee service, so they may not all or always have a possibility to get involved at the agency level. But for them, as for Mark, getting involved within his own university is yet another way to be part of the grant funding system and possibly another way to leverage funding success. Mark both contributes to and draws on his university research support capacities. Below I look at each of the two aspects in some detail.

7.4.2.1 Contributing to institutional research capacity

Mark's involvement in university research venues is on-going and varied. He chairs a research related university-wide committee. He consults for the university research office. He is one of the PIs who are current with their agency involvement and on whom the research office calls when preparing outreach and R&D events. Most recently, he co-authored the university response to the 2016 survey by the Minister of Science to assess conditions for development of blue-skies research in Canada; that is, Mark directly contributed to what is now known as the

Naylor report (Naylor et al., 2017). Internal institutional involvement for him seems as organic as his service at NSERC and CIHR:

It's all part of the same exercise. It comes back ... it all does come around.

This highlights both the nestedness of the research funding contexts and Mark's positive outlook on the efforts of the research office. In fact, Marks helps them build their R&D capacity and credibility. But, like Paul, he does not necessarily seek to collaborate with his faculty-based research administrators. Among the possible reasons may be frequent personnel rotation which makes the meaningfulness of such engagement a challenge. Given Mark's own in-depth understanding of the proposal review processes and the funding climate, relative inexperience of repeatedly new research staff may not be worth his effort to engage with. But contributing to the development of his university's overall research capacity seems as important to Mark as being a contributor to his epistemic domain. So Mark gives: to the university, to the disciplines, to his colleagues and students, to the grant funding agencies, and to fellow PIs.

It may be surprising that in the highly competitive nature of grant funding Mark is so willing to share his insight. But he sees this as a scientist's social duty. Also, this is in part how he acts on his observations as NSERC and CIHR committee member. They coincide with insight shared by the research office: researchers, especially established faculty, are often resistant to change. As committee member, Mark sees the consequences of such resistance when grants are in review:

... everybody [every PI has] got their own way and they feel that their way is the right way.

[But] what granting committees want [is] change ... If people don't keep up, they are not going to know.

This sounds obvious, and a logical outcome of such understanding would be for researchers who plan to submit their grant proposals to inform themselves of ongoing changes and address them in their proposals. But Mark highlights the same problem that was brought up by the research administrators, namely that not many researchers take advantage of the university support services designed to help them with precisely that:

Our office of research has tried numerous times to get more people to come to these things.

As I witnessed first-hand, researcher participation rates at these events are not high. One drawback maybe logistics. The timing of grant information events '*when grants are due at the beginning of the Fall term ... [is] kind of ridiculous*', so many people cannot find the time to commit. The other issue has significance on a deeper level. If some researchers may want to attend but are overloaded at this time of year, others do not feel the need to attend at all ("*They [NSERC] should know what I want*", is often the attitude of an established PI, according to the research office). Yet some others, while attending, may not be receptive to what an informed colleague may have to share:

... if they don't listen and they think they are right (this is how it should be and this is how it's always been), then they are not going to be playing the game necessarily. But the problem is when the game changes, the ground shifts. When that happens, then you are ... you know....

When the ground shifts, you are already likely left behind because the proposal would not reflect the shift. With each agency in the Tri-Council being inundated with applications, the outcome is easily predictable. So while staying *au courant* is absolutely necessary, it is being perceptive to change that seems an important prerequisite for playing the funding game. However, as Mark pointed out, '*some people you can't tell anything to*'. Being unresponsive disadvantages them from the start, which rather means that their not getting funded has nothing to do with luck.

I should note that resistance to change was brought up by the research office with regards to mostly established PIs. However, the university research office serves PIs across the career spectrum. Many participants at the events I attended during this study were in early or mid-stages of their careers (tenure-track, post-doc, a few associate professors). If this is somewhat representative of the audiences Mark has addressed, it seems that resistance or unawareness of change is not uncommon among earlier-career PIs as well.

While early and mid-career PIs may be waiting to be invited on review panels and have yet to accumulate experience to share, the university offers opportunities that can help them leverage their participation in the grant funding system. Taking informed advantage of this nested context of research funding and contributing to their university research services may help PIs in several ways. One, drawing on resources offered by the research office they could learn to understand what significance shifts in the grant funding ‘*ground*’ may have for the funding of their work. They can also draw on assistance offered by faculty research personnel to reflect these shifts in their proposals. Two, specific experiences shared by successful senior colleagues from across the university who consult for the research office could help these PIs to understand the significance of being in step with ‘*the game*’ when change occurs. Three, they can make contacts across the university with fellow faculty and research staff, and collaborations and consultations with them may ultimately contribute to higher fundability of their proposals. This third is additionally significant in that PI familiarity with the university research resources may augment their funding choices. And finally, these PIs could learn to appreciate that conscious and conscientious sharing of insider expertise by a senior colleague is more than a duty. It is also a personal example of being agentive. As the interconnectedness of the funding contexts takes on concrete meaning in the process of these engagements, it will help junior PIs build towards their own luck.

7.4.2.2 Drawing on institutional affordances

As discussed, being informed of resources available through one’s own institution is advantageous. Starting in the early 2000s, Mark’s university has been purposefully developing state-of-the-art facilities geared to support scientific research. Here I consider how Mark draws on these affordances of the institutional (nested) context to optimize his grant funded time and grant budgets.

Mark’s own laboratory has equipment that is specific to his lines of research. But it is also in the nature of his work to use high-cost equipment such as MRI machines, or rely on high-tech

processes overlaying real-time, high-resolution imaging at a micron scale that would be beyond the capacity of a lab microscope.³⁴ As a principal investigator he bears responsibility for the budget and is very aware of the costs of equipment usage:

It's like everything else. If you do functional magnetic resonance imaging of the brain, you've got to pay for physicists, people running the machine, doing statistical analysis, the voxhall analysis on the machine. There is a lot to pay for that is hidden in the cost of actually doing it.

If a university does not own its own MRI equipment, the work needs to be outsourced to an institution which does. Most often these are hospitals, which means that university imaging requests have to be fitted between hospital patients. Waiting in line creates time-costs for the PI; in addition, this also incurs service fees which eat into the grant budget:

You then have to pay the [hospital] system money per hour to buy your time on it, and it can be \$500/hour. So if you have an NSERC grant of 20K, your \$500/hour only goes so far for so many subjects. ...

As Mark points out, *'your limitations close in pretty quickly'*. Working in a university which has its own equipment means having access to a resource that can help optimize the monetary value of one's grant. Mark's university has its own MRI *'which is totally for research'* as well as advanced microscopy equipment, and this takes grant money that much further in terms of both fees and wait and travel times. But one has to know about such options to be able to benefit from them.

Benefiting from access to these facilities is one way Mark draws on institutional resources. Another is his being able to and taking advantage of university-wide research services. The one

³⁴ As referenced in Ussui, V. M & Wallace, M.B. (2012). Confocal Endomicroscopy of Colorectal Polyps. *Gastroenterology Research and Practice*. doi: <http://dx.doi.org/10.1155/2012/545679> Retrieved from <https://www.hindawi.com/journals/grp/2012/545679/> on 3 February 2018.

that is especially important to Mark, for example, is his university fully subsidizing per-diem costs of keeping laboratory animals.

[This university] helps people because we don't actually pay per diems, and we are very, very lucky. So if you have an NSERC grant it can actually go much farther because we are not paying per diems for your animals. That's a huge cost.

In another example, much like Paul's, Mark's students are safety-trained for working in the labs through the workshops offered by the University. They also take courses in academic writing which provides a foundation for building students' skills for effective discipline-appropriate communication. While PIs are involved in student training, they do not incur base-level expenses out of their grant budgets. These examples are intended to highlight that Mark is conscious of his university's support and does not take it for granted:

It means that our NSERCs, which of course are much smaller, can go much further and that's real money for real research and not for maintenance ..., not for procedurals.

Depending on their disciplinary affiliations and lines of research other successful PIs, as well as Mark, likely draw on a variety of other resources and services available to them through their universities. These vary in both scope and significance. Services such as those I profiled above are a sort of open source. They are available to the entire (eligible) research community within a university and, among other things, they represent some of the nested contexts of research funding.

7.4.2.3 Synergizing

One other stream of internal research support may not be accessible as readily as those above, but the symbolic capital associated with it is considerable. This high-value, high-visibility form of institutional support is university research chair-ships. This concept merits some attention as it may demonstrate how university-researcher cooperation could be mutually beneficial.

Research chairs internal to a university are distinct from the federal pipeline of Canada Research Chairs (CRC). CRC "is a tri-agency initiative of the Social Sciences and Humanities

Research Council (SSHRC), the Natural Sciences and Engineering Research Council (NSERC), and the Canadian Institutes of Health Research (CIHR) (the agencies).” It is a funding program designed to build research excellence capacity within Canadian universities “to make Canada one of the world's top countries in research and development.”³⁵ University research chairs, on the other hand, are funded by the universities themselves and serve as an incentive for highly productive researchers to remain and continue their work there. Internal research chairs are a form of support as well as recognition for the researcher and for the contribution they are making both to their field and to the institutional reputation.

Internal research chairs are built on the concept of reciprocity. Only high-impact, high-productivity, or high-potential researchers are awarded chair, and external grant funding is a recognized indication of each of the three, so the university gains considerably through publicizing the research of these PIs. Such publicity is a key incentive in the university’s recruitment of new students as well as of new high-potential faculty. In their turn, research chairs benefit from monetary and in-kind contributions the university puts at their disposal such as teaching remissions, equipment subsidies, and/or directorships of research centers. But the award is competitive and contextual:

I think the university enjoys the press they get from [my external grants] but you know I haven’t yet after four tries got a [university] RC. And this is after doing everything they want me to do. It’s weird. But those research chairs are political.

This chapter is not the place to consider political aspects of institutional recognition. But it may not be unreasonable to note that they exist, as they do within agency review panels (*‘there is ... politics’*, Paul). What comes in focus through Mark’s statement above are two things. One pertains to the meaning of a PI’s intra-institutional involvement. The other says more about

³⁵ Information and quotes retrieved on 6 February 2018 from http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/index-eng.aspx

Mark himself. I will close the section on PI internal institutional involvement with the first and start the discussion of a different topic with the second.

The first of the two suggestions that I make based on Mark statement above is that, if attained, internal research chair leads to deeper PI involvement with their university towards building research capacity, recruitment, publicity, industry liaisons, cross-faculty appointments, etc. This involvement may vary in its intensity and format; it can also be more publicized, as in Mark's case, or less, as in Paul's case. But in effect, the award of research chair augments a PI's intra-institutional involvement and contributions. The university, or those universities which have internal research chairs or equivalents, must be seeing a sufficient return on this investment to continue to develop it. Extending research chair privileges to select PIs, universities also draw on these PIs as a resource to boost institutional competitiveness in a competitive academic market. Research chairs enable their universities to do so in a credible, game- and genre-appropriate way. In turn, being awarded research chair contributes to the PI's own disciplinary credibility, which could help them further build up their external funding success. It seems a win-win.

7.4.2.4 Summary

Overall, the discussion above suggests that there is value in a PI's involvement in the grant funding system at institutional levels, both externally and internally. Each holds merits of its own with regards to the PI's funding success. Inter-institutionally, PI service on agency panels and committees enables in-depth, insider-level understanding of how grant proposals are evaluated and what matters. Investing in development of research capacities of their own university can, among other things, contribute to PIs' credibility as researchers, help them better understand university priorities with regards to research, increase their research visibility, mediate communicating their research to the wider public, which resonates with the funding agencies' intent of being transparent with their accountability to the tax-payer. That is to say, institutional involvement is one of the many nested contexts of funding, provides PIs with other venues for making their research fundable.

7.5 Developing an *über-sense of the whole symphony*

7.5.1 Persevering against randomness

The second of the two things that Mark's statement about research chair highlights is something that pertains to Mark himself. It is about his resilience to and his outlook on failure. The specifics of his perspective on failure in this statement can be best observed in the way he frames it linguistically. Paul has the university research chair. Mark does not have it 'yet'. It is not discouraging for him to have encountered failure four times. It is 'weird'. But what is implied, clearly, is that the weird, the unknown, the puzzling or the frustrating does not de-spirit him.

Mark is consistent in his approach to failure when he encounters adverse conditions with external grants. As an applicant in 2016 he was caught in the windfall of the review process reform at CIHR which also involved considerable but inconsistent changes to the submission requirements:

CIHR ... between the last submission [2015] and this submission [2016] ... changed everything. And between the submission prior to that and the last submission they changed everything. And so, it was changed from ... a grant ... that was 11 pages long and had sections that you knew you had to do and you knew how to do and how to emphasize things ... to this completely new format and [they] divided everything up, completely differently...

Characteristically, instead of complaining or going in denial, he thinks that it '*actually wasn't a bad idea*'. Mark maintains that while the changes caused frustration for applicants, they also eventually led to re-constitution of the composition of CIHR reviewing committees, which in turn triggered a different, positive, change. It was the start of dislodging of the entrenched and biased review process:

[This committee] used to be 15% women and everybody was from McGill and it was very Eastern-Canada-centric and it used to have a lot of problems. And now it's ... 26 people and ... half women and half men, and it was from all over. Many different expertise, a lot

of different expertise, ... much more diverse and I think it's going to show in the grants that are going to get funded. How many? Nobody knows. They are all different, there is no Douglas mafia, there is no McGill mafia, there is like... I'd say it was still Eastern-Canada-centric but at least East spread to Ontario. There was somebody from Dalhousie, somebody from Memorial, from UBC, one from Lethbridge, one from U of Alberta, one from Calgary, I think one person from Winnipeg. So it was much more diverse, which is good.

Referring to this power struggle over funding outcomes was the only time Mark used the term luck, and it was clearly connected to CIHR '*mafias*' rather than to the overall concept of applying for funding. His saying '*it was luck of the draw if you were not at the Douglas*' was prefaced by the discussion of the equitable and balanced review process at NSERC. He emphasized that this remained the case even during the periods when CIHR reform forced many of its would-be applicants to seek funding from NSERC, thus augmenting manifold the pressure on this agency. Further, Mark did not invoke luck discussing post-reform processing of applications at CIHR, which indicates that he does not associate the term with the funding system processes per se but rather with inadequacies of their particular instances.

However, Mark is aware that circumstances out of PI's control are inherent in grant funding decisions (e.g., McAlpine et al., 2016). They may be, as in the paragraph just above, more pronounced in some committees over others. They may also be characteristic to varying degrees of a particular time period or government tenure, as was the case at CIHR in mid-2010s:

... it ma[de] it like ... you are in an earthquake zone and you have no idea when the earthquake is going to hit, but it hits every time you are trying to write.

At the time Mark himself was not serving on CIHR but was applying for it, with varying outcomes. Being in an earthquake zone did not stop him. In his view, reconstituting the CIHR committees during and after the reform allowed for more equitable distribution of funds and enabled many researchers who had previously been rejected to '*break in*'.

The element of randomness remains present throughout the funding system, in the review process as much as in the selection of researchers for committee service. Mark, for example, at the time of the 2017 interviews was in hiatus, an agency-mandated break after three consecutive years of service. He was not sure whether NSERC would invite him to resume the service after the break. Although he had been re-invited before, uncertainty about next time, every time, is built into his expectations (*'They may do it again, they may not. I don't know'*). Mark accepts unpredictability as an element inherent throughout the system of research funding. But it is his approach that counts:

...you keep on doing it until something works. And something will work. Eventually.

To elaborate on the meaning I assign to Mark's statement above I draw on two sources. One is a theme of perseverance and belief that threaded through my interviews with Mark. The other is an echo of this theme documented by van Nostrand (1997). It pertains to van Nostrand's own experience as an Allied soldier during WWII. But while both Mark and van Nostrand reflect on personal experiences, in both instances their perceptions are enabled by the larger social systems they participate in (van Nostrand 1997, p. 2). Those are the systems of grant funding in one case and of the Allied war effort in the other. My perspective below is a bit of a linguistic digression framed by a genre-system view.

Van Nostrand's encounter with a "remarkable piece of syntax" in the run up to the D-Day would be best described in his own words (van Nostrand, 1997, p.1):

On June 4, 1944 near the harbor at Torquay, England, a large shed stood empty. Its former occupants, part of a U.S. Army headquarters company, had boarded one of the troop ships in the harbor, bound for Normandy. Inside the open shed door, propped on an easel, a chalkboard framed the orders of the day. ... The words were simple but the message was metaphysical.

REVEILLE WILL BE 0330.

DRESS WILL BE BATTLE.

MORALE WILL BE HIGH.

There is a close relationship between the two sets of statements, Mark's and van Nostrand's. It pertains to the expression of their intent which, in both cases, is that of pre-emptive certainty.

7.5.1.1 Pre-empting certainty

Speaking **from the point of view of language-in-use (pragmatics)**, although none of the individual sentences is constructed as an imperative, taken together both sets are directives. What makes them interesting is that each is aimed at directing circumstances and, at that, circumstances rather outside of the directive-issuers' control. Moreover, both express determination to succeed, in a non-negotiable way.

Both statements derive their meaning from syntax, drawing on the grammatical structure with which to declare an intent. Traditionally, imperative speech acts using future tense mandate humans a performance of certain actions, either in the form of an order (e.g., Thou shall not lie) or when reasserting a conviction (e.g., We shall overcome). The two sets I profile are closer to the latter in their connotation and ultimately are expressions of belief. But they aim to exert their will over circumstances.

To do so the statements draw on the modal verb *will* but they declare a future intent with a matter-of-fact certainty, which is a bit of a grammatical paradox. Given that statements connected with the future are inherently tentative, the grammatical modality of *will* and *shall* as auxiliary verbs designated in the English language to formulate future tenses has built-in uncertainty (cite). Furthermore, as an expression of a future tense *will* has a more moderate connotation of the everyday than its determinedly declarative and magnanimous counterpart *shall*. And it is the everyday that challenges the uncertainty of the intent in both sets, by making the intent sound as nothing out of the ordinary, which in strange way normalizes the situation. In fact, van Nostrand refers to the inscription as orders of the day, which, aside from it being D-Day, is reflected in the business-as-usual connotation of the verb *will*. Routine and nothing out of ordinary is also the tone of the statement by Mark.

But however routine in their formulation, these statements convey a powerful message. They arrive at it in somewhat different ways. One does it via a surprise calculated into what van Nostrand terms a grammatical nonsequitur, where “sentences by themselves were innocent but together they made a quantum leap in meaning” (van Nostrand 1997, p. 1). The other owes its impact to a more logical construct implying that being persistent pays off, ‘*eventually*’.

But what about uncertainty? Interestingly, both statements address it through the poetic means. More precisely and somewhat paradoxically, repeating the verb in the future tense helps mitigate the uncertainty of the very future the verb is striving to define. Van Nostrand refers to the D-Day inscription as a poetic inversion and a spiritual forecast. But if he at the time was left wondering as to who decided that morale will be high and whose vision it was, Mark leaves no room for such doubt. In his interviews as well as in person Mark comes through as a persistent individual with considerable stamina. But his outlook and approach to research funding is beyond simply persistent. It is purposeful. This notion of defined intent resonated throughout my conversations with him and is reflected in other quotations in this chapter. Mark is both the poet and the visionary who ‘transform[s] a procedure into commitment’ (van Nostrand 1997, p. 1). Or is it perhaps also vice versa?

What this linguistic detour highlights is the continued value of the PI’s intent to their approach to grant funding. Now a classic of the research funding literature, van Nostrand’s (1997) experience pertains to an even earlier date in 1944. But more than 75 years on, Mark asserts his intent to succeed in a similar way. Without resorting to an overhaul of literature on military history, the notion of determination is of prominence in *The Art of War*, a military treatise possibly dating to the 5th century B.C.³⁶ This notion then pre-dates modernity and has already, before van Nostrand and Mark, been defined by visionary willfulness. Through history the approach has proven to be effective in the competitive contexts of the battlefield, corporate

³⁶ Giles, L. (1910). *Sun Tzu on the art of war*. Translated from the Chinese with introduction and critical notes by Lionel Giles, M.A., Assistant in the Department of Oriental Printed Books and MSS in the British Museum.

https://jstrack.org/suntzu/Sun_Tzu-The_Art_of_War_Lionel_Giles.pdf

world, and grant funding. In fact, Mintzberg's (1987) diagram of evolution of a strategy is a flow that culminates in a single strike point. My interviews with Mark revealed that the strike, invoking maps of military campaigns, is purposeful and decisive, but the building up to it demands effort, patience, resourcefulness, vision, and experience. Mark has directly or indirectly discussed them all as essentials of his approach to grant funding.

7.5.1.2 Navigating and negotiating

Speaking ***from the point of view of research funding as a social system***, while Mark articulates and displays qualities which enable success, they are as much his own as they are a pre-requisite of the system of grant funding. That is to say, they are not uniquely his; they are, like the D-Day inscription hand-written by someone in chalk, made possible by the system. They are in fact part of the system, and in evolving his own approach Mark has learnt to expertly navigate them. The system is the genesis of fundable knowledge, both necessitating and enabling it. To succeed in the system - to be funded - it is essential to navigate and to negotiate its constraints, exigencies, and affordances, or, as Mark puts it, to play the game.

Technically, the more experience one acquires within the system, the better negotiator one should become. But, as Mark and the research administrators pointed out, not all experienced researchers are willing to negotiate. This tends to affect their ability to navigate the grant funding system successfully, with potentially significant negative consequences. But to the best of my knowledge, practical implications that result from the PI's ability and willingness to negotiate have not been considered. Below is one aspect, perhaps specific to the sciences, of the meaning of PI resilience, as enabled by the grant funding system.

Writing for research funding is a career-long undertaking for most researchers. It is organic to academic work and so are the positive and negative outcomes of grant submissions. Therefore, it is not a received practice in scholarly literature to refer to instances of being awarded a grant as winning one. However, from nearly ten years of conversations with colleagues, graduate students, and now the participant PIs, I venture to say that getting a grant feels like victory:

So I went from being 13th ... to then being 49th and being triaged. I was really livid, so I said, “to hell with [committee A]” and sent it to [committee B]. I did that and I came third and they loved it, different committee with a different focus. And I won Olympic bronze and got my grant.

Mark is resourceful, it is clear. But what his re-submission also shows is that the funding system affords such a maneuver, and Mark ‘*won*’ by navigating the option. His case demonstrates that how a PI responds to system affordances may influence the funding outcome. This is significant on its own as one of the (dis)tributaries in Mintzberg’s graph of evolving strategy:

And we have ... a lot of papers from that grant, and a lot of talks and a lot of TV shows, a lot of stuff. And this is what I was proposing for the Foundation [CIHR grant, two years prior] and CIHR just slammed it.

But behind Mark’s resourcefulness is a constraint. His capacity to repeatedly recover from failure is especially important in light of his having several people, students especially, who depend on the continuity of his grants. His re-orienting the proposal from [committee A] to [committee B] is not only a way to prove to CIHR that his research is credible and that he is right (Myers, 1990); it is also a means of ensuring continuity of the operations of his lab, of funding his students and staff, and of maintaining the lab livestock:

The bigger you come the harder you fall too because there are a lot of people that are depending on you, ... so when CIHR renewal did not come through, they started freaking out and the moral in the lab fell as a result of that, and it all came back to me [because] they somehow think I am pulling out on them. It’s difficult.

The significance of such pragmatic issues in the context of grant funding is perhaps most evident in the PI’s ability to negotiate an acceptable compromise. Before I proceed it is important to note that negotiating exigencies of research funding likely differ from one national context to another. The main reason for this would be country-specific and government-specific priorities which the government-based funding of research tends to reflect. For example, there may be significant differences in the affordances and constraints of funding contexts between

Canada and the US, or Canada and the EU. The somewhat dramatic reality of negotiating for funding in the US is described by the two researchers who consulted for Tardy (2003) as feeling like “prostitutes compromising what we do to get money, selling our goods” (Tardy, 2003, p. 17) and, in case of writing for the Dept. of Defense, as ‘they own him, they tell him what to put into his proposal’ (Tardy, 2003, p. 19). More recently, combined pressures of the corporatizing higher educational sector and competitiveness of research funding in the UK and Australia are seen to force PIs towards sensationalizing the impact of their research and inflating their proposals claims (Chubb & Watermeyer, 2017). Mark, on the other hand, is negotiating in Canada, where the overall research funding environment is more consultative. Most recently, this was exemplified by the Minister of Science initiating a survey in 2016 into the national state of blue skies research. The findings, now known as the Naylor Report (Naylor et al., 2017), are expected to have facilitated a positive change in the federal research budget. These examples illustrate some of the varied specifics of the embeddedness of grant funding in larger social contexts, while also demonstrating the challenge which the situated nature of negotiating for funding poses for PIs.

To return to Mark, unlike Tardy’s (2003) and Chubb & Watermeyer’s (2017) respondents, he elaborates on the specifics and outcomes of his negotiations. While diversifying the sources of his grant funding cumulatively contributes to Mark’s research credibility, he is not necessarily excited about all of his grants. Some of them are a necessity more than they are a victory but they still have to be obtained since, as Mark points out, there are *‘a lot of people ... depending on me’*. Characteristically, however, Mark sees an opportunity in this. One of the attributes he associates with success is *‘publishing papers, having things that are fun to write up and getting published’*. The renewal he submitted to [committee B] is *‘focused on [x,y,z], which I published extremely well on’*. Enjoying what he does helps to maintain his resilience; it is also something he conveys to his students, to help them build professional stamina.

Yet while Mark is prepared to be flexible, as a researcher he is motivated most when he feels he is funded for advancing his research program in a significant, to him, way. So even while

negotiating for options available in order to maintain operations, he is focused on the optimal. In the specific instance he refers to above the optimal would be to be funded by [committee A]. But serving on the now renewed [committee A] has given him insight into it potentially becoming more meritocratic because it is now a '*somewhat diverse committee*'. Accordingly, he plans to re-submit to [committee A] if [committee B] does not fund the renewal:

I would have something interesting about it rather than.... I mean we had a lot of grants that were very focused on similar things.

Once again, by being purposeful Mark is seeking to negotiate his luck rather than leaving things to chance. He is, as is evident from just above, opportunistic. He is also willing to take risks in order to do things that are '*interesting*'. But his risk taking is calculated in that he does not simply go after a chance that presents itself. Rather, Mark goes after a chance once he identifies it as a plausible possibility for his proposal can stand out in competition. Traditionally, the notion of standing out in grant writing studies has been associated with intellectual advantage (e.g., Myers, 1990). But, as Mark demonstrates, competitive advantage can also be related to the procedurals of conducting research. At the time of the interviews Mark was exploring a new funding possibility, from the NIH in the US. The proposal would address a problem common to youth in both the US and Canada; however, US government regulations make it impossible for US researchers to consider the issue from within the US. The gap - differences in the US vs QC legal age - disadvantages researchers from within the US but gives QC-based scientists an opportunity to compete for US funding with elevated chances of success.

So, we'll totally have a niche, and I think it'll give us some NIH money, which'd be kind of cool. And something between [a research-intensive uni] and [a comprehensive uni]. [We] are setting up a very similar set up in our two labs.

Mark and his colleague will act on a clearly defined competitive advantage when they write their NIH grant proposal. Their idea is in development and they are open to options. One such option may be involving US-based colleagues with NIH funding; this may help them gain further

ground in competition since NIH values track-record³⁷. Other options may develop or become available in time. But already the co-PIs can expect to garner recognition from their universities for their inter-institutional collaboration, which is welcomed by the Tri-Council and therefore encouraged at Canadian universities. In other words, Mark is not simply opportunistic in his pursuing funding opportunities; his approach is systematic and reflects his understanding of the situated and socially embedded nature of funding. It also reflects his vision, which I attempt to sketch below.

7.5.1.3 Vision

Aside from illustrating how Mark calculates risk the example above is also indicative of his being intentional to diversify. It applies in equal measure to both widening and deepening his research program ('yep') and to having it funded through various but related venues:

... to CIHR I am taking the paradigm that was created in my NSERC and also in my former CIHRs and using them to create [a new sub-direction] ... and one can tell me about the other...

In informing one another his grants form an interrelated web of support for what he terms as '*one of the greatest ultimate goals*': to have one's research '*be entirely translational*' from animals to humans. Published instances of this are '*very rare*' as they require corresponding data. Mark and his team have such data, which validates his research for being fundable by venues whose core mission is not natural sciences:

... and I can hold SSHRC too. I can be a triple crowner. And hopefully I will and will have an NIH as well. And they'll be all linked.

The key is not so much that he is ambitious (he is) but that they all be linked. He is purposeful in diversifying meaningfully. That is, even though Mark is open to developing his program offshoots he does so with the intent that the outcomes feed back into furthering of the main focus of his research. And for him, at the big picture level the funding has to be consorted. To

³⁷ Rosbash, M. (2016). Five suggestions for substantial NIH reforms. *ELife*, 5, e22471 <https://elifesciences.org/articles/22471.pdf>

this end he explores affordances of each of his current funders. His NSERC Discovery grants address '*the whole system*' ('*working out how it works*'), whereas in his CIHRs he takes aspects of the paradigm and makes them '*very clinical*'. This in turn informs further applicability of the aspects of his work, explored through industry partnerships which tend to be focused on specific health issues:

... the algorithm that I worked out with another company – a genetic algorithm – that predicts [x, y, z] may actually be the way to assess [a human health issue], not just as part of an office visit but also then slating the people into personalized medicine, like which drug would work better for this [patient] as opposed to that [patient].

Mark seeks to enhance credibility of his proposals by validated preliminary data. He relies on the published outcomes of his work in the university lab as well as on the results of his industry partnerships. The latter, while valued by funding councils at a lower scale than peer-reviewed research findings, provide validation of a complementary kind. Industry partnerships generate R&D data with an outlook for commercial viability. In Mark's case, some of these R&D outcomes may already be in implementation when he writes a proposal. As a result, Mark refers to the work he is doing in pharmacology not as contracts but as contract grants, which enforces the notion of all his research-related funding being interlinked and radiating from his über-focus. The primary benefit of Mark's '*contract grants*' is operating support. They cover costs of running his lab but they also may serve as a source of new ideas as, for example, testing one of the drug components in an industry setting:

...has influenced my interest in understanding generally how the ... systems work to induce this effect

Mark's 2010 NSERC proposal

What is of interest here is how Mark frames his '*contract grants*' in each of the submissions: the understanding of a mechanism underlying a phenomenon ('*generally*') is within the scope of NSERC Discovery grants, whereas '*a genetic algorithm*' is a pre-cursor to a clinical assessment method, which addresses the priorities of CIHR. So by situating his industry partnerships, as

related to the workings of his basic science program for NSERC and as directly feeding into the clinical aspects of it for CIHR, Mark re-enforces the notion that all his funding is interlinked.

In other words, industry partnerships are a source of developing aspects of Mark's program with a view to facilitating either its advancement as a whole or its translatability from animals (pre-clinical phase) to humans (clinical phase). This reflects the kind of knowledge outcomes sought by the Tri-Council as part of their core mission and of their being accountable to the Canadian taxpayer. NIH funding from the USA, if obtained, will give Mark's work a further international cachet, a near-global appeal to his research program which, while grounded in fundamental science, would be seen as translatable to health of Canadians as well as of all humans. So by occupying R&D niches with commercial potential Mark not only achieves a certain value-add to credibility of his research. An industry partnership also enables him to assess research-fundable potential of *'the [translatable] way'* before constructing a grant backed up by the preliminary results. Together then, due to Mark's vision and on-going efforts, funding from diverse sources forms consorted support for his research.

To sum up, diversification, perseverance, resilience, resourcefulness, agentiveness all contribute to Mark's vision. Drawing on his past and current experience he is exploring the future and the research potential he can realize. He is intentional about making his research cross over to corresponding fields so that it can gain more pertinence and recognition. And he is purposeful in niching out strategically so as to make the work he does meaningfully attractive to diverse research funders. He is determined to succeed and he knows that if one stays focused and perseveres, *'[e]ventually you'll probably hit it'*. But he is also experienced and therefore realistic. His experience, more than anywhere, is voiced in *'eventually'* and *'probably'*. He understands that as a grant applicant he is often up against the odds that are not accountable for at all, in any way, but that this is part of the game. So his dress is battle and he has evolved ways of keeping morale high.

7.5.2 The meaning of Mark's funding success

My interpretation of Mark's view on success in competitive external funding is based on the discussion above and is essentially two-fold.

One, success for Mark is defined by his research goal for the frontline knowledge he generates to *'be entirely translational'*. I suggest that within the context of funding this statement pertains not only to the translation of knowledge from animals (pre-clinical) to humans (clinical) but also from fundamental to applied sciences and from natural sciences to social and health sciences. As such, success for Mark is the broadest possible recognition of his research. To this speak his applications to various but purposefully selected funding programs, his intent to widen the scope of his funding further through SSRHC and NIH, his being cross-appointed between disciplinary departments, and his heading an interdisciplinary research centre. In a way, his appointment as chair of one of NSERC review committees also supports this point, for the members of mixed disciplinary sub-committees under his guidance look up to him to moderate disputes. Grant funding achieved in competition for Mark is a re-iteration, in a measurable way, of recognition of his contribution to knowledge. It is also, to borrow from Myers (1990) and Strathern (2011), a way of legitimizing the extent of knowledge he has produced and of certifying the value of promise of future knowledge framed in his proposals.

Two, as a researcher who is engaged institutionally both at the agency and at university levels, it seems that success for Mark is also being able to contribute to meaningful change in the system of grant funding. As a reviewer, panelist, panel chair, and a writer Mark is concerned with several interrelated things. One is fairness in distribution of grant funds across the disciplinary committees he serves on to deserving researchers across Canada rather than to well-established clusters of researchers associated with research-intensive institutions. Another is balance in committee compositions and transparency of the review process. Internally, at the university level, he contributes by consulting for the research office, chairing university-wide committees, and being active in research publicity campaigns. And at both levels, internally and externally, he is participating in soliciting government understanding of the need to fund blue

skies research and to forge constructive collaboration between the scientists and the funding system. That is, he engages not just with the grant funding but with the larger social system in which funding is embedded.

From the discussion above I posit that Mark's success is grounded in a systemic approach. In an interestingly reciprocal way, participation in the genre system of grant funding enables Mark's success. For his part, Mark acts on this opportunity. The system, in fact, is open to participation by any and all PIs. By playing various roles in it they in effect co-construct it. That is to say, being purposeful and agentic with one's intent is integral to a PI's success.

To sum up, Mark is an active and engaged participant. In his navigating and negotiating the system he acts on its constraints and affordances. He is plugged in on an ongoing basis through diverse institutional engagements internally, at his university level, and externally, at the agencies level. His staying current allows Mark to rapidly assess ongoing shifts within the context of a given institution and enables him to time and target his response to a challenge or to an opportunity. At the core of Mark's success are his resilience and stamina: with over 25 years of active participation in the Canadian grant funding context, he draws on his past experience but focuses on the present, from where he builds capacity for future opportunities. Mark does not leave his success to chance, he constructs it.

7.5.2.1 Story in the culture of entertainment

As a North American insider, Mark understands the vernacular nature underlying its mass market aesthetic, which makes elements of entertainment acceptable and potentially expected even in the intellectual circles (Wolf, 1999). My speculation is that this is something due to the meritocracy of the assumed North American citizen society, in contrast with class-based hierarchies of old Europe. Old world traditions were established and patronized by the intellectual or monetized elites who accepted drawing on the vernacular for the purposes of art creation but not necessarily identified with it. The arts aesthetic of North America, which evolved from the European immigrant vernacular, is younger and, although it has long since

assumed its own conceptual space, is still grounded in the commonly accessible. Entertainment rather than aesthetic sophistication assumes a primary position in the North American culture, which may explain why it is a currency compatible with academic persuasion.

