ASPECTS OF SPACE: QUANTITATIVE APPROACHES TO FICTIONAL WORLDS

by

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ABSTRACT

This dissertation investigates the evolution and function of narrative setting in modern German fiction through computational literary analysis. More specifically, it examines how fictional spaces are constructed and perceived, drawing on theories from narratology, phenomenology, and embodied cognition. Using Gerhard Hoffmann's triadic model of setting—*gestimmter Raum* ("space reflecting mood and atmosphere"), *Aktionsraum* ("space of action"), and *Anschauungsraum* ("field of vision")—along with the additional category of "descriptive space," the study explores the reciprocal interplay between characters and setting to uncover how spatial elements shape storytelling.

Employing tools from natural language processing (NLP), this study develops a BERT-based classifier to identify and categorize different types of narrative space within a dataset of approximately 4,800 German-language works of fiction from the 19th and 20th centuries, alongside a separate non-fiction dataset.

The findings challenge the presumed decline of setting's importance over time, highlighting the dominance of embodied and affective spaces (*Aktionsraum* and *gestimmter Raum*), which facilitate characters' interactions with their environments. Genre analysis reveals distinct uses of setting, with fiction emphasizing action and affective elements, while non-fiction, particularly travelogues, prioritizes descriptive observation.

The project bridges distant and close reading, integrating computational models with qualitative literary analysis to uncover new insights into the narrative role of setting. It highlights how setting functions as an active, dynamic force in storytelling, shaping characters' perceptions and actions while contributing to the construction of fictional worlds. Far from being a static backdrop, this study underscores the centrality of setting in narrative structure, offering new

perspectives on its multifaceted nature across genres and contributing to broader discussions in computational narratology and literary studies.

RESUMÉ EN FRANÇAIS

La présente thèse examine l'évolution et la fonction du « cadre narratif » (*setting*) dans la fiction allemande moderne à travers une analyse littéraire computationnelle. Plus particulièrement, elle étudie la façon avec laquelle les différents espaces fictifs sont construits et perçus. La narratologie, la phénoménologie et la cognition incarnée servent de base théorique à notre analyse. De plus, l'étude explore l'interaction réciproque entre les personnages et le cadre narratif à partir du modèle triadique de Gerhard Hoffman – *gestimmter Raum* (espace reflétant l'humeur et l'atmosphère), *Aktionsraum* (espace d'action), *Anschauungsraum* (champ de vision) – et d'une catégorie additionnelle (espace descriptif). Le but est de démontrer comment les éléments spatiaux façonnent la narration.

Au moyen d'outils de traitement automatique du langage naturel (TALN), nous avons développé un modèle de classification textuelle de type BERT afin d'identifier et de catégoriser les différents cadres narratifs à l'intérieur de deux ensembles de données distincts : le premier, constitué d'environ 4 800 œuvres de fiction en langue allemande du XIXe et du XXe siècle et le second, d'œuvres non fictionnelles.

Les résultats remettent en question le déclin présumé de l'importance du cadre narratif au fil du temps par le fait d'une prédominance des espaces incarnés et affectifs (*Aktionsraum* et *gestimmter Raum*), qui facilitent les interactions des personnages avec leur environnement. Notre analyse révèle des usages distincts du cadre narratif suivant le genre : les œuvres fictionnelles mettent l'accent sur l'action et les éléments affectifs, tandis que les œuvres non fictionnelles, en particulier les récits de voyage, privilégient l'observation descriptive.

Notre projet établit un pont entre la lecture distante et la lecture rapprochée par l'intégration de modèles computationnels à l'analyse littéraire qualitative. Il offre de nouvelles perspectives sur le rôle narratif du cadre et souligne la manière avec laquelle celui-ci agit comme force active et dynamique dans la narration. En effet, le cadre façonne les perceptions et les actions des personnages tout en contribuant à la construction de mondes fictifs. Loin d'être un simple arrière-plan statique, donc, il occupe un rôle central dans la structure narrative. Ainsi, la présente recherche ouvre de nouveaux horizons sur la nature complexe du cadre narratif, à définir selon le genre littéraire, et contribue à élargir les discussions autant en narratologie computationnelle qu'en études littéraires.

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Thank you to my dear friend Andrea Barbieri for translating my English abstract into French.

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1. INTRODUCTION. Quantitative Approaches to Fictional Worlds

How we come to understand the notions of place and space is closely connected with stories and the way we tell them. How we tell stories in turn is crucial to how we come to understand ourselves, our relationships, our place in society as well as our potential to affect these spheres.

Narratives can take on many forms—from oral storytelling, to film and the internet, and can be found nearly everywhere and in any format or medium. In this dissertation, I will focus my analysis of narrative space on modern fictional prose, which, as Mikhail Bakhtin observes regarding the novel, "reflects more deeply, more essentially, more sensitively and rapidly, reality itself in the process of its unfolding" (Bakhtin 1981, 7).

Studying the construction of fictional worlds in narratives sheds light on this relationship of mutual production and thus contributes to the discussion of our relationship with the world we inhabit, how we view our position both in the natural world and in society, what agency we attribute to ourselves, and ultimately, how we see our subjectivity and speak about our inner life—questions, that are also closely connected to the roles of class and gender differentiation in society.

In my dissertation I use quantitative models to better understand the way "setting," as a narrative element, has developed in fiction. I conduct this investigation based on digitized collections of German writing from the 19th to the 20th century. The primary basis of the quantitative models are algorithms and tools from natural language processing (henceforth: NLP). Recent advancements in NLP and new developments in the field of computational linguistics have also led to an increased interest in quantitative methods in the field of literary studies. As a consequence, the rapidly evolving field of computational narratology (among others) allows analysis of textual data in more and more sophisticated ways. Recent work in computational

narratology has studied key narratological concepts such as narrativity (Piper & Bagga 2022) temporality and suspense (Piper et al 2023; Underwood 2016; Cheong 2007), characters (Underwood et al 2018; Bamman 2014), plot units and events sequencing (Chambers & Jurafsky 2008; J. Ouyang & K. McKeown 2015), or narrative frames (Mostafazadeh et al., 2016). Applying such sophisticated computational methods to works of literature is especially helpful in identifying gradual transformations in texts.

With respect to narrative setting and space, scholars in cultural analytics have studied literature's attention to geographic space—its relationship to real-world locations or how geography is imagined in texts (e.g., Moretti 1998; Piatti 2011; Gavin and Gidal 2017; Evans and Wilkens 2018). Others have focused on questions of mobility, analyzing how characters move through space and traverse both geographical and non-geographical places (Wilkens et al. 2024).

Building on this prior work, I aim to investigate how setting functions within stories with regard to character interactions and description. While previous studies have examined how characters are situated in space and the places they occupy (Soni et al. 2023), my focus is on exploring the various ways characters in fiction perceive space and the reciprocal relationship between setting and behavior. Using computational methods and collections of digitized texts, this project seeks to provide new insights into the narrative strategies through which fictional space is constructed across different literary periods.

Capturing narrative space in computational analysis poses a challenge, as it is a higher-level concept that emerges from specific sets of words, which are difficult to identify at the level of individual words or n-grams. However, with the advent of Transformer models such as BERT—used in this project—it has become considerably easier to model how texts are produced and structured through language. This thesis will spend a great deal discussing the steps involved in

transitioning from theorization (the theoretical foundations of the concept) to operationalization (its translation into a computational framework).

Moving forward, I will restrict my analysis to the perceptible and concrete "lived space" presented in storytelling—the representation of a material reality that can be directly perceived—and thus will omit the metaphorical or symbolic meanings these spaces might carry. The focus is on how characters experience space and the interaction between subject and setting. To describe the interdependence of subject and space as depicted in the representation of a character's immediate environment, I draw on the spatial theories of phenomenology, especially the concept of "lived space." The notion of "lived space," as theorized by phenomenologists, emphasizes the inherent unity of subject and space, asserting that space cannot be understood independently of the subject who experiences and perceives it.