(Intellectual) entertainment is something Mark associates with readability of a winning proposal. He sees this to be a key to keeping the reader '*with you*', i.e. engaged. In fact, because he considered the issue at some length drawing on many examples of writing of his own and some of his successful colleagues, I would suggest that being wowed and entertained in peer reviewing is becoming part of the proposal expectation norms. How does Mark keep the reader engaged with his proposal?

...you just tell the story. The story of how you got there and where you are going with it.

That a proposal should tell a story was one of the central themes in Mark's interviews. A good story is what makes the proposal stand out, and good storytelling, in Mark's opinion, is multifaceted and unfolds simultaneously on several domains. One is about making it personal: the proposal has to reflect the PI as a researcher and as an individual. Another is about it being accessible: it has to be written in easy-to-follow prose that reflects contemporary reading practices; and it has to wow. The third is about constructing the prose: the proposal should be suspenseful, to '*suck the reader in*'; it should be constructed logically, to encourage continued reader attention, and explicitly, to anticipate macro and micro-readers. And if it does:

...if it does, it will stand out better than any other one. So when you read it, you go, 'God, this is amazing!' I mean I had that feeling with one of the grants that I read from a colleague at [xyz] who just did everything right. It was really interesting, it was progressive, it was new, it was..!! And it was built on what he had done in the past. It was gorgeous. It was a really gorgeous grant. He got a triple-E[xcellent], which I have never seen before

7.5.2.1.1 Proposal and personality

A good grant, in Mark's view, is an organic blend of the writer's research persona and their individuality; that is, for him the PI as a person is part of a proposal's persuasion work. Mark

describes the colleague above as '*a very engaging individual*' but also sees his gift for interpreting complex matter in an accessible way to be part of who he is:

... it's how he is, as a person. I mean, it's how he describes what he does. ... When you are talking to him about stuff... It's all interpretation, but you hear somebody do that and you are like, wow!

It seems peer-reviewers long to be wowed by the applicant's work to truly engage with it. This is probably not surprising given the information overload with which researchers deal on a daily basis. The demand for their participation in the multi-dimensions of academic work - intellectual, institutional, and interactional – contributes to generating a high-volume of work. So good proposal science presented in an unengaging manner is more likely to pass under the peer reviewer's radar than good science constructed to wow. An engaged peer reviewer is thus also part of the proposal's persuasion work:

... if you are passionate about what you are doing it really comes across. [And] that's what you want, that's what you want to do.

Storytelling in the proposal aims exactly at that: besides readability it can facilitate readers' emotional engagement. To do so, Mark seeks to stay true to his own personality. He is extraverted, informal, a practiced public speaker, and his work in popularizing science has been formally recognized. And the way "*he is, as a person*" plays into his approach to constructing a story.

Further, his vision is panoramic. That is, to tell a story he looks to frame his work in a wider disciplinary context, to nest it within the implications from the past, from the present, and into the future. What helps him are two things. One is the breadth of his research program, which affords his grant applications a wide diapason spread (*'[my subject] has the biggest spread of all, I think, because it's so diverse and there are so many different ways of asking a question*). The other is his personal trait of needing to see and situate himself in the big picture of disciplinary knowledge (*'I mean, that drives me. Because not seeing the forest makes me crazy'*). For example, to NSERC he brings the fundamentals of how the brain processes certain signals,

to CIHR *'tightly focused cluster[s]'* of e.g. *'reward as it's driven by electric stimulation of the [xyz] bundle in the brain'*. This diversity, in both capacity and ambition, is reflective of his active, engaged, agentive personality. And because it is, what may look like spreading oneself thin is in fact nurturing his research productivity.

7.5.2.1.2 Über-focus

Mark writes constantly: for funding, for publication, for presentations, for invited talks, for his lectures, for public appearances, and for various functions of his committee service. In each case he strives to tell a story, and each story reflects his personality and research persona traits discussed above. But he also knows that a story has to be told in genre-appropriate ways. It has to adhere to genre essentials, to the bones that make it up. The bones of the proposal for Mark are causality (*'more than just statement/answer but why certain things ..., how they affect ...'*), consistency with the body of the discipline (*'it was new'* but *'built on ... the past'*), and continuity (*'it was progressive'*). The central point where these essentials converge is coherence:

As long as you have the über-focus. It's the big picture. ... You know why it's important – because you know where it's going.

He focuses on being meaningfully explicit:

It's easy to say, we hold these truths to be self-evident, ... but ... you still got to say it. And if you don't, then nobody knows what you are talking about.

As peer reviewer, he attributes the most common cause of failure to communicate one's work to subject matter outsiders to a multi-lack of a) the proposal having a defined focus, b) of it being built on the cause-and-effect structure, and c) of it being framed in a big picture:

Our lab has been doing blah-blah-blah for the last 25 years and I just did another blah part of the blah'. That's not going to fly.

Having an *'über-focus'* serves as genesis of the story the proposal is to tell. Explicitly connecting the über-focused proposal with and within the *'big picture'* signals to the reader that the

proposal is grounded in the familiar, in the already accepted disciplinary values. It stems therefore from a credible ground. Mark defines the big picture of disciplinary scholarship as *'usually a human picture, ... a problem associated with [it], or a human quest to understand why'*. The PI's own published papers co-constitute the framework of the familiar, while also affirming their researcher credibility. This grounding of both the proposal and himself as a researcher in the long-term epistemic values contributes to how Mark conceptualizes his own success:

... that's also part of the history of when you write a grant. ... you know that this has been the question and you can couch that question in a much larger question. Wow! Then it becomes a better read, you've actually educated people. They've read your grant and are saying, 'Hey, I've actually learnt something from this'. As long as they have that feeling, you are good.

A proposal that makes the reader feel not only good about funding it but also more sophisticated for the reading of it can reduce the distance between the writer and the reader created by the text (Bazerman and Prior, 2005). In doing so it can create a bond between the writer and the reader instead of distancing them. And given the role of the emotional/cognitive in academic knowledge (e)valuation (Camic et al., 2011), a proposal which educates the reader in a genre-appropriate way stands a higher chance of being funded. This perspective contributes to the notion of readability of funding proposals across the board, including those meant for fundraising (e.g., Connor and Upton, 2004).

To close, a story with an *über-focus* constitutes the architecture of Mark's proposals. Now I look at how Mark makes it work.

7.5.2.2 Proposal as a symphony

Having the big picture when telling a story (*'so you know where it's going'*) is a key recurrence in Mark's interviews. The main reason why it comes up almost in every aspect of his discussion of funding is that operating with the big picture in mind is the only way that works for him. Much like tearing his guitar strings to get the useless energy of rejection out of his system, he

needs to ‘*see the forest*’ in order for his writing to make sense (‘*not seeing the forest drives me crazy*’):

Grant writing is like paper writing. And paper writing is like anything else. You are writing something, you have to have a strategy. And the picture of the whole thing. And if you don’t have that, then you are meandering, and people will know that.

He aims for all his written work to be nested in and expanding the big picture; all of it is part of this forest. It is now clear that his work in its entirety or in clusters is embedded within progressively larger nested contexts of his epistemic domains, its institutional, national and international situatedness, and its resulting positioning within the federal funding system. But how individual elements of his work (‘*the trees*’) interact and intertext to jointly create an ecosystem of ‘*the forest*’ and how this whole and its elements achieve a fundable status within and across the other contexts is more complicated.

It was when talking about his writing for publication that Mark verbal-visualized how he evolves strategy for his grant proposals. He openly admits that seeing both the forest and the trees is challenging (‘*it’s a lot to manage*’) but it is not a challenge that is unsurmountable (‘*I mean how did Dostoevsky manage “Brothers Karamazoff”?*’). Mark has evolved a process which, through facilitating his ‘*hav[ing] in ... mind the whole layout*’, helps him operationalize his vision.

When you are writing a symphony, how do you manage all the ...? I mean you need to know in your head what it sounds like and where the strings go and where the brass goes and where the woodwinds go, and when they come in. It’s the same thing [with grants]. ... You have an über-sense of the whole symphony.

So far, I have mostly focused on the interactional, institutional and intellectual instruments in his symphonies. Now I will briefly look at the principals that define his proposal construction.

7.5.2.2.1 Writing for the bully

Mark’s experience of agency service taught him another lesson crucial for storytelling: **to distinguish between his peer-reviewers**. As I see it, this has direct bearing on his facing the

randomness factor head on. However objectified the institution of peer review may be within the academic community, Mark knows it consists of individuals, each with their own personality, worldviews, and various forms of academic capital. From what he has seen with regards to his own proposals, most *'members of the committee, they are kind of with you anyway'*. But there are some who are particularly difficult to satisfy. As already discussed, a simple dismissal or unwillingness of just one reviewer to accept credibility of the grant's knowledge claim can be enough to reject a proposal that would have otherwise been evaluated in the 99th percentile:

I had one person who slapped me down, and that slap down was sufficient to make me not get a CIHR Foundation [in 2014]. Not even go beyond the first round. Because this person just didn't believe what I said ... I had papers to prove it. But the person just didn't want to believe it. And I don't think there is anything you can do for the people who don't want to believe something.

It remains unclear to Mark why this reviewer refused to believe evidence documented in Mark's publications. This sort of peer reviewer may represent the ultimate in the randomness of knowledge evaluation. They are almost impossible to anticipate in one's writing. There are others, however, whose reviewing approaches may be more readily anticipated. Mark has experienced a number of them and addresses these in his proposals. There are, for example, micro-readers:

We had one guy the last time I was on NSERC [2016] who was actually doing people's H factors'³⁸ ... it means nothing. But he had calculated everyone's H factor, everyone's where he was first or second [reader]. ... it was the scale that was based on what you had done in that five-year period and not prior to that. So if you had one paper that had a billion citations, that was out of the rendering.

³⁸ *'Your H factor is the number of times you have a paper cited that number of times. If you have an H factor of 40, that means that you have 40 papers cited 40 times or more. It's a personal impact factor.'* (Mark)

Statistically substantiated opinion of a proposal's primary reader can have significant weight in the final decision. Micro-readers may be difficult to pre-empt but their practices could be, at least to an extent, anticipated. They likely do not set out with the intent to '*kill*' the proposal; rather they seek reassurance that what they are about to evaluate is fully substantiated. But their practices also seem to correspond with a particular type of an individual. Mark encounters such practices elsewhere in his work, such as in the classroom:

... there is always one person [in class] who thinks here she is being insanely clever and makes the whiny comment, '[Animals] aren't people, what does it have to do with psychology?' ... there is always somebody who says that. Now imagine if that person could say that on a grant committee.

No researcher is exempt from the randomness factor in peer-review. Mark aims to address it pre-emptively. In the case of a grant proposal one's work is being interpreted for an audience of disciplinary insiders and outsiders. But even for an informed reader this has to be done in an accessible way. Mark sees ***explicit causality*** to be key to accessibility and therefore significant to convincing the reader that the proposed science is credible. He illustrates this on the example of the '*absolutely stunning*' triple-Excellent grant I profiled earlier:

... and some curmudgeon could have said 'I don't' think [his method] tells you that'. But the dude had track record, already. So [his method] does tell you that. So either you were going with his track record and publications one of which was, in fact, in Nature. And not Nature & Neuroscience but Nature Nature. It had a broad enough appeal to the editors of Nature that they were going to make money off it. ... [Or] you were going to argue with that, at which point you were going to look like an idiot...

For his part, Mark employs the method of step-by-step building of causality on a day to day basis throughout his academic work. This applies when he leads his students on a path of understanding a complex subject matter ('*what does it have to do with psychology?*'); or when he explains what he does to the media, or when he writes a key-note address, or a grant proposal. The example below is a supra-illustration of causality building for a potential

collaboration between Mark and the colleague whose triple-E grant had to do with how human brain processes music:

... you know, drive, motivation, needs, states... what are these things? One of the best ways to understand them is to understand why you have a drive for something that you absolutely don't need. Sex is that way, drugs is that way, and rock-n-roll is that way. And if rock-n-roll is that way then so is Mozart.

While the technique is not a guarantee, it is a way to anticipate, to '*appease*', at least some of random criticism. With Mark's premise that most of the committee is '*with you anyway*', it may just be that '*if you bring the curmudgeon along, then it's like yeah, then we shall fund this person*'.

Having experienced detrimental effects of the randomness factor, Mark tends to write for the '*curmudgeon*'. This is a significant attribute of his being a grant writer. He does not aim for a defaced disciplinary audience which, although identifiable collectively, is a still impersonal. Mark targets the randomness factor. What he finds particularly helpful is both having been on the receiving end of randomness and having observed subjectivity in action during his committee service. In the latter he encountered a sort of peer reviewer he terms a '*bully*':

... she doesn't really have a research domain of her own. Her output is not great. Typical kind of bully. Their output is not great, so they take people whose outputs are really good and they bring them down to size. How do you do that? By being super-critical, of everybody.

The problem, he finds, is that although the bully can be a known quantity among the peers, by being '*super-critical*' they tend to attain a status of '*the reality consultant*':

And you are seen as holding the bottom line. You are seen as not liking anything. Which means when you like something, oh people listen, right? (emphasis his - LY)

Why a bully can carry enough weight to swing the panel decision in their direction and why the panel, collectively, do not address the issue is unclear. Mark did not discuss this, so it remains

open. But if the bully's position were not to be questioned, the resulting problem is fairly easy to define. Proving oneself right to someone who is perceived on the panel to be the model peer reviewer ('serving *that* role' – emphasis his) would be an uphill battle for any researcher regardless of experience. But the initial value of this knowledge is in that it is transferrable. Similar situations can be expected in other areas of academic work such as peer-reviewing in journals. In Mark's experience, bully peers can also hold gate-keeping positions of considerable significance in such disciplinary domains as publication:

I had an editor of a journal who came to my poster at [a conference]. I've been [a PI] for maybe five years at that point. He comes up and says, 'You should send this to my journal but not that [nonsense] you just published in this other journal'. I was like, "What?" a) how dare you say that to me in public? Or how dare you say that ever, at all? But b) [get lost]. We'll see what happens. This paper is in my H factor now because everybody kind of woke up But this editor thought it was [nonsense] ... he just doesn't know. And that's ok But to call something crap that is not crap, and turns out to be really important ...

Unlike with his 2014 CIHR Foundation grant, here Mark '*had the last laugh*'. But these examples demonstrate how unpredictable the process of knowledge evaluation can be. There must be multiple other variations of randomness that are difficult to anticipate and to pre-empt. However, the bullies above can be looked at as some of the personifications of the randomness factor, and in that they become helpful because one can extrapolate. Mark's approach to writing includes always keeping the bully in mind. He writes '*for th[at] person*'. In grant writing in particular, he has had an opportunity to work alongside with a bully and took advantage of it by making an effort to understand how she operates:

... you have to write it in a way that appeases what you know her criticism are going to be. Her criticisms surround how novel something is, what your track record really is, your track in basic research – ... have you found anything interesting, have you exploited what you found.

Mark's way of risk management is to construct the text as if the bully were assigned to his grant as one of the two primary committee readers.

In the specific case of Mark's fellow committee member, the individual, while not confronted openly by her peers, was being kept at a distance. Members of the committee would sometimes go out as a group but the bully would not be invited (*'because everybody hated her'*). Mark made an effort to bring her in because, from a psychological point of view, he saw danger: however unpleasant the individual may be they should not be kept *'isolated'* (*'Does anybody live in a vacuum? ... Nobody likes to be in that position'*). At the same time, he understands that although his effort may have had some effect (*'It's sort of like Kennedy put the blockade on Cuba, Obama took the blockade off'*), it is not likely to be profound enough to affect the innate nature of the individual. So he does not expect change. But he is better informed of how she thinks and how she works, e.g.:

If you are doing same old same old, she'll [kill] it. But if you are doing something that's based on what you do but now you are branching out and doing x, then wow! Then she is all wowed by it. You know, I've seen her wowed by some stuff because of exactly that.

Although Mark in this discussion refers to a particular colleague, at least some of her demands reflect documented proposal evaluation practices. For example, in her wish to be wowed she is not unique. The wow factor is an expectation of the genre. It serves as a discursive tool in the proposal's marketing work which facilitates the welding of the research(er)'s past and the proposed future into a credible storyline (van Nostrand, 1997). According to a highly successful Canadian museum fundraiser, the wow factor should be brought in "as soon as possible, right on the first page" (personal communication).

Mark has also observed this bully-reviewer to be convinced by explicitly outlined incremental advances which are being backed up by credible researcher partnerships:

And you've let her know, by your grant, the way you've written it, that you've been here and now going there. You are going to be adding this new technique which you are collaborating with so-and-so on, which is quality assurance right there because so-and-so is the person who discovered it and etc., etc. So as far as she is concerned, you are the best thing since sliced bread.

It seems that on the whole, grant reviewers do prefer to err on the side of caution by favoring incremental over revolutionary science in almost all proposal pipe-lines, including those calling for highly innovative propositions (Porter, 2005, 2007). Given that Mark's bully-peer also serves on a panel seeking high levels of scientific innovation, her expectations may be plausibly representative not only of the genre practices but of some constituents of the randomness factor as well. The cumulative value of this knowledge is two-fold. On the one hand it's '*I know: if you could bring her along, you can bring everyone else along*'. On the other hand, Mark needs to account for variability in panel decision making, which, as he has learnt, is considerable. Although the two issues may seem contradictory, they are in fact complementary, as every time Mark submits a proposal he addresses the challenges he has seen played out during the evaluation process.

That committees seek '*quality assurance*', a sort of pre-recognition of some aspects of the proposed research, is a known factor (van Arensebergen & van den Besselaar, 2012). In this study as well, validated preliminary data was mentioned in the interviews as a factor of significant potential to contribute to the proposal's success. Because PIs are limited by the space allocated to the proposal text, they often choose to demonstrate credibility of their claims and preliminary data via referencing their publications. And since most publications in the sciences are multi-authored, such referencing sends a double message: a) that the preliminary data/research has already been validated by the disciplinary community, and b) that the PI is being sought after as collaborator by their disciplinary peers. The latter is also a form of disciplinary valuation of the PI, enhancing the PI's credibility in the eyes of peer reviewers. Both Paul and Mark use this technique. But, as Mark points out, highlighting that some of the collaborators on the grant are '*so-and-so ... who discovered*' something directly relevant to the proposal could further reinforce, both for the bully and for the committee, their validation of the PI's projected ethos as appropriate, i.e. of the PI being right (Myers, 1990). It is a step potentially countering randomness.

Wherever possible, in his own grant proposals, Mark does project mainstream quality assurance (publications, patents, collaborators, presidencies of international research societies, etc.). For example, in his 2018 NSERC, he uses the section titled “Additional Information on Contributions” to highlight the well-known names in Canada and the international names of his collaborators. I estimate that due to his committee experience of being familiar with a ‘*cross-section*’ of his Canadian scientific community, he expects these names to be known to peer reviewers who themselves are part of this cross-section. But from what I see, add-ons to quality assurance may be a matter of opportunity. Mark’s 2010 NSERC and both his CIHR proposals did not allow for direct mention of collaborators, so there he was limited to demonstrating their involvement through referencing joint publications.

In sum, Mark is prepared to work with randomness: to be rejected by various types of ‘*curmudgeons*’ who will likely happen to review his proposals (*‘it’s a game’*), and to continue working with them as fellow peer reviewers (*‘you have to put [rejection] into episodic memory and then move on’*). He fully accepts that researchers do not always have the luxury of choice as to whom to work with. At least on grant decision panels the randomness factor seems a constant, and Mark plays the game:

Which is why when I found that this woman was on the committee, I was mortified. And when I saw her, it was like “Gaa, not you!” but I said “[Name], how are you? Good to see you! Oh my God, it’s been forever!”

In sum, accepting inevitability of the random in peer review is part of Mark’s success.

7.6 Lessons learnt

Mark’s case is the most complex of those in this study. He is not only the most experienced grant writer and grant reviewer, and an NSERC review committee chair. He is actively implicated in the development of his institution’s R&D services, mentoring PIs across the university and co-authoring institutional involvement in responding to government-initiated consultations on the future of academic research. These multiple experiences reflect into his

thinking about funding and about the proposal and into his enacting this knowledge. His thinking is panoramic, in-depth, and uber-focused. His engagement with grant funding is agentive and purposeful and extends beyond doing it only for the success of his own proposals. The summary below aims to encompass this complexity in broad strokes.

7.6.1 Seeing the forest

I would argue that the metaphor of symphony in Mark's case extends from his proposals to all his interactions in the contexts of, and related to, grant funding. Through his multi-role participation in the system of funding he has developed an informed perspective on the key aspects of the institution of validation of new knowledge. Always striving to '*see the forest*' he is purposeful in how he architectures his participation in grant funding, how he draws on his knowledge, and how he shares it with those less experienced than he is. In doing so he is consistent with the approach that stems from his research goal of '*being entirely translatable*'; that is, he is thinking across the systems that constitute research funding, knowledge valuation, and academic work. But aside from pursuing his intellectual goal he also seeks to invest the funding system with positive and meaningful change.

8. Phil

... the one thing I've learnt is that people work in different ways. ... I have the process that works for me and the critical thing for them is to work out what's the process that works for them.

Phil

8.1.1 Phil: Staying *ahead of the curve* through collaborative research networking

Table 6: Phil, Profile Highlights

Phil's research goal	Primary funder(s)	What stands out	Trope for the proposal
To make the methodologies being developed in his lab integral to a wide variety of research focused on a particularly high-impact health issue	CIHR	The highest funded	Holiday read Moving target

Phil is an applied health scientist specializing in methodologies of therapeutic approaches to a condition common across the world. Of the three PIs in this study Phil is the youngest. At the time of data collection, his academic track record, post-PhD, did not exceed 20 years. However, in the last 15+ of these he had been near-constantly funded by research grants, nearing a grand total of CAD \$100M as PI or co-investigator. This is higher than what Paul and Mark could claim at similar points in their careers. Yet Phil is a relative newcomer to grant funding. During his doctoral studies in mid-late-1990s Phil, who is an Anglophone but not North American, was funded by his university but he did not have to write for grants. He attributes this to the favorable conditions of state-funded academia at the time.

Phil's first exposure to a competitively funded research environment came with his first post-doc in the United States at the debut of the 2000s. It is worth noting two things. Not only did Phil start in what he still perceives to be the most aggressive of grant writing cultures. He also worked with an extraordinarily successful PI whose funding track had few rejections. Phil went on to do several short post-docs in Canada. Having participated in research funding systems of

the US and Canada and been exposed to two extremes, from no grant writing at all to being mentored by several advisor PIs, has given Phil a solid perspective on proposal fundability. It also enabled him to articulate what would be deemed genre-appropriate in the US vs Canadian proposals. But most importantly, this experience has connected Phil with many different researchers and teams, and since then research networking has both formed and informed the core of his approach to funding.

Phil carries on building on the advantages of his interconnectedness. His grant applications are most often co-authored by several co-investigators. This enables him to draw on expert input of specialists from different domains in his networks, while in the process of writing the grant goes through a preliminary peer review by its contributors. Wide collaboration also enables near-constant stream of submissions which improves the chances of being funded. While Phil focuses on CIHR, he applies to several of its committees and serves as a review committee member on one other. In this way, his focus on a single agency is not restrictive. Since CIHR encompasses all the fields of healthcare research, it opens doors to multiple funding options in the domains of health.

Phil's focus on a single agency shapes a fairly bounded context in which to learn to be successful. At the same time, of the Tri-Agency councils, CIHR funding is the most competitive: its average success rate in the mid-2010s did not exceed 15-16%³⁹. CIHR grants, if secured, are both prestigious and substantial; they contribute to PI track records, and the grant average in the CIHR Operating pipeline had routinely exceeded \$100K. At the time this was more than double the average NSERC equivalent. The stakes are high. Rejection of one's CIHR application

³⁹ Source CIHR 2012 Evaluation of the Open Operating Grant Program <https://cihr-irsc.gc.ca/e/45846.html> retrieved 25 Feb 2020. The report states that "The time taken by researchers to complete an OOGP application is in-line with benchmarks. However, the program's decreasing success rate results in four in five applications not being funded. Streamlining the amount of information to be submitted during the application process would likely reduce burden on applicants." "Grants have typically averaged between \$79,000 and \$134,000 per annum and most are held for either three or five years". For the record, in his interviews Paul stated that CIHR success rates at the time were 6-7%.

is more a norm than its acceptance. But Phil has been consistently funded by CIHR, even throughout the most turbulent period of its re-structuring in the mid-2010s, when a key grant stream was suspended for two seasons and many health researchers were left scrambling.

Phil's approach, in a nutshell, has evolved to address constant change through building collaborative research networks that he draws on and contributes to so as to benefit from a range of grant-system expertise of two or more co-investigators on any of his grants. This is in large part enabled by the nature of Phil's work in research methodologies and that of his inter-institutional lab which provides a collaboration platform to researchers from Canada and from abroad. That is to say, Phil has learnt to capitalize on the advantages offered by a challenging situation and, whenever possible, convert constraints inherent in it into opportunities. The chapter considers these points in detail.

8.2 Shaped by change

The story of Phil is a story of change. Phil's experience as PI has been shaped by change: from transitioning in early career between several national academic and funding systems to addressing rapid shifts in the Canadian system of funding research. The focus of this chapter is on how Phil has made change part of his grant-funding success. Specifically, this chapter explores how, on the one hand, Phil has been learning from change to develop his approach to grant funding, and on the other, how he integrates and anticipates change inherent in the grant funding system in his way of being a PI.

8.2.1 Data sources and analysis

This chapter draws on several documented sources. These include: two in-depth semi-structured interviews with Phil, audio-recorded and transcribed; Phil's curriculum vitae, with specifics of his funding history and of his engagement as a member of grant review panels. Data also include websites of the inter-university centres and initiatives (co)led by Phil and some contact with the centre staff; Phil's research/social media pages; and some university-based media coverage of his work and recognition. Finally, a total of three proposals were shared by

Phil: all multi-iterations of full final versions, submitted, re-written and re-submitted to various committees at CIHR; one of them was rejected and two accepted, of which one accepted on the 7th re-submission. Where available, corresponding reviewer comments were included as well. The proposals were written and submitted during the period between 2008 and 2013. As mentioned earlier, this period marks the transition in the CIHR leadership that reflected the shift from Liberal to Conservative government in Canada (2006-2015) and the resulting changes in the structure of the CIHR funding and evaluation processes. Similar to Paul and Mark, Phil considers the period of 2008 - 2016 at the Tri-Agency in general and at CIHR especially to be the most challenging for proposal writers and for peer reviewers alike.

The analysis pertains to the now re-evaluated and updated CIHR Open Operating Grant Program for which Phil had applied with the proposals he shared. The program is currently represented by the Foundation and Project grant schemes. Foundation funding contributes to long-term research programs with focus on translation of the knowledge being created to Canadian healthcare. Project grants prioritize rapid knowledge translation and applied clinical research.⁴⁰ Phil focuses on the latter.

The following main themes surface from the analysis: a) Phil's focus on collaborative effort, b) his intentionality in fostering and promoting global (inter)disciplinary networks; all within the overarching context of c) his ongoing navigation and negotiation of change related to grant funding. These three points are closely interrelated, serve as the chapter keystones, and are referred to throughout. They help contextualize the dialogic interrelations between the strategies Phil has evolved for navigating and negotiating the system of grant funding, his ongoing engagement, and his research thinking.

⁴⁰ Sources: CIHR Foundation grant and Project grant overviews <https://cihr-irsc.gc.ca/e/49798.html> and <https://cihr-irsc.gc.ca/e/49804.html> Retrieved 25 Feb 2020

Phil's own statements and excerpts from his proposal texts will illustrate the discussion. As in the previous chapters, I make an effort to relate my interpretation of the views expressed by Phil with the earlier findings. The scale of applicability of the findings in this chapter remains limited to Canadian federal funding of science.

8.3 Learning from change

Phil's experience with research funding has been shaped by change which he had experienced through a series of inter-national transitions in early career. He considers the entire process a learning experience.

8.3.1 PhD without grant writing: the sense of foreboding

Phil's story begins in Europe, where in the 1990s PhD students did not need to apply for external funding. During his doctorate Phil was writing in the long-established academic genres: thesis, conference presentations, reports, research articles. But in 2018, reflecting on this experience Phil brings up two lessons which he considers valid for grant proposal construction. One is *"the concept of the sense of foreboding"*:

... writers who do a phenomenal job would give you the answer to the story earlier in the book, in a parallel scenario. So you know what's going to happen, you just don't know that you know what's going to happen. And people, when they read, they always have that conceptualization in the back of their mind.

Over the years that followed his PhD thesis Phil had found that giving the reader a preview of the answer to the proposal's research question enables the grant writer to *"create an expectation"*, which serves as a hook⁴¹. This is one side of the coin. The other side is delivering on that expectation. Together these comprise a persuasive tactic that caters, in the right way, to the emotions of the reviewer. Like the other expert PIs in the study, Phil finds that *"emotion*

⁴¹ More details on Phil's way of proposal construction are in the forthcoming CIHR service section.

is critical to when people are reviewing”, and if the scientific promise is unfulfilled it frustrates the reviewer:

... I mean what happens is that if you start pissing off the reviewer, the reviewer starts finding the niggly bits, right? And then ... I mean, it's easy to trash a grant. It's always much easier to destroy a grant than to fight for a grant. Because no one is going to write a perfect study, no one is ever going to do a perfect study. So invariably there's going to be faults in every grant that's written. And you upset the reviewer – whatever it is – if you upset the reviewer, they'll find a way to pull out all these things that aren't probably that big a deal, but because they are upset it feels like a bigger deal. And then they make it into a big deal. And the funding lines are so low, it just takes a couple of small things to turn it into a big deal, or even one small thing, and that's it – you are done, you are not getting any funding.

The credible scientific promise is at the core of the proposal as a genre. So if the expectation is offered but not delivered on, the proposal promise is compromised. Ultimately then, such a proposal fails as a genre and so does its power of persuasion.

The second lesson from Phil's grant-less doctoral days comes from his PhD thesis co-advisor and concerns textual construction of academic persuasion. In what highlights the interconnectedness of the academic contexts, Phil says that it was his co-advisor's meticulous approach to crafting the thesis text that *“really helped me with conceptualization of the story, down to the sentences”*. And in what reflects how he navigates these contexts, Phil says that this lesson is highly applicable to the grant proposal:

Every word has to serve a purpose. It's even true, it's more true in a grant than it is in a thesis because you have no boundaries in terms of limits for a thesis. For a grant you normally have page limits, so every word has to have a meaning, and every sentence, and every paragraph, and the whole. You have to be a little fanatical about wastage everywhere and making sure ... and if you worry about the little pieces then it helps making the whole story a lot clearer. Because, ironically, it's the detail that makes the story seem seamless.

That is, Phil transfers what he has learnt in one nested context to another, which likely enriched the overall outcome. What must help along in Phil's process of textual construction is that he finds he actually enjoys grant writing and tends to assume more of this task than the co-lead of his lab because "*I think I am naturally more inclined at grant writing. ... I enjoy it more*". Aside from the fact that no other proposal writer in this study or in the literature stated anything quite like this, it would be reasonable to suggest that his ongoing practice of proposal writing helps Phil keep up his grantsmanship skills. In fact, he has his own perspective on practice which in his eyes "*is always a critical component at getting better at anything*". But it has to be done right:

... I have a sports history and there's this old adage which is "Practice makes perfect" and I had a coach one time who was like "yeah, no, that's nonsense because perfect practice makes perfect". The point is you can keep practicing anything multiple times and you'll still be bad at it because you just reinforce bad components. ... you've got to really repeat the right things, you got to work on refining —... What I am saying is that you've got to always be constantly challenging your idea of what is a good grant.

Phil was lucky to be able to learn about and practice reinforcing the right habits as he was working alongside his post-doc mentors and, later, to draw on his own experience as proposal peer reviewer.

8.3.2 Post-doc: learning from a winner

When Phil landed his first post-doc in the US, the grant proposal was not a genre he was familiar with. Nor was he experienced at the time in the very competitive academic environment where research funding, or lack of it, could considerably influence the course of one's career. But, significantly for Phil as grant writer and future PI, he had found himself in a unique learning scenario. Besides starting off in what he perceives to be the most aggressive of grant writing cultures he worked with a post-doc supervisor who was an extraordinarily successful PI: his grant proposals had almost never been refused. Whether or not it registered at the time, Phil was learning the art of grantsmanship under the tutelage of a highly successful expert.

What helped Phil articulate the lessons he had assimilated in his post-doc advisor's lab was becoming a mentor and supervisor himself. Having to externalize his learning and reviewing experiences in a related but different context of academic work was helpful for Phil to understand what sort of approach he had evolved and how his students and proposal co-authors can benefit from it.

.. as I say, I was very fortunate. When I did my post-doc the guy that I worked with, who supervised me, he was a phenomenally good grant writer. And he never sat down and said, "This is how you write a grant", he never gave me his philosophy. But by the fact that I read the grants and I worked with him in writing a grant and stuff like that, it was learning this by process. And then just over time, er... I've refined my writing skills to reflect this and then at some point I just... I started to really think about it. ... when we started to have post-docs in the lab and I started to train post-docs to write grants, when you actually sort of have to explain to them very concretely what needs to go on, you have to start conceptualizing and really thinking about "What is this process that I do and how I do it? And what's important?" And you know it was probably then that I could articulate it in the way that I can articulate it now.

Initially an outsider to both the US and Canada, Phil had a heightened perception of the characteristics that define their research funding systems. The unambiguous way in which he articulates them now demonstrates his awareness of two things. One is the embeddedness of the genre in wider social contexts, the other is how it translates into what is and isn't genre-appropriate in each context. He sees the grant proposal in the US, where *"oversell is the norm"*, to be far more promotionally pronounced than it can be in Canada, where the government-academic relations are more consultative than prescriptive, where *"reviewers are very conservative"*, and where *"people apologize for their success"*:

... in the US everything has to be the next great thing. If your grant isn't going to change the world - and it has to be written in that way - it's not going to get funded. In Canada, if you want to change the world it's too ambitious, too novel. So in Canada you've got to talk about what's the next important step. ... I was fortunate because someone had let me in on that early and so I was able to write stuff that was interesting but not revolutionary.

Over the years as PI and CIHR peer reviewer Phil evolved the essentials of his own proposal writing which render his proposals genre-appropriate in the Canadian context. But at a closer look they can be adaptable to any national research funding system. The first is having a good idea *“because no one is going to fund a bad idea”*. The second is crafting a story about the idea in a way that would *“get[...] people excited and interested about why that’s important ... that’s the hard part”*. The third is finding *“the best way of packaging it ... the aesthetics of the story”*. The thread that unites these points is *“making it pleasant for the reviewer”*, a key lesson Phil derives from his CIHR service. They help the proposal make allies at the review panel, and are discussed in more detail in the next section.

8.3.3 CIHR committee service: proposal as a moving target

Phil says the essentials of his own grant writing fully crystallized after he had started his CIHR committee service. The primary function of the points above is to spark and maintain positive interest of the reviewer who’s *“got to get in it, get through it, get out of it, got to move on”*. From the time he became a peer reviewer, Phil had been experiencing this pressure first-hand as he had been dealing with the ever-increasing numbers of proposals to review. A proposal that adheres to his three principles helps the reviewer assess a complex scientific proposition, which most likely is not within their immediate field of expertise, in an expedited yet efficient manner, without losing sight of the knowledge claim.