Drawing on the work of German philosopher Elisabeth Ströker, specifically her book *Investigations in Philosophy of Space* (1965), which provides a general framework for understanding how people experience space in everyday life, literary scholar Gerhard Hoffmann developed a triadic model that applies Ströker's categories to fiction. He suggests that setting can be broken down into three different categories according to their function in the narrative, namely, *gestimmter Raum* (i.e., "space insofar as it reflects mood and atmosphere"), *Aktionsraum* (i.e., "space of action"), and *Anschauungsraum* (i.e., "field of vision")[1] (Hoffmann 1978).

Based on Hoffmann's schema, I build a classifier that can detect the different types of setting in my dataset. What makes Hoffmann's model so compelling for the study of setting in literature is that it provides a systematic way to better understand the various modes in which a character might perceive and react to its surroundings. Rather than viewing setting as a pre-given

[1] *Anschauung* is notoriously hard to translate. In the present context, let me translate it as "field of vision."

category that merely illustrates a character's environment, Hoffmann's model emphasizes how setting is created *through* narrative.

While my focus primarily lies on Hoffmann's application for literary analysis, I will also incorporate certain philosophical insights from Ströker regarding these categories. An important distinction between Hoffmann's model and Ströker's inquiries is that Ströker not only grounds the various types in "lived space" but also emphasizes the "embodied" aspect through which these spaces are experienced. Drawing on Husserl, she thus understands the body as not only extended but also as "lived," in German, *Leib* which refers the body as "experienced in the first person" (cf. Colombetti 2014, 8). This contrasts with *Körper*, which relates to the body as it is physically described (Ibid.; see also Ströker 1965; Husserl 1952/1989).

This emphasis on the embodied subject is absent in Hoffmann's adaptation. Nevertheless, as I will demonstrate, the concept of "embodiment," as theorized by Ströker and further elaborated upon by cognitive scientists and narrative theorists, holds significance not only in how readers comprehend narratives but also in how this is manifested within language—how stories make use of narrative elements like "setting" and "character" to render the narrative world more tangible and "perceptually real" to the reader.

To study this, I will formalize Hoffmann's model so it can be translated into a quantitative context. By first manually annotating passages in fiction that correspond to the different categories of setting that I investigate, I fine-tune a computational model that can classify these different categories automatically. Applying this to a data set of ~4800 works of German fiction over the course of one hundred sixty years can tell us more about the longer-term historical distribution of these types of spaces as well as their function within the narrative. An important function of "setting," as we will see, is to ground experience in a tangible, lived space. Hoffmann's model offers a way to examine this coexisting relationship between character, setting, and event in its

entirety, rather than giving priority to one category over the other. The focus on the different *kinds* of spaces also suggests different ways of how setting is experienced and perceived by the character.

Computers are especially good at detecting patterns on a large scale. To briefly illustrate what a practical example of a research question of this kind might look like, consider the following: In his book *How Literary Worlds are Shaped*, Bo Pettersson explores the "mimetic function of literature" (Pettersson 2016, 52). He examines works from various cultures and asks how mimesis and genre are related. Pettersson claims that "the detailed depiction of character and setting," which Ian Watt identified as characteristic of formal realism in novels, "is found in much literature that is neither realist fiction nor prose" (Pettersson 2016, 52-53). Using quantitative methods, we can conduct large-scale analyses to address questions with such broad historical scope. If the detailed analysis of selected individual passages claims to reflect these historical shifts, then these major historical changes should also be detectable when analyzed on a larger scale.

We can thus ask to what extent the depiction of setting varies across different periods and genres. This way, we can assess whether our findings corroborate the critic's approach, or if the results tell us something different. Each of the computational experiments presented here combines quantitative evidence with existing critical theories, allowing us to explore their mutual implications.