Serving as CIHR committee member has and continues to inform Phil’s approach to funding and to proposal construction. Phil assigns considerable value to grant peer review service, one of the system’s key nested contexts of funding, for enabling his in-depth and up-to-date understanding of the funding game. In 2008 or 2009, seven or so years after commencing his US post-doc, Phil was recommended by a senior colleague for one of CIHR review committees. He was invited to participate, tentatively:

What they used to do was bring you on as an ad-hoc person, to make sure that you are reasonable, which is a very smart thing to do because some people are not suited for

peer-review (laughs). So they sort of check you out and then, if you seem like a reasonable person who is not particularly antagonistic and is not, you know, a complete dick, then they invite you a few more times, just to make sure that it wasn't one off and then it's like 'Ok, would you like to be a member?' ... And then you'd sign up for a three-year term and they could renew you at the end and so on and so on. ... the central office plus the chair and the [scientific officer] they work together to populate the committees

Phil's comment about his first CIHR mandate being a trial run reflects the perception of the exclusive nature of the agency expressed by the other participants and some representatives of the funding system. But while they indicated this applied to the CIHR proposal selection process, Phil's experience demonstrates that the agency filters their potential committee members as well. The aim of this selectivity, in Phil's words, is *"to make sure that they have enough expertise that covers the pool of applicants and the right mix of people"*. It seems a reasonable policy. But as Phil started his service at CIHR, the system went into a politically induced downspin.

With the change of government in 2006 and the ensuing cuts to research budgets, the traditional face-to-face committee meetings in Ottawa were replaced by a new online conferencing process that was said to be more cost efficient. But it had not worked as well as intended. Eventually, complaints from the committee members and the scientific community at large encouraged the CIHR leadership to revise the decision of using the online-only process. An experimental hybrid – *"the [new] old"* - process was put forward, whereby initial discussions were done online and the final stage in person. It worked even less well. Phil participated in the unravelling of the *"new old"* before the *"old old"* process of in-person deliberations in Ottawa was restored:

I even went through the weird transition thing and I was invited to go do one face-to-face with them at the very final stage which was horrible but Yeah, that's the [new]old system. So they had this bizarre scenario, the last round before they went to the old old system - they decided that, maybe people complained so bitterly the time before, which

was purely online, that they wanted some face-to-face. So then they created these things called clusters, these were sort of macro-groupings. And every grant that went to a cluster – there was supposed there, in the cluster, to be a person who had previously reviewed it at early rounds. Because I do some ... my general area is around [...], but I do have a history of physiology background and I've good [...] training, so the few of the grants that I got were more sort of standard bio-medical-[...] stuff. I ended up getting this one particular grant that ended up going to this committee that was effectively a pharmacology/molecular biology kind of committee, and so there was myself and it was totally bizarre. You looked around the room and all these people were bench-side, bench researchers developing molecules primarily, and there was myself and there was a bio-stats person and there was a third person who was an engineer. And the three of us were like, 'What the hell are we doing here?' But we were the one reviewer for our individual grants, so we had to be there for that effectively one grant. And they had one each as well. And it was like, a) that grant should never have gone to that committee; it really was not their stream. And then we were saying, b) 'it has taken an entire day of my life to sit here and do this'. That was the epitome of dysfunction.

Since Phil both writes and peer reviews for CIHR, maintaining one federal agency in his funding focus helps him navigate change. Most of his CIHR experience was acquired throughout the 2010s, i.e. during this period of turbulence, and Phil observed that peer reviewers effectively found themselves at the receiving end of this instability just as much as the proposal writers did. Both parties had a hard time keeping up with a torrent of changes at various levels. But, aside from the two-season hiatus while the Operating Scheme was being re-envisioned, grant proposals were still being submitted and reviewed, and funding decisions carried out. This experience has highlighted for Phil the importance of the role of peer reviewers in the assessment process. Making his proposals enjoyable for them to read is his maxima:

... reviewers have a hard time. They have to churn through a whole bunch of information, from multiple applications; they have to make sense of it, they have to process it, judge it, evaluate it, forget it, and then move on to the next one. So I think what I've learnt more and more over time is that you can't over-simplify the process. And that's not about

writing in simplistic language but really taking the reader by the hand and pulling them through the application.

As a result, Phil sees a good CIHR proposal as a “*holiday novel*” and the process of writing it as crafting a sign-posted journey for the reviewer:

... I draw a parallel. ... There are these giants of literature who write these fantastic books that are deep and intricate and they get to be parts of curriculum where people dissect them ad nauseam, right? And then you’ve got the kind of novel that people read whilst they are on a holiday and it’s an easy read, it’s fun and enjoyable, and you get it.

This in itself is his pay-off for being a reviewer, for learning and applying his learning within the nested contexts of the system. Taking care of the reviewers, making it easy for them seems to be foremost on Phil’s mind. Helping them “*get it*” by “*taking [them] by the hand*” are Phil’s ways to help his proposals stand out but also stand on their own. The quality of content is important, “*does the science hold up?*”. Reviewer excitement is also important, “*it’s got to grab you and make you go “Oh! I’ve got to read some more of this. It sounds kind of interesting”*”. But to help the reviewers be persuaded, the writer must situate the excitement in the CIHR priorities. Reviewers need to be convinced that findings can “*quickly lead to new interventions*” (Reviewer 2 on Phil’s 2012 grant, rejected) so as to address the CIHR priority that new knowledge be readily translatable into human healthcare. Phil does this right at the start of the proposal:

LY – how would you say your sitting on CIHR reflects into the grants you write?

Phil – I think it’s had two impacts. One was this summary piece at the beginning, the trailer. I think I picked that up from someone else’s grant. I’ll be honest, things are so blurred at times, I don’t remember if it was the grant I reviewed or a grant someone else wrote that I was an investigator on. Either way, I saw it and I was like, “Yes! I like that”. I liked it and it made sense to me as a reviewer, to have that piece. And then the other thing is just visually some of the stylistic things: how to emphasize certain bits and how to fill the page and make it pleasant....

Phil's "*movie trailer*" is a genre-appropriate promotional move, i.e. accepted and acceptable by the reviewers, that he builds into the scientific summary right at the beginning of the proposal proper ("*Most reviewers don't even read the lay abstract, I don't think*"). At CIHR the scientific summary is used for triaging purposes, to decide which committee to assign the proposal to and, once directed, for would-be reviewers to volunteer to be one of its three principal readers. Phil dedicates the scientific summary, which is "*a lot less technical than the main summary*" but "*sharper, science-wise, than the lay summary*", to giving the reader a preview ("*sense of foreboding*") of what is to come in the proposal and situate it within the requisite contextual constraints:

...it's very important to contextualize what's the health importance. ...Where in the chain of...? This is the part in the beginning I like to get people excited about the question and I talk about the objectives and touch upon what's the clinical significance of this work. ... the first half page/ $\frac{3}{4}$ of a page, that's the "here's why this grant is important" and "here's how it's going to change things for the better". That's the sales pitch.

Since Phil most often applies as lead PI of a team of experts from multiple institutions, it is essential that the "*holiday novel*" be seen as credible on another count. Given that Phil targets the CIHR applied stream (the Project stream), the proposal, just like a beach novel, has to be tightly focused on a single, defined issue, preferably knowledge-translatable to healthcare within the proposal timeframe. The issue raised in the proposal and the evidence supporting it must be directly corresponding. Besides aiding textual coherence, this signals unity between the aim and the approach of the team, which in Phil's view is essential for any proposal but especially so for those that represent researchers with different expertise.

... 20% of the stuff I write ... never makes it in. It's invariably around the topic area but it's not pertinent to that particular line of inquiry. You can't stitch it in. It sticks out like a terrible bulge. It's like, I am reading this nice smooth thing and then wo!... there's a big bump and ... that bump's not going anywhere! And it just distracts.

When he is the principal writer, Phil takes it on himself to bridge the contributors' input into a coherent "novel". Below I look at his thinking and construction processes related to writing.

8.3.3.1 *Proposal as a moving target*

Phil's process involves scrutinizing the proposal from all levels and, like the proposal genre, is constantly evolving. At this level, CIHR committee service has helped Phil operationalize not only key lessons from his prior writing experiences but also make broader connections between shifts in the proposal as text, in the funding system as its context, and in scientific knowledge construction as their overarching supra-system. In essence, it is the framework that helps Phil rationalize change as the intrinsic part of the system of research funding and the proposal genre.

Phil has observed that the grant proposal is not formulaic but rather "*it's a forever ... moving target*". He is always on alert for changes. At CIHR this applies to all aspects of the proposal, from scientific content to text structure, formats, and expectations:

... we used to have a 13 open-page thing, then we went to this smaller version with very specific sections, and back to an open 10-page and then of course you have other parallel things.

By parallel things Phil means that within a given funding pipeline different calls for proposals highlight particular aspects of research that would help CIHR achieve their strategic (i.e. government-directed) knowledge translation goals:

... CIHR has this ... [particular] research grant that we've been quite successful getting funding through, and they have a totally different way of writing.

As far as Phil is concerned, the writer's ability to persuade in large part "*has ... to do with ... the adaptation*". He accepts these shifts as a matter of fact which echoes his aim as a PI to be reviewer-centered. During the transitional shifts at CIHR and across the Tri-Agency, when committee compositions were being redesigned and some research was redirected between the councils, he observed the consequences of proposal writers' ignoring this at their peril. Because CIHR is highly eliminative in their assessment process to begin with, any and all change weighs considerably into the final decision:

... the [proposals] that are really-really bad have actually been from people who have come from a SSHRC background, switched over to CIHR and haven't really thought through the process. So they've written a SSHRC grant for CIHR and it's, you know, six pages, and at [CIHR] it's a 10-page competition (laughs). And you are like, right there and then it's an indicator.

What helps Phil take both big and small changes in stride is a higher-level connection he draws between them and the nature of science more generally. Phil locates funding changes in a wider scientific context by making inter-genre connections. This helps him conceptualize change as a recurrent constraint of scientific writing:

... I think [change is] true of all parts of science. ... I think about what you'd need to put in a publication to get it published 10 years ago, in a journal. The standard's gone up: to publish in the same journal, there is ... a lot more structure because we are trying forever to... get people to be more consistent in how they report things. So it's forever an eternal evolving process. Especially in a health world... There's much more emphasis around reproducibility these days, and waste. And part of it is ... to be more transparent in the reporting ... but as you try and do that you have to provide a structure, because if you let people just free-wheel through everything there is a possibility of missing things that might be considered important...

Perhaps since Phil has experienced considerable volatility in the funding system through peer-review service this notion of change seems basic. But given the observation of research administrators that many grant writing researchers resist change it may not be as obvious to other PIs. Seeing change as intrinsic to the fabric of science and being “*cognizant not just of the [proposal] content but of all the other things around it*” helps Phil situate his proposal writing in the progressively larger contexts of research funding, knowledge valuation, and academic work. It has also contributed to the development of his research thinking. Phil's own term for it is “*the big picture*”. The way he has been building it up is the subject of the next section.

8.3.4 Research collaboration as a framework for a personal genre system of funding

The constituents of Phil's big picture have been evolving since he began to accumulate and build on his experiences of participating in change. This stage of Phil's story is about how he has been shaping them into a unique and innovative approach of his own.

The first of the two main lessons Phil foregrounded from his US post-doc with an exceptionally successful mentor was discussed above. It is about how he conceptualizes his writing. The second is about the larger social framework in which his writing takes place and which in large part shapes it. Within the immediate context of Phil's US post-doc lab, as in most labs, novice and experienced researchers worked and wrote side by side, learning from each other. It was the way that his advisor PI encouraged their interactions and contributions that brought Phil's thinking to another level. His advisor put emphasis on collaboration. Lab researchers were encouraged to work with one another and to collaborate further afield. Adopting his post-doc advisor's way of doing research, Phil later, during his Canadian post-docs and tenure, adapted it to a differing national academic context of Canada.

The outcomes of this learning and adaptation are Phil's inter-university lab, collaboratively authored grants, and a number of key principles he operates by with regards to being a PI and a scientist.

8.3.4.1 Inter-institutional lab

Phil does not run his own lab in quite the same way his US post-doc advisor did or the other expert PIs in this study do. That is, his lab is not defined by the leadership of a single PI. Instead, it is an inter-institutional unit located off campus and co-directed with a researcher from another university. The lab has its own name but is simultaneously affiliated with the public institution where it is housed and with the universities where its co-leads are tenured. As a result, it is positioned to draw on some institutional resources and post-doc talent of its host and parent universities. At the same time, in its operating and reporting procedures it has to conform to tri-institutional expectations which are not necessarily in synch. This brings the

need to have office staff who are paid from the lab's research funding budgets and not from those of any of the three institutions. But although the red tape is a drawback and expense needs are a form of constant pressure, for Phil the research gains make it well worth it.

The co-leads had conceived the lab as a way to merge the respective experiences of their final post-docs and continue with their existing collaborations. It was also a way to give a development boost to their nascent research networks. With time their foresight paid off. Now the lab associates represent other universities in the area as well as those provincially, federally, and internationally. In effect, the lab is a collaboration platform open to multi- and interdisciplinary research. It has become an innovation hub and the scope of its research makes it eligible for funding from many sources other than the CIHR but since CIHR grants remain Phil's main focus, I continue to discuss his approach with regards to CIHR funding.

Because of the encompassing, rather than streamlined, profile the work produced at the lab often "*falls between the cracks*" of the defined mandates of individual CIHR committees. At the same time, it can and often is eligible for funding from not one but several different CIHR committees. On the surface of things, this is a clear competitive advantage. But it is not problem-free. When one of the proposals from Phil's lab was re-rejected, Phil and the team drew the line:

... yeah, and you navigate through that. I got that comment back... I forget which committee... I think it was the [x] committee, the second time it got sent there. And that kind of comment you are just like "Ok, I can't, I am done with that committee" because you can't get around that kind of ignorance where it's a prevailing thought, so you re-orientate and ... so I've bounced around a lot of committees. Let me think, collaboratively within our lab we've probably sent to 7-8 different committees at CIHR. Our work sort of straddles so many areas that... yeah, so many doors but it's also kind of complicated because you sit there going "Is it the right committee?" And then you have to write for the committee as well... You are going to have to massage it so it's going to resonate with the right group.

Matter-of-fact attitudes at the CIHR seem to work both ways: committees to applicants, and applicants to committees. At the same time, this matter-of-factness seems to function well for Phil, whose shopping around at the CIHR seems a good tactic - if one is prepared to be rejected in informed or uninformed ways, and be able to move on. In Phil's case, he targets other CIHR committees but tends not to go outside the agency for the funding of the lion's share of his research. He trusts his knowledge of the CIHR and does not deviate from the core nature of his work, having successfully identified the funder that is best positioned to value it.

8.3.4.2 Collaboratively authored grants

As lab co-director, Phil is one of the two principal writers for most proposals, so all grants originating from the lab carry his name as PI, co-PI, or co-investigator. The method of co- and multi-authoring reflects Phil's insider knowledge of CIHR in that it enables at least two advantages with regards to the fundability of the proposals. One is that he is able to draw on diversity of his co-investigators' expertise in contributing to and commenting on proposal drafts, thereby simulating peer review prior to submission: *"the more eyes [the better] – there may be a dead angle that you are missing"*. His building and developing collaborative inter-institutional teams, which are constituted of experts in related sub-fields, in effect simulates multiple disciplinary specialisms of the members of CIHR committees. This enables pre-submission peer review on every proposal Phil is part of.

The second thing is that co-investigators from other institutions are often aware of different funding opportunities which facilitates a near-constant stream of submissions (*"There's very rarely a grant competition that we haven't submitted something"*). Phil's horizon of possibilities of applying, even within the confines of the CIHR, is wider than it would have been had he run the lab solo or even if it had been centered on the two universities represented by the co-directors. Being plugged-in to multiple possibilities of applying, at CIHR and elsewhere, gives the lab continuous access to research funds, and simulated peer review of the proposal drafts mitigates randomness associated with funding decisions. Together, these factors contribute to a higher likelihood of grant income and the co-investigators' grant net-worth.

Finally, having a constant stream of proposals-in-making is strategic as it helps address a certain system constraint Phil highlighted during interviews. Due to a relatively small size of the Canadian scientific community most reviewers of Phil's proposals are not experts in his area yet are in position to impose a decision-making opinion. Phil's engaging multiple disciplinary gatekeepers as co-investigators, and so as co-authors, optimizes the proposal chances of being constructed in ways that make sense to the insiders and outsiders alike. And as already mentioned, multi-expertise team proposals have built-in flexibility that enables their submission, appropriately modified, to various CIHR committees. Given Phil's singular focus on the CIHR this is beneficial at the following level:

At the end of the day the question I always ask myself is "Do I believe in what I do?" And am I willing to fight for it? And that becomes the ultimate ... I mean my greatest success, followed by a crazed amount of failures... I have one grant that got funded after it went to CIHR six times. Seven times? That's a lot. But I believed in the grant, I was not willing to let it rest.

The grant Phil is talking about had gone to three different CIHR committees over the space of just over two years before *"it got a home. At committee #4"*:

... it was for the trials, an [x and y] trial and first it went to the clinical trials committee and they were like, "Oh no, it's too premature for trial. You need to do an observational study". Fine. I did an observational study, sent that to a different committee and they were like "You really need to do a trial on this". So I had repackaged it and sent it to..., oh no, I sent it to the same committee and they were like "meh", lukewarm. I was like "ok" and sent it to a different peer review committee, the third one. Didn't get a lot of traction in that one either...

He tends to regard the first submission of any proposal as a trial run with very high probability of rejection because the reviewers *"will pull out a bunch of negatives"*. But he looks upon their commentary as feedback that reflects disciplinary consensus-at-large. In essence, his proposals that already have built-in consensus of the co-investigators receive more feedback that is directly relevant to the project. And if committee #1 funds the proposal, there is no need to

devise other options. But if rejected, a re-submission or sending the proposal to a different committee is already informed by multi-feedback on this particular project. In all likelihood, by the time the proposal is funded it is as bullet-proof as can be.

What is interesting about Phil's method of drawing concentrated peer feedback into a particular CIHR proposal is that it fully suits his line of project-based applied research, whereas it would not be applicable to the work of fundamental scientists like Paul and Mark, who apply to NSERC for continued support of their large-scale research programs. It would be safe to posit that the way they each seek feedback on their work is PI-specific:

I mean the one thing I've learnt is that people work in different ways. ... I have the process that works for me and the critical thing for them is to work out what's the process that works for them.

The other interesting thing is that Phil can afford to send a proposal around for some time without the lab losing solvency because there is always a grant in the pipeline, both in terms of writing and in terms of having the funds. This is his way to risk-manage rejection, which at the CIHR is the highest in Canada.

Phil says that when rejecting a proposal "*peer reviewing committees aren't very good at ... being brutal*" and that he tends to always find "*faint lights of hope*" in the comments. So for him it makes sense "*to throw it out there*", often more than once. He says his funding history has far more rejections than successes. As a result, he has developed a way to address failure. Given that an overall possibility of rejection is already embedded in his process his main concern is peer commentary. Without exactly classifying it as such, he divides it into relevant and irrelevant. And because both types weigh into the negative decision, he addresses them both:

... you know, Canada is very conservative, right? so the very avant-garde stuff has always been hard to get funded, and people with the idea of patients with [x] doing [y] was really avant-guard, for a lot of [the reviewers]. Well, they oscillated between "why would you do

this in patients with [x]?” vs “oh, we know [y] is great for everything, so why do we need to know it in [x]”? The second one is an ignorant view.

Be they due to mis-interpretation or mis-understanding, his way of dealing with “*the stupid comments*” is to let the rejection rest for a few days so he can accept a *fait accompli* and then go through them “*line by line*”. Rejection reviews require an interpretation on the part of the PI, but unlike novice PIs Phil is well positioned for this because of his reviewing and networking experience. He knows that non-disciplinary experts are likely to perceive a conceptually similar issue through a differing lens and he knows how to engage the resources of his network to address this. Without such contextual knowledge it could be hard for a PI to interpret reviewer rejection comments as a system response.

I note that aside from its main focus on how Phil conceptualizes his proposals, the discussion in this section presents concrete examples of how he learns and navigates the nested contexts of the system to negotiate fundability.

8.3.4.3 *Phil’s principals of operation*

As to Phil’s ways of being, one that reflects his experience with his own rejected proposals is to be constructive in peer review. In a way, he reciprocates the system for what he has learnt from it by giving feedback to CIHR grant applicants:

... vast majority of stuff that gets submitted is not bad. I’ll be honest, I mean there is probably a handful of grants that are [so] terrible that I am like, literally, “never submit this again”. I never write that brutally ... I mean, I am constructive in the criticism as much as I can be but you can normally tell by how many things you are picking on that are fundamental, that just is telling.

Within his collaborative network, even if Phil’s name is not on an application he stays open to requests for proposal writing help and assumes a mentorship approach to PIs with less experience:

... people that send me their grants and send it to me with the reasonable window..., I will give my full input and I always look at these things as a reviewer. And I tell them ahead of time that I' am not going to sugar-coat what I am saying. I mean I am going to give you my opinion... because I want to see this thing funded, right?... so I am going to tell you where I think things are good and where things don't quite click and work. And the more junior the person is the more I am going to be detailed because ... Junior people have the hardest time ... making that transition [to PI] and often need more feedback, more specifics...

He also continues to synthesize his experiences by *"always trying to learn"*:

... one philosophy I always hold dear is that we are all eternal students in academia, and that every day new stuff comes along that I am learning. Some of it is common sense but I look at parts of the process as well and conceptual things. ... and if there is anything useful that pops out of that that could be always incorporated down the line somewhere in terms of the way I write.

Phil's statement underscores what is surfacing as one of the trademarks of research funding success shared by all three PI participants: they do not allow themselves to fossilize in their achievement. Their learning is rhizomatic in terms of drawing on a large variety of interactions they engage in as academics, and they synthesize it on an ongoing basis.

More broadly, Phil says he tries to do his best in any role he assumes in the system be it research chair, post-doc mentor, PI, peer-reviewer, or program director in his department. His research chair is directly relevant to disseminating the lessons from Phil's transitions between academic systems. Its mandate is to foster research innovation through collaborative peer networks. Phil, along with colleagues in his lab, mentors early career researchers in ways of advancing their own and disciplinary goals collaboratively rather than competitively. Phil firmly believes in collaboration as a way forward in science and puts considerable effort in approaching and selecting only like-minded collaborators:

... there are a lot of people out there that really don't give a shit about the big picture, and it's all about them. I don't work with those people ... So in conversations, and I have

conversations with a lot of different people, ... I know these are people that I respect because of the work they do but I am never going to work with them because ... Life's too short.

This "*limitation of me*" does not preclude him from understanding that the same people will sooner or later be peer-reviewing his grant applications or other research contributions. He is still learning how to work alongside them as, he says, in his discipline he "*deal[s] with a lot of people that have very fragile egos*" and who "*do not take input well*". To this end, Phil looks up to a colleague whose inter-personal skills are so effective that "*he can calm any situation down*". Working alongside this colleague Phil has and continues to learn ways to "*disagree nicely with people*".

Another interpersonal area where he has to be particularly proactive is institutional support of research innovation. To be exact, when it comes to his work Phil sees institutional involvement to be more hindrance than help, especially since an off-campus unit like his lab has to operate within a multi-frame of several bureaucratic structures simultaneously. He factors in the likelihood of institutional prescriptiveness as an operative constraint. Pls everywhere accept this and have no choice but comply. What is interesting about Phil is how he does it:

You know, one thing that I've learnt is trying to always be a little bit ahead of the curve, so standard strategy now is whenever we hire a new dean or VP research or associate dean of research – obviously, I worry about the research stream of things – first thing I do is as soon as they are hired, I make an appointment with them and go see them early, to make contact. I want to get a sense of who these people are, how much are they going to be collaborative, how much are they going to be dictatorial, where are they at, and then give them an opportunity to see who I am and what it is I do and what I bring to the table.

His "*standard strategy*" of making pre-emptive contact with institutional research management is reflective of Phil's ability to turn a constraint into a potential affordance. Phil aims for his work and its value, both scholarly and monetary, to be known. But being known is one side of it ("*who I am and what it is I do*"). Being known in genre-system appropriate ways is the other

(*“what I bring to the table”*). In other words, his emphasis is not on personal academic achievement but on how it contributes to advancing knowledge on the one hand and to raising the institutional profile on the other. These ways of self-representation are acceptable within the wider academic context (*“obviously, I worry about the research stream of things”*) and provide him with opportunities to act on the affordances within the system.

This approach also aligns with Phil’s CV being in open access. Anyone who looks up his name can see his full track record, his research collaborations and how they are funded. As a result, Phil promotes his own work and that of his close colleagues. That is to say, although in the research funding system promotion and self-promotion are credible ways of being a PI, Phil finds ways to elevate his collaborators alongside. In this he is consistent with how he is as a researcher.

What is significant in Phil’s case is that although the approach he has evolved may on the surface seem mercenary, it was not developed to serve a self-centered purpose. Phil believes that research, in the applied health fields in particular, must be *“collaboratory”*. This helps ensure rapid and relevant sharing of the findings across related (sub)domains where it can be readily applied to healthcare, which corresponds with the CIHR priority of knowledge translation. In addition, the very nature of research Phil is involved in *“need[s] multiple people, you can’t do this in isolation”*. The lab’s inter-institutional status has enabled Phil to build *“the pool of collaborators [that] is quite large”*, so they are now positioned to access the resources for long-term sustained success. This example demonstrates the interconnectedness of disciplinary specifics and Phil’s research thinking, and their joint role in the development of his approach to participating in the systems of academic research and funding.

To sum up, Phil’s participation in the Canadian system of research funding is geared towards anticipating change while acting on its affordances and constraints. This is reflected in his interactions which characterize how he thinks about doing research in general, how he does his own, and how he applies for its funding. Although the question of advice to early career PIs did

not arise in Phil's interviews, his drive to "*always be a little bit ahead of the curve*", in system-appropriate ways, could qualify.

8.3.5 The meaning of Phil's funding success

The next stage of Phil's story is ongoing. He is now an expert in his field, with deep insider understanding of the system in which he does research and negotiates for its funding. His perspective is informed in large part by the collaborative work with colleagues of varying disciplinary status and by his academic institutional service, as a CIHR committee member, as a departmental program director, as a co-lead of a lab which requires coordinated drawing on and contributing to inter- and intra-institutional resources of the education and health sectors, and is reliant on his mastery of interpersonal contact:

I am thankful now that I've got to the point that I have the CV that people sometimes want me on the grant because they just want the CV.⁴² And I understand that. I've always played that game, along the lines. ... And depending on the nature of any particular application I say yes or no to that.

Being a recognized methodologies expert is advantageous on at least two additional counts. One is that the majority of the proposals which Phil authors as PI are constructed with input from co-investigators from various disciplinary (sub)domains, and this indicates that the methodologies Phil develops or spearheads are validated across a certain spectrum of applied health sciences. Since composite profiles of team expertise and therefore of their aim could vary from proposal to proposal, this adds to the reputability of Phil's work.

Two, as pointed out by the university research office, the weakest area of proposals rejected by review committees tends to be methodology. Having a methodologies expert as a contributor or co-investigator adds credibility to grants led by Phil's colleagues. While this aspect of

⁴² This corresponds to Mark's saying in his interviews that having "*the great so and so on the grant*" helps to add credibility to the application and pre-appeases the bully reviewer. Impressions matter.

collaboration helps widen the scope of eligibility of Phil's expertise for CIHR funding, it has a built-in risk as Phil's reputation also becomes associated with the quality of someone else's proposal. This must be in part why he is unambiguous about who he is willing to work with; in effect, his *"limitation of me"* is a risk management tool.

It is worth noting separately that on most grants that bear his name Phil serves as PI or co-PI. This means that these also aim, in large part, to advance methodologies as a knowledge domain. In other words, while Phil lends his expertise to the applications of his colleagues, he continues to develop new knowledge as a disciplinary domain expert in his own right. In both cases he emphasizes collaboration as a way of staying ahead in competition.

8.3.5.1 Writing for funding as a vehicle for research thinking

When speaking about how he frames the promise of new knowledge for the CIHR, Phil approached it from the contextual frame: *"[At CIHR] there is this question of 'Ok, ultimately where does this fit in the chain of changing human health?'"*. This larger picture informs Phil's view of the recurring problem in CIHR grant writing, one he considers to be *"the largest area, collectively, where ... people struggle"*:

I think it's very difficult to often conceptualize how your work fits into a big picture. ... a lot of people have a hard time making that transition. I think the vast majority aren't trained to do that. ...the vast majority are trained around understanding very narrow specific things and then what they do is cut and paste those specific things into other slices that stay very narrow. ... And simply saying that we should do [something] because we don't understand it doesn't [work].

As already mentioned, Phil's big picture encompasses the emotional dimension of peer review, a significant factor in the assessment process (Lamont, 2009) which, during difficult funding times, can dominate decision making. But in prioritizing the reviewer and the discipline Phil does not lose sight of his own goals as a researcher. Proposal writing for him is a way to validate his own research goals and consider how his research vision can be positioned for continued

success. That is, his multi-role participation in the grant funding system helps Phil future-proof his intellectual goals in fundable ways.

Grant writing and funding also helps address the practical aspects of achieving Phil's intellectual goals since their attainment depends on the continued functionality of his research support framework:

... two things that are really driving me ... one is practicalities of [the lab and staff] ... who ...help us so much to achieve the research goals And then the other thing is to find opportunities to do interesting fun work that's actually going to be helpful and have an impact, and sometimes, to do that you need to have some money and sometimes you don't. So not every piece of research we do is actually funded. We get a little bit creative in terms of when the research dollars come in ... [t]o get stuff done that we need to get done, and support the students ... What you realize, ... here's a very fundamental difference that I didn't expect. I am way more a manager than I am a researcher, to be brutally honest.

To deviate slightly, in the interviews Phil, like the other PIs, has touched on the price of grant success. It adds to the overall portrait of the PI as a researcher. It is clear from these interviews that one's intellectual ability alone does not enable the attainment of one's research goals. An operative framework is needed to be put in place and maintained, and in the science fields it tends to include a lab with the associated costs of infrastructure and staff payroll. Training of next generation researchers also factors into this framework and comes with responsibility of providing for the students intellectually, financially and often emotionally (*"and we have quite a lot of students"*). But for Phil they are all collaborators of equal value, so as manager, he invests considerable effort into finding the right people:

... anybody who wants to come be part of the lab as a staff member or as a student, there's a pretty long interview process that they go through. They meet with [co-directors], they meet with the staff, they meet with other students. It's at least a full day interview process. Because it's important to make sure that you get the right kind of person - the harmony of everything is critical. ...

All this could put a lot of pressure on the PI to secure funding. But Phil's interpersonal and managerial investments are paying off. The lab is now an established and internationally desired research destination which has momentum to enable opportunities for *"fun work"*. Connected with this is another aspect of the price of success which tends to be unspoken of, although Phil touched on it in passing: the likelihood of peer envy. Phil's name is associated with a high grant value, which is very measurable in today's performance-oriented academia. When asked how this may factor into his academic membership he was humming throughout the question, so it seems a sensitive topic. But his answer was not euphemistic: *"Some people care and some people don't; I think some people see it as an opportunity and some people see it as a threat."* Phil deals with it by carefully selecting all his collaborators.

In other words, practicalities of Phil's research goals are also part of his big picture. Here too Phil seems not just to overcome a system constraint but turn it into an opportunity; not avoid it but make use of it as a building block of success.

8.3.5.2 Exercising the agency of success to negotiate towards positive change

Phil's participation in the grant funding system beyond proposal writing and peer reviewing demonstrates how he can and does draw on institutionalized system interactions to inform positioning of his work and his proposals while helping advance the larger disciplinary effort. Since the CIHR is the primary federal funder of Phil's lab, committee service for the same agency contributes to informing his research thinking and to making it fundable. But being embedded in these structures enables not only his navigating them so as to stay ahead of the curve. Phil also exercises his agency of expert insider to negotiate for change in the system.

On the one hand, Phil draws on his collaborative expertise to advance scientific innovation. As already discussed, Phil is skeptical about institutional maneuverability in supporting innovation. But being networked nationally and internationally as a researcher, he has seen how scientist-led networks can function as a tool for enabling cutting edge research. He carries on developing

and contributing to his networks for the purposes of creating frontier knowledge that can be funded. His grant teams are in large part Canadian as the expertise he seeks must also be situated within the context of addressing CIHR priorities to care for the health of Canadians. But he does not limit team membership to Canada. His international collaborators can contribute expertise that is not available in Canada, thereby strengthening credibility of the proposals and their knowledge claims. Having co-investigators from institutions represented in the lab, and often other researchers nationally and internationally, also serves to enhance the track records of all listed co-investigators which at the CIHR, according to a former agency representative, weighs considerably during review. CIHR wants assurances that the large-scale funding they dispense will not go to waste. But it's a barrier to entry, especially for new talent, so Phil enacts this CIHR system requirement (constraint) as a mentorship and research collaboration venue.

Internationalizing proposal teams in Phil's case is not only possible but desirable because the knowledge his teams develop is applicable to patients globally. This could help raise the prestige of Canadian science in the world. All Phil's proposal teams also include post-docs, which means he is constantly training new talent. Both these are within the Tri-Council aims. As far as fundability of such work, (inter)national collaboration facilitates Phil's access to funding calls in and outside of Canada. This in turn helps expand his horizons for further innovation that he can then adapt to the Canadian context. As for the post-docs, those involved in the application have a chance to begin building their own track record with the CIHR. Phil says that in the vast majority of cases he continues to work with these researchers after the completion of their post-doc. This contributes both to further building on collaborative innovation and to future-proofing fundability of Phil's and the collaborators' work.

On the other hand, Phil seeks to impact the worldview of the funding system participants. His explicitly collaborative approach also has a wider implication. If it looks like working together is a re-invention of the scientific canon, it may be. But at the very end of 2010s the basic idea of collaborative, rather than competitive, scientific research is so innovative that CIHR is funding

Phil through research chair and a large part of it is to mentor early career researchers on how to work together.

As research chair, Phil is leading the development of a particular area of frontline disciplinary knowledge but he also guides novice health scientists in building and nurturing research networks. These networks reflect the principle of nested contexts (McAlpine & Norton, 2006) in that they originate from the immediate environment of one's lab or department and expand inter-departmentally, -institutionally, -provincially, nationally, and internationally. Through this service, Phil is co-constructing positive change in his domain as well as in the system of research funding, as he helps novice researchers build towards a climate of mutual support rather than of competition. In his role of research chair, Phil mentors not only his own (post)graduates but an international community of early career researchers who are engaged under his lead in addressing the main research question of his chairship through developing innovative, interdisciplinary peer networks. His aim here is two-fold. One is to help them evolve their own collaborative approaches to co-producing frontier knowledge. The other is to make this knowledge fundable in ways that address constraints and opportunities of their domains and strengthen credibility of their personal contributions by their membership in the joint scientific effort.

As academic advisor to postgraduate researchers and an international innovation leader, Phil dedicates considerable time to mentoring, and this comes in addition to his workload as a teaching faculty member, peer reviewer, and lab director. But as PI, Phil also benefits from his mentorship in that he is often invited on projects and on grants from his ever-expanding network. For his last interview, Phil was skyping from abroad, where he was working with one of his former post-docs on a new research initiative. So besides enabling interesting new research such opportunities, if funded, benefit all team members by increasing their grant net worth.

In summary, the big picture of Phil's membership in the grant funding system is not only about continuous learning to navigate and negotiate it for the purposes of being sustainably funded. It is also about exercising his agency as disciplinary gatekeeper and CIHR insider to effect positive change, through leading by example and sharing his accumulated experience.

8.4 Lessons learnt

Phil's story has traced how change has shaped his becoming a PI and how he has developed and consolidated his understanding of CIHR funding into an approach that I would call a research funding genre system of his own. The keystone of his approach is collaboration. It reflects Phil's research goals and extends to his entire academic practice.

Phil's research funding approach and its success have been informed by his adapting, addressing and, eventually, anticipating change. As a novice researcher, he primarily had to adapt to change in the form of differences that at the time defined European, US and CAD national academic contexts. His trans-Atlantic transition brought up the need to learn to write grant proposals. It would be reasonable to say that while his US post-doc was formative at the foundational level for his grant and research thinking, it is Phil's participation in the Canadian system of grant funding that has, over the years, shaped his overall approach. That is, if the US post-doc inspired and enabled his building of collaborative research networks, his Canadian experience as PI and peer reviewer service enabled his navigating and negotiating the system during some of the most challenging times in grant funding faced by Canadian researchers.