As I will demonstrate in ***Chapter 1*** of this thesis, defining space in narratives is a challenging task. In order to make a concept scalable and readable by a computer, it needs to be formalized. Quantitative analysis requires us to define what "setting" or "space" means in fiction from the outset. Therefore, a large portion of this chapter is dedicated to surveying a broad array of studies on how setting has been theorized in narratology.

However, my approach is not limited to narratological theories. I will also engage with phenomenological and cognitive approaches to spatiality in narratives, drawing specifically on the

concept of "lived space" from phenomenology, which provides the basis for my analysis of setting in fiction. Building on these theories, this chapter will then introduce, as mentioned earlier, Gerhard Hoffmann's triadic model of space, which will serve as the theoretical framework for the computational analysis. This model allows for a nuanced analysis of setting, capturing various ways characters engage with and are influenced by their surroundings.

Through close readings, I will demonstrate how Hoffmann's model applies to literary texts, illustrating how different spatial modes shape character behavior and emotional responses. This analysis highlights the dynamic interaction between characters and space, showing how narrative settings can drive actions and reflect psychological states. The chapter argues that Hoffmann's model offers a structured approach to analyzing these complex interactions in fiction. This theoretical framework establishes the foundation for the quantitative analysis presented in later chapters, where Hoffmann's categories will be applied at scale to explore patterns in narrative space across a large corpus of texts.

Moving to the "Methods" section of this thesis, ***Chapter 2*** focuses on the steps needed to operationalize Hoffmann's model so it can be used by a computer. It also outlines the creation of the datasets used in this analysis, documenting in detail how textual data—drawn from large repositories like Project Gutenberg—can be prepared for quantitative analysis. The chapter begins by explaining how Hoffmann's categories were adapted for computational analysis.

Another important element to consider when studying space in narratives is the "canonical binary of 'description' and 'narration'" in narratology (Friedman 2005, 194; see also Ronen 1997). Commonly, "narration" is associated with time, defined as "the representation of real or fictive events and situations in a time sequence" (Prince 1982, 1). Description, on the other hand, is thought to emphasize "the spatial rather than the temporal, the topological rather than chronological existence of events" (Friedman 2005, 194).

To account for the description of scenery in texts, independent of a character's perception, I introduce a fourth category into the model to capture this concept. Spatially situated descriptions are understood to be particularly prevalent in realism and pre-19th century literature. Setting in early literature is thought to accommodate character, providing an "object-filled milieu" in which the scene is set (Stanica 2015; see also Auerbach 1946). Using this approach allows us to analyze the frequency of descriptive passages in fiction compared to other, more character-centered, embodied occurrences of setting and spatial perception. Moving past the strict binary of "description" and "narration" the model used here explores their interactions in the construction of "lived space." Lastly, a "no space" type label has been added, to classify sentences with no spatial relevance. This adaptation was necessary to translate the theoretical model into measurable components.

The annotation process involved manually labeling a representative sample of sentences to create training data for a BERT-based classifier, which was fine-tuned to categorize sentences according to the five spatial types. This data was then used to train a multiclass classification model, whose performance was further assessed using accuracy scores as well as closer manual inspection of the model's output. By looking closer at the annotations and the output, I discuss limitations and challenges that came up during the process. Overall, the model demonstrates a strong alignment with my annotations. Lastly, the chapter focuses on how the datasets (fiction and non-fiction) were constructed, what kind of metadata is present, as well as the automatic and manual processes undertaken to enrich the metadata.

Expanding on existing work in computational literary studies, this chapter will also survey research that has examined space in narratives from a quantitative perspective. Space or setting—particularly in its geographical sense—has garnered increasing attention in cultural analytics. This section will identify relevant prior work that my project builds upon. This research has contributed

to understanding the semantic qualities of how places, objects, and things are described in narratives, as well as how characters move through and interact with space across historical periods and genres.

Having established the methodological basis for the project, ***Chapter 3*** begins by putting the developed model into practice. Focusing on "lived space" (*gelebter Raum*) in German literature over time and across genres, this chapter conducts individual quantitative experiments, each organized around a theoretical argument that addresses an aspect of how space has been approached by previous scholarly work. The chapter explores how the different types of settings outlined in my model appear and function across historical time periods, genres, and narrative structures.

The ***first experiment*** will look at the historical role of setting. In particular, in this analysis, I advance two central arguments that complicate traditional views of setting and narrative space. My findings demonstrates that, contrary to critics' assumptions about the historical role of setting, computational analysis of a large dataset of German-language fiction shows that setting does not decline over time. Moreover, when focusing on the role of "descriptive space," I found that it holds minimal importance overall, contrasting sharply with the more embodied and affective notions of *Aktionsraum* (space of action) and *gestimmter Raum* (space reflecting mood and atmosphere). These findings challenge theories that emphasize the primacy of description with regard to setting, particularly in pre-modernist works.

By focusing on a canonical sample, drawn from research working in canonicity in German literature, I explore whether these canonical works exhibit a timeline more closely aligned with critical theories about setting. Interestingly, the canonical sample does indeed portray a (slightly) different timeline compared to the broader, more heterogeneous corpus. However, a closer examination reveals that this divergence is largely driven by the works of a few highly canonical authors rather than indicating a broader trend across the sample.

Using the metadata in my corpus, the ***second experiment*** focuses on genres and examines how they differ in spatial composition and in the ways they construct literary worlds. Building on critics' arguments regarding the specific world-building capacities of genres (Herman 2013), this experiment investigates whether there is evidence supporting theories about the distinctly spatial elements that characterize and differentiate genres. By viewing narrative as "a blueprint for constructing a world" (Herman 2009, 105) and analyzing how they construct space, we can explore how fictional genres differ in the ways they textually realize the represented world.

The analysis suggests that genre may be a stronger predictor of distinctions among different types of settings than literary periods. A Tukey HSD test reveals significant differences across genres in how they employ the various types of settings, with *Aktionsraum* and *gestimmter Raum* showing the most notable variations. These results further support the hypothesis that the distinct "worlds" created in these genres are primarily driven by embodied experiences and actions directly linked to the character, with descriptive notions, similarly to the historical data holding consistently much less importance.

To analyze these claims in greater detail, I provide a case study comparing texts from two different genres. Close readings, such as these, are employed throughout the thesis to illustrate theoretical points or serve as additional in-depth investigations and explorations of phenomena observed in the quantitative data. In this case, I also demonstrate how a closer examination at the textual level can add depth to the results, helping us pinpoint some limitations of the computational approach and suggesting ways future research can build on this work. This approach underscores that traditional close readings and qualitative explorations remain essential to the thesis. They complement the quantitative analysis and cannot (and should not) be replaced by it alone.

In transitioning from historical time to genre, the ***third experiment*** in this chapter examines the distribution of setting across narrative time, with a particular focus on "narrative beginnings."

This analysis seeks to identify what distinguishes the use of setting at the start of books from its progression later on. While much has been written about the significance of text openings (e.g., Polaschegg 2020, Romagnolo 2015, Said 1997, Nuttal 1992, Miller 1965), only a few studies to date attempted a large-scale quantitative analysis of focusing, among other things, also on beginnings (see for example, Piper et al. 2023, Boyd et al. 2020). Little work has been done, however, to investigate setting's importance for beginnings.[2]

Beginnings are the points at which we are introduced to the narrative world and its key characteristics are established. The schema proposed here enables us to investigate whether, as literary criticism frequently suggests, the beginnings of fictional texts emphasize spatial features more prominently than other sections of a book. By analyzing narrative time, we can quantitatively examine how beginnings differ from other parts of the narrative in their spatial focus and what makes them unique in this regard.

Chapter 3 provides a comprehensive exploration of the different functions of setting within storytelling, placing these functions in dialogue with questions of historical context, genre distinctions, and narrative time. One of the main findings of this chapter, which connects all experiments, is the emphasis that narratives place on the embodied role of setting. Setting facilitates embodied behavior in characters, primarily through "action," "touch," and "movement." The most prevalent concept in this regard is *Aktionsraum*, followed by *gestimmter Raum*, which suggests that, in addition to its "action" element, setting also contributes to the creation of "moods." This influence affects the character bodily through sensory perceptions, such as sounds and smells, as well as through atmosphere.