Phil has experienced first-hand, as both grant writer and peer reviewer, that change in the funding system can be random, with positive or negative consequences. But even though it may not always make sense to a PI, change has to be addressed. With this in mind, Phil has learnt to integrate change into his funding approach. Now as an expert, Phil goes beyond accepting change. He actively seeks to convert the constraints inherent in change into advantages that would help make the research of his lab consistently fundable.

At the same time, Phil has been able to adhere to his research goals. He may be lucky in that the priorities of his research correspond to those of the CIHR so that he did not have to reorient his work to lend itself to knowledge translation, or this may have been shaped early on, but Phil does not feel he had had to compromise his research goals to render them fundable. However, as this chapter has demonstrated, Phil's approach to research funding does have considerable built-in flexibility in that it addresses the constraints and opportunities of CIHR funding in genre-system appropriate ways. Phil's approach is to work through collaboration, both in doing research and in writing grant proposals. This enables a wide and current-most scope of funding opportunities; simulates peer review, at least in the context of Canada; enables Phil to grow his own and the team's net worth; and expands research and funding networks, thus enabling future collaborations and grant proposals. All these are moving parts of Phil's way of participating in the nested contexts of the funding system, with the aim of *"trying to stay ahead of the curve"*.

Phil's accumulated knowledge of the Canadian system of research funding is applied to the way he does research – collaboratively, to the way he approaches research finding – by leading collaborative teams, and to the way he draws on his expertise – by mentoring novice researchers in collaborative knowledge making. It would be reasonable to suggest that as PI Phil has evolved his own grant enabling system.

8.4.1 Anticipating change

Over the years, Phil has articulated strengths and limitations of his approach. Three strong points stand out. One is that collaborating on writing for grants widens the horizons of funding available for a particular research line. Phil's lab tends to stay informed of every significant opportunity in the field. Two, due to differing expertise and disciplinary specialisms of the collaborators, proposal writing in a team facilitates peer review from the early stages. Given that Canadian disciplinary communities are relatively small, a multi-member grant team has the potential to approximate the composition of a review panel and provide each other with similar

feedback, which could contribute to the higher chance of the proposal being funded. Three, if funded, the grant contributes to team members' funding track record and net-worth.

The approach also presents challenges, and Phil has learnt to address them in his proposal construction process. His principal concern is the collaborators themselves and Phil is unambiguous about his way of building his networks. Once the team is in place the proposal process varies. If Phil is the principal writer, he creates the first draft on his own and takes full responsibility for the final text. In the next step, he delegates review and further contribution to team members who may be more knowledgeable than Phil about the content of a particular section. Alternatively, Phil may assign drafting of certain proposal sections to team members with requisite expertise and then compile a full draft from the sections written by him and by the team member(s). These techniques reflect the grant peer review practice of deferring to a disciplinary expert on the panel when members have trouble finding consensus (Lamont, 2009). But they also challenge Phil to be a human resources manager and bear responsibility for the quality of team contributions and for vetoing them. The other two challenges are of administrative nature. Due to the lab being an off-campus unit its operations have to adhere to the bureaucratic constraints of the institutions represented by the lab co-directors as well as of the institution providing the lab with its physical facilities. Phil finds these to be both constraining and enabling as far as research innovation is concerned. Finally, because the lab staff are paid from the core research team's grants there is continuous pressure on the co-directors to bring in funding.

With the recent shifts at the CIHR, Phil has had an opportunity to assess the overall productivity of his approach. Given that of the three PIs participating in this study he is the youngest but highest funded, it is reasonable to conclude that Phil's approach to change enables him to address and, to a certain extent, pre-empt randomness associated with grant funding decisions. That is to say, in his approach to grant funding and grant writing Phil does not only incur the risk that is acknowledged to be associated with the grant proposal (Myers, 1990). Phil pre-emptively manages this risk. It is worth noting that grant funding risk prevention is not

something discussed in the literature. The findings of this chapter could contribute towards developing an understanding of how novice PIs can navigate and negotiate (inter)national systems of grant funding to build long-term approaches to sustained funding success and ways to facilitate it.

The innovativeness of Phil's collaborative approach could be summarized as:

- a) mitigating randomness associated with grant funding by anticipating change and risk, and**
- b) co-constructing future positive change in the system of grant funding by mentoring early career researchers in collaborative research practices. This last stands in contrast with competitive practices in grant funding which have contributed to nurturing the culture of individualism in corporatizing academia.**

9. Cross case analysis

9.1 Introduction

This study was originally designed to investigate how expert PIs evolve discursive approaches for grant funding success. At the time, the term ‘discursive’ was taken as it is understood in writing studies, i.e. as situated and structured written communication that (re)produces institutionalized orders of making new knowledge within the system of related genres of grant funding (Connor, 2000; Connor & Mauranen 1999, Ding, 2008; Feng, 2011; Tardy, 2003; Tseng, 2011). The term ‘grant funding success’, accordingly, signified the success of a written proposal. This perspective, in addition, was a logical extension of my earlier background in philology (text linguistics) and writing studies.

But in the course of this study, ‘discursive’ expanded to the more encompassing ‘dialogic’. Both terms at their core are defined by interactive exchange, but the three participant PIs go beyond drawing on features and functionalities of other genres for the purposes of constructing a written grant proposal (Yousoubova, 2011). Nor do they merely reflect the expectations of the grant genre system into their proposals to get funded (Casey & Fletcher, 2017; Ding 2008; McGinn et al., 2019). Rather, as multi-role system stakeholders, these PIs engage in complex interactions with the structured nested contexts related, but not limited, to research funding. In the process they learn, interpret and co-construct these contexts.

The findings demonstrate that in their dialoguing, successful PIs are not limited to writing and interacting within only the grant funding system. As they participate in the intellectual, interactional and institutional contexts in which their careers evolve, they also become more knowledgeable about the progressively embedded structural nested contexts (McAlpine & Norton, 2006) of research funding (Myers, 1990; Tardy, 2003; van Nostrand, 1997), knowledge making (Knorr-Cettina, 1981/2013; Latour & Woolgar, 1979/2013), knowledge evaluation (Lamont, 2009), and academic work (McAlpine & Amundsen, 2018). Because grant funding is embedded in these larger systems and structures, the concepts help frame the expanded systems view developed in this study.

9.2 Overview

This chapter identifies the themes and patterns which emerged across the three cases. Analysis of the themes and patterns then facilitates identification of key commonalities and variations of grant funding approaches of the participant PIs, preparing the argument for the contribution of this study.

The themes and patterns are situated in the social context of Canadian federal funding of academic research. While not representative of the specific nuances of grant funding in other countries, these reflect the competitive nature of research funding in the developed world and its principal constraint, rapid change from the ongoing socio-economic, political, and policy change.

It should be noted that in the context of this study the notion of peer review has not come under analysis. Rather, peer review is assumed to be the received and institutionalized practice of evaluating grant proposals. The participating PIs were not asked to reflect on it and have not offered their opinions on its values and drawbacks in validating new scientific knowledge (e.g., Derrick, 2018).

Each of the three participant PIs comes with a graduate degree obtained outside of Canada, of them one in a language other than English. Two of the three received their doctorates in their countries of origin, and it is safe to assume that the specifics of their national academic systems contributed much to their being a researcher and, eventually, a PI (Yousobova, 2011). Their academic and societal histories, research goals, and personal drive led them to academic work in Canada, where grant funding plays a significant role in supporting university-based research. Some of their grant success may be due to their innate personal qualities. But most of it is purposefully constructed and has evolved from their being intentional in learning, thinking, and interacting across the nested contexts of academia.

9.2.1 Research questions

The study described in this dissertation set out to explore how expert PIs navigate and negotiate the system of research funding to build towards sustained grant success. The study extends from my previous work (Yousoubova, 2011) and builds on the consensus arrived at by Myers (1990), Mehlenbacher (1994) and Tardy (2003): the need to conceptualize grant writing as situated in a complex communication system. Myers (1990) was first to recognize the interconnected social nature of writing for research funding. Mehlenbacher's (1994) investigation of the grant writing system as a combination of written proposals, funding processes and academic research also indicates a complex interplay of multiple connected factors that influence the final outcome of a proposal submission. Tardy (2003) demonstrates how grant writers must operationalize their procedural knowledge of the grant funding system by navigating "a larger system of documents" related to the grant proposal (Tardy, 2003, p. 11) as well as dialoguing with resources and individuals involved. Drawing on the above findings, the study considers how researchers' experience in the structured nested contexts of academic work (McAlpine & Amundsen, 2018; McAlpine & Norton, 2006) informs their approaches to grant funding. More specifically:

- **(intellectual)** How do scientists use proposal writing to advance their research goals?
- **(institutional)** How do they draw on their institutional roles in grant funding?
- **(inter-textual)** How is their understanding of the decision-making drivers in research funding reflected in their proposal writing?
- **(inter-personal)** What is the nature of their **interactions** within and beyond the grant genre system and why do they engage in these activities?
- How do they integrate the institutional, intertextual, interpersonal and intellectual knowledge they develop into the grant proposal?

9.2.2 Themes and patterns

The patterns emerging across the three cases reflect the research sub-questions but suggest a relational difference. They lend themselves to be grouped under the themes defined by the participant *PIs' being purposeful and open to learning in many ways, over time, from:*

- **interacting with, within, and beyond the system of grant funding through enacting multiple stakeholder roles, including institutional service;**
- **inter-texting across the genres of funding and knowledge work;**
- **co-constructing the system of grant funding, including institutional leadership;**

The overarching supra-theme is **intellectual**: it is in the pursuit of their research goals that the participants situate their learning. PI learning in this process is ongoing and, because they build on it over time, it is iterative.

These themes are drawn on to demonstrate how purposeful PI learning from experience in the nested contexts of funding facilitates situatedness of their engagement. There are three principal aspects here: a) PI addressing the constraints and affordances of the system, including institutional service; b) PI perceptions and response to the proposal as a genre, including their proposal construction processes; c) PI processes for developing unique approaches to enhance fundability of their work.

Next, the themes are cross-analyzed to facilitate a deeper understanding of expert learning and PI development through participation in the nested contexts related to grant funding. The findings demonstrate that the individual approaches the three PIs are rooted in their bio-historical experiences and in their systemic and epistemic thinking, leading to the development of a resourceful mindset. Further, PI approaches reflect their learning and evolve to facilitate advancement of their intellectual goals, to enhance fundability of their research, and to co-construct the system of research funding. The ensuing discussion chapter lays out the contribution of this study.

9.3 Teasing out themes and patterns

9.3.1 Learning from inter-acting across the nested contexts related to funding

The participants' engagement with grant funding is primarily driven by the PI-specific research goals: to solidify the mainstream status of knowledge they produce across related fields (Mark, Phil); to advance the knowledge they produce into the foundations of the discipline (Paul, Mark); to assert inter-disciplinary credibility of the knowledge they produce (Mark, Paul); and to advance their intellectual goals through developing, nurturing, and expanding research networks (all three).

The principal source which shapes these PIs' intellectual goals is their lines of scientific inquiry: fundamental (Paul), applied (Phil), fundamental and applied (Mark). Disciplinary domain specifics thus determine, and facilitate, PI responses to the constraints and affordances of the system of research funding. Across the three cases these include: a) their seeking and assuming multiple stakeholder roles in the system, especially via institutional service; b) their addressing rapid change inherent in the system; and c) their building informed resilience to failure.

9.3.1.1 Purposeful participation in the system of grant funding

Focused on their research goals, all three PIs aim to engage in the system so as to support their work – rather than make it supportable by adjusting to the priorities of the funder. That this is possible, in the context of cuts on research spending (World Bank, 2018), adds to the current understanding of researcher funding success. The findings expand the body of knowledge that funders' priorities can and do influence what PIs may choose to advance for funding, by either modifying their lines of research to reflect those prioritized by the funder(s) (e.g., Laudel, 2006; Whitley et al., 2018) or addressing the lines of inquiry prescribed by the funder directly (e.g., Tardy, 2003).

To build and maintain fundability of their work, the three participant PIs first seek to understand how it can be rendered competitive yet credible within the fluid context of

government funding priorities and budgetary constraints. The approach shared across the three cases is to assume multiple roles in the grant funding system. These roles can be grouped around institutionalized ways of researcher participation in the funding of academic research: writer (solo or part of a team), peer reviewer (external reviewer and committee member), and leader (see Leadership section below).

Further, the PIs' multi-role engagement is ongoing. They aim to remain "plugged in" which helps them evolve in-depth understanding of how the affordances and constraints of the system can be a) reflected in the proposals of their own yet b) addressed in ways that would align with their research goals rather than vice versa. That is, their capacity to engage with the system to advance their research goals is based on personal experience rather than solely on literature or information sessions that could never address the nuances of an individual PI's work. These PIs' expert knowledge of the system is personalized in the sense that allows them not only to understand "*how it works*" (Paul). It also enables them, in their own proposals, to address and reflect the aspects of the system that are particularly relevant to the fundability of their lines of research. Long-term commitment to this multi-role participation ensures that their understanding is kept up to date. Given the constant fluidity in the workings of the system brought on by change in governments and policies, this particular approach is strategic to making their work sustainably fundable.

9.3.1.2 Self-challenge as response to change

Another theme that emerged across the cases in connection with the PIs' responses to the system affordances and constraints was their adaptability to change. Grant funding systems reflect the socio-economic and political shifts in the wider society, and these PI have learnt that regardless of the nature of their work, being able to address change in funding system is vital to ensuring continuity of their research programs. They may not always agree with change that is taking place, but in their various roles within the system they have observed the inevitable consequences of other PIs' not addressing change (*...it takes a couple of tiny things and that's it, you are done, you are not getting any funding*, Phil). Their response to this constraint is a form

of self-challenge: finding ways to balance their research goals and the ongoing change which is embedded in the funding system and which could have bearing on the development of each PI's research goals.

Among such changes experienced by the participant PIs were considerable budget cuts in the support of scientific research, rushed structural reforms across all three federal funding agencies, and connected to them instability in the application and review processes. From the mid-2000s to the end of the 2010s, federal budgetary cuts to research funding in Canada resulted in a steep decline of funds available to support the continuously rising numbers of proposals, making it harder for applicants to be funded while nearly tripling the workloads of peer reviewers. Ensuing large-scale reforms of the administrative structures and review committee designations across the Tri-Council had negatively affected the proposal evaluation processes. Due to lack of procedural support in one of the agencies, the CIHR, where the three participant PIs are implicated, a key funding line had to be suspended for more than one season, forcing the applicants to compete for funding within the pipelines that prioritize other areas or kinds of research. Finally, as the reforms had to be re-considered on the go, further instability in the system processes meant that for many consecutive application seasons proposal structures and proposal committee routings in a given disciplinary area could change from one season to the next, often on a short notice, causing frustration among both proposal writers and peer reviewers.

One key outcome of these shifts was the constantly changing expectations imposed on the proposal texts. This made the already complex system harder to navigate. But, as the participant PIs observed first-hand, not being able or willing to address these shifts affected one's chances of being funded downwards from an already low point. Another consequence of the possibly forward-thinking but rushed government reforms of the system was their 'disconnect' with the nature and expectations of the Canadian reviewers. This meant that proposal writers had to address the duality of the government drive for aggressive innovation

and of the conservative nature of the Canadian reviewer, who on the whole favors incremental rather than revolutionary knowledge advances.

The dynamic of institutional change then is to be navigated and negotiated. These PIs do so organically. Their addressing change is embedded in their approaches and is in many ways conceived in connection with their research and other goals. But there are two ways in which the PIs share: self-challenge and balance. *Self-challenge* was not a term used by the PIs; rather, it is a cumulative description of their commitments as experts to addressing rapid change inherent in the system, learning from it but also contributing to it. Their multi-roles as system stakeholders facilitate their understanding of change and their addressing some of its recognized shortcomings such as potential for subjectivity in peer review, nurturing practices of collaboration across their scientific communities to attenuate the competitiveness of the system, and participating in policy development with the aim of co-constructing positive change. The term *balance*, on the other hand, was used by the PIs independently of each other and refers to the need to find and maintain equilibrium between the system priorities and their own goals development; to assert themselves in the proposal as uniquely qualified achievers while also taking a stance as member-contributors to the larger, consorted effort; to walk the line between selling yet not overselling, and between competing and contributing.

To sum up, the participant PIs draw on their past and ongoing experience of the roles they actively seek in the system to build an understanding of how to position their work, the work of their colleagues and collaborators and of their post graduate advisees to address the rapid shifts in the funding system and related nested contexts. Their insight and implicated-ness in co-constructing (counter)change will be discussed in the Leadership section. The remainder of this section focuses on how, during the period of turbulence, they sought to address the shifting expectations of the system under reform.

9.3.1.2.1 The Canadian reviewer and the expectations of the Canadian genre system

The key word in the advancement of the federal funding reform was innovation; it formed part of the government rationale for positioning Canada on the global research frontline. The participant PIs, however, thought this call to be ill-informed (Mark, Phil). In their view, the drive for grand leaps in scientific knowledge, which they perceived to be embedded in the call for innovation, was at odds with the nature of the Canadian peer reviewer and, therefore, the Canadian system of research funding.

To unpack, all three PIs initially were outsiders to the Canadian system of research funding. Because of this they at times articulate their perspectives relationally, via comparing the research support systems they had been familiar with before coming to Canada to those in which they are implicated through their current work. It is very likely that this dual positioning has and continues to play a role in developing their perspectives (Pavlenko, 2003). On the one hand, it informed their initial lens on the system; on the other, it contributes to enriching their current knowledge. While being a system outsider initially may be detrimental to getting funded (Yousoubova, 2011), evolving such bi-focal vision, in Pavlenko's (2003) terms, has clearly become advantageous for each PI as they develop an approach to grant funding, and to proposal writing especially.

The PIs feel that the nature of the Canadian reviewer is both conservative and conciliatory (*...nobody in Canada fights; [reviewers] politely agree to disagree*, Mark). This in turn determines the system expectation that the science advanced in the proposal be incremental rather than revolutionary, and demonstrate how the proposal claim forms an integral part of the consorted disciplinary effort instead of leaping out. So *"bursting the boundaries of innovation"* (Phil, quoting the former head of CIHR) would not be seen as a credible claim in a Canadian grant proposal. Yet at the time that frames this thesis, the Tri-Agency was highlighting the idea of rapid innovation and the proposal writers faced a controversial need to pitch the novelty of their claim. The PIs' response to this acknowledged both the promotional nature of the proposal genre and that of the Canadian knowledge-making context. It was *"sell but don't*

oversell" (redacted, Mark, Phil). Because "*Canadian reviewers are conservative*" (Phil), being overtly academic (*intellectual processes*, Paul) is appropriate for Canadian proposals. This, in my PIs' perceptions, stands in some contrast to the overtly promotional writing style of the US proposals (*sounding like a used car salesman*, Mark; *claiming to change the world*, Phil). It also reflects their understanding of how the proposal is nested in wider social contexts.

But on its own, being bi-focal would not have informed this level of understanding. Their views are also informed by their ongoing multi-role participation in the system which facilitates their "*learn[ing of] what is appreciated by the majority of the reviewers*" (Paul). Together they inform a degree of genre creativity with which each PI is comfortable and which the Canadian system accepts. This could be briefly summarized as "*I always try to tell a story*" (Paul) because "*it's the story that sells your grant*" (Mark); while being succinctly explicit about how the proposal expands (from) the ongoing disciplinary effort is "*the sales pitch*" (Phil). Since the proposal is a high stakes genre, creativity is a mark of confidence gained through extensive experience, but each of the three PIs engages with it differently. Their notions of story and its situated-ness are explored in detail in the inter-textual section, which follows.

9.3.1.3 Informed resilience to failure

The possibility of proposal failure is embedded in the competitive nature of the grant funding system. The advancement of the government reform of the federal funding agencies, and of its consequences, elevated proposal rejection into an acute system constraint. Statistical success rates went down across all three federal councils and, for the most part, stayed low until some easing of the budgets and change in policy by a new government was beginning to be felt towards the very end of the 2010s. As the PI interviews took place between 2016 and 2018, response to failure was a logical theme to emerge across the three cases. It was clear, however, that my PIs' perspectives on failure represented reflections of their stakeholder multi-roles.

The participant PIs expect their proposals to fail, if not routinely then often enough and, especially, if advancing into a new or inter-disciplinary domain (Mark), addressing a new

committee (Mark, Phil), or an agency that is not among the primary funders of their work (Paul, Mark). Although they may be emotionally affected by it in the immediate aftermath (Mark, Phil), all the PIs share in their response to failure as a concept built into risk-taking that is inherent in the proposal (Myers, 1990). However, in their understanding of failure they go beyond accepting it only as part of the game.

Their multi-role involvement in the system has nurtured their conception of failure as feedback, both on their proposals and on their perspective on the system itself, and helped them evolve an informed two-part approach. Part one: the PIs see grant failure as peer feedback which, although originating from individual fellow scientists, is institutionalized as disciplinary gate-keeping. The participant PIs' opinions converge on that the nature of this feedback, which most often is represented in the form of reviewer comments, could be subjective. It is therefore to be reflected on critically. But since the reviewer comments are the sole window into the peer deliberations that have led to the negative decision, the aspects of this feedback that PIs find applicable tend to be reflected into their subsequent proposals. Part two: they look beyond the proposal text to help them rationalize failure - to the extent possible - as part of the grant funding process. They understand that negative decisions can be and are often driven by factors beyond the quality of science which, to all three PIs, is the primary criterion of a fundable proposal. Some of the factors that are out of a PI's control are government and policy changes, institutional reform, and budgetary fluctuations. These factors are out of reach of the evaluating committee as well. The latter is particularly important in how these PIs understand failure as during the grant adjudication process, they have developed hands-on experience of having to balance the scientific, administrative, policy, and budgetary issues. This experience helps them objectify what is often perceived as randomness in funding decisions.

Indeed, due to their encompassing perspective on the complexity of grant rejection these PIs can at times anticipate and pre-empt failure. But the principal outcome across the three cases is not their possibly gaining an upper hand but their a) rationalizing failure as part of the game,

b) capacity for sustained resilience towards rejection and thus c) their acceptance of the continuous uncertainty of being grant funded. It is about their informed stamina.

9.3.1.4 Section summary

The patterns discussed under this theme are: *learning through interactions* in the nested contexts of the system by assuming *diverse stakeholder roles* which facilitates the PI's *capacity to address change* and develop system *participation stamina* for the long run.

Clearly, in the funding system that is characterized by ongoing shifts, being intentional and expanding beyond the traditional roles of writer and peer reviewer facilitates these PIs' capacity to produce fundable knowledge. But this is not all. Their multi-role participation also facilitates an opportunity for ongoing learning, and there is consistency in this aspect across the three cases. The reflection of their learning is evident both in their proposal texts (i.e. intertextual connections they make when conceptualizing and constructing grant proposals) and in their leadership initiatives within the system (institutional service at their university and/or at the funding agencies beyond peer reviewing, with the goal of co-constructing positive change in the system of grant funding). The following two sections detail the themes emerging in these regards across the cases.

9.3.2 Learning from inter-texting across the genres of grant funding

Seeking to improve fundability of their work the participant PIs strive to learn from the proposals they review. Their roles as peer reviewers provide them with ongoing opportunity for close up encounters with a large range of texts in their disciplinary domains. And since review committees do not always have readers with direct expertise on a given proposal, these PIs read grant proposals from adjacent fields. In addition, they are often approached by colleagues for comments on proposal drafts in progress. All three read as writers, i.e. not only providing expert feedback on the text but also drawing critically on these texts for possibilities to be assimilated into their own. If they co-write with another PI or a team (Mark, Phil) they draw reciprocally on the expertise of the team. Participating in other systems of academic work, e.g.

student advising, and knowledge making, e.g. publishing or presenting a paper, all of them they draw on related interactions as feedback on persuasiveness of their argument (this is especially pronounced in Paul's case). In all three cases the PIs attribute particularly effective aspects of their proposals to having synthesized them from reading grant proposals which they consider to be superior to theirs as well as from reading other genres of academic prose. Similarly, through reading, they continually acquire knowledge on the negative attributes of the proposal.

A key factor that informs how the three PIs learn from assessing proposals by other scientists is their engagement in peer review discussions. As they and their fellow panelists deliberate rationales for decisions, the PIs evolve unique perspectives that help them situate future proposals of their own in both the immediate and wider disciplinary contexts. The PI's participation in this consensus seeking continuously validates their insider understanding of what, to paraphrase Myers (1990) and van Nostrand (1997), in the discipline gets certified as both legitimate and fundable knowledge.

The participant PIs' learning is thus informed through the ongoing synthesis of their own expertise and experiences in the system, and through reflecting on the relevant experiences of their colleagues, fellow peer reviewers, students. Through this process they have each evolved a vision of what makes a proposal fundable. Aside from the fact that all three PIs prioritize quality of science in any proposal, their own or those under their review, two themes consistently emerged across the cases. They are: a story and the big picture.

9.3.2.1 A unique story: enhancing proposal readability

The need to tell a story in a grant proposal was emphasized by all three PIs. While for each of them the term story embodies a unique vision, its aim is to enhance readability of their proposal texts. In this sense, the PIs strive for connectedness of the proposal claim to the existing body of knowledge (all) and to one's own prior work (all), for attracting and convincing the reader in discipline-appropriate ways (all), for structure (all) and accessibility of their prose (Mark, Phil). They aim to address these criteria in the stories they construct and seek them in

the proposals they review. The commonality across the cases then is in that a story must be told in discipline-appropriate ways. But while this was interpreted by the PIs similarly, their conceptions of the story were distinct.

Paul, a fundamental scientist with a focus on discovery research, sees the proposal story to be *“the history of [one’s] intellectual processes”*. At the core of Paul’s story are explicit connections between the proposal research question, the hypothesis (knowledge claim), the methods designed to investigate them, and their joint furthering the knowledge created as a result of the PI’s prior work and related grants. This view reflects both Paul’s research goals and the perspective of the funding council he prioritizes, NSERC. NSERC primary funding lines support fundamental science programs designed for a long-term continuum.

Phil, an applied health scientist, aims for the proposal story to be told as *“a holiday novel”*. The emphasis in Phil’s story is to advance a singular, defined and bounded issue the outcomes of investigating which could be rapidly applied in healthcare. While this approach reflects the drive for direct knowledge translation, a strategic research directive from Phil’s funding agency, CIHR, it is also reflective of Phil’s own research goals. As an interdisciplinary team lead, Phil’s way of focusing the story on a sole research issue, addressed via a consolidated methodology, demonstrates to peer reviewers that there is unity in the approach of a team with diverse expertise and that the issue benefits from multi-faceted yet rigorous and focused examination. Team membership could vary from one proposal to the next. Plus, CIHR is known for rapid institutional change, so Phil envisions the proposal as *“a moving target”*. With a background in team sports, Phil says he enjoys grant writing as it draws on his skills and affinities.

Mark, whose research has capacity for and does cross boundaries between fundamental, applied and social sciences, constructs the proposal story as *“a symphony”*. In Mark’s story, the attributes specific to the knowledge claim are explored through the genre *“instruments”* that are relevant within the context of a particular field, funding council and committee. Due to the encompassing nature of his work the research harmonies Mark seeks to create are complex and

at times risky because they could be perceived as too novel rather than safely incremental. This requires fluency in the discursive means that frame and advance the proposal claim (new knowledge) in ways that are acceptable by funders and committees with different epistemic values. Mark, however, enjoys the challenge and the risks associated with it as he seeks to affirm the fluidity of disciplinary boundaries and forge meaningful interdisciplinary connections.

Each of these ways of storytelling is designed to streamline reader experience and to avoid the pitfalls they often see in other proposals, e.g. not tailoring the proposal claim and content to the agency (Paul); now addressing the format imposed on the proposal by a given agency (Mark, Phil); not making explicit connections between the significance of the claim and broader knowledge advancement (Mark, Phil); providing supporting evidence that is not directly relevant to the claim (Phil); not being explicit about how the proposal methodology enables a thorough investigation of the claim (Paul). For peer reviewers, whose workloads have gone up in the last decade, this is irritating; for proposal writers this is consequential (*if you upset the reviewers, funding lines are so low ...*, Phil). So all three PIs create stories that steer the reviewer towards a positive decision.

In all three cases, the PIs cite their peer review service, i.e. reviewing proposals and participating in panel discussions as committee members, as a significant contributor to the shaping of their conceptions of the proposals. They learn from working collaboratively with colleagues, from reading and from proposal discussions. Some of the elements of their own stories have been assimilated or adapted from the proposal writing they perceive to be superior to theirs. Clearly then the storytelling techniques of each of the participant PIs were developed with the input from their participation in academic work and from decision-making disciplinary peers. Since these stories are usually funded, they must be received by the evaluating panels as legitimate and appropriately addressing the disciplinary expectations of knowledge making. In short, the stories the participant PIs tell in their proposals acquire meaningfulness because they are grounded in the disciplinary ethos while also being original.

9.3.2.2 *The big picture: situating the individual and the disciplinary*

The second theme across the cases was that of “the pig picture”. As in the previous theme, each of the PIs used the term independently of the others. This time, however, their perspectives on its meaning converged. In these PIs’ view, to be truly persuasive the story must go beyond reflecting the disciplinary genre specifics of writing the proposal. It must also be framed in the wider disciplinary knowledge developments while being situated in the appropriate disciplinary conversations (all). A key reason for this is that due to the relatively small size of Canadian disciplinary communities the majority of their peer reviewers come from adjacent fields rather than directly from the PIs’ own. So their proposals must reflect this expectation of being networked into a wider effort (*Where in the chain of things ...?*, Phil) because non-specialist appeal adds to proposal credibility.

As a result, among the reasons that the participant PIs serve on review committees in and outside their disciplinary fields are learning how to address expectations of the wider field inclusiveness in their own proposals, learning how such proposals may be evaluated by peers from related fields, and working this knowledge into their own peer-reviewing best practices (*reading proposals from different and distanced fields... it’s learning*, Paul).

Another reason, especially in these PIs’ cases, is that they do not always apply solely to the committees which reflect the core of their research niche. They may seek to be funded for a new or specific part of their research program, or for collaborative, inter- or cross- disciplinary work. In fact, the individual research niches these PIs have developed as a result of their long careers are not narrow; rather, they are open-bordered to enable research collaborations and cross-overs with other fields or industry. It allows the PIs to widen their research networks, the range of would-be funders, and the persuasive appeal of their proposals. Effectively, this helps their work to be recognized and drawn on more widely. Such encompassing outreach of their work is among the factors that enable the longevity and sustainability of their work and disciplinary standing. The proposal stories they aim to tell thus are encompassing of both their

expert status and disciplinary advances, and are situated in the wider network of knowledge advancement.

9.3.2.3 Framing the story in the big picture

These perspectives evolved by the participant PIs are in large part the outcome of their experiences of participation in the grant funding system. Diversification of their roles in the system contributes to the broad spectrum of their understanding of the proposal situated-ness at several levels.

9.3.2.3.1 The construct

In terms of proposal construction, nesting of the story into the big picture achieves connecting the new with the familiar in the sense of making transparent how the proposal claim extends from the knowledge that is already certified in the discipline as legitimate (... *where you are coming from and where you are going with this*, Mark). In addition, the three PIs have learnt that the proposal gains credibility when it explicitly addresses how it contributes to expanding the knowledge frontier (e.g., for applied health sciences “*here’s why this grant is important and here’s how it’s going to change things for the better*”, Phil). In doing so it helps the reader co-construct the meaningfulness of the proposed contribution and retain the proposal main points when writing a review or speaking at a panel discussion.

9.3.2.3.2 The text

Text-specifically, being immersed in the system interactions that inform proposal evaluation enables continuous development of the participant PIs’ own ways of storytelling (*by sitting on these different committees you learn what is appreciated by the majority of the reviewers*, Paul). At this level, each of the PIs in the study synthesizes their experience into the proposals of their own. Some PI-specific examples of intertexting between their proposal writing and that of other participants in the grant funding system are: assimilating an idea that can enhance reader interest (*I saw that and it was yes! It makes sense to me as a reviewer*, Phil on his ‘movie trailer’); adapting a rhetorical move seen elsewhere in disciplinary writing (*How would I say it?*,

Paul on an elegant construction of an argument by a colleague); or taking a risk and introducing to the proposal genre a principle recognized elsewhere (Mark on borrowing the use of the vernacular in classical compositions of Prokofiev and Copland).

9.3.2.4 Risk and genre innovation

Indeed, as experts, all three PIs are in position to be creative with the genre (Tardy & Swales, 2008). Of the three, Mark has the most experience in the grant funding system and is notable for taking risks with introducing new elements to the proposal genre (e.g., references to pop-culture). These are calculated risks, for Mark's accumulated perception of what reviewers would find acceptable spans close to 30 years. His purpose in genre innovation is to re-spark reader interest and make the reading more accessible and memorable. This reflects his goal of building bridges between the disciplinary domains that correspond to the subject of his research program.

Phil, the highest funded of the three but not as experienced as the other PIs, takes only moderate risk in this regard. Rather than innovating himself he adapts genre novelties that *"make sense to [him] as a reviewer"* in the proposals he reads. Having found a reader-engaging way that both he as a reviewer and the readers of his proposal find genre-appropriate, he relies on it to enhance the chances of his team proposals. In other words, being a moderate risk taker with the proposal genre is in line with Phil's goals of collaborative network research. Building these research networks is where he innovates, so he is not in position to put large proposal teams at stake.

Paul, the scientist with the longest career but also the only ESL writer (at least originally), does not take risks in proposal writing. Instead, his writing reflects how the mainstream proposal expectations evolve. Given that for the last 20+ years he has written only in English, his not taking risks may have less to do with language use than with his research goals. Paul aims to solidify the disciplinary legacy he has already created; and his proposal writing within the

traditional boundaries of the genre is consistent with his prior written work and with the way he works overall, and is likely expected of an established mainstream disciplinary contributor.

The grant proposal is a high stakes genre, and the levels of genre creativity with which each of the PIs is comfortable - high, moderate, or none – correspond as much to the extent of their experience and genre confidence gained through this experience as they do to each PI's research goals. In other words, even though they may be best positioned among the system participants to genre-innovate, not all experts would necessarily engage with it.

9.3.2.5 Section summary

The patterns discussed under this theme are: *intertextual learning* to facilitate construction of genre-appropriate persuasiveness in the proposal by creating *a story* situated in *the big picture*, sometimes with a degree of *genre innovation*, if taking the risk could help advance the PI's research goals.

The above themes have one thing in common: they demonstrate that the proposal genre is heteroglossic in the classical Bakhtinian sense of every utterance being multivocal (Bakhtin, 1981, 1986). Within this view, genre is defined by its participants through reciprocal, multi-way, situated conversations with many other genres, voices, and interactions (Matusov, 2004; Voloshinov, 1973). Moreover, because this dialogue is ongoing the participants learn and contribute to the genre system development (Bazerman, 1994; Prior, 2009; Spinuzzi, 2004). So every proposal echoes input from other users of the genre and from other participants of the genre system, but also shares its own input with these other participants and proposals. To define the process of genre inter-influence, Bakhtin, whose philosophy of language was anchored in his studies of literature (Holquist, 2002), uses the term *intertexting*. The term more widely used in this study and more descriptive of the nature of the processes by which the PIs develop their approaches is *interacting*.

It is clear that each PI interacts with the system in unique ways that are reflective of the nature of their research, their research goals, and of the levels of their experience in the system and of linguistic sophistication. They share in constructing persuasiveness in their proposals via the means that are deemed acceptable and credible within their disciplinary fields and the committees and the agencies they apply to, while doing so in the voice of their own.