[2] Boyd et al. tested the presumed prevalence of linguistic features, such as articles and prepositions related to "staging," at the beginning of stories, suggesting beginnings are stylistically unique in this regard.

In the analyzed dataset, descriptive notions—represented by "descriptive space" and *Anschauungsraum*—hold relatively little importance. This suggests that, broadly speaking, when setting appears in fiction, it is less often associated with ornamental functions, spatial positioning, or visual observation from a static viewpoint. Instead, setting appears to be more integral to a character's corporeal identity, playing a significant role in constructing a perceptually rich environment for the character.

Chapter 4 builds on these findings by introducing a new dataset, specifically non-fiction, to explore what distinguishes fiction in its presentation of setting. Using the metadata gathered for the non-fiction corpus, we can analyze how different types of settings are used across genres within non-fiction. This dataset includes a wide array of sub-genres, from philosophy, nature, and history to travelogues. Notably, the results show, that travelogues surpass all other genres—including fiction—in their use of setting, leading me to treat them as a unique "genre" one that straddles both fiction and non-fiction.

Examining the role of the body in narratives from the perspective of embodied narratology, allows us to illustrate how it introduces new viewpoints on both narrative theory and literary texts (Caracciolo et al. 2017). While such research has primarily focused on the reader's experiential engagement with narrative worlds (see, for example, Ibid., Troscianko 2014, Ryan et al. 2016, Caracciolo and Kukkonen 2021), my aim is to investigate how this notion of embodiment and experientiality is textually manifested and what role setting plays in it. Embodiment is understood to significantly influence how readers form mental images of the described world. However, when theorized in narratology, it often hinges upon the representation of a character's consciousness,

which is considered central to how readers comprehend narratives.[3] Consciousness, although abstract, is framed as fundamental to narrative itself, much like time.

Uri Margolin writes for instance, "[…] only fictional narrative can present us with a storyworld participant's mind in action, as it perceives, categorizes, represents internally (creates a "mental image") and judges any object in the storyworld" (Margolin 2003, 282). While perception is considered as central to these theories, researchers have largely fallen short in giving recognition to the way *how* things are perceived, as opposed to *what* is perceived. Thus, another important concern of this book is to understand "embodiment" in fiction in a way that is sensitive to its experiential quality—not as a means unto itself (it's not "in the head"), but as "an active exploration of the world" (Caracciolo 2014, 59).

Chapter 4 will address these questions, arguing that rather than providing a coherent image of a scene, the settings presented in fictional texts are more about the experiential feelings they evoke. The primary difference between travelogues and non-fiction more broadly, compared to fiction, is that characters in fiction predominantly engage in various embodied actions and experiences. This suggests that fiction emphasizes dynamic, sensory interactions with setting, whereas travelogues often present setting in a more detached manner, focused on descriptive and visual detail. Data further shows that "travelogues" is the only genre, compared to both fiction and the other non-fiction sub-genres, that makes significant use of descriptions of settings, clearly distinguishing it from other genres in this respect.

Focusing on how literature simulates perceptual experience, I will explore the concept of mimesis as introduced in literary theory, arguing that setting in fiction serves as a key element of mimesis by creating experiential, affective worlds. This stands in contrast to travelogues, where

[3] A recent study in CLS has found that rather than explicitly invoking characters' consciousness and emotions, narratives focus on their embodied actions. See Piper 2023.

descriptive observation predominates. Essentially, I propose that, rather than characters inhabiting a pre-existing world designed to accommodate their actions, fictional narratives portray the world as unfolding through a character's perceptual and active engagement, evolving dynamically—and processually—through reciprocal interaction with the physical environment.