What these themes also demonstrate is that being discipline-specific is not the only thing that renders the proposal credible. For all three PIs the big picture is not limited to only being aligned with the discipline(s). It is also about every grant consistently stemming from, extending and expanding their own body of work. That is, their proposal stories reflect their research goals and ways by which the PIs advance these goals: they are encompassing of their expert status and of credibility as a researcher. Situating every new proposal in both the disciplinary and their own research is about balance (all): it enables the PIs not only to re-assert their disciplinary membership but demonstrates to the peers how, by developing their distinct research niches, they have and continue to be committed to advancing the frontline disciplinary knowledge.

In sum, on the one hand a story situated in the big picture enhances readability and persuasive appeal of a proposal, enabling the text to stand out on its own during review *and* helping the reviewers stand up for it. A non-contextualized proposal, even if it tells a story, risks to be seen as not credible and therefore not persuasive. On the other hand, the participant PIs' approaches to telling a story nestled into the big picture of their fields and of their own ongoing research demonstrate that there is no one right way of constructing a fundable proposal. What is clear is that, at least in the Canadian context, a story that is a) original; b) constructed in discipline-appropriate ways; and c) situated in the disciplinary and wider conversations of the field endows both the story and the PI with credibility. This gives the proposal an advantage in competition, making it more fundable. Adding to the literature on proposal writing being discipline-specific (Myers, 1990; Tardy, 2011), it could be suggested then that as a storyteller each PI is unique and so the grant proposal is also PI-specific.

9.3.3 Learning, contributing, leading

Clearly, learning has emerged as a key characteristic of these PIs' engagement in the system of research funding. Their learning in the system is defined by being continual, systemic, and intentional since it is informed by and designed to inform the advancement of their research goals.

They remain open to seeing any new experience as potential for learning. Although the PIs are experts and have reached points in their careers when their names add credibility to the application of others, they do not stop seeking and acquiring new knowledge that would inform further advancement of their work. The one phrase all three PIs have used almost without variation was, "I am always learning", with the implication for the ongoing being that *if you stop you are dead* (Mark).

Their assuming multiple roles within the system enables the PIs to develop an encompassing perspective on the system as a whole and on its structural components. The ongoing interactions these roles entail, whether interpersonal, intertextual, or institutional, facilitate their insider understanding of the impact of the many factors co-shaping the system. These interactions themselves form part of the complex interconnectedness of the scientific, human, socio-economic, political, financial, and the administrative that comprise the research funding system. This hands-on experience informs their proposal construction processes and their long-term positioning for system engagement.

Finally, their ongoing and systemic effort is informed by their intent. Being purposeful in how these expert PIs engage in the research funding system and how they seek to learn from it is clearly beneficial to the development of their research goals and to making their work fundable. As they seek advancement and disciplinary recognition of their work, being intentional in their ongoing learning is important at two levels. One, it contributes to the breadth and depth of

their understanding of the system. Two, it facilitates forward-planning of their research and goals.

9.3.3.1 Breadth, depth, and forward thinking

At the first level, the expansive perspective these PIs have developed is nurtured on an ongoing basis throughout all the interactions that constitute their participation in the system. This not only ensures they are informed of the frontline knowledge developments in their own and related fields, informing their big pictures. It also serves to keep their knowledge of peer reviewing practices up to date, which informs the continuous development of their proposal construction processes and practices.

At the second level, their proposals are in part means of validating their research planning. One way in which they all do this is by sending their work to different committees or agencies. This approach serves many purposes. It broadens the scope of peer feedback which is helpful in the construction of their big pictures. It enhances their preparedness for being rejected which contributes to building long-term resilience (*this line of research is my life*, Paul). It also continuously reconfirms to the peers their long-term disciplinary commitment and quality of contribution (*if the reviewer says, hey I learnt something from this, you are good*, Mark). Finally, it reasserts them in their own sense of being right (*I like to bounce [the new idea] about to see [with which committee] it gains traction*, Phil).

So as purposeful, engaged and expert learners, they have built capacity for participating in the grant funding system more comprehensively. Which means that their informed navigating, negotiating and contributing to the inter-connected and nested interactions of the system enables the suggestion that learning at their expert level is strategically intentional.

At the same time the breadth and depth of their engagement presents a challenge. Critically synthesizing their past and ongoing experiences in the system enables them to engage with its organizational structures more comprehensively than could have been possible otherwise. But

they still have to compete for the same funding lines as everyone else and although they are always prepared to be rejected, they do not apply to fail. The very existence of their research labs and graduate training programs in large part depends on grant funding. They are thus continually facing a challenge of balancing their drive to learn, to advance their research goals; the need to compete, to address the nature of the system; and the self-obligation as experts to contribute to it. One way they have all chosen to develop and maintain this balance is by giving back to the system and by assuming leadership roles.

9.3.3.2 Personal values: giving back

Reciprocity of the PI's interactions in the system is another theme common across the three cases. A key characteristic that defines all three participant PIs is that they engage in the system to use the benefit of their accumulated and accumulating knowledge to contribute. A starting point perhaps of how they build relationships with other system participants is to receive and give feedback: through text, through person-to-person contact, and through related research activities. Through these relationships they actively seek to reciprocate the knowledge they synthesize from their interactions back to the system and its participants, especially early career researchers. As experts, they feel it is their *social responsibility of a scientist* (Paul) to support fellow scientists and to give back: to peer-review, to educate, and to mentor.

In their formal and informal interactions as peer reviewers, all three PIs focus on the quality of science in the proposal. In the process, they seek to share with peers and students their accumulated understanding that, system flaws notwithstanding, this is the primary criterion of the funding assessment process. As (post)graduate advisors, the PIs help their students build their own ways toward high quality proposals. These PIs' experience demonstrates that each has evolved a process of their own, and they advise their students that *the critical thing for them is to work out what's the process that works for them* (Phil).

Another important aspect of their reciprocity is mentoring which also extends into the wider contexts of the system. Aside from advising students of their own, which is an expectation built

into the grant funding system and the proposal genre, they are engaged in institutional programs of mentoring early- and mid-career researchers. Some of the specific forms their mentoring takes is consulting for the university office of research (Mark), offering guidance regarding grant funding to their departments (all) and faculties (Mark, Paul), or holding a research chair aimed at building front-line research capacity often through inter-institutional or industry collaborations, or through globally networked research partnerships all of which involve their sharing knowledge with many early and mid-career scientists (Paul, Phil).

To digress slightly, when talking about giving back, Mark and Phil displayed some emotion. Independently, they both suggested that the proposal reflects *the kind of person you are* (Mark) and the reviewers tend to sense it (*If you are an egotist it shows [in the proposal and is not appreciated]*, Mark). Mark and Phil were also expressive when discussing what they look for in other people when building collaborations (*I respect them for the work they do but I will never work with those people*, Phil). Paul, on the other hand, was not given to expressiveness and did not expound on these values but his strong sense of giving back came clear in a roundabout way. Contacting him with an invitation to participate in the study, I mentioned that I was looking to interview a few more scientists. When I got back to the office, an email from him was waiting. It had names of his colleagues “*who I know will talk because some people won’t*”. Paul shared some of his knowledge of the system to help an unknown novice navigate the sensitive landscape of grant writing.

In other words, these PIs go to considerable lengths when it comes to giving back. Although it is in part an expectation embedded in the system, they also do it because they believe this is the way to be, both as a scientist and a person. The support they extend to fellow researchers demonstrates their generosity and “*trust [in] the system*” (Mark). But it also underlines their strong sense of academic duty and personal values which guide their participation in the system of grant funding. They know that for the most part their effort will be reciprocated. So giving back is instrumental in their success: they are people with whom others want to work, whose opinions are sought after, and whose leadership in the system is trusted.

9.3.3.3 Leadership

Being disciplinary and institutional leaders are among the multiple roles the participant PIs assume in the system of funding. Although none of the PIs actually used the term “leadership”, certain aspects of their peer review service and academic recognition clearly indicate that in their system participation they go above and beyond just giving back.

In the course of this study, through the interviews and informal conversations with various system members, it became clear that an invitation from a funding agency to serve as a committee member on grant evaluation panels is in itself a sign of disciplinary recognition. At the time of data collection, the participant PIs had between 6 and 15+ years of committee service. But their leadership extends beyond committee membership.

Phil holds a federal research chair, a financially endowed research award, which formally recognizes his leadership in building multi-disciplinary global research networks that enable consorted approaches to a particular health issue by members from many disciplines, teams, and institutions. Phil’s own self-challenge is to enculturate early career members of the networks in the practices of research collaboration. He leads by example, effectively teaching new research cohorts the meaning of giving back.

Paul holds a university research chair which, recognizing the value of his research program for fundamental and applied science, is in part focused on (post)graduate training across Canada and on industry liaisons for rapid knowledge transfer. Paul also serves with one of his federal funder’s quality control group, a college of reviewers, which is a body established by the agency to review and improve its peer reviewing practices. Members of the college are recognized experts in the field whose candidature is subject to review as per the agency’s guidelines. This role reflects the disciplinary recognition of Paul’s commitment to objectivity in peer review.

Mark, who of the three PIs is the most experienced within the system of grant funding, chairs a large committee at one of the agencies that support his work. The committee consists of several sub-committees, and the challenge of this particular role is to identify and moderate difficult panel discussion and to mediate disputes so as to help committee members reach consensus in their decision making. Mark also serves as advisor to the university office of research and often leads funder information sessions on campus, helping other researchers improve their grantsmanship and understand how grants are evaluated. He is thus recognized by his peers as an effective communicator and negotiator whose expertise is sought after by the funding agencies as well as his university. These also reflect Mark's own commitment to making the system functions more transparent and equitable.

Finally, in addition to mentoring early career academics who are not necessarily their own students, another common theme across the three cases is these PIs' participation in the ongoing dialogue between the government and the scientific community. Because the nature of this relationship in Canada is more consultative than prescriptive, it facilitates the opportunity for researchers to co-contribute to policy development. In these three PI cases specifically, this took the form of participating in consultations, or co-authoring, or leading their university's response to the government commissioned reviews of applied and basic research in Canada (Naylor et al., 2015, 2017), advising the university research office, and consulting with the university VP Research.

9.3.3.4 Section summary

The patterns discussed under this theme are: *expert learning from participation in the system is transformative* as it lends *breadth and depth* to their engagements, facilitates their *forward-thinking*, makes their system participation *more comprehensive* than could have been possible otherwise, and enables *reciprocity* between their learning and *leadership* which results in their *co-constructing* the system itself.

Their roles as leaders demonstrate peer recognition of the participant PIs' expertise, expert status and disciplinary reputation. As for the PIs themselves, engaging in these leadership capacities enables them to contribute to co-constructing what they see as positive change in the academic awards system that has perceived or recognized flaws such as randomness, exclusivity, limitations of peer review processes. At the same time, their leadership engagements are opportunities for further learning and for making their participation in the system more comprehensive and meaningful. They reflect the cumulative experience of the many roles these PIs assume in academia. In a way, these engagements are a synthesis of the PIs' long-term purposeful scholarly memberships. It could be suggested then that at this expert level, their learning is informed by but also informs the development of their intellectual goals, and as engaged learners they are using and contributing to the system's organizational structures more coherently than could have been possible otherwise.

9.4 Cross-analyzing themes and patterns

The themes and patterns emerging across all three cases demonstrate that PI grant funding approaches evolve from past experiences and from being purposeful in learning, interacting, thinking across the structured nested contexts related to research funding.

9.4.1 The proposal: PI-specific and epistemically inclusive

The grant proposal is the principal genre of the research funding system and is understood to be discipline-specific (Connor, 2000; Myers, 1990; Tardy, 2011). Explored within the study's developmental systemic framework and based on the above findings, it becomes logical to state that the grant proposal is also PI-specific and epistemically inclusive.

The processes by which the participant PIs conceptualize and construct their grant proposals demonstrate the meaningfulness of individual variation within the unified notion of genre. Specifically, their metaphoric envisioning of the proposal directly reflects each PI's research goals. For Paul the goal is to cement his contribution into the foundations of his epistemic domain, for Mark it is to expand acceptance of his work across the related domains of both

fundamental and applied science; for Phil to enable globally networked multidisciplinary research collaboration, especially for the development of research methodologies.

Correspondingly, Paul envisions the proposal as history of one's intellectual processes; Marc as a symphony; and Phil as a moving target written as a holiday novel. In other words, the PIs share in that they conceptualize metaphorically *their* notion of the proposal, and this is based on their goals and their anticipation of the reviewer worldviews. Given that each of them faces a distinct situation, their tropes differ to reflect it.

More specifically but briefly, Phil is focused on collaborations that are international in nature but are brought about by his laser-focused involvement with the CIHR, which is known to be the most competitive and exclusive of the Canadian Tri-Council agencies. So in his case, this nested involvement has revealed that the way to address competition is to collaborate widely but within focused interdisciplinary groups that share research aims. Displaying unity within an applying team of diverse specialists enhances both the proposal credibility and that of the team. Epistemic inclusivity of the team, moreover, is reflected in the tightly structured yet easy-to-read proposal which Phil, as the principal writer, has evolved to appeal to the non-specialist peer reviewer. Hence his trope of the holiday novel.

Marc's envisioning of the proposal as a symphony reflects his goal of expanding the acceptance of his work into the inter- and multi-disciplinary domains. By being epistemically selective or inclusive in his writing he builds credibility with the reviewers at the committee or agency he applies to. If his goal of being funded by all three Tri-Council agencies in Canada is achieved, this recognition across disciplinary domains would effectively signal acceptance of his work in the knowledge mainstream. The trope of symphony then reflects his personal approach to scientific writing

Paul, reviewing for fundamental and applied funding councils globally, pursues the goal of cementing his lifetime contribution into the foundations of his epistemic domain, expanding it recognition beyond his immediate field. He strives for continuous recognition of his work from

the agency that is directly relevant to his research, while peer-reviewing much wider in the field. He thus writes more conservatively, adhering to the intellectual tradition. Being also the only second language writer among the participants, he, unlike Marc and Phil, avoids the risk of genre creativity although he is an expert grant writer. This strategy is in line with Paul's seeking "total" feedback and addressing the "total" reviewer, which are his way of being epistemically inclusive in proposal writing.

To sum up, PI research goals, along with the received understanding of what constitutes new knowledge in their epistemic domains and with agency-specific constraints, and peer reviewer expectations are the principal drivers of proposal conceptualization. However, these commonalities also enable considerable variation in the PI's conceptualization of their proposals.

9.4.2 Expert PIs as (genre) systems thinkers

A key commonality among all three participant PIs in this study was their agentic systemic thinking.

The PI agency develops, evolves and is exercised through their interactions within an established but dynamic institutionalized structure such as the research funding system. Because interactions within such a structure are also institutionalized and (re)produce agreed-on orders of doing and being, these interactions are genred. That is, they conform to the constraints and expectations of the collective of participants who have established and maintain the system. So studying PI interactions within the grant genre system provides ways to understand how PI thinking evolves through their participating and learning within the structure.

Any given genre of academic work, however, is interlinked with other related genres and systems and, in turn, nested in larger social structures. In the case of the grant proposal, interrelated genre systems are those of research funding, knowledge making and valuation, and

academic work. Some of the genres representing these systems are research publications and presentations, peer reviewing, lab work, and graduate supervision. The grant proposal, as the flagship genre of research funding, reflects not only the call for proposals and agency guidelines but the PI's previous and ongoing experience writing publications, presenting their work at conferences, and reviewing works of their peers (Yousoubova, 2011). These genres contribute to the PI's learning of how to construct and present a proposal knowledge claim in a way that reviewers from mixed epistemic backgrounds would find convincing. In writing a grant proposal then the PIs reflect not only the constraints and affordances of the grant genre system but also interact with other genre systems which exist within the larger relevant social structures.

The participant PIs' continual engagement in these systems shapes their approaches to proposal conceptualization. The proposal is a textual artifact reflecting the PI's knowledge and perceptions of the system at the time of submission. It represents a moment in the PI's learning and thinking process. As the PI's thinking and learning continues to evolve, it would be reflected in their next submission. The value of the proposal text therefore is in that it is a tangible artefact that is conveniently suited to being studied (Myers, 1990), whereas processes and systems are much more fluid and unstable and, as the object of study, are occluded. Systems are also large in scale and tend not to have permeable interacting boundaries. As this study demonstrates, for each PI the grant funding system can signify any number of genres at a given time.

To understand then how this agentic systemic thinking evolves one needs to consider how PIs participate in and learn over time from other systems which have impact on their processes of proposal construction.

9.4.3 Ongoing and iterative learning

The participants PIs' understanding of the proposal evolves with each submission. Their proposals represent an instantiation of a particular moment in the ever-evolving process by which PIs navigate and negotiate the intrinsically nested contexts of academic work, knowledge

making and research funding. During this process the PIs learn as well as contribute to the funding system, which facilitates further development of their expertise. This agentic, purposeful participation of an expert is the strategic intent that informs their long-term funding success. In other words, successful PIs develop individual, continually evolving, approaches for their engagement with the funding system.

Among the key contributors to informing the PI's approaches is their assuming multiple roles in the contexts of academic work, including, especially, various stakeholder roles in the system of research funding (writer, reviewer, committee member or chair, consultant). Besides, the PIs perform multiple roles within the progressively expanding nested contexts of their labs, departments, faculties, universities, funding agencies, research publication and communications venues, etc. These engagements are purposeful in that they are driven by PI research goals. In Paul's case, for example, envisioning his interactions across all the roles he assumes in academic work as feedback on his research (total feedback) corresponds to his seeking to persuade peers in both fundamental and applied domains. By doing so, he aims to achieve not only fundability of his knowledge but its acceptance as epistemically foundational. Paul thus seeks to learn from all his interactions as a researcher.

The connection between the PIs' research goals and their work as peer reviewers in particular is evident in the choices of agencies, both in the sense of the agency focus and geo-locations, and in their performing peer reviewer roles, both formally and informally. When the research intent is to enlist acceptance of one's work as widely as possible, in terms of the disciplinary fields relevant to one's specialism, the PI aims to peer-review for as many relevant councils as possible, including globally (Paul). When the research goal is to cross disciplinary boundaries, the PI aims for a diversity of review panels to serve on, nationally and internationally (Mark). When the research goal is development of a particular aspect of applied research, the PI may remain focused on one or a few agencies with similarly defined priorities that directly reflect this research aim in the geographical context the research is being applied to (Phil).

Each PI has evolved his own way of navigating and negotiating their roles in academic work and the grant funding system. This involvement is purposeful in that it informs not only their research goals but also the process of their proposal construction. For example, Marc was the only of the three PIs who co-authored his university response to the Naylor inquiry. He consults for the university research administration, mentoring academics across his university and, as committee chair at one of the Tri-Council agencies, he is implicated in moderating peer review processes. Paul rarely, if ever, intersects with research administrators at the university but is active in the federal quality assurance effort aimed at improving the peer review process in funding of science. Phil, who co-leads an inter-university lab, somewhat ruefully considers himself to be a research administrator. But while he is not directly involved in grant peer review other than at the CIHR committee he serves on, his input is geared towards the future. His building of interdisciplinary global research networks fosters collaboration and epistemic tolerance in scientific inquiry, especially among early career academics. These examples demonstrate that expert PIs differ in their navigating, negotiating, and contributing to the research funding system.

In other words, the participant PIs shape their own approaches - personal genre systems - to participating, navigating and negotiating the contexts of research funding, knowledge making, and academic work.

9.5 Personal grant (genre) systems

The notion of personalized genre systems elaborated in this study facilitates the understanding of individual variation within common patterns. The genre system is a structural concept but it is made viable through participation in it of individual stakeholders. The PIs as such stakeholders evolve their own ways of engaging with the system by enacting its genres and structures to achieve their research goals within their particular nested contexts (national, institutional, and day-to-day workplace(s)). In addition, they are agentive in the learning they derive from this participation. This blending of structured genred systems and negotiated agentive interactions in each PI's case facilitates their evolving personal approaches (genre

systems) to making their work fundable. Grant success then is about navigating the interconnected and nested multiple academic systems of related genres in their own way to achieve their research goals.

The individual nature of the PI grant genre systems would presuppose that variation is embedded in the construct. Variation originates in the bio-historical aspects of PI development and evolves as they build experiences and pursue their research goals. Below, the processes by which the PIs construe fundability of their proposals highlight the embeddedness of variation in their grant genre systems.

Of the three PIs, Mark has the widest scope of research and is also the most experienced in the funding system. Plus, Mark is, innately, a versatile communicator. Periodically chairing a large sub-divisioned committee at NSERC and sitting on review panels at CIHR, he has developed an in-depth understanding of the review panel as an epistemically heterogenous collective of individual peers. This in part is due to the chair's mediating role in reviewer disagreements. Mark's understanding has evolved over many years, resulting in knowledge of the dynamics of peer review (Lamont, 2009) that is as deep as it is wide. His view, in this sense, is likely more enriched than that of Paul and more encompassing than that of Phil. The peer reviewer envisioned by Mark when he constructs his own proposals is squarely situated within the context of his research goals. Indeed, Marc, Paul, and Phil have this in common. But unlike Paul and Phil, Mark addresses the reviewer not as an amalgamated body of decision-making readership. As he aims to bridge epistemic boundaries in his knowledge making, Mark knowingly takes the risk of being perceived to be an outlier. But as an expert peer reviewer, he also knows that while panels are ambivalent about too much novelty in grant proposals, that resistance comes from only a few, rather than from all, panelists. So Mark writes pre-emptively, to "appease the bully" on the review committee.

Phil only targets CIHR and if his proposals are not funded, the livelihood of his lab and therefore of his research will be at stake. Helpfully, with the background in team sports, Phil enjoys the

competitiveness of grant funding. His sports-acquired understanding of how to manage team dynamics through collaboration has fused into his approach. But Phil is not limited to being only persistent with his applications. Over time, he has developed insider knowledge of CIHR review processes and institutional dynamics. His insight on the CIHR process of selection of peer reviewers is key to Phil's crediting the "vast majority" of peer reviewers as being reasonable. At the same time, given that his peer-review expertise is limited to the CIHR, when Phil considers the nature of the Canadian reviewer, he is referring to the CIHR reviewer. However, within the context of his research goals this knowledge is exactly what he needs, so his grant writing addresses the reasonable CIHR peer reviewer.

For Paul, funding opportunities are represented by both NSERC and CIHR. But as he now aims to build a legacy in fundamental science, Paul applies to CIHR in a somewhat cursory manner. He is not deeply concerned about not being funded by them on a regular basis. CIHR is not his primary focus, so if they fund him it is a bonus. But maintaining both fundamental and applied connectedness of his work *is* within his research goals. It also helps him keep up his perspective of the extrapolated ("total") reviewer. To have his work accepted, he needs to remain capable of convincing reviewers from both fundamental and applied domains of his field. Thus, since he *a priori* aims to persuade across the board, he is not as dependent on committee dynamics. Paul's "total" peer reviewer subsumes the qualities of Mark's bully and of Phil's reasonable vast majority. Plus, probably because Paul comes from a background of social conformity and writes in a second language, in his communication he remains unassuming but deliberately and diligently consistent. This may lack in charisma but the approach has proven itself in making Paul's research goals fundable.

This interplay of commonality and variation in PI approaches to grant funding was made visible by the approach developed in this study.

9.6 Summary

The empirical contribution of this study emerges through its exploration of the approaches which the participant expert PIs have evolved to make their research goals fundable. The cross-analysis of the themes and patterns emerging across the cases a) highlights the ongoing and iterative nature of expert learning, and b) facilitates a deeper understanding of PI development in the structural nested contexts related to grant funding.

The findings highlight that expert PIs engage in continual learning across the interactions that constitute their participation in the structural nested contexts related to grant funding, purposefully seeking differentiation of experience; that their learning is dialogic in that they seek input on their learning and reciprocate by sharing their knowledge and insight; and that they contribute to these contexts and therefore to the development of the funding system itself by assuming leadership roles. In doing so they seek, create and use opportunities for continuous learning which makes their engagement with grant funding more comprehensive and coherent than could have been possible otherwise.

The findings also suggest that successful navigation and negotiation of the constraints and affordances of the research funding system is PI-specific. That is, the PI participation in the research funding system is defined by a number of factors which extend beyond their fields of study and include but may not be limited to the nature of the PI's research, research goals, personal values, and the way PIs seek and configure their learning when engaging in the genred interactions of the broader system of academic work and knowledge.

To sum up, although these PIs participate in the same federal system of funding, their engagement in it is, like their grant proposals, PI-specific. This participation is anchored in their intellectual goals and in the specifics of their epistemic domains and ways of thinking, so there is no formula to achieving this balance. Instead, to paraphrase Phil, each PI has evolved “*a process that works for [them]*”. This process is not linear or unidirectional. It is dialogic and iterative. It is a system of interactions – interpersonal, intertextual, institutional, intellectual –

that these PIs have evolved purposefully and intentionally in the course of their careers and experiences with grant funding. In effect, they have evolved personal genre systems of sustained engagement with grant funding through participation in the larger, structured and nested academic knowledge systems related to research funding.

10. Discussion

10.1 Introduction

This study explores how expert principal investigators (PIs) learn to participate in the nested contexts of academic research funding, knowledge making and valuation, and academic work. Its longitudinal lens contributes to the emergence of an integrated novel framework, building on previous research and enabling a more encompassing view of success. The study contributes to the literature on experiential learning and genre systems. Its longitudinal developmental systemic lens has enabled an enriched perspective on genre as a vehicle that facilitates PI thinking and on the transformative role of agency in expert learning.

In terms of the immediately observable, grant success is part of the genre system of research funding. In its tangible, measurable form it is directly connected to the genre of the grant proposal. However, this study demonstrates that research funding success is not limited to the written proposal or indeed to the grant genre system alone. Rather, it is built over time through PIs' purposeful and agentic participation in the contexts that encompass or intertwine with the grant genre system.

More specifically, expert PIs build towards success in grant funding throughout their careers, by configuring their participation in the nested contexts of the genre systems of research funding, knowledge making and validation, and academic work. Moreover, they approach their participation in these as an opportunity for continuous learning and contributing. By assuming multiple stakeholder roles (writer, reviewer, committee member, leader, mentor, consultant) successful expert PIs remain engaged in the funding and funding-related contexts at all times. Through intellectual, interpersonal, intertextual and institutional interactions in these contexts, the PIs build towards peer-acceptance of their work. Key examples of such interactions include: developing and sharing insider knowledge of the grant system, expanding and drawing on their research networks, and implementing peer feedback on their work into their research programs and grant writing. The aim of such interactions is to make the knowledge the PIs

advance in their grant proposals to be accepted *and* endorsed by peers, and therefore fundable.

Examined from within this integrated framework, expert purposeful learning within and across the nested contexts of the grant proposal can be viewed as strategic intent. The PIs navigate and negotiate these contexts to evolve *personal genre systems* of grant funding. Their agentic multi-role interactions in these contexts are informed by their inter-systems thinking. *The grant proposal, and the genre system, acquires a distinctly personal dimension, while research funding success emerges as a process: agentic, rooted in systemic thinking, and constructed over time.*

10.2 The motivation

The intent of the study described in this dissertation was to explore how expert academics build towards research funding success. Because grant success is elusive, my initial supposition was that the path of every sustainably funded PI would be largely individual. But because grant success is also attainable, it would not be unreasonable to expect that there are commonalities and parallels in how expert PIs evolve ways to make their knowledge fundable. Given the high stakes nature of grant funding an investigation was warranted.

The study has set out to explore how expert PIs learn to navigate and negotiate the system of research funding to build towards sustained grant success. The participants were three PIs in the natural sciences whose experience with research funding ranged from about 20 to 30+ years. All of them were in Canada at the time of the study. The system in question is Canadian federal funding of science, with a focus on two of the three agencies of the Canada Tri-Council which support university-based science research. These are NSERC and CIHR.

What makes this study particularly interesting is that it encompasses PI experiences during the 2005-2016 federal budgetary compressions in Canada. Due to rapid shifts in government policy this was a period of high volatility in Canadian research funding. Institutional change and

organizational restructuring within the Tri-Council took place so rapidly that the then lead of the CIHR likened it to changing an aircraft engine in flight (Crowe, 2016). Researcher success rates plummeted and stayed low yet the participant PIs had continued to be funded throughout. **How did they manage and what can be learnt from it?**

10.3 Practical background

From the practical standpoint this investigation was warranted by several factors. One is that the grant proposal is a genre of academic writing that is both fundamental to enabling new knowledge (Myers 1990) and high stakes (Tardy, 2003). Being funded has impact on continuity of a researcher's career (Connor & Mauranen, 1999; Feng, 2011). In case of early career academics, it affects their ability to secure a research position in the first place (Karram Stephenson et al., 2018). Another factor is low success rates of grant funding (as cited earlier in this thesis), which causes some researchers to abandon their attempts at grant funding (Bazeley, 2003) or re-orient their work to fit the priorities of the funder (Tardy, 2003, Laudel, 2006, Laudel & Gläser, 2014; Laudel et al., 2014). Further compounding factors are fluctuating government budgets for university research (World Bank, 2018) and research performance exercises that have become ubiquitous in the universities across the world. Since the early 2000s, the latter in particular have resulted in increased pressure on academics to obtain research funding (Lucas, 2006), driving up competition, and in the downward curve of success rates. It is understandable then that publications related to the grant proposal should appear in many disciplinary fields other than writing or genre studies. Some, non-exhaustive, examples include health sciences (Szasz, 2015); sociology (McGinn et al., 2019); applied linguistics (Cotos, 2019; Matzler, 2021); and exercise science (Casey & Fletcher, 2017).

But despite the proliferation of inquiries much is still not understood about how researchers can make their work sustainably funded. Country and funder specifics often determine the scope of affordances and constraints which PIs have to address (Harsh et al., 2018; Slaughter & Cantwell, 2012), as do government policies (Gläser & Velarde, 2018). This makes government dynamics inevitably reflected in the grant genre expectations (Feng, 2014; Myers, 1990; van

Nostrand, 1997). Complicating matters further is the rather secretive nature of the grant peer review (Lamont, 2009, Derrick, 2018). So is the sensitive nature of the proposal texts.

Competitiveness of research funding makes it at times difficult for researchers to share their insight (private correspondence). As a result, funding success tends to retain its association with randomness (Graves et al., 2011). But recent studies began considering perceptions of luck as a resource on which PIs can learn to draw to develop resilience and perseverance in face of funding decisions (McAlpine, 2020; McAlpine et al., 2016).

10.4 Theoretical background

Theoretically, the principal source of the initial supposition was the work that defines the field of inquiry into writing for research funding (Myers, 1990; Tardy, 2003; van Nostrand 1997).

Myers (1990) examined the processes of textual construction of credibility in proposal writing by two expert US scientists. Tardy (2003) explored how an expert and a novice US scientists learnt to navigate and negotiate the system of inter-related genres of grant funding. Van Nostrand (1997) investigated the connectedness of researcher, document, and government interactions in the construction of persuasion in US funding applications.

The secondary source of support was a pilot study that shaped this dissertation (Yousoubova, 2011). It explored the learning path of an ex-Soviet scientist who had transitioned across the Atlantic to the competitive research funding system of Canada. The final source of support is the consensus in the writing literature that a) the grant proposal is discipline specific (Myers, 1990; Tardy, 2011) and b) genre mastery is the domain of the experienced (Bhatia, 2004; Tardy & Swales, 2008). Genre experts are established writers who have evolved extensive insight by enacting the genre within the system of inter-related genres, for a long time. The discipline-specific view of the proposal is informed by the genre's primary discursive aim of construction of credibility, that of the researcher and that of the knowledge claim (Myers, 1990). The system view of the proposal is concerned with the researcher's participating in the other – mostly written - genre constituents of the grant funding system (Tardy, 2003).

The consensus across the above studies is that, although some proposal genre knowledge can be acquired through being explicitly taught (e.g., Ding, 2008), most of it PIs develop through their ongoing participation in the genre system of research funding (e.g., Feng, 2014). Their insight into both text and system participation are built over time, hence Tardy's (2003) recommendation of longitudinal studies of grant writers. Although this recommendation has since been taken up by a number of writing studies, the majority of them focus on novice researchers (Cheng, 2014, Ding, 2008, Flowerdew, 2016; Edlund & Lammi, 2022). In-depth explorations of how experts navigate and negotiate the system of grant funding are few and far between (McGinn et al., 2019; Mehlenbahe, 1994; Myers, 1990). Thus, this study contributes an enriched perspective of expert PI engagement with grant funding by conceptualizing the transformative nature of expert learning. This process in which, over time, expert PIs not only participate but configure their interactions within and outside the funding system informs fundability of their work: they evolve personal genre systems of research funding. As such, the study could inform mentoring the development of early career PIs. It also offers valuable insight into the nature of research fundability for struggling mid-career PIs.

10.5 The study

The epistemic and practical considerations of this study, as discussed above, informed the purposive choice of the participants who agreed to being interviewed and to sharing some of their proposal texts (drafts and final versions, both funded and unfunded). This approach enabled examination of individual paths which the PIs have evolved throughout their careers towards making their research fundable.

Interviews and analysis of proposal texts shed light on how the PIs have and continue learning from participation in the grant funding system. Importantly also, this approach allowed for an extended view of how, in their learning from and contributing to the system of grant funding, they draw on the larger social systems of academic work. This encompasses the nested and interconnected contexts of knowledge making, feedback, collaboration, student supervision,

teaching, administrative work. By being purposeful in their engagement, the PIs learn to think across these contexts to inform fundability of their research.

The connectedness of the biographical and genre system views in this study is grounded in the concepts of researcher development and experiential learning (McAlpine & Amundsen, 2018; McAlpine et al., 2016; Paré, 2000; Acker & Wagner, 2019; Åkerlind, 2008; Nguyen, 2012).

Learning is a developmental process of becoming more knowledgeable and is most productive when it is situated (Lave & Wenger, 1991). In grant writing in particular, PIs learn the art of the proposal by writing and re-writing proposal drafts (Myers, 1990) and from enacting the other genres of the grant funding system (Feng, 2011; Tardy 2003). This study demonstrates that successful PIs are also purposeful in how they learn. As they participate in the intellectual, interactional, and institutional contexts of academic work, they become more knowledgeable about its interconnected and embedded nature (McAlpine & Norton, 2006). Navigating and negotiating these contexts on an ongoing basis these PIs draw on the knowledge they develop to evolve their own genre systems of engaging with grant funding. Proposal genre mastery then is best considered not an achievement but a continuous learning process in which researchers engage throughout their careers, and a reflection of this process.

10.6 Contributions

What started as a writing study evolved into an exploration that extends far beyond the single genre of the grant proposal. The developmental theoretical framework underpinning this study enabled a broader, more comprehensive and more encompassing view on the process of grant proposal construction. But this view is not limited to the proposal or proposal writing process. It highlights the role of the PI's agentic learning in research funding success. Rather than being limited to one genre system, that of research funding, grant success is also informed by the PIs' learning from participation in nested and interconnected contexts of the larger social systems of knowledge and academic work.

This novel conceptual framework is the principal contribution of this study. It enables me to argue that the nature of research funding success of sustainably grant-funded PIs can only be fully comprehended through a ***longitudinal developmental systemic lens***. This claim is supported by several specific patterns and themes which attend to both commonality and variation in how expert PIs make their work fundable. They lend themselves to be grouped under three broad notions of:

- **Negotiating within and across all academic genre systems**

Assuming multiple roles across the nested contexts of knowledge and academic work, including grant funding, to develop a resourceful mindset and a big-picture perspective (on grant funding in general and on the fundability of one's own work in particular);

- **Thinking systemically**

Drawing on the experience of engagement in the above roles to conceive of a research funding approach holistically and metaphorically and to evolve a personal grant genre system;

- **Learning iteratively**

Learning to be successful is a developmental iterative process requiring agency and self-belief, emerging from bio-historical experiences, and rooted in disciplinary, epistemic thinking.

As with the trajectorial strands of researcher development (McAlpine & Amundsen, 2016), the new framework is integrative. This means that these notions do not denote stand-alone aspects of how PIs build towards grant funding. Rather, they characterize the process and, although identifiable, they are intertwined. As this study demonstrates, ways in which these notions interlink and develop each other are PI-specific, which accounts for variation in how the framework and the patterns within it can be enacted. This means that in future studies the new framework can facilitate understanding of commonalities and individuality in the approaches of research participants.