While "[m]ost narrative theories", Jan Christoph Meister states, are tested and developed on a "single illustrative example" (Meister 2008, 201f.), this project, rather than looking at selected individual passages, uses digitized corpora in order to be able to study the role of space and place in literature at scale. This, however, does not mean that I want to do away with close reading. In the opposite, the exemplary close readings that I provide throughout this thesis, the comparison of texts to one another, form the starting point for my attempt to build a model, and serve as a continuous supplement throughout the process of computational analysis, by using considerably larger scales of evidence than prior work.

As other researchers have done in the past, I aim to present a method of "computational reading" that highlights its iterative and interpretative nature.[4] Instead of adhering strictly to either "distant" or "close" reading practices, I shift between the two at different scales, zooming in and out at various levels. Reading with the computer also required me to reflect a great deal on what "close" (and "distant") actually mean.

A second line of reasoning that runs through this project is thus to reflect on how "reading" itself changes when done with a computer. Mediating between practices of "close" and "distant" reading helps us to refine the categories in question and allows us, as I will demonstrate, to include instances of "setting" that we hadn't noticed before. This process begins with annotation: by examining thousands of passages in fiction and classifying their categorical belonging, we gain a

[4] For work on this topic, see, for instance: Nguyen et al. (2020), Metha et al. (2017), Gius and Jacke (2017), Long and So (2016), Piper (2015).

clear understanding of what these categories mean, how effectively they capture the systematized concept, and what aspects remain unclear or require additional clarification in our conceptual frameworks (Nguyen et al. 2020).

Model outputs offer insights into the texts, and analyzing these texts closely alongside the outputs provides insights into the models, which "can be used for more effective model building" (Ibid.). This process of computational modeling can be understood as a "feedback loop that operates between discovery and re-reading" (Metha et al. 2017, 351).

Reading computationally can therefore be understood as a circular process, in which the computer acts as a "quasi-like" subject with whom the researcher interacts (Piper 2015, 69). This underscores the interpretative and dialogical nature of the iterative process of model building. Identifying and understanding a model's errors requires a detailed analysis of the texts that cause these errors making close reading an essential component of the model's continuous improvement.

While there is a growing body of research in computational literary studies and digital humanities more broadly regarding the German language, the resources freely available—such as datasets, pipelines, or libraries—remain limited, especially when compared to the English-speaking context. Rather than relying on a pre-curated dataset, I thus had to collect my own corpus from the digital libraries available on the internet. Building my own corpus allows me to have at least some control over the quality of the texts included. This means that while I am not scanning and OCR reading my own texts, I nonetheless rely on digital libraries, such as Hathi Thrust or Project Gutenberg. Which library to choose, however, is my decision and allows me to assess the quality of the digitized texts (e.g. how have the texts been collected, how good is the OCR, have the texts been proofread, what kind of metadata exits, etc.).

The most time-intensive part of building the corpus was not scraping or parsing the texts from the source page but cleaning and processing them to make them usable. However, this process also allowed me to tailor the corpus to my specific research needs. Retroactively assigning metadata to a pre-curated corpus can be tedious. From the outset, I chose which digital library to use, determined what metadata was present, and identified what additional information was needed. Having a good understanding of how the data is structured, and equally knowing the structure of the source webpage from which it was drawn, made the later steps in the sampling process much easier for me. Documenting the sampling and cleaning processes, challenges and limitations throughout will in turn make it easier for other researchers to reuse the data ensuring transparency and reproducibility.

This also applies to the modeling process: Making the data (alongside the annotations) and code used in this project publicly available enables other researchers to reproduce my results and review the methodology.[5] Or as Bode suggests, "[w]ithout access to underlying data, visualizations and other data summaries become the only available "text" for analysis. As well as concealing the data used, this situation occludes the fact that such summaries arise from—rather than simply invite—interpretation" (Bode 2019, 49-50). Accounting for the mutable, constructed and partial nature of literary data is important because computational modeling should be understood as an interpretative process that encompasses not only conceptualization and analysis but also more technical steps throughout, such as annotation, data curation, and model selection.