10.6.1 Looking beyond one genre system

Within the field of rhetorical genre studies, theories which consider genre interaction, usually termed inter-textuality (Bakhtin, 1981, 1986), have thus far emphasized the interconnectedness of individual genres. These links are conceptualized as constellations (Schryer, 2000), ecologies (Spinuzzi, 2004), sets (Devitt, 1991), networks (Swales, 2004), and systems (Bazerman, 1994). Of these, the term most widely used for denoting the interconnectedness of genres of research funding is Bazerman's genre systems (Ding, 2008; Tardy, 2003). There is also a complementary approach which considers PI interactions across the genres related to grant funding to explore how PIs learn to navigate and negotiate the grant genre system (Feng 2011; Moeller & Christensen, 2009). In other words, genre system approaches consider intertextuality within the boundaries of the genres that are directly related to grant funding. To the best of my knowledge, there is no literature which considers the development – over time - of individual PIs and of their knowledge of research funding as an integrated process informed by their purposeful participation in the interconnected and nested contexts that are not always directly bearing on grant funding. This novel contribution was enabled by and emerged from the integrated theoretical framework of this study.

A further novelty of this theoretical framework is in that it gives concrete meaning to how participants navigate and negotiate a genre system. Both terms are a key common denominator of how PIs participate in the funding system, but they tend to be used interchangeably (e.g., Tardy, 2003). This study defines the processes behind each term via its focus on commonality and variation of PI engagement with research funding. The definition is achieved by demonstrating how PI participation is informed by their purposeful interactions in the nested contexts of the social systems of knowledge production and academic work in which research funding is embedded. The funding system structure determines acceptable ways of navigating it; this leads to commonalities in the PI participation patterns. But it is their individual research goals that define their interactions in the larger nested contexts and facilitate their unique approaches to negotiating the constraints and affordances of the funding

system. The two aspects are equally significant in the evolving of PI success. They are intertwined but not conflated, which tends to be the case in grant genre literature. One may suggest that genre knowledge helps PI navigate the grant genre system, inter-system thinking to negotiate fundability of their work.

These novel values contribute to recent developments in genre theory in general and to the notion of genre knowledge in particular. Newly theorized by Tardy et al. (2020), the notion of genre knowledge, while acknowledging its developmental aspect, does not identify how the various forms of knowledge processes over time interact to foster the development of genre knowledge. This study does that.

10.6.2 Thinking systemically

This study shows the three participating expert PIs as ***inter-system thinkers***. At these stages of their careers, their thinking is epistemically inclusive, innovative and could even, at times, be disruptive. But they had not come into academia as ready-made, successful experts. Their learning and ways they learn evolved alongside their developing experiences as researchers, in ways that are as interconnected and reciprocal as the Bakhtinian dialogic utterance (1986). That is, over time and as they evolved their approaches to grant funding, they themselves evolved as PIs, drawing on and reflecting their bio-historical and socio-linguistic backgrounds, epistemic experiences, research goals, and participation in the many inter-linked systems of academic work and knowledge production.

In other words, these PIs are embedded in many different academic systems and contexts, including different institutional and (inter)national contexts. Over time, they have learnt to understand and developed a meta-knowledge of the connections and interactions among the different contexts. As a result, they can move in and between these, gleaning greater meaning through this ongoing integration.

The learning the PIs derive from participating in all these contexts is not only intentional, it is also iterative. Their learning intent over time has led to their purposive participation in the funding system and their unique visions began to evolve. The key here is that they have aimed to, became, and remain comprehensively knowledgeable not just about grant funding overall but about grant funding as it bears on making their own work fundable. Importantly, they seek to share the accumulated knowledge and, in the process, continue learning. And finally, rather than draw on their learning outcomes only to ensure their own funding success, these PIs contribute to the grant system through leadership and collaboration.

To understand and envision the transformative role of expert learning, the concepts of researcher development studies were instrumental. Learning from experience in the socially situated contexts of change is central to the conceptions of researcher development (Evans, 2014; McAlpine & Amundsen, 2016; Nguen, 2012). To evolve their approaches to grant funding, the PIs in this study draw on the learning experiences as they engage in the intellectual, institutional, intertextual, and interpersonal interactions in the progressively embedded contexts of knowledge making and academic work (McAlpine, 2016; McAlpine, 2020; McAlpine & Amundsen, 2018; McAlpine & Norton, 2006). The inter-connectedness of these ongoing processes is different in each PI's case which helps understand individual variation in how they engage with their experiences to navigate and negotiate the complex nested contexts of grant funding.

To understand how expert learning leads to evolving their approaches to research funding and envisioning their grant proposals, this study also drew on the concept of genre. In academic writing, genre plays a gatekeeping role in (re)producing institutionalized orders of knowledge production (Bazerman, 1988; Schryer, 2011; Swales, 2004; Tardy et al., 2020). Genre helps researchers understand the boundaries of what is and is not acceptable in the systems of agreed-on interactions which constitute the academy. In grant funding specifically, genre knowledge aids PIs in advancing their research thinking from within the proposal's written structures, by generating and supporting new knowledge claims. Other genred interactions

such as committee service provide the PIs with understanding of how new knowledge is evaluated.

Genre thus facilitates and structures communication and engagement between its participants, while the multiple nested contexts of researcher development facilitate the PI's systems thinking. In a sense, these PIs build their own scaffolding for learning, relying on their richly embedded capacity for the learner's agency. That is, their own learning agentiveness is well-developed by now but it is also continuously enriched by their in-depth, experiential understanding of the systems. These PIs are self-driven, yes, but without both the innate capacity for and the experience that has and continues to nurture this learning they would have had a different time navigating and negotiating the funding system, let alone multiple systems with a view to grant success. In other words, their agentic learning capacity informs the building of experience, but the experience in turn has been augmenting their agentiveness. They are the two sides of the same coin. Besides the structural constraints of its institutionalized situatedness the learning scaffold also provides the resourceful and intentional learner with opportunities (after Bazerman, 2013; Billett, 2010; Giddens, 1984).

The three PIs in this study learn by drawing on experience of their participation in the genred systems interconnected with grant funding. Their engagement in such systems over time has enriched their understanding not only of what makes new knowledge fundable (Myers, 1990; van Nostrand, 1997) but of what makes it so for the knowledge produced by *them*. This understanding has proven to be particularly significant for their evolving unique conceptions of the proposal and for their insight into how the proposal as a genre is linked with other knowledge making interactions. Bakhtin's dialogic intertextuality is prominent in this evolution because, to be fundable, the proposal has to persuade the epistemically diverse, and at times disparate, peer review readership who collectively hold decision making powers over the legitimacy and fundability of the proposal claim. The participant PIs have each evolved their own visions of the peer reviewer based on their insider understanding of the relevant committee compositions and committee work dynamics.

If by this point the Matthew effect is starting to suggest itself, it shouldn't. These PIs have worked throughout their careers to build the knowledge they have now. They now choose to share it with future and current PIs - would-be competitors - who have yet to understand that grant funding is not about random luck but about being purposeful in thinking analytically and synthetically across the academic genre systems. This choice, implemented directly in their interactions with students and peers and indirectly by lending their expertise to this study, is yet another illustration of inter-systemic thinking of these PIs. Their students and peers may adopt, practice and disseminate at least some of the knowledge shared by these PIs, and the outcomes of this study may reach further afield. This is how, in part, the participant PIs enact learning through leadership in the funding system, which is looked more closely in the next section.

10.6.3 Learning iteratively

In this sort of learning process, the learner agency is instrumental. While, by way of fostering a critical mindset, systems thinking may help in the development of agency (Acaroglu, 2020), this study demonstrates that it is the PI's ***agentive and intentional learning*** that facilitates *inter-systems* thinking. This is why expert learning is transformative. Personal aptitudes and histories may play a role in how these PIs engage with grant funding and grant writing, but their systems thinking is developed intentionally and maintained on an ongoing basis because – always – “it’s learning” (Paul).

As a process, their learning and thinking is also reciprocal in that these PIs seek not just to co-maintain the system in ways that genre systems’ participants are normally understood to do by the default of participating (e.g., Bazerman, 1994). They seek opportunities to implement their learning capital in ways that would contribute to grant system development and also transform it. That is, they seek to lead, especially by being active proponents of positive change in grant funding, be it about assessing the quality of peer review processes, facilitating inter-institutional collaboration, or consulting for the university research office. Within the period of

data collection for this study, each of them had, in their own way, contributed to the role Canadian science community played in addressing the perceived elitism of the CIHR, the Harper government research budget compressions, and the subsequent Trudeau government consultations about the future of Canadian science (Naylor et al., 2015, 2017). In other words, each of them draws on their accumulated knowledge capital to initiate, lead, and co-construct positive change in grant funding. And, in the process, they continue learning.

It was clear in the interviews that the PIs do not appreciate peer egotism in grant funding or, for that matter, in academic practice. Nor do they appreciate being strong-armed by a defaced system, as was the case in the mid-2010s, for even Paul's '*total*' peer reviewer is a composite of individual contributions. This suggests why, in their current engagement with research funding, they seek to lead in institutionalizing the collaborative in frontline knowledge making. At the same time, they also strive to stay fundable as PIs. Put simply, the funding system will not recognize their leadership if as PIs they do not produce fundable knowledge. But to remain funded they need to continue learning. Their choice of participating in the system by reciprocating the knowledge they have acquired is conscious. In part it is associated with their status as mentors. It is their time to give and so they do, by co-constructing a possibly better system of the future. In the process they go on learning that helps them as PIs to remain fundable. Evidently, the more one gives the more one gains.

To sum up, transformative nature of expert learning emerges as rooted in systemic and epistemic thinking, strategic intent, and long-term commitment.

As a side note, it would be difficult without this view, enabled by the study's theoretical framework, to understand how a grant system participant – a PI - may learn the system's genred ways yet not develop an approach to making their work fundable. This has been the case of many PIs, including those with years of experience, who lost continuity of their grant funding when the Tri-Council had gone into restructuring along with the Harper government drawing back budgets for research. How can PIs address rapid change in the grant funding

system? Seen in the proposed light, the understanding of how agentic experts learn could help shed light onto the issue. Building on Tardy's (2003) recommendation of longitudinal studies of grant writers, the findings of this study facilitate questions that would be worthwhile considering in the future.

10.7 Moving forward

Aiming into the future, the novel conceptualization of research funding success enables broader questions and provides the framework for (re)thinking of how writing studies conceive of genre systems and of how the PI's learning and thinking across the multiple nested contexts of the genre (re)situates the notions of genre awareness and genre knowledge development. That is to say, the PI-centered view on research funding developed in this study helped surface some new nuances of the grant genre system that had not been seen before and could be worth considering in the future. Below are high-level observations on two issues that became visible in the course of this study.

10.7.1 Considering new research angles

Of the two observations, the first concerns textual construction of persuasion *vis-à-vis* the balance in interpersonal interactions when a PI works with collaborators. People whom the PI has to consider in the course of conceiving and co-constructing such proposals are co-PIs or contributors who weigh in proposal conceptualization and writing, colleagues who are asked for feedback on drafts, non-specialist reviewers whom the writers must keep in mind when constructing the text. Maintaining balance in these interactions could be a challenge. As the principal writer, the PI must accommodate the input of contributors who may differ in their thinking epistemologically or methodologically. At the same time, the PI needs to integrate their thinking so that they remain interested in the proposal and do productive work on it if funded. The challenge is to integrate this thinking in such a way so as to project coherence in the proposal text that non-specialist reviewers would find persuasive. How do expert PIs navigate this challenge? And also, textually, what are the connections between fundability and communicating the promise of new knowledge in epistemically inclusive and accessible ways?

The other point is the role of motivation in scientific pursuit and the part that research funding may play in it. The PIs in this study indicated that their intellectual interests were not dictated by their fundability. In fact, the view taken in this study, as informed by the PIs, is that their research goals determine how they navigate and negotiate the contexts of funding. Yet it was also clear that making their research fundable is part of situating their intellectual goals in the big picture. This facilitates peer endorsement and acceptance, which is crucial to advancing one's research agenda. At the same time, this is different from the findings of studies that saw PIs adjust their research goals to address the priorities of the funding council (Lauder, 2006; Tardy, 2003). So then, (how) does success in navigating and negotiating the context of research funding impact the PI's intellectual goals?

These are interesting new angles of grant funding and its nested contexts that have yet to be considered.

10.7.2 Framing future studies

I argue that future work in the fields of academic writing, rhetorical genre studies, experiential learning, and researcher development would benefit from implementing the theoretical framework developed in this study. Drawing on it would:

- enable a broader lens of inquiry so as to understand the richness of the thinking of research participants;
- prevent the researchers from missing out on issues that may be important to understanding participant experiences yet be outside the immediate context of a given genre system;
- enrich the researcher's own thinking and interpretation of participant experiences.

10.8 The niche

In the foreground of this study is the PI. Originally, however, it was to be the grant proposal text. Like Myers (1990), I started by looking at the proposal as a socio-rhetorical construct. Like Tardy (2003), I saw it as part of the genre system of research funding. Like Connor (2000), I understood that its persuasiveness is contingent on adherence to normalized genre conventions. Like van Nostrand (1997), I still perceive it to be building knowledge as defined in a larger social system with multiple stakeholders. But in the process, I also began to understand how the PI makes the proposal fundable.

As a result, this work contributes to those above by centering on the PI as an agentive, multi-role learner and systemic thinker. And, as the findings demonstrate, it takes a lot more than a proposal to be research-funded. The successful PI purposefully seeks to learn from assuming multiple roles within the nested contexts of research funding, knowledge valuation and academic work. This is an ongoing journey that takes place within the strands of academic career, reflecting their patterns yet being defined by the PI-specific research goals. In the process the PIs evolve their own genre system of making their work fundable.

But the core of the original projection that guided the study also holds: the proposal is a discursive site reflecting the PI perspective as writer-reviewer-networker. The findings show how the proposal and the process of its construction reflect the complexity of the ever-evolving PI expertise. This enables me to posit that in addition to being discipline-specific (Myers, 1990; Tardy, 2011) the proposal is also PI-specific. Further, the nature of funding success emerges as constructed, cumulative and negotiated but also fluid, unstable and requiring ongoing effort. Finally, while building on previous landmark studies of grant writing, I niche out by developing a systemic longitudinal lens that could be useful to the future studies of the grant proposal, grant writing, research funding, and researcher development and experiential learning.

10.9 So what?

In closing I want to return to the question that motivated this study: what can be learnt from the experts who successfully negotiated fundability of their research during perhaps the most challenging period in Canadian research funding? My position is that the conceptual framework developed as the result of this exploration facilitates more than an in-depth understanding of grant funding success. It offers encompassing and novel ways to consider success as it may be understood in any field of knowledge work and researcher development. This longitudinal developmental systemic lens has enabled novel perspectives on genre as a discursive concept that facilitates inter-systems thinking and on the transformative role of agency in expert learning.

11. Conclusions, future research and implications

11.1 Introduction

The aim of this chapter is the future and, as such, it focuses on three things. The first is considerations for future research that are informed by the shortcomings of and the opportunities that came to light in the course of this study. The second is more specific implications for early- and mid-career researchers as well as some ideas for applicability in and outside of academia. And the third is my own reflections as a researcher which, in Paul's words, 'crystallized' as I was concluding the manuscript of this dissertation.

11.2 Future research

Reflecting on the study and its contributions, above, and the limitations noted in the methods, future research could incorporate issues of gender, epistemic domains, inter-national funding of research, and non-Anglophone PIs.

11.2.1 Gender

This study did not address issues of gender. Part of the issue is that the move towards balanced gender representation in the sciences is relatively recent (NASEM report, 2007; NASEM follow

up project, 2019) and varies significantly by country (Huang et al., 2020). It means that the number of women scientists at the stage of expertise comparable to the three male PIs in this study could be hard to find. The other part of the issue is that there are likely to be gender related differences in how female and male PIs may build towards being funded. The evidence is only beginning to emerge. So far, female PIs have been reported in a small study to be less aggressively promotional in their grant proposals (Connor, 2000). Another small NSERC-based study reports lower amounts awarded to female science PIs and higher rejection rates for early career female science PIs (Urquhart-Cronish et al., 2019). A recent investigation of CIHR practices suggests that proposals by female PIs are at a higher risk of being rejected regardless of the quality of science (Witteman et al., 2019). Female science PIs are also reported to be less satisfied about their research funding than male PIs (Meulders et al., 2010). To succeed, they are finding it necessary to be agentive, creative and resilient (Acker & Wagner, 2019). These early findings result from diverging methodologies and foci and should be interpreted with caution. At the same time, this evidence suggests that there may be different sets of opportunities and constraints related to being a female science PI.

For this study, adhering to one gender had value given the small number of cases. My choice pre-empted potential confusion over issues, such as those above, that may be significant in understanding how male and female PIs engage with grant funding. But given the ongoing concern over gender bias in the sciences (Handley et al., 2015; Larivière et al., 2013) a mixed-gender or all-female study of science PIs would pave way for valuable comparative and relational analysis. A more systematic approach to investigating such experiences needs to be developed.

11.2.2 Sciences only

The study is also tightly focused on the funding contexts of natural sciences. Within its framework this focus is a definite strength as it was instrumental in eliciting patterns of commonality and individuality in the PIs' navigating the funding of science research. But future investigations of funding success should broaden to other epistemic domains including inter-

and multi-disciplinary research. As the experiences of each of the three participant PIs demonstrate, successful PIs negotiate fundability of their research much further afield than their direct disciplinary domains. Attaining depth of insight in this way would shed more light on the role of epistemic inclusivity in proposal construction on PI success. It could also identify potentially differing sets of expectations and opportunities for PI navigation and negotiation of the funding contexts across disciplines and related funding agencies.

My view is that this broadening of scope should proceed in epistemic clusters (e.g., humanities, fine arts, hard sciences). This would ensure consistency in exploring the inter-systems context of grant funding and PI approaches within a relatively broad scope of related knowledge making practices. Studies that compare and contrast (music vs biophysics, for example, in Cheng, 2014) or go across the curriculum (e.g., Koutsantoni, 2009) likely miss at least some of the specific constraints and opportunities which the PIs need to learn to address. As a result, they tend to replicate the classic findings (Bellés-Fortuño, 2021) instead of truly adding anything new. At the same time, corpus studies (e.g., Casal & Kessler, 2020; Markowitz, 2019) are disconnected from the PI and so lack the deep encompassing perspective. These may be some additional reasons why the attempts for in-depth understanding of grant funding stalled.

11.2.3 International funders and ESL researchers

Given that affordances and constraints of research funding could be country- and funder-specific (Auranen & Nieminen, 2010; Barnett & Wiber, 2018; Jonkers & Zacharewicz, 2016) expanding the scope of future research to national and international research contexts would also be valuable. In the climate of high international mobility of new researchers (McAlpine, 2012), understanding how PIs evolve participation genre systems of their own in differing funding regimes would enable valuable perspectives on how the patterns identified in this study are enacted in differing geo- and socio-political contexts. Additionally, given that the English language dominates communications of inter-national funding councils such as The European Research Executive Agency, it would be important to consider paths of the PIs who forge success in English is a second or additional language (ESL or EAL). Of the three participant

PIs in this study only one was an ESL writer. Incidentally, or perhaps not, he was the only one of the three who did not take risks or experiment with creativity in proposal writing. The study pilot demonstrated that ESL PIs have more to navigate than text-linguistic or rhetorical aspects of the proposal and grant funding systems (Yousoubova, 2011). It would not be unreasonable to project then that risk aversion in the proposal genre may be connected to the PI's socio-cultural and socio-linguistic confidence. Yet risk taking is integral to the proposal (Myers, 1990), so experiences of successful ESL PIs, like Paul, would offer valuable insight into negotiating research fundability.

11.3 Implications

Conceived within the broader framework of social construction of scientific knowledge the study prepares the foundation not only for future, possibly larger scale, theoretical work. It also offers less experienced researchers the opportunity to draw on its conceptualization of how experts engage with grant funding to reflect on ways of building their own approaches to success.

11.3.1 For PIs

The depth and scope of the findings of this study provide meaningful implications for PIs across the career spectrum. The insight into the expert knowledge processes of building towards funding success would perhaps be especially useful for *early career PIs*, including PhD and post-PhD level scholars, as well as their supervisors. It should facilitate their understanding that being grant funded is a long-term learning journey. It is a process informed by and informing the PI's research goals in the course of which the PI agency is developed, evolves and is exercised within an established but dynamic institutionalized research structures (McAlpine, 2020). But as these structures extend beyond grant funding, being purposeful in how one draws on the interactions within them facilitates the development of the PI's inter-system thinking and could over time lead to making their work fundable.

PIs across the career spectrum who struggle to obtain grant funding would also benefit.

Ideally, the findings of this study should encourage them to see the proposal and its genre system as dynamic parts of the wider nested contexts of their epistemic domains, funding opportunities, and research networks rather than stand-alone genres of academic writing. Interacting purposefully within these contexts could prevent potential self-marginalizing that results from not keeping up with change or assuming infallibility of one's prior track record. Evolving navigation of these contexts into purposeful participation would enable PIs to build opportunities for continuous learning and for developing their own long-term approaches to making their work fundable.

Further, encouraging struggling PIs to become more intentional in how they engage with grant funding would help them understand that PI success is not isolated to the proposal or to the grant funding system alone. Rather, it is defined by how PIs learn – over time – to and navigate and negotiate the nested and genred contexts of research funding, knowledge production, and academic work to achieve their research goals. The proposal is a textual manifestation of this process. It reflects the outcomes of individual PI learning in these genred contexts of negotiating fundability of their work, the successful proposal is both PI-specific and epistemically inclusive.

It would be helpful for struggling PIs to understand that the grant genre system is not a stand-alone domain of academic work. Rather, it is nested in and is part of the larger social systems of academia and is not closed to input and contribution: it is not prescriptive, as may seem on the surface, but participatory. That is to say, PIs' active engagement in the system, via assuming multiple stakeholder roles, enables them to co-shape the system and co-contribute to its development, thus keeping it from ossifying (Bazerman, 1994) or, as was the case at CIHR in the mid-2010s, from becoming subject to unreasonable top-imposed change. So researchers who give up applying for grant funding may not understand that they are co-pilots, not mere passengers. Their participation in the system shapes it, imprinting on it their own ways of

engaging in academic knowledge production and their ways of addressing the socio-political change that university researchers face on an ongoing basis.

11.3.1.1 Expert PI advice to early career PIs

The advice the three expert and sustainably grant funded PIs offer below may look very obvious. It probably is. But in their practices as peer reviewers they see enough instances of other PIs not doing this and so they must have felt it needed articulation.

Paul

...always try to think about your problem and create new challenges, new questions ... it's constant work, thinking about it. Because when the time comes to... put it on paper, you must be prepared.

Mark

Learn how to tell people what you do ... in a 15-second soundbite
Don't even think about it, say yes! (to being invited on a peer review panel)

Phil

... always be a little bit ahead of the curve.

In the course of their interviews or correspondence with me, all PIs fairly directly demonstrated the need to be collaborative, to aim to contribute and not to be self-centered, and to share the knowledge and insight into success that one accumulates with experience.

11.3.2 For research administrators

This study should also be useful for **research administrators**. When developing events and processes of institutional support for PIs, the results of this study could help research administrators make explicit connections between the institutional, interactional and intellectual aspects of building towards research fundability. This knowledge should be particularly useful for research administrators when consulting novice PIs or PIs whose

proposals are refused. The hope is also that it would encourage research administrators to develop systemic thinking of their own. In addition, evolving a systemic-embedded perspective on grant funding could help research administrators better define their own roles in the system of research funding, helping them move out of the liminal professional space they perceive themselves to be in (Allen-Collinson, 2009; Collinson, 2007). More to the point, an understanding of the nested interconnectedness of funding and other contexts of PI work could enable research administrators to help their client PIs construct PI-specific big pictures (personal genre systems) out of the fractured minutiae of the masses of academic and administrative detail associated with grant funding.

As a side note addressed to the future, PI advising aimed at the long-term could conceivably be done in one-on-one consultations with a faculty-based research administrator. But, as this study shows, at present this is not within the research administrators' job scope; they too focus on the proposal. The experience of the three participant PIs shows that their post-doc mentors did not advise much on the proposal construction let alone on building approaches to funding, preferring instead to let the novices assimilate what knowledge they can via hands-on participatory experience. Two of the three PIs (Mark and Phil) did mention working with their post-docs on proposal writing; but none mentioned mentoring for the long term. This may be because participatory learning (Lave & Wenger, 1991) works or because newer approaches, if any, have yet to be documented. It would be interesting to see if things may be changing in the future.

11.3.3 For academic and non-academic contexts

Elsewhere in academic work and outside of academia, future research exploring developmental processes, especially involving participants with research backgrounds, would benefit from drawing on this framework as it will ultimately encourage both the participants and the researchers themselves to build and develop their systemic thinking capital. In this way it would aid in several areas besides the knowledge making discussed above.

In knowledge evaluation, mentorship of developing *peer reviewers* could be informed by widening their perspectives of (e)valuating a proposal and could help peer reviewers, who are also PIs themselves, define and develop epistemically inclusive understanding of research excellence. In doctoral supervision, through fostering the notions of inter-systems thinking developing *PhD supervisors* could inform their approaches to advising students in the art of research and scholarship. *PhD and post-PhD researchers* could draw on the notions of the new framework to establish and develop their research goals and ways of achieving them, to enhance their job search processes through building a broader understanding of the applicability of their research and skills, to optimize ways of communicating the strengths of these skills to the various types of employers (academic, corporate, gov, non-profit, etc.) for optimal impact and job satisfaction. Finally, *ex-academia*, corporate and other leaders hiring PhDs could develop an understanding of how to engage with such employees. Drawing on and encouraging the development of their inter-systems-thinking potential could contribute to win-win outcomes in mission-driven or more open-ended R&D work in public, private, or non-profit contexts.

11.3.4 Re-cap that bridges to the future

The defining value of the PI-in-system perspective developed in this study is thus two-fold. One, it highlights the role of individual variation within the common patterns of PI engagement with both grant funding and proposal writing. Two, it situates individual variation in the PI-specific contexts of research funding, knowledge making, and academic work. That is, the study does not portray the PIs as typified participants of the typified system of genres of grant funding. Instead, it is PI-specific as well as situated within the institution where they work and within the funding lines that support their work. And it is specific to the funding of research in the epistemic domains of natural sciences. The angle gained as a result is unique in that it adds considerable focus and flexibility to the current understanding of the complexity of PI involvement in the system of research funding, and of the system itself.

To unpack, Tardy's (2003) mapping of the written genres and activities of grant funding defined the boundaries of the system of research funding, and the ensuing work has adopted this view (Ding, 2008; Feng, 2011; Moeller & Christensen, 2009; Tseng, 2011). As a result, the genre system of grant funding in these studies stands as a pre-defined framework. It pre-exists the PI. That is, the PIs are understood to participate in the system which, although a part of academic work, is limited to the genres bearing direct relevance to grant funding. This locates the PI in the system but limits the possibility to understand how and what they navigate and negotiate for long-term fundability. My work provides situated insight into how the participant PIs learn to *navigate* the institutionalized spectrum of research funding but, in the process, develop an understanding of how this system is nested in and interconnected with the larger systems of knowledge making and academic work. It identifies what aspects of these are critical to achieving PI research goals; and how they engage with(in) these systems in unique ways to evolve a grant funding system of their own. Further, the study shows how, In the process, PI *negotiate* many genres beyond the written genres of grant funding. This view expands the understanding of PI engagement with research funding.

My perspective, however, still remains to be fully encompassing of the PI. What I mean is it would be good in the future to design a study that creates an inter-system bubble in the center of which is a PI, and all my (researcher) interactions with systems and stakeholders and genres would be directly bearing on this PI. For example, these would be people who invited or recommended this PI to become a peer reviewer, researchers for whom this PI reviewed unofficially or gave feedback, fellow members of the peer review panels where the PI serves, admin colleagues, lab partners, co-authors, etc.

This view would not be blurred by how things work in general. Instead, a coherent picture could be built about how things work around a particular PI. For example, Paul and Phil do not really interact with university research administrators beside the logistics, so knowing that one could better design questions for the research admin. For instance, instead of going to the office of research which plays little or no role in their own PI-genre-systems, I would go to the VP

Research, with whom Phil makes a point of getting acquainted, and ask not “how do you support Phil?” but “what is your position as university research lead on PI inter-institutional, interdisciplinary collaboration?” because it is important to Phil. Or in the case of Paul, who serves on grant panels globally, I would ask if I could talk to his co-panelists to see what is prioritized, how they assess, what the epistemic representation of the panel is, how the panelists are selected, what sort of research is funded. It would give me a concrete sense of what Paul learns from sitting on these panels and how it then gets factored into developing his *‘problem’*. Or for Mark, I’d ask to talk to his inter-disciplinary collaborators to see how they together build persuasiveness in proposals that likely need to address very different epistemic expectations. So in effect, I’d be looking for how Mark is building towards his aim of being funded by all three agencies of the Tri-Council but also what sort of PI qualities it takes to be fundable across the spectrum. This is the gap I’d like to bridge. Furthering this idea is on my research agenda.

11.4 Reflections

11.4.1 Proposals, PIs, and epistemic clusters

Reflecting back on the study design process, I recognize that my initial focus on the proposal as the primary starting point may have unintentionally obscured an opportunity to observe how the PIs enact multiple stakeholder roles in the funding system. With the understanding that proposal construction is informed by the PI’s participation in the grant funding system (Tardy, 2003), the interviews with the participant PIs focused on their ways of navigating and negotiating both these processes. That the study elicited a much wider and more encompassing picture became apparent after the data collection was complete. In retrospect, I could have asked to follow the PIs into their other roles such as peer review panel member, institutional consultant, lab manager, etc. But the sense that I was onto something bigger than one system was at that time only beginning to emerge. While all the PIs spoke about their multi-role participation in the nested contexts of grant funding, only one was observed in his role as consultant for the university research office. Although this was not pre-organized, it enriched both the data and the analysis.

The novel and encompassing approach elaborated in this study has proven to be illuminating. But in developing it, I had to rely in large part on the PIs' own reflections of their interactions in the contexts of research funding, evaluation and academic work. Van Bonn and Swales (2007) and Lamont and Swidler (2014) independently point out that the interview as a method has an inherent weakness in that interviewees may re-interpret their actions while reflecting on them during interviews. Future study designs would benefit from following up in the contexts that the PIs themselves identify as contributory to their getting funded. For example, it would be useful, as much as possible, to attend events or processes that would allow to observe the PIs enact their multi-roles in grant funding. Interviews with other system participants who come into direct contact with the PIs in these contexts would also be beneficial. The future design would in particular need to navigate the sensitive and secretive nature of grant peer review (Lamont, 2009). But the resulting sets of tightly integrated data would provide for high-definition portraits of PIs as systemic and epistemic thinkers and as agents enacting their own genre systems of research funding.

That said, in this study, system stakeholders and events were observed to maintain a steadfast focus on the proposal rather than on the PI. This is much in line with the literature and, with the proposal recognized as a flagship genre of grant funding (Myers, 1990), is only to be expected. The aim of the observed events and processes was to help those in attendance inform the construction of their proposal, not approaches to funding. Given the center-place of the proposal the perspectives, including those of expert peer reviewers, offered at these events were focused yet generalized. That is, the focus was unwaveringly on what "a good proposal" does, has, or does not do or does not have; this was undoubtedly illuminated by the speakers' expertise in how the evaluation process works. To give them credit, this is also what they were being invited for, and this is what they delivered. However, while undoubtedly formative, these events were addressed at an audience of many PIs at different stages of their careers and representing different fields which the research office grouped under technical and natural sciences. The attendees' own aims were not known to the presenters. So the talks were

situated in the context of a funding agency and a funding line rather than in the concrete circumstances of a particular PI. To be fair, it would be on the one hand impossible to address career-long concerns of each of the attending PIs. Even if the research office had such capacity, doing so would inevitably touch on issues that render the process of seeking funding sensitive. On the other hand, these events are designed to deal with the proposal, and so PIs attend with the expectation of help with proposal construction.

This focus on the proposal may also be an outcome of the fact that there aren't many in-depth studies that would help research administrators and other stakeholders to understand how, with regards to funding, natural scientists think and write vs hard scientists vs artists vs social scientists, etc. Is there a difference? A negative, as Mark says, is also a valuable finding. But for now, the existing across-the-curriculum literature is not, despite some claims, capable of going deeper than the proposal. And due to that, the only empirical findings researcher-support structures can rely on are focused on the proposal and revolve around the classic findings that are getting updated by the newer writing studies. I thus re-iterate the need for studies of PIs to be framed by epistemic domain clusters. They would help build in-depth understanding across the curriculum but with consistency within comparable data. It is possible that research support is not well enabled because of the lack of such studies.

11.4.2 Researcher self-development

I came into the PhD mainly for the value of its intellectual exercise. Not too strategic of me perhaps, given that one needs to plan career moves before one's PhD application is accepted (McAlpine, webinar, SIG24 Researcher Education & Careers, 2020). But at the time that was not singularly prominent on my list. I had a good job. What I needed was thinking space, a way to make sense of the experiences, readings and thoughts I had accumulated in order to move forward.

Reflecting back on it, I must have craved a system. I have always thought of things in interconnected ways, but in its innate, unguided state this could easily be confused with being

superficial. Throughout this PhD, interacting with people who have purposefully honed a similar skill has facilitated, validated, and challenged my own evolving as a critical thinker. It expanded my epistemic horizon beyond the fields of academic writing and genre studies and provided an outside perspective on my inner ruminations. In other words, working with the messy data has granted me a luxury of making sense of my experiential capital. My thinking during these years evolved, deepened and widened. Thanks to Dr. McAlpine's light-handed guidance, I became curious about all things developmental, taking in more sources and always looking for connections, both observable and occluded.

This doctorate, or rather, doing it under Dr. McAlpine's supervision, offered me more than a space for thinking. It helped me build towards my own systemic perspective. It highlighted the role of agency in my learning. It shaped me into a researcher and, one hopes, into a scholar. All these are luxuries I may not have had otherwise, and for that I am deeply grateful.

At a more personal level, learning from and about experts during the course of this study offered me a unique way to honor the research legacies of my family.

11.5 In closing

The longitudinal developmental systemic framework developed in this study would in the future enrich the understanding of how the PI participation in the funding genre system (Tardy, 2003) is nested in their interactions in wider contexts of knowledge evaluation (Lamont, 2009) and academic work (McAlpine & Norton, 2006). In particular, the notion of agentic researcher development (McAlpine & Amundsen, 2018; McAlpine et al., 2016) embedded in the framework would facilitate an understanding of how PIs evolve their approaches over time. In this sense, the study contributes to the rhetorical genre theory. Most specifically, it expands the newly advanced integrative notion of genre knowledge which is understood to develop "in social contexts through interactions and in authentic and varied rhetorical situations" (Tardy et al., 2020). It also contributes to the notion of experiential learning by developing a concept of expert learning as strategic intent.

Becoming a PI is a learning process that is usually understood to be facilitated by the genres of the grant funding system. But ensuring sustained fundability of one's work, as demonstrated in this study, requires that the PI invest in time to learn to think and interact across the genres of many other systems of academic work. Being purposeful in how one learns from these interactions could lead to the PI developing their own approaches (genre systems) of engaging with grant funding and making their work fundable.

For this reason, the design of a future study should begin with the PI rather than the proposal. Now that the perspective on some of the institutionalized contexts implicated in the study is gained, it is possible to re-consider the meaning of the boundaries of grant funding as a genre system. Rather than seeing it as a framework of grant funding genres funding should be seen, and explored, as PI-specific, interconnected, nested contexts which both facilitate the PI learning and are co-shaped by the PI purposeful participation in them. Through this lens, the funding system, which is currently bounded by written and interactive genres directly related to the grant proposal, would expand to include knowledge making and evaluation, and academic work. Some of these, at first glance, bear no direct relevance on the proposal but they are highly meaningful for the shaping of PI funding success.

In closing, it comes down to the difference between focusing on product vs process. The process is always hard to see and, in this study specifically, a lot of it is internal: it is about thinking. In genre studies generally the process is writing. In the case of grant writing, the notion of process is centered on proposal construction that is conceptualized as a response to the constraints of the funding system, while the wider systemic context and its role in the process remain occluded. As a result, attention is inevitably drawn to the product, the proposal, although it is only an artifact of the process and represents a particular moment in time in the process. This study demonstrates how in their writing PIs not merely respond to but interact with and co-construct this complex, nested and multi-systemic context. And for that - for

helping me make visible some of the process usually obscured from an analyst's view - I thank Dr. McAlpine and the participant PIs. I trust this work does justice to their generosity.

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13. Appendix A: Nested contexts of research funding

The discussion below highlights some key constraints of – mainly - CIHR funding context in the mid-2010s. The writing was completed in May 2018 and reflects the situation as it was then perceived by the participant PIs and Canadian academic and popular media, with an additional perspective from a former Assistant Director of one of CIHR Institutes. The reason for the CIHR to be in primary focus here is the perspectives shared with me by the PIs and the university research personnel. In their perception, during the Tri-Agency re-structuring under the Conservative cabinet, the CIHR had performed considerably less well than NSERC.

13.1.1 Changes

Over the course of the 2010s, the CIHR experienced a series of dramatic shifts in its institutional structure and the assessment processes. These shifts, representative of “how government changes reverberate through science” (Myers, 1990), reflect CIHR’s response to the constraints and priorities of Canada’s conservative and liberal governments. Before being voted out in 2015, the Conservative government had been in power for nearly 10 consecutive years, and both CIHR leadership and operating procedure had pivoted to reflect the conservatives’ policies with regards to funding scientific research. In the PI chapters I have discussed some of the challenges and pressures experienced by scientists who write, review and serve on review panels at NSERC and CIHR. Overall, however, the PIs agreed that even in the adverse budgetary conditions, further exacerbated by the re-routing of applications between the Tri-Agency councils, NSERC managed to maintain “*an amazing balancing act*” (Mark) in their assessment and decision-making processes. CIHR experienced these budget constraints with somewhat different outcomes:

And it was like, a) that grant should never have gone to that committee; it really was not their stream. And then we were saying, b) ‘it has taken an entire day of my life to sit here and do this’. That was the epitome of dysfunction.

Phil

First of all, internally, operations were adversely affected by ***significant cuts to key operating personnel***. As described to me in a private conversation with a former associate director of one of the CIHR institutes, prior to 2015 there had been two research officers at each institute. One was a content specialist (scientific director), advising on program development, and the other a bureaucrat (associate director). The second of the two oversaw the logistics of the application assessment, reviewer training, and international relations which were being cultivated for the purposes of disseminating the funded research. These two roles were merged, dissemination funding eliminated. The newly single director was expected to travel 60% of the time, which resulted in services to reviewers and universities being under-attended.

The impact on the procedural inefficacy in coordinating the newly implemented virtual review process was also negative and affected agency communication with PI and peer reviewers. Many of the staff were overworked and chose to leave. This left the agency with a further loss of professional expertise which was not being fully replaced.

Mark –

You can have a skype meeting or you can maybe triage it first and *then* have a skype meeting, there's got to be a way to do it. They've done [the first] but unfortunately, they've done it in a way that doesn't assure any quality control over the reviewers. And no quality control of the process. ... I mean how could the people who are reviewing [your application] *not* know that they are supposed to be reviewing you as a researcher? How do you not get trained? How do you not train the reviewers to know that? So that when they have a problem or when they are reading the little precis of your proposal, which was only allowed to be 3000 characters, - "the researcher has not provided enough detail in it". Where the hell are you supposed to provide the detail? That's coming! That's coming in the next phase. ... How do they not know that? And where is there the quality control which should come in the [admin] saying, "well no, the [LOI] has nothing to do with it. [It] is just there to let you know what the person is going to do and what's coming, and has nothing to do with detail. Of course there's not enough detail. There's not supposed to be enough detail right now." So where's the quality control? Why is it not said?

LY –

I believe CIHR do not have [this particular admin] any more, from conversations with a former associate director. There *was* a scientific director and associate scientific director...

Mark –

Exactly! That's great, now the person who might have done that is gone [laughs sarcastically]. ... There's nobody on the floor who says, "what the hell is all that about?". ... and they are going to take the mean and kick you out in the first round.

A strain to the operating effectiveness came from the ***CIHR decision to eliminate face-to-face meetings of evaluation panels*** was considerable. CIHR invested \$1.7M into virtual review software but failed to estimate the almost complete lack of buy-in from the panelists (Crowe, 2016). While many researchers supported the idea of a move to virtual review, most agreed that it was being deployed too soon. The new system had not been fully troubleshoot and did not accommodate applications in French. Issues with its implementation resulted in cancellation of two competition rounds, leading to an overflow of applications in 2015-16. But faced with the government freeze on funding for panelists' travel to Ottawa for face-to-face meetings, CIHR may not have had a choice. Hence the analogy to "changing the motor of a plane in flight" that was assigned to the then president of CIHR (Crowe, 2016).

Many scientists protested via open letters to the then Health Minister as well as via a twitter feed #PScream, titled to mock the CIHR Project Scheme, now Project Grant, which along with the Foundation Grant was subjected to what CIHR termed live-pilot. The pilot was near-boycotted by academic researchers, and a significantly augmented workload for those who did agree to participate caused considerable frustration:

[CIHR] staff were struggling to find enough reviewers to read all the applications.

CBC news 28 June 2016⁴³

⁴³ <http://www.cbc.ca/news/health/cihr-health-science-research-funding-controversy-1.3649635>

Shortcomings in review process management and the resulting shortage of scientists available and willing to serve led CIHR to ***potentially over-represent expertise of medical practitioners*** in peer-reviewing research a lot of which extends from fundamental science:

There were a lot of MDs on the committees that were reviewing things, [who] didn't really understand the value of ... pre-clinical research A lot of it got dinged, even for drug addiction, which is kind of crazy.

Mark

While medical doctors (MD) as reviewers were qualified to assess clinical aspects of the proposals, they may not have shared or understood the PIs' epistemic worldviews. But given the CIHR focus on rapid translation of academic knowledge into healthcare, MDs who routinely address specific health issues, do seem a logical choice. The solution would have been to find the right balance between practical and theoretical expertise but, as already noted, many researcher scientists with foundational knowledge removed themselves from participation in the new system. CIHR had to scramble to fill in the gaps and could not balance the pressures as did NSERC, where an established procedure had been modified but not abandoned. As a result, NSERC retained its pool of informed reviewers both familiar with the NSERC research terrain and willing to serve despite the still lingering constraints of the then turbulent funding climate.

Finally, ***CIHR overall assessment procedure remained complex and not transparent***. The process was divisive in that the applications were reviewed and assessed in parts rather than a whole. The first round of assessment was focused on the PI's Letter of Intent (LOI). If successful, PI was invited to a Strengthening Workshop in Ottawa, where talks were given by the co-directors of the institute on how to make proposals more competitive, what the institute was looking for, how the institute sought to translate knowledge, etc. In the second round the proposal proper was being assessed by often different reviewers. If the initial LOI was not successful, there was no furthering of the proposal. The PI and the proposal were out of competition:

That was the problem with the whole scheme that CIHR had. Everything should come at once, so you evaluate everything at once. ... Getting different researchers/reviewers to evaluate the different parts of you, that's ridiculous.

Mark

The complicated divide-and-reject approach to assessing parts rather than the whole application led to the agency being characterized as exclusive. This was exacerbated by already mentioned process management problems. As a result, the agency struggled with outreach and with persuading academic researchers to serve on the new virtual review system. The ensuing over-representation on the panels of medical professionals may have led to not enough support for pre-clinical research:

NSERC, you submit yours [list of suggested reviewers] and they typically ... are also NSERC grantees. because most of these people have served on NSERC, [NSERC] knows what these people's main areas of interest are. And because of that you are able to actually get, like, five people – they send out to eight– but it's good, you are good to get at least three reviews back if not more. Usually, four or five. If they send out to five people, quite often you get five reviews back. Whereas CIHR has had a big problem with that and mostly because people are like, "well, you are sending this to me at the last minute now and you need these reviewed across all these different domains every time?" And many reviewers were like, screw this. And then, when they go to non-face-to-face reviews for the actual grant, a lot of people in their College of Reviewers just told them to take a hike, they were not going to participate. And when *that* happens, CIHR goes out to MDs. And MDs are not researchers... well sorry, they are doctors too, that's true, but not the kind that do any research really. And so it's hard for me to understand how you could send a grant app ... to an MD who has never even *thought* about [animal] research as preclinical whatever, and thinks it's a bunch of bonk. So you got [a reviewer MD] doing, say, treatment for alcoholism, and now you are just submitting [animal] research looking at mechanisms of alcohol effects of meso-dopamine? This person probably looks at it and thinks, what is this? [sarcastically]

Mark

Clinical work may be more immediately applicable to healthcare than outcomes of pre-clinical studies. But even though both clinical and pre-clinical research may focus on knowledge translation - CIHR core funding mission, - knowledge produced in clinical studies may appear more evidently translatable than that in pre-clinical work. So proposals from non-medical universities, which often carry out pre-clinical research, came under higher risk of being rejected. All three participant PIs experienced this with their proposals.

Finally, frequent domination of the panels by representatives of large medical centers, nicknamed “mafias”, may have hindered CIHR procedural transparency. These individually identifiable constraints are formative of a bigger picture, a genre system specific to CIHR. They help frame the context in which the PIs sought CIHR funding in the mid-2010s.

13.1.2 Challenges

Scientists applying to CIHR had to address various combinations and degrees of intensity of these and other constraints until about mid-2017. Yet despite multiple barriers to entry, CIHR funding has retained both its prestige and, despite agency operational problems, its credibility. The participant PIs continue to serve on CIHR committees and to apply for CIHR funding. Their ongoing willingness to participate is in part indicative of recognition for the agency’s effort to maintain and improve the rigor of its assessment process. But the constraints of the situation also help shed some light on the perils of competition for CIHR funding, which the attempted reform caused to spike, and on the resulting single-digit success rates.

As my interviews with the PIs took place, between 2016 and 2018, so did further changes at the CIHR. By early December 2017, when Mark participated in the newly diversified CIHR committee [x], Canada’s liberal government had been in power for two years and its investigative surveys on the state of science research in the country had been published (Naylor et al., 2015, 2017). The document, known as one of the Naylor reports, outlines both concerns and recommendations of Canada’s scientific community with regards to advancing and investing in science research. It was expected that the government would act on the

recommendations. Indeed, changes at CIHR observed by Mark and Phil suggest the beginnings of a positive turn in the Canadian system of research funding.

To begin with, echoing Canada's transition in government, there had been a shift in the CIHR leadership. Observations shared in Mark's and Phil's chapters suggest that in its approach to both procedure and representation the agency was striving for equitability. Mark, whose peer-reviewing experience is the longest and widest among the three PIs, said this was a good thing and that this was "*how NSERC has always been*". In his experience, the principle of diversity in representation adopted by NSERC is effective. In 2015 and earlier, Mark served as NSERC panel co-chair coordinating over 60 panelists. This was the time when NSERC was flooded with "refugees" from other councils, yet its balanced review system held under strain. A key effect of CIHR diversifying institutional representation on its committees is the dissipation of dominant groups, or 'mafias'. The PIs expect this to lead to more meritocratic decision making.

Additionally, the virtual review system, which was at the heart of the failed reform, is being re-oriented towards what Phil termed a "new old" hybrid, balancing online and for by face-to-face meetings:

... they reconstituted the committees with the face-to-face meetings, which they didn't have last year [2016] or the year before. Now they are coming back with those, now that Alain Baudet [CIHR president under the conservative gov] is gone.

Mark

What is interesting is that while both Paul and Phil, who submitted proposals for and served on CIHR panels at about the same time, voiced their impressions of the effectiveness of virtual panel meetings differently. As a member of CIHR College of Reviewers, a group of scientists called on to assess and make recommendations for improvements in CIHR process of peer review, Paul was perhaps cautious. He acknowledged that the panels used to convene face to face in Ottawa and at the time of his interview in 2016, they did so only via CIHR Skype-type virtual platform. This was not brought up as criticism. Rather, in retrospect, it was Paul's way of saying what Mark expressed as "when the game shifts you got to really figure it out". In other

words, Paul, while involved in evaluating CIHR governing processes, took the shift to virtual review in his stride, as is characteristic of him.

Mark, on the other hand, was vocal in his criticism of the virtual system. His own experience of being turned down before his application could reach the stage of the evaluation of proposal proper is indicative of why a lot of scientists chose to boycott the virtual review platform. A single panelist's negative rating, made and documented virtually, put Mark's researcher credibility in question, and the notation could not be reversed or revised. The virtual review system could not take into consideration conclusions of other panelists who – also virtually and therefore independently - indicated that the negative assessment by one of them may have been erroneous. One may suspect that the impossibility to revise could have been more due to software design than to CIHR intent but the damage had been done. Mark was one of many applicants who bore the consequences of the rushed reform, and so he welcomed the return of face-to-face evaluation, not least for the flexibility offered by interpersonal communication:

At least with [the return of] face-to-face vetting you'd have people there who could say, 'No he really did do that'. And it makes a huge difference. Because then [in a case like his] they haven't done the rating yet.

...

Mark

To be fully transparent, all three PIs cite Interpersonal factor as a key reason to why, in decision making, they hold face-to-face meetings to be superior to virtual platforms.

LY –

You've been observing this for several years now, right? That was around 2015 that that's started and it's changing now? You've seen it bottom out.

Phil –

Yeah, yeah. Having lived the peer review process I think the issue, on a personal perspective, before this last round [2018]... before they went to the new-old system [in person panels] ... I think most people generally felt that there was no merit or consistency to the process. It was literally – you flip a coin and maybe you get a grant and maybe you

don't. Quality had very little to do with it. The randomness of which reviewer you got and what they would say. There was no discussion, no ... You know, people could put outlandish things into their reviews and there was no accountability. Right? There was no balance and checks in the process. So I think people just in general had very little faith in the quality of the process. And I think now [2018] that's starting to come back because now we are going back to the idea of having committees, face to face, discussion. ... I have to say the last meeting I went to was I think one of the best I've ever been at. Maybe it was a relief of going back to the old system. But it was, it was nice to get to a point where, you know, when someone else presents something, someone else presents it, another person chips in, and then you have a discussion. And you really feel like you've pulled apart what is important, and is this really the best of the best? A conversation...

It is also possible that just one year separation in Paul's and Mark's submitting proposals to CIHR made a difference. Paul submitted in 2013-14 and was refused in stage 2 (proposal proper). While steeply on the rise, high numbers of proposals for evaluation at CIHR at the time were representative of augmented competition across the Tri-Council. The system was yet to be inundated with an overflow of proposals due to CIHR cancelling several competitions in 2015-16 to implement and then troubleshoot virtual review. Mark submitted in 2015 and was turned down in stage 1 (LOI/quality of researcher), when one panelist's negative rating disqualified him. Although it is impossible to say what exactly may have contributed to this panelist's negative outburst, it is not impossible to suggest that it was in part due to unprecedented levels of work overload on CIHR reviewer:

The CIHR ... [due to computer systems not being ready] ... had created an unprecedented demand for research funding by cancelling two earlier competitions as part of the reform process. That pent-up demand for funding has created [in 2015] the largest ever number of applications, with more than 3,800 projects threatening to overwhelm the untested system.

(Crowe, 2016)

Change is ongoing and so are the challenges the participant PIs face. Taking a high-level view, throughout the 2000s and 2010s changes at both CIHR and NSERC have been reflective of the

varying priorities of Canada's conservative and liberal governments. The system had to adapt. CIHR, in its effort to support health related bio-medical research, had struggled. NSERC's processes had proven to be more robust. The system's own challenges may have had to do as much with the epistemic worldviews encompassed and (re)produced in the genre systems of scientific and medical fields as it did with the councils' funding priorities. Below is a brief detour.

13.1.3 Worldviews

One may speculate that among the factors contributing to the efficacy of each agency's image and operating processes is the collective worldviews of its review panels. As mentioned, at some point in the turbulent mid-2010s CIHR panels ended up being outweighed by practicing physicians and certain medical centres were over-represented.

But there is more. Each member of the Tri-Agency has a distinct profile of funding priorities which determine which knowledge is fundable

... [there is] one of the things that's a little bit more important in CIHR than in NSERC and SSHRC. And the reason I say this is that because at the end of the day CIHR is very specific about changing the health of Canadians. That's what its mandate is. So everything has to tie back to the fundamental question about changing the health of Canadians, so there has to be a driving force behind it. Whereas arguably, at NSERC and SSHRC there is as much value in something applied as there is in the process of acquiring knowledge and deeper understanding. So you can, my sense is, for SSHRC and NSERC, for certain areas just that pursuit of knowledge is a good enough driver to move forward. CIHR is not. That's very clear. It's like "You are doing it for the sake of doing it? That's not CIHR".

Phil

Health fields are also distinguished by a unique specialist persona. In their examination of the genre of medical case presentations Schryer et al. (2003, 2006) demonstrate how medical students in the genre system of patient care develop communication approaches for projecting themselves as experts. Conveying certainty and uncertainty is a key part of projecting

epistemically appropriate persona in all academic fields. But the ways in which this is done in science and health fields may bear significance in how each NSERC and CIHR is handling change and associated challenges:

[A panelist's] reason[ing] is ... subjective ... and there is also politics.

Paul

[It is] partly personality traits, it's also partly... the discipline they come from.

Mark

Medical students are trained to communicate with both medical peers as well as with non-peers (patients, staff, general public). Very simply put, medical discourse distinguishes between being consultative with peers and prescriptive with patients and the public (Schryer et al., 2003, 2006). Science researchers, on the other hand, are enculturated to communicate primarily with peers and to convey experimental results rather than diagnoses. Thus, students in both streams learn to express themselves as disciplinary experts. But medical discourse is also characterized by a declarative prescriptive aspect which may eventually be internalized by the health researchers in ways that distinguish their worldviews and ways of communication even within the research world:

I deal with a lot of people that have very fragile egos ... cardiologists have some of the fragilest egos in the world. Hence why they have to be always the best, it's a compensatory mechanism. And so they don't take criticism well, they don't take input well.

Phil

One reason for this may be that ways in which researchers (re)produce institutional orders of their disciplines are normalized (Sullivan, 1996) and become more and more taken for granted as people advance in their careers. These tacit disciplinary norms of being become visible or perceived as abnormal only by field outsiders (Paré, 2000), as demonstrated by Paul's and Mark's cases of applying to CIHR. In other words, it is likely that peer-reviewer worldviews influence how they participate in the funding genre system. And in the context of NSERC and

CIHR, predominantly representative of scientific and medical fields respectively, reviewer collective research personae likely influence the way these agencies respond to internal and external challenges, constraints, and opportunities. In other words, when it comes to optimizing routine procedure, the CIHR may be affected by the prestige, clout, and haughty temperament associated with the medical fields.

13.1.4 In closing

A possibility of any PI encountering these and related factors in proposal assessment and committee compositions makes for a complex and constantly shifting context which they have to address. The three PIs have been working constantly to evolve their responses and do not take their experience, however extensive it may be, as a guarantee of being funded.

14. Appendix B: Proposals as storytelling: Analyzing text in context

Reflecting their research niches, Paul writes mostly for NSERC and for opportunities which support fundamental research; Phil writes for CIHR. Mark writes for both NSERC and CIHR and at the time of interviewing was aiming for SSHRC and for NIH & NHS in the US. To have their research accepted, each PI has to write differently. Each of the three emphasizes that proposals must tell a story. *But the stories they tell in their proposals, while adhering to the constraints of the genre, persuade in different ways.*

For **Paul**, the main focus, when peer-reviewing proposals, is their consistency and coherence with the applicant's research program. They are also the two keystones of Paul's own proposal writing. That is, in his proposals Paul seeks to be diachronically and developmentally consistent with his goal of advancing his *problem*. He also seeks to display synchronic coherency in terms of the research questions, the ensuing hypothesis, and the methodological and experimental validation of this hypothesis. Coherence for Paul is also an important factor in connecting the future research to the developmental aspect of the research program overall, of how the

proposal “*fits into a single understanding*”. In doing so Paul projects a certain research persona, that of an experienced, established scientist producing a steady flow of new knowledge.

Also in line with his research goal and informed by his peer reviewing experience at NSERC and CIHR, *Paul addresses a depersonalized panel* in his writing. He writes to the entire discipline, and as such to the objectified every-reviewer. Paul acknowledges that there is politics on review panels but in his experience, this can be superseded by the quality of the proposed science and the proposal. It should be so and, as Aarensbergen et al (2012) demonstrate, it often is. But part of Paul’s own reasoning for objectifying the process may be due to his expert ability to separate a hostile reviewer from the value of the question they ask. Another part may have to do with the fact that his research is within the disciplinary mainstay. This means that the objectified reviewer whom he aims to persuade in effect represents the body of his discipline. In fact, when on reviewing or panel duty himself, Paul strives to adhere to the same objectified reviewer persona. He displays consistency and coherence both in how he writes and how he reads and evaluates.

For **Mark**, there may be no such thing as writing for every-reviewer. As the longest serving PI of the three, he has found that someone will inevitably say something against his work, mostly because boundary work, which he does, is more difficult to achieve reviewer consensus on. Hence Mark may be more overtly articulate of panel politics highlighting the issue of the panel bully. These, in his experience, are mid-range mid-achievers. In the course of his peer review service Mark has observed that the main body of the panelists tends not to stand up to a bully. That is, If the panel is satisfied with the proposal, it does not always lead to a funding decision: the bully has to be convinced. If they are, the decision will not be a difficult one. If the bully is not convinced, they are capable of swaying the panel into a negative decision, singlehandedly.

This is why *Mark writes for the bully*. Projecting personality for him is as important as projecting research persona in the proposal. He is not ignoring consistency and coherence in his story. In this he is not different from Paul and perceives these as a given, a constraint of the

genre. Mark knows that however skeptical the review panel may be about his subject matter, with an appropriately constructed proposal they could be convinced. His challenge is to persuade an opinionated mid-ranger, so Mark extends himself *“for Lisa”*. One way he has found effective is to *“suck the reader in”*, often by adding an element of something stylistically unexpected in the proposal.

For **Phil**, who writes for CIHR, the key is not to overload the already overworked reviewer and keep the proposal focused on a single, defined topic. *Phil writes for ‘the vast majority’* of the reviewers whom he perceives to be generally well intended towards funding promising new knowledge. This view is informed in large part by Phil’s own experience as peer reviewer. As such, Phil has made it his central priority to make the reviewer experience of reading *his* proposals pleasurable. Seeking to lighten the reviewer’s burden of reading informationally dense content, Phil has developed a way of drawing the readers in and keeping them committed and interested to the end. While the idea is loosely based on a well-known phenomenon in popular culture, its rhetorical construction brings into sharp focus Phil’s shaping his proposals around both of the CIHR principal priorities: health of Canadians and rapid translatability of the new knowledge into Canadian healthcare.

The samples of analysis below are not solely those of the proposal texts. Perhaps the best way to describe them is proposal considerations. My aim in this appendix is to bring in a nested systems perspective into what would have normally been a genre analysis of the proposal construction. Nor is each PI’s vignette focused on the same thing. Rather, I look at various aspects of their proposal conceptualizing processes that offer insight into how these expert PIs learn from the nested systems of funding and how they project their learning into their proposals.

14.1.1 Paul: *“Always try to think about your problem and create new challenges, new questions”*
Having discussed in Paul’s chapter his approach to research fundability as *everything is feedback*, below I consider how this is reflected in his grant writing.

14.1.1.1 *The abstracts*

The discussion here is based on Paul's applying for funds from CIHR (early 2013, unsuccessful) and to NSERC (late 2014, successful). Each of the submitted proposals is a furthering of his research program.

2013 CIHR scientific summary (evaluated by panel, non-public version), rejected

Health: a *“door to novel approaches for therapeutic manipulation of normal [process] by dietary and pharmacological interventions”*.

2014 NSERC summary (evaluated by panel, same text becomes public if funded), funded

Fundamental: *“fundamental mechanisms and biological principles underlying the inherent complexity of cellular [process]”*.

The CIHR application pre-dates the NSERC application, and the content of the two suggests they are an intertextual bridge. The NSERC one represents Pauls' problem, i.e. his long-term fundamental research program. The CIHR one addresses an element of the program relevant to applied healthcare. At the linguistic level, the NSERC proposal is characterized by shorter, precise, sentences which lead one into another. The NSERC summary suggests a seamless fit with NSERC aims. The proposal was funded. The CIHR proposal, at least in analytical hindsight, seems more vague as instead of identifying and elaborating a concrete dietary or pharma solution, as CIHR would want, it offers a way to help identify one, or a few. Paul offered a “door” to therapeutic solutions, the reviewers expected something readily implementable in healthcare. The intertextual dialogue of the proposal and peer reviewer commentary demonstrates the extent of mis-alignment of the PI intent and CIHR willingness to negotiate. The proposal was rejected. What make the case interesting is the lessons Paul drew from the experience.

14.1.1.1.1 Aligning, almost, with CIHR priorities

Paul's formulation of the expected outcomes of his CIHR proposal (a "door to novel approaches for therapeutic manipulation of normal aging by dietary and pharmacological interventions") clearly attempts to fit the proposed research with CIHR's government-defined mandate for "creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system"⁴⁴. But although CIHR strategic plan states that "[b]ecause all scientific progress stems from curiosity-driven questions, CIHR has always provided – and will continue to provide – strong support for discovery-based research"⁴⁵, it is understood that the agency is primarily focused on translation of this scientific progress into health applicability. Hence projects and programs of research that demonstrate concrete links between creation of knowledge and its translation towards healthcare would be favored over fundamental research with its potentially numerous venues of applicability.

Reviewer comments on Paul's CIHR application indicate that although this was a solid and well-argued proposal, it is not what they expected to see:

Your significance of your CIHR proposal summary reads like an NSERC research program.

CIHR Reviewer 2

Further, praising well founded and well justified methodology and experimentation methods, another reviewer states that the proposed research lacks a linkage to a particular substance (insulin) associated with this type of research in the fields of human health:

A great deal of attention in human [...] studies centers on insulin signaling. Although [lower organisms] do not make insulin per se, they do have ... signaling pathways that affects lifespan. The application would have been considerably strengthened if this pathway were discussed and tested directly.

CIHR Reviewer 1

⁴⁴ Bill C-13, April 13, 2000

⁴⁵ Retrieved from <http://www.cihr-irsc.gc.ca/e/48964.html> on 12 July 2017

But, since Paul works with lower organisms which do not make insulin, he does not include insulin signaling in the experimental validation of his hypothesis. Given how Paul approaches the construction of his proposals, insulin signaling - whether simply mentioned or factored into his experimentals - would be inconsistent with the specifics of Paul's work. While it may have been reasonable to mention the parallel of insulin in the proposal, insulin testing would not be relevant for his work with lower organisms. And therefore, it is not part of the proposal. But on the opposite side of this intertextual dialogue are reviewers' expectations, and they have not been met. So the reviewer goes on to disqualify the proposal based on lack of translation of Paul's work from lower to higher organisms.

The reviewer comment above indicates that Paul did not quite position the proposed research within the received wisdom of the health research community. The situation is not unlike that discussed by Myers (1990), when an established biologist was expanding into the territory of another discipline and not dissimilarly, reviewers expect explicit bridging:

How this type of [process] is translatable to higher organisms is not clear, as humans do not undergo a similar [...] state. ... The application would have benefitted by a discussion of translatability.

CIHR Reviewer 1

The relationship of this proposed mechanism(s) in [lower organisms] to human[s] ... has to be better developed to demonstrate the study's utility in human medicine

CIHR Reviewer 2

Translatability stands out as the key concern in the reviewer comments. But it seems that in their eyes Paul does not translate or does not translate sufficiently: be it from lower to higher organisms, or from his curiosity driven research program to human health. In effect, in their eyes he does not translate fundamental to applicable. As mentioned by a former associate director of one of the CIHR institutes, translatability of research competing for CIHR funding is a

non-negotiable criterion. So the fact that CIHR reviewers question “*whether [Paul’s expected outcomes] could be of therapeutic interest*” is suggestive that the proposal either is a CIHR misfit or has a way to go before it is CIHR-fundable.

Where Paul acts strategically, however, is in considering *what* the reviewers put a stress on in their comments. Because it is impossible for PIs to know what exactly is said during the panel discussion, Paul regards comments by external reviewers to be representative. For him, they are a sufficient indication of an impression the proposal produces within particular disciplinary circles and of issues that will most likely stand out in the panelists’ eyes. Whether these issues would be interpreted by the panelists in the way reflecting documented comments is a different question. But they will play a role in the final decision, so for Paul reviewer comments have been instrumental in developing his *style*, as he refers to his grantsmanship. Each new application, from his very first as PI, reflects this synthesis of reviewer comments on the previous application:

... reviewers wrote many different things and some of them were critical; therefore, learning from this experience and understanding what the reviewers’ criteria were and what exactly their criticism [was], how shall I adjust my next application in light of what was criticized and suggested?

Paul puts reviewer comments to work for him. No matter how they may make him feel, he does not approach criticism as a personal attack. Rather, he assesses reviewer perspectives. He analyses their comments for core issues that cause reviewers to articulate these perspectives. He considers how they frame their criticism. He is critical in how he sees criticism as feedback. This maturity may sound logically obvious in a case of an established researcher. But as other participants of the grant funding genre system indicated, PIs are not unknown to take reviewer comments personally or to ignore them altogether. It is worth highlighting then that in his approach to critique and criticism Paul is both analytical and synthetic. His “*learning from this experience*” lends itself to be interpreted as strategic.

All in all, Paul's reviewers were not prepared to consider how the proposed program may enrich research efforts in the fields framed by the universal process that Paul studies. Would they have if the proposal had guided them to? Looking at some aspects of the proposal as a sign-posted road, I consider the writer's challenge of being distanced from the readers by the text.

14.1.1.1.2 Dealing with reviewer subjectivity

While the preliminary data supporting Paul's CIHR proposal were assessed by reviewers as "*extensive and pertinent*", it drew their criticism in that it needed "*to be better identified*" in separating published and unpublished findings. One of the two CIHR reviewers saw this as a major weakness stating that only with "*the unpublished preliminary data set relevant to the current proposal can [it be] properly evaluated.*" This offers Paul an insight into what, for at least one reviewer, would facilitate a positive evaluation in the context of CIHR. What is puzzling, however, is that as a CIHR panel member himself, Paul has exposure to face-to face discussions which draw on reviewer comments. In other words, Paul is not unlikely to be able to estimate the assessment angles on his proposal. So why is he not?

The answer may be in part supplied by the second of the two CIHR reviewers who appears to be fully satisfied: "*The proposal is thorough and all required reagents and expertise are well established*". The reviewer opinion split is a sharp 50/50. These diverging points of view suggest that perhaps the objectified "*majority of reviewers*" to whom Paul writes is a concept that at CIHR is more elusive than it is at NSERC. One may estimate that given Paul's research focus, there may be very few, if any, disciplinary specialists who would be motivated to interpret the proposal from the health applicability angle. However, since Paul himself serves on CIHR panels, it is not unlikely that on the panel reviewing his application there would be researchers from related fields of fundamental science. If so, their view on Paul's publications, coming just below, indicates that Paul and his reviewers do not routinely read and publish in similar venues and that their respective fields may be related but only distantly so. Which means that when writing

for CIHR, Paul is addressing a highly diversified – for the purposes of his proposal - collective of non-disciplinary specialists. It would be hard to conceive a majority in a case like this.

Diverging reviewer opinions may also be indicative of the ambiguous nature of the CIHR Operating grant, conceived within the notion of “*strong support for discovery-based research*” (above). This formulation suggests openness to fund fundamental work. But CIHR readers seem to expect Operating proposals to be road-posted not just to health issues, but to solving concrete human health problems. So for all its applicability to the health industry, a process universally applicable to all mortal organisms has likely proven to be too ambiguous for CIHR goals.

Another area in which subjectivity of reviewer evaluations is also evident is the assessment of Paul’s publications. Based on his-publishing 16+ papers on the subject by the year 2013, one of the CIHR reviewers assesses the journals to be of “*mostly low impact*” and Paul to be “*an established investigator with moderate productivity.*” CIHR Reviewer 2 states that “*The applicant is highly productive in the research area.*” CIHR reviewer opinions diverge again, which supports my doubting the possibility of the majority to which Paul’s writing appeals most effectively, i.e. in a fundable way.

A year later, in 2014, NSERC Reviewer 1 views the same publications as having been published “*in journals with impact factors ranging from 2 to 7*” thus providing a more specific but also more lenient interpretation of the papers’ impact. Further, rather than draw conclusions from the number of Paul’s published papers this reviewer highlights their value as having “*been cited over 250 times*”. CIHR and NSERC reviewers seems to measure Paul published productivity differently, and their emphasis on one aspect over another produces assessments of differing connotations. The number of publications is easily measurable but on its own may or may not bear significance, as is evident from the diverging views of the two CIHR reviewers. NSERC reviewer, while also assessing numerically, sees active circulation of these papers to be “*evidence of the impact and contributions his lab is making to [disciplinary] research*”.

To weave in a system perspective, as one of the speakers at NSERC information sessions, an established scientist with a track record of reviewing for and being funded by both NSERC and CIHR, stated, researchers cannot be expected to publish only in *Nature*. What matters, he said, aside from the journal's impact factor, is that the publications also appear in venues that have the most outreach and significance within the relevant field. But this tactic gains meaning only if it is framed so, explicitly, in the proposal. For NSERC reviewers, Paul's publishing venues were likely familiar and therefore meaningful, and did not require explicit elaboration. The numerical impact range of Paul's publications for these reviewers was likely superseded by the fact that they receive multiple citations in the field, producing evidence enough of his contribution research value. But CIHR reviewers are not likely to be as familiar with non-therapeutically oriented journals. They would have benefitted from having these venues being explicitly framed as significant for the applicant's research in a meaningful way.

Overall, however, it is clear that CIHR is interested in funding fundamental research as long as Operating grant proposals are framed towards addressing problems of human health. Paul knew this when applying, which is evident from his juxtaposing of CIHR and NSERC priorities during interviews. What is also evident in Paul's CIHR proposal is that he – not dissimilar to the agency - is willing to provide a doorway to therapeutic applications but would himself produce knowledge for the foundations of these applications. It looks like both the agency and the applicant are willing to work for each other but on their own conditions. It is not a seamless fit. And given the reviewers' assessment of the quality of the proposal and of the proposed science as solid, the rejection stems from this rather forced fit, the agency not willing to accept the applicant's conditions.

At the same time, Paul's conditions are not a matter of self-denial mentioned by research administrators, when established PIs would disregard agency guidelines or reviewer comments because they cannot be bothered and because “[the agency] should know what I want”. Such proposals cannot stand up to competition no matter how well-fitting the agency aims and the

applicant's intentions may be. In Paul's case the issue is that of a fit, in terms of the research profile: to produce a truly CIHR-fundable proposal he would need to re-orient his work to test for direct applicability of his findings towards humans or not too distant higher organisms (insulin signaling pathways). This is not where he is prepared to go as far as the core of his research program is concerned, at least not at the moment. In effect, each proposal Paul writes reflects his own big picture

... the research progress, the hypothesis and the future experiments all are written ... to comprehend a certain type of a complex biological problem. To fulfill the program, research program, which is a means to understanding this. So you need to say that this particular experiment or a series of experiments are aimed at testing certain aspects, certain facets of this hypothesis but how it actually fits into the entire problem. ... It's not like oh, we do that and then we do that and that, ... [it's] the big picture ... the most important part of things, at least in my experience: to ensure there are connections

That said, Paul's industry partnerships suggest that he is actually working on concrete applicability of his big-picture research program. But it is being done outside of the CIHR-funded framework. That is to say, Paul has found a way –without modifying his research program – to scale it towards being translatable to human health. Being funded by NSERC (direct fit) he is outsourcing the human applicability to an industry-sponsored partnership, i.e. he is operating from within his niche, without putting an undue strain on the advancement of his problem while lending his expertise to program offshoots that in the future will likely be within the range of CIHR expectations. He did say that he remained open to applying to CIHR again.

To sum up, Paul has reached a stage in his career when he has a considerable amount of liberty deciding what funds he will be applying for and to what extent he may be willing to modify his already award-winning research to be fundable by a particular council. His previous CIHR funding ended in 2009. While he remained engaged with the agency through his service on their panels, he had not applied for their funding for four years. During 2009-2013 he had been awarded multiple NSERC and CFI grants. The example of his 2013 unfunded CIHR application

demonstrates that Paul remains open to councils whose priorities are not in direct line with those of his research program. However, as his CIHR application suggests, he may be doing this more to test for availability of funds than to seek core monetary support to enable advancement of his *problem*.

Hence my understanding that both CIHR, as represented by reviewer comments and the final negative decision, as well as Paul, as represented by his proposal, considered this 2013 application on conditions of their own. In this situation CIHR, of course, has the decisive upper hand, but the fact that Paul was applying somewhat tentatively is also indicative of a certain position of power he has acquired in his disciplinary community. That CIHR refused to fund the application on Paul's conditions is in line with what NSERC info session presenters said about the highly augmented number of applications in the recent years which, combined with inter-agency overflows, makes for a highly competitive situation, much more so than in previous years. Paul has confirmed the same. These circumstances put the agencies in positions of even more power over what they would and would not fund than may have been the case only a few years prior. This put PI proposal writers in a situation in which they must conform to agency priorities or seek support for their research elsewhere. Paul has the luxury of turning elsewhere rather than having to adjust or modify the core content of his work.

Yet, also characteristic of Paul, he is not turning his back on CIHR and human health; he is not focusing solely on being funded through alternative sources. Paul understands that while his research is foundational to all mortal forms, like most fundamental science, its ultimate goal is to inform future studies, both basic and applied. In case of the latter, the process Paul studies will have the highest applicability in the fields of human health. And as the former associate director of a CIHR institute repetitively stated, funding councils reporting to Canadian government prioritize research that benefits Canadian citizens. Hence, Paul is planning for the future now, by outsourcing his expertise to specialists in human health to validate his findings in applications for higher organisms. Once again, unlike many established PIs, described by research administrators to be sometimes fossilizing, Paul is not resting on his NSERC and CFI

laurels. He works now and puts his current NSERC funds toward furthering, widening and deepening recognition of his program in the future.

14.1.2 Mark: *“Learn to tell people what you do”*

As discussed in Mark’s chapter, his research spans several epistemic worldviews, bridging natural, health, and social sciences. Over the years and in the course of his taking on various stakeholder roles in the system of research funding, Mark has evolved a view that unifies his approach to proposal writing. At the core of Mark’s approach are the values associated with the proposal genre (LY- emphasis mine):

[My] principal concerns when shaping a proposal are to make it coherent. It’s got to have a story. And then the other things that go into it are your expertise, what you are looking at. If what you are looking at is interesting and you can create an interesting story out of what you are looking at and tell people why it’s important, that’s the most of it.

Below I briefly consider both coherence and story in Mark’s proposals.

14.1.2.1.1 Coherence

Coherence is a thread that binds the proposal. Expertise, scholarship, novelty are all core expectations, but bringing them together into an interesting story is a perpetual challenge associated with the genre. For his part, Mark articulates coherence from several corresponding standpoints. As a panelist and reviewer, he values grant proposals that *‘advance our understanding of something’*. In doing so he seeks coherence of a newly proposed piece of science with the body of disciplinary knowledge and values; that is to say, he gatekeeps tradition and novelty and continuity. As a grant applicant, he is concerned with nesting his own proposals within these context(s) as well as with playing the funding *‘game’*. In this he is a peer who strives to contribute to knowledge in ways that would be perceived as *‘advanc[ing] our understanding of something’* and, therefore, fundable. As a proposal writer, he aims to construct the kind of story that would *‘keep the reader with you’*. Here he seeks intra-textual coherence, a plot for the story whose causal construction will highlight and make the reader retain reasons for why this proposal should be funded. At the same time, he is concerned with

inter-textual coherence, one between his story and on-going disciplinary conversations as well as stories (proposals) that are fundable or already funded. This trio of concerns are individually identifiable yet intensely interconnected and interdependent. It is a system.

Coherence for Mark then is not a criterion that originates solely with the proposal. Rather, his coherence is a system concept where text is one part of the nested many. His coherence is a system constructed out of and (re)producing orders of the multi-contexts of connected systems of his discipline(s), of fundable knowledge, and of research funding, in which he takes an active part.

What is more, the above is an insight into a bigger picture, that of Mark's approach overall. His perspective on research funding is systemic and interdiscursive and is consistent throughout his involvement in it: as a writer, reviewer, panelist, committee chair, and institutional R&D consultant. These roles, nested, overlapping and interconnected, inform and are informed by each other. They are '*the forest*' he needs to see when writing ('*not seeing the forest drives me crazy*'). Together they facilitate Mark's constructing texts which are appropriately situated within the current-most conditions of the funding game: reflecting disciplinary values, expectations, and proposal genre conventions. In addition to this, his texts also reflect '*how he is, as a person*', making them sound authentic, personal and, therefore, original. While this last likely makes his proposals memorable, originality is not a guarantee of their being funded. But it helps the proposal stand out on its own during review and, during a panel discussion, makes the job of the primary readers easier.

14.1.2.1.2 Story

A good story for Mark is one that can 'suck [the reader] in'. How does he do it in his own grants? Mark credits his storytelling skills to reading '*quite a bit*' of fiction as well as talking to the media. They contribute to his feeling enabled to experiment with genre conventions, in writing for funding and for publication. But pushing genre boundaries is risky and not all experienced researchers take this risk. Mark is willing to, to gain an additional competitive edge

for his proposals. In doing so his decisions are informed greatly by his experience as reviewer and committee member/chair. He assigns high value to being exposed to the work of colleagues across the country:

... it gives you this whole idea of what people are doing and you get quite a cross section of that. In a three-year period [of committee service] you get a cross-section of most of the people doing research in Canada.

In this too he displays a system approach. Serving on committees he sees what is being funded and, during committee discussions, he hears why. One bonus in particular that his long-term service affords is having exposure to a cross-section of national research on a continuous basis. He has done so for several decades, observing change as it is being shaped and participating in it. In this, he compares a reviewer-panelist-PI with a venture capitalist. Both take risks and both strive to be informed to the best of their ability before they do so. But they are also not dissimilar in that:

... the venture people never really are promoting the money they are going to make from it; they are always promoting the thing that they are doing.

And here is the key to the nature of the grant proposal text. It has to **promote, both the research and the researcher:**

... you got to sell ... but you can sell things different ways. You can be a used car salesman, which is going to come across really badly [laughs]. You'll come across as Trump, "I am going to do it. Trust me. ...". And people do that.

As van Nostrand (1997) notes, promotion of knowledge is a complex issue determined by the context. They tend to, however, surround a common core of explicitly causal storytelling, scholarship, and genre-appropriate marketing. Mark is not afraid of pushing genre boundaries. But to achieve balance, his storytelling also reflects the genre's core conventions. In his view, if he is funded it's *'because I tell a story. And I get it'* and when his proposal is rejected, it's *'because ... I haven't done that properly'*. Constructing balance for him involves anticipating the

reader. His experience has shown him that readers appreciate being led around the curves of the storyline:

...sometimes ... people twig on to certain things, like ‘Why did you abandon [x]?’ and then I realize that I probably haven’t given enough of an explanation, enough of ‘yes, we’ve done this ... and that with [x], and this was really cool and that too, and NOW we are going to expand out to these systems that interplay with them’. I should have said it that way. And then the person would not have said that I am abandoning [x]. Because I wasn’t. I was just downplaying it for other things. But it’s the way I said it.

Inadvertently mis-leading the reader may be not uncommon in grant writing, especially by early-career researchers, but it is a valuable learning experience (e.g., Yousoubova, 2011). At the same time, in Mark’s opinion, ‘*you can’t please everybody*’, and this being part of the game he expects critical reception on the part of at least some of his peer reviewers at all times. In this example he displays how he would have built coherence by explicitly tying up reviewer expectations with his work and justifying de-prioritization of a certain path of inquiry while keeping the reader focused on his new principal concern. The proposed way would support a new main focus rather than detract from it. It may sound simple but this is how the unspoken value of reviewing, sitting on panels, writing, getting rejected fuses into a master stroke. This too is part of telling the story.

Finally, when reading fiction and disciplinary literature, he considers ways in which the writer claims readers’ attention. He then experiments. One way that works for him is to have a

suspenseful plot-line:

... because you are writing for an audience. And you want that audience to be with you as you are unfolding the story. So I’ve done things like ... one time I went through an iterate process: ‘Was it this? No. Was it that? No. maybe it was this? Yes’. And nobody writes a grant like that, so they are going to read this and be like ‘What? So you tested that but it didn’t work. Heck. Should have [worked]. What about this? He tested that and didn’t work either. What the hell? Oh, he tested this and it worked? Oh really? Why?’ and then you tell them why.

This is an example of how Mark pushes the proposal genre boundaries, by bending genre conventions. His aim here is to frame the significance of his preliminary data analysis. Validated preliminary data has surfaced in many instances of my work as a significant booster of credibility, for both the researcher and for the proposal. But framing these data in a grant in winning ways is a challenge. The most conventional is to refer to prior publications or other validated outcomes. But writers do not always sign-post the road for reviewers to see how the data feeds into the proposed science (Yousoubova, 2011). So what is interesting about Mark's statement above is how he plays the established concept in ways that make it a) an integral part of the story, b) a discursive hook to draw and retain reader's attention (Hyland & Tse 2005), and c) a signposted reading road, all at once.

Speaking of signposting, Mark also reflects on and acts on the current reading momentum. This for him is part staying up to date as a researcher but also part *modus operandi* he evolved striving to understand how his grants are read and received. As a reader of both disciplinary literature and of '*quite a bit*' of fiction Mark considers and articulates but also reflects current reader preferences and practices in his writing. In an anecdote he recounts, a young US publishing company was sent a re-type of *The Great Gatsby*, with the title and character names changed. Everything else was verbatim from Fitzgerald's original. The submission was turned down because '*the writing was bad*', trying '*to evoke some sense of the 1920s and failing miserably*':

I mean, a) [these] people clearly haven't read *The Great Gatsby* before, and b) - the b) part is the most important - the way Scott Fitzgerald wrote before isn't the way people read any more. ... And it's the same with writing a grant. Because you are writing for an audience. And you want that audience to be with you as you are unfolding the story.

Evolution may indeed be a word applicable to the proposal text considering what Catherine Schryer remarked about her 2004 paper on grantsmanship being no longer accessible: "grants have changed a lot in the last ten years" (Schryer 2014, personal communication). Grant writing

prose seems as much subject to times in which it is produced as it is to times-driven change in reader perceptions about good writing.

14.1.2.2 2018 NSERC Discovery vs 2018 CIHR Project

The ways Mark enacts his experience is reflected in his 2018 NSERC Discovery and CIHR Project grants. Starting with the first sentences of his NSERC abstract, called Summary, he ensures unambiguous road-posting. In doing so he meta-texts his proposal to NSERC criteria of excellence: the grant is *progressive* and *built on the past*. He also ensures the presence of substance [x] which has caused some consternation by being absent from the prior grant: he is not abandoning [x] but expanding from it (all underlining mine - LY):

The main objective of the proposed research is to continue our identification of specific ... systems that excite or inhibit [A] and [B] aspects of [Mark's research] in ... behavior of [animals]. We have concentrated our efforts in the previous grant cycle around understanding the excitatory role of the [A] and its interaction with [d], [e], and [f]. The proposed research will extend this work to investigate the role played by [x – it's back(LY)], [y], [z], [w], and [v], in controlling ... behaviors, and how those ... systems are activated by unconditioned and conditioned ... stimuli.

NSERC 2018 Summary

As Mark stated earlier, NSERC Discovery does not look for projects but is concerned with research programs and, on case of returning PIs, with their program continuity. By employing verbs which directly reflect his engagement with this mission Mark signals to NSERC that: a) he is adhering to Discovery Grants priorities (he will *continue* from what he previously *concentrated on* in his NSERC funded studies), and b) that his proposed research is coherent with the work he is continuing (he will *extend this work*). The linkage between coherence and continuity is further emphasized by the carry-through key term behavior(s), which encapsulates the core of his research program in the first iteration and anchors the newly proposed research to it in the second. As a result, together the two opening sentences of the abstract represent

and enforce the notion that Mark is *über-focused* on and in his work, and that this grant is organic to his research line.

Writing for 2018 CIHR Project grant, on the other hand, Mark de-emphasizes fundamental goals of *identification* and understanding of natural phenomena but foregrounds instead what he said CIHR is looking for, clinical aspects of his work. This intent is projected with immediate effect in the title of the grant: if the NSERC grant was titled “*Neuroanatomy and neurochemistry of ... behavior*”, to signal a broad-spectrum, blue-skies nature of the exploration, the CIHR grant is titled “*Preclinical models of ... disorders in [human patients]*”. CIHR reviewers deemed the submission to be “*well within the CIHR purview*”.

Further, CIHR being a project rather than a program grant, it mandates researcher positioning in a different way. CIHR Project funding, if offered, supports concrete developmental opportunities with concrete outcomes, as opposed to exploratory findings of NSERC Discovery. Thus rather than emphasizing continuity, Mark adheres to a funnel structure of research article introductions that allows him to pinpoint a problem and then move from the problem to a solution. Unlike the opening of his NSERC abstract, which delves straight into the problem, Mark begins his CIHR abstract by identifying the importance of the problem to human health and by positioning his line of work as instrumental in solving it:

Numerous studies have shown the positive effects on health of a [...] in women and men, and the detrimental effects of ... dysfunction. Distressing ... dysfunctions occur in approximately 7 to 42% of [a patient segment] Decreases in [...] also occur in [another patient segment] Preclinical animal models have been crucial for understanding physiological mechanisms that underlie the etiology of different ... disorders, and in crafting appropriate and effective treatments.

CIHR 2018 Complete Summary

The divergence between the starting points of the two abstracts stems from at least three more interrelated things. One is the need for Mark in the CIHR grant to identify and assert that his

animal research is directly relevant to prioritized by CIHR human health; there is no such need in the NSERC application. Two, the relative luxury of a more dramatic opening (urgent! – the issue is *distressing*, effects are *detrimental*) is enabled by the bonus of extra space allocated to the Complete Summary section of the CIHR Project grant. Three, the structural build of these two grants reflects limitations imposed on the proposals by each agency. NSERC requires one short abstract which, in case of funding, will be made available to the public. It is thus to be comprehensible to both peers and the public. CIHR mandates one scientific and two extended abstracts, each for a different audience. Of the latter two, Complete Summary is in line with a structured abstract required by some scholarly journals and is aimed at peer reviewers; Lay Abstract is a short continuous paragraph prefaced by Lay Title, to be released to the general public in case funding is awarded.

Mark takes advantage of constraints as well as affordances offered by these differences in abstract formats to guide the reader into his story. In the CIHR grant, having located his healthcare niche Mark moves to occupy it. He at once emphasizes that his work benefits CIHR core health mission and that he is credibly suited to carry it out (underlining Mark's own):

My laboratory has been at the forefront of developing preclinical [animal] models of human ... dysfunctions and examining the ... neurochemical systems involved. The proposed studies seek to identify neural, neurochemical, and molecular correlates of ... disorders in [humans] using new and unique paradigms that generate homologous disorders in [animals].

CIHR 2018 Complete Summary

This opening prepares the reader to understand two things. One is that the studies would not result in a new drug or treatment (they *seek to identify correlates* to humans by drawing on animal-based *paradigms*). But two, their outcomes will be translatable into such treatments. To pre-ensure reader acceptance of the second, Mark takes advantage of the Complete Summary subsection titled Specific Aims. He lists three aims (*To study the ability of [animal] paradigms to induce ...disorders ...; To study how ... systems in the brain are activated by ... stimuli as a*

function of these experiences; To examine the efficacy of [medication agents] to restore ... a normal pattern of activation) Each of the aims flows from the previous one and consistently links Mark's animal models to possibility of human solutions. It therefore comes as no surprise that in closing the Complete Summary Mark makes explicit use of the key CIHR term [knowledge] translation:

Studying the mechanisms of these new states of [...], and their potential amelioration by therapeutic drugs, will provide a rational translational approach to understanding the etiology and treatment of [...] disorders in [human patients].

CIHR 2018 Complete Summary

In the Lay Abstract Mark's re-iterates this claim but takes the opportunity to also make it explicitly unambiguous via use of terms that are openly reflective of healthcare research development practices and are therefore impactful (*models, pharmacotherapies, therapeutic efficacy, clinical trials*). He thus ensures that while addressing the general public, he also recaptures attention of those peers who may have wavered at yet another proposal '*studying mechanisms*':

The proposed experiments will examine several potential pharmacotherapies currently in clinical trials, along with experientially-based therapies, to complete the validation of the behavioral models and to use them to assess ... mechanisms of onset and therapeutic efficacy.

The goal of this project is to generate a neurochemical model of different ... dysfunctions that can be used to create rational pharmacotherapies ...

CIHR 2018 Lay Abstract

By welding the past with the future, Mark creates a credible plot for the storyline he is to unfold in the main body of the grant. The past is the anchoring frame, situating the proposal in a human quest. The future is a promise of translation to pharmacotherapies and of therapeutic efficacy. Welded together they result in "hooking the reader" (Hyland & Tse, 2005). By the

means of the hook Mark urges the reader to do two things. One is to read on (how will this all work out?). Two, he prepares the reader to believe that what he does is disciplinary credible: he and his work are situated within the framework of the disciplinary quest (*pre-clinical models have been crucial in understanding a certain human problem*), and his lab has pioneered exploration for solutions by *being at the forefront* of the quest. So the proposed installment will translate directly into an understanding of not just the causation (*etiology*) of the problem but of its treatment as well, which will contribute to the quest.

As an aside, this sentence is interesting to look at from the perspective of grammar and phraseology and may be significant in explaining the result of Mark's 2018 CIHR submission. It did not receive funding in a full sense of it. He was instead awarded so-called bridge funding, a respectfully significant token amount for one year. Bridge funds, as research administrators indicated independently, are usually a signal from the agency which means "*we like you, we like your work, but you have to shape up your act*".

Although the sentence below reads like an opening of a proposal abstract, it is in fact a closing line of the Lay Abstract, the text CIHR makes available to public should the research be funded. In full it appears as follows:

The goal of this project is to generate a neurochemical model of different ... dysfunctions that can be used to create rational pharmacotherapies or examine as causal mechanisms in conjunction with behavioral endpoints in experientially-based interventions.

CIHR 2018 Lay Abstract

This is not easy to read. The sentence is long and the phraseology of its second half (*...or examine as causal...*) requires some interpretation. The grammatical structure of the second half abounds in prepositions that link their respective noun phrases to each other but have no main anchor. The resulting effect is somewhat confusing. The un-initiated lay person may or may not be able to make necessary inferences to arrive at the intended meaning (I could not). An informed disciplinary reader would be able to infer the meaning but is not likely to

appreciate the need to. Two out of two reviewers did not. Their comments demonstrate that they had difficulty following the text. Although they evaluated the research itself as *'important'* and *'relatively original'*, they found *'the text difficult to understand'*. The above example was not the only part of the grant that caused readers some consternation. They found that *'there [were] several places ... in the text where things are not well explained and confusing'*. As a result, although acknowledging the quality of research and of Mark as researcher, peer-reviewers penalized him for making them work harder at reading than they were prepared to.

Mark knows this. His strong proposal suffered from being under-edited. From the reviewers' comments, it appears to have also been under-crafted (e.g., *"The aims outlined in the Complete Summary did not clearly map on to the aims in the body of the proposal"*). As a result, Mark's meta-textual road posting suffered; in all likelihood, what reviewers wanted to be connected explicitly was all too obvious for Mark. But although under-developed at the structural level of its presentation, the reviewers indicate that they see no problems with the science itself:

I would have liked to see more space devoted to discussing the putative actions of the various compounds (...) and the heterogeneity of presenting symptoms of ... in [human patients] to justify the focus on ... mechanisms, and the choices of experimental inductions of ... in ... rats. Linking the three ... conditions to putative developmental pathways for ... and potential pharmacotherapeutic approaches would improve clarity.

CIHR 2018 Reviewer comments

Given Mark's occasionally under-the-wire timeframe for writing, this probably came to him as no surprise. But it served as a valuable reminder that no matter how experienced one may be in the proposal genre, every instance of it is a new slate and the writer cannot expect to ride on prior laurels. This is especially sharp in view of his 2010 CIHR receiving a reviewer notation of being *'elegant and pleasure to read'*.

14.1.3 Phil: *“The real kicker, the really important piece is at the beginning of the grant”*

In the two examples above, I have considered how the PIs think about NSERC and CIHR proposals (Paul) and how it translates to their writing (Mark), including the construction of two of the three CIHR proposal summaries, Complete and Lay. The third of the three, the Scientific summary, was not discussed by Paul or Mark. But it was singled out by Phil as the discursive site which carries the maximum persuasive impact in his proposals.

At the federal level, Phil only applies to CIHR since the nature of his research is applied and related to human health. Over the years as PI and CIHR peer reviewer, Phil evolved the essentials of his proposal writing so as to render his proposals genre-appropriate for CIHR. The first is having a good idea *“because no one is going to fund a bad idea”*. The second is crafting a story about the idea in a way that would *“get[...] people excited and interested about why that’s important ... that’s the hard part”*. The third is finding *“the best way of packaging it ... the aesthetics of the story”*. The thread that unites these points is making the proposal highly readable, a key lesson Phil derives from his CIHR service. How does he operationalize it?

In Phil’s experience, even if his first criterion is met and *“the science holds up”*, the overworked reviewer counts on the writer to make it accessible. Phil has seen the reviewers, who *“got to get in it, get through it, get out of it, got to move on”*, disqualify proposals that were difficult to follow:

... I draw a parallel. ... There are these giants of literature who write these fantastic books that are deep and intricate and they get to be parts of curriculum where people dissect them ad nauseum, right? And then you’ve got the kind of novel that people read whilst they are on a holiday and it’s an easy read, it’s fun and enjoyable, and you get it.

As reviewer himself, Phil says even enjoyable reads lead to reviewer excitement only if they are situated in the CIHR priorities. Reviewers need to be convinced that findings can *“quickly lead to new interventions”* (Reviewer 2 on one of Phil’s CIHR proposals, rejected). This would address the CIHR main priority that new knowledge be readily translatable into human healthcare. Phil does this right at the start of the proposal:

...it's very important to contextualize what's the health importance. ...Where in the chain of...? This is the part in the beginning I like to get people excited about the question and I talk about the objectives and touch upon what's the clinical significance of this work. ... the first half page/ ¾ of a page, that's the "here's why this grant is important" and "here's how it's going to change things for the better". That's the sales pitch.

Phil is referring to the Scientific summary right at the beginning of the proposal. At CIHR, the scientific summary is one of the three required within the application (scientific, main/complete, and lay, i.e. for the taxpaying public). The scientific summary is used for triaging purposes, to either disqualify the proposal right away or decide which sub-committee will review it. It is the most visible, highest-stakes part of the CIHR proposal:

LY –

How would you say your sitting on CIHR [committees] reflects into the grants you write?

Phil –

One [impact] was this summary piece at the beginning, the movie trailer. I think I picked that up from someone else's grant. ... I saw it and I was like, "Yes! I like that". ... it made sense to me as a reviewer, to have that piece.

The '*movie trailer*' of Phil's scientific summary is within the affordances of the CIHR proposal. Phil has seen it accepted by CIHR reviewers and knows that it is genre-appropriate. He adopted this idea of a preview and now relies on it to help the proposal gain allies along every stage of the review. He designates his scientific summaries to creating "*a sense of foreboding*", while simultaneously situating the proposal within the CIHR-specific contextual constraints. Below, I look more closely at Phil's movie trailer.

14.1.3.1 CIHR Operating grants: The scientific summary as a 'movie trailer'

The scientific summaries of Phil's 2012 and 2013 submissions deal with two different health issues. Both are concerns in Canadian healthcare and both are comparably high on the list of

concerns. The 2012 submission was rejected; the one from 2013 was funded. I project that the way Phil framed the previews of each study in the scientific summaries likely contributed to the rejection of one and the funding of the other.

And the one-page summary, it's quite dense, so that part has got a lot of pieces that you want to get in there because, for CIHR, ... it's ... the actual, the real kicker, the really important piece...

Each 2012 and 2013 proposals start with a title. Each is specific to a disease. But whereas the opening line of the 2012 proposal is also disease-specific ("The importance of the impact of [a factor] among [disease sufferers]"), the opening line of the 2013 reads "Importance of the study for the health of Canadians". The difference is that the 2012 one is unclear about its relevance to Canadian healthcare. On the other hand, the 2013 line does not specify which disease it will address. What it does is aim explicitly at the CIHR primary mission, "health of Canadians". In other words, Phil leaves the 2013 reader with no chance of possible mis- or under-interpretation of the study's fit with the CIHR mission.

This shift indicates that Phil understands how CIHR reviewers read, and what in the proposal text carries value. Given that he is limited to ten pages total, Phil aims at once to awaken the reviewer interest and to signal his commitment as PI to the CIHR main priority. He seeks to have the reviewer committed to reading the entire 10 pages:

[Once committed] reviewers [will] focus really heavily on those 10 pages and yeah, you've got to sell them. And once you get them, even if they've read the summary and then are coming to those 10 pages, once again you want to have an opportunity just to get them excited about reading the rest 9 and a half pages. And you want to... there is nothing like telling people, up front, "here's where we are going, here's what we are doing, and now I am going to break it down and give you the nitty-gritty bits".

I focus on Phil's 2013 proposal because it illustrates his approach as he discussed it in the interviews: situating the proposed in the big picture, not a narrow slice; making explicit connections between the need for the proposed research and the health of Canadians, while

emphasizing rapid translatability of the expected research outcomes to healthcare; and structuring the text around:

... “what’s the fundamental questions, what’s the actual methodology”. There is quite a bit of methodology that goes into that one-page summary. And what’s the aim and, very briefly, what’s the outcome, what’s it’s going to lead to. ... it’s a way that people make judgements about whether they have the capacity to review it or not. So they need to know those things

At first glance, the 2013 preview is not much of a sell. It does not do overt marketing of the proposal’s promise; instead, it provides a guided tour. As it progressively narrows to the specifics of the problem, it is simultaneously achieving another goal. It categorizes as urgent an unstudied aspect of a now recognized - but hitherto considered secondary - cause of a leading, devastating, and costly for Canada health problem.

Within this road map, Phil is intermittently moving between the registers of the language of scientific popularization (*‘our lifestyles have become increasingly and exceedingly stressful’*) to specialized terminology (*‘Specifically, [x] factor activity and [y] time reflect activity and speed, respectively, of the [z] pathway’*), with every claim backed by citations. But the language use pendulum does not swing as widely as Mark’s, from the vernacular to the scientific; Phil’s is treading lightly between compatible ways of expression. This does not jolt the reader into attention. Instead, it offers a sense of flow (*‘take the reader by the hand’*) and of assurance that the candidate is both competent in the subject matter and able to connect it to the everyday impact on public health. Indeed, the emphasis on the proposal’s pertinence and applicability to healthcare permeates nearly every sentence of the 2013 trailer:

At least when they read, and if they’ve got a good summary in their mind and they see where this is leading to, then when they read any individual section, I think it helps contextualize... coming back to this sort of ... the big picture.

CIHR 2013 Scientific Summary

The issue threatening the health of Canadians is identified in the opening sentence. In the same sentence, it is also categorized as leading among the Canadian health issues (*"[Abc] is a leading [problem] in Canada though there are notable sex differences in its prevalence"*). The scene is set, the issue and its urgency conveyed. At the same time, a niche is being outlined (*"sex differences in prevalence"*). Within the space of the subtitle and the first sentence Phil has told the readers what he is going to tell them, infusing it with a sense of urgency while also opening the way for identifying the scope of inquiry.

Phil is building a sense of foreboding. First, he defines the outlines of the proposed research niche: he is not going to assess sex difference across the [abc] disease. Instead, filtering through the main recognized causes, which *"do not fully explain the [ABC] risk"*, he is zeroing in onto the hitherto secondary but now gaining recognition elements, which are *"increasingly accepted as important [ABC] risk factors"*. Narrowing still further, but directly issuing from what was said before, he pinpoints the knowledge gap and then a particular aspect of this gap. His identifying a very specific sub-gap implies that the research is doable, the project scope realistic, and the PI competent.

As all the PIs stated, CIHR Project Scheme focused on defined inquiries, with tangible and implementable results as outcomes. Accordingly, Phil frames his research question within the intent to assess sex differences within the narrow scope of the sub-gap. At the same time, he indicates how this inquiry would also contribute to the collective effort addressing this bigger issue (*"where in the chain of... ?"*)

Although Phil stated that *"quite a bit of methodology ... goes into"* his movie trailers, at first glance, again, the 2013 one is not overtly describing how things will be done. Rather, Phil infers his methodological approach throughout the text:

Different aspects of [a narrow phenomenon] will be assessed. Specifically, [related] factor [x] activity ... and ... time reflect activity and speed, respectively, of the [key aspect of the narrow phenomenon], whereas ...

In effect, Phil is very specific about what he will assess but not so much about how, and herein becomes visible his building a sense of foreboding. With such a defined scope of the problem and intent to investigate it, the reader is bound to want to find out more and therefore read on beyond the short pre-emptive summary:

I remember nothing from my English class except for one thing, pretty much. And that's the concept of the sense of foreboding, so writers who do a phenomenal job would give you the answer to the story earlier in the book, in a parallel scenario. So you know what's going to happen, you just don't know that you know what's going to happen.

True to form, in the two concluding statements of the scientific movie trailer Phil offers the reviewer a sense of the outcome of his 2013 proposal story. But he is - intently - more explicit than a writer of fiction would be. That is to say, by the end of this half-page summary Phil's reviewers know what impact the study could have for Canadian healthcare, and beyond:

By identifying such mechanisms, interventions specific to each group (e.g., sex-specific) can be developed to reduce the impact of [x] on the [patients]. Ultimately, this and future, related studies may significantly contribute to reducing the morbidity associated with a clinically important and prevalent disease (i.e., [reiterates the name of the disease]).

CIHR 2013 Scientific Summary

In other words, Phil's '*movie trailer*' is a rhetorical funnel: it starts by situating the project significance in the health of Canadians and it concludes with what this significance would translate to in concrete outcomes. It is also unwaveringly centered around a defined, specific niche within a narrow scope of a sub-problem: sex differences. Unintendedly, this last sentence is testament to the mastery with which Phil shapes his scientific summary. His writing guides the reviewer along the unambiguously outlined path from within the broad CIHR priority of making translatable healthcare knowledge to a sharply focused project which is precise in its aim, defined in its intentionally narrowed scope, and therefore doable

In summary, Phil does not aim to push the proposal genre boundaries. His choices reflect his accumulated understanding of the CIHR review climate. Phil aims to address its constraints by keeping his proposals within a single, defined theme (the *holiday novel*) enhanced by a focused preview. But the risk he takes to improve proposal readability is comprehensively hedged. Unlike Mark, Phil does not try something hitherto untried. The “*movie trailer*” demonstrates how Phil experiments with an already fundable way to write, adjusting it to the expectations of each CIHR committee he applies to and proceeding on the premise that the idea of a preview is acceptable to the conservative CIHR reviewer. In other words, Phil’s creativity in his CIHR proposals is fittingly conservative. By staying within the boundaries of the acceptable, his writing remains genre-appropriate yet has an original touch that helps the proposal stand out in competition *and* retain credibility.

I should note that the 2012 proposal was reworked and resubmitted, successfully, in 2013. The re-submission addresses the same but more narrowly defined issue and is distinct from the 2013 proposal discussed here. It received full funding. This makes it two large-scale CIHR Operating Grants awarded to Phil and his teams in 2013.

14.1.4 In lieu of discussion

The analysis aligns with the prior work on genre creativity (Bhatia, 2004; Tardy & Swales, 2008) and risk (Myers, 1990). But while the three PIs’ engagement with genre creativity does commensurate with experience, this study contributes by nuancing how they may do so and what informs their decisions to engage. At least two factors emerge to be of influence. One is their research goals. The other their evolving an understanding of the proposal genre, in particular of the expectations of the agency and its peer reviewers.

While the affordance of creativity is built into genre (Schryer et al., 2003), the study demonstrates that the writers draw on their experience in the genre system to inform their decisions as to its use. In all three cases, the *PIs’ peer-reviewing experiences* inform their understanding of the expectations of the national academic system (Canadian reviewers are

conservative), of the agency culture (NSERC more flexible than CIHR), and of the priorities specific to the agency and its funding lines (NSERC embraces blue-skies research, CIHR prioritizes rapid knowledge translation). It could be suggested that genre affordance for creativity is agency-specific. Each of the two agencies in this study affords room for flexibility in proposal conventions, but each does so in its own way. These ways depend on the nature of research being funded and on what the agency's peer-reviewers qualify as genre-acceptable (Schryer, 2011; Schryer et al., 2003).

However, whether even expert PIs avail themselves of the affordance of creativity is individual. The decisions of the three PIs to engage with creativity are further informed by *their research goals*. Paul is cementing his already established legacy, so aiming to make it relevant to both fundamental and applied science he avoids the risk. Mark is bridging his established work to new epistemic domains and so needs to be a trail blazer. He relies on his extensive peer review expertise to take considerable but calculated risks. Phil is expanding the relevance of his work to other sub-domains of applied health research, so engages with risk but cautiously and within the boundaries of the already acceptable.

The thread that unites these findings is the PIs' learning from their participation in the grant genre system and drawing on their learning to inform their proposal construction. Future research into how PIs learn and think about their proposal writing would offer insight into other factors that inform their writing grant proposals that credibly stand out.

Implications

This writing analysis contributes pedagogically motivated insight into how *successful expert* PIs inform their choices of engaging with the affordance of creativity in genre by situating their writing in their experiences of participation in the grant genre system. The intent is to help other PIs think about their proposal writing from an individual yet system-situated perspective.

Although creativity in genre may be better suited for expert use (Bhatia, 2004; Tardy & Swales, 2008), this does not mean that less senior PIs cannot consider it. Of the three participant PIs, Paul is the researcher with the longest academic career who mostly writes for NSERC. NSERC reviewers are more accepting than CIHR reviewers of the genre boundaries being pushed, yet Paul's writing remains within the framework of the established genre conventions. Mark, who writes for NSERC and CIHR, makes use of this affordance and takes risks by experimenting with the genre. But Mark is the researcher with the longest service on the federal funding boards and has the deepest insight into the proposal evaluation practices. So the risk Mark takes is well calculated but would not be within the range of an earlier career PI. Phil writes almost exclusively for CIHR, the most conservative of the Canadian science funders. His approach could be described as risk-conservative, for he experiments with what is already proven to be acceptable. Being the least senior of the three PIs, Phil's ways of engaging with creativity in the proposal would be the most relatable to mid- and early-career PIs who seek to inform their learning of this high-stakes genre.

Finally, while the three PIs in this study developed their approaches with the view to the Canadian contexts of funding science, their insight could be considered by PIs anywhere.