All this is to say that computational modeling is by no means an "objective" process that happens "under the hood," but requires researchers to carefully document and reflect on the interpretative decisions that shaped it. These interpretative decisions, in turn, influence the

[5] The data and code used to replicate this project are available in my GitHub repository: https://github.com/katrinrohrb/aspects-space.

conceptual analyses that accompany such approaches, and vice versa. By coordinating the technical specificity and rigor of quantitative methods with the analytical and theoretical strength of the qualitative methods employed in this project, I hope to demonstrate that using such an approach can bring new insights to the table that would not have been possible otherwise. This does not make one approach superior to the other; rather, by playfully and creatively combining them, and by not losing sight of the affordances and limitations of either of them, new connections might arise that hold the potential to become subjects of further analysis that can be put into broader contexts and perspectives.

CHAPTER 1. Theoretical Approaches to Setting and Space in Narratives

Although space and time are considered the two fundamental principles of prose (Ritter 1975, 1), and function as a central component in the construction of fictional realities (see Auerbach 1946), the description of space in narrative and literary theory has, unlike time, gained comparatively less attention (see Friedman 2005, 192). In her book *Narratology*, Mieke Bal states that "[t]ogether with character, few concepts deriving from the theory of narrative texts are as self-evident and have yet remained so vague as the concept of space" (Bal 2017, 148).

According to Buchholz and Jahn, this neglect stems from two main reasons. First, Gotthold Ephraim Lessing's classification of narrative literature as a temporal art, distinct from spatial arts like painting and sculpture, was long accepted as unquestionable (Buchholz and Jahn 2005, 551). Second, in much pre-19th-century literature, spaces often served only as a general backdrop, functioning as a secondary element that required little critical attention and was perceived as far less integral than the temporal progression of the plot (Ibid).

The dearth of studies of space in narrative theory can also be traced when looking at entries in prominent anthologies of narratology. For instance, the first edition of the *Cambridge Introduction to Narrative* (2002) did not address narrative space or setting at all. However, the second edition, published in 2008, introduced a chapter on "narrative worlds." In this new chapter, Abbott acknowledges the oversight of space in both his own and other narratological studies, noting that "setting has fallen from favor because it suggests a kind of container in which the entities are found, and the events take place" (Abbott 2008, 20). He observes that because "it is often difficult to disentangle setting from what's going on and who's doing it," some critics have opted to explore space in narratives using terms like "storyworlds" or "narrative worlds" to better capture the immersive and expansive qualities of these constructs and their effect on readers (Ibid.).

It is only more recently, driven largely by the "cognitive turn" in narrative theory, that scholars, that critics have also begun "[…] as a result of work by David Herman and Susan Stanford Friedman, and others […] to take up more sophisticated questions about space and setting and to give them the attention they deserve" (Herman et al. 2012, 84). The focus thus shifted from the more "technical" aspects of setting, e.g. static description vs. dynamic events, to a "more complex appreciation of how text and space, fiction and location, might be understood as inseparable and co-productive" (Hones 2011, 686).

In the *Living Handbook of Narratology* Marie-Laure Ryan distinguishes five hierarchical layers to define narrative space in fiction. "Spatial frames" make up what she calls "the immediate surroundings of actual events" that shift from one action to another. These comprise "the various locations shown by the narrative discourse" (Ryan 2010). Next to "spatial frames" there is "setting" which designates "the general socio-geographical environment in which the action takes place" (Ibid.). In opposition to the shifting spatial frames, this is a more "stable category which embraces the entire text" (Ibid.). The term "story space" then designates the space that is "relevant to the plot" as mapped out by the characters' thoughts and actions. The "narrative world" on the other hand is "the story space completed by the reader's imagination" inferred with their "cultural knowledge and real-world experience" (Ibid.). Finally, the "narrative universe" comprises the whole world as presented by the text, including "counterfactual worlds constructed by characters as beliefs, wishes, fears, speculations, hypothetical thinking, dreams, and fantasies" (Ibid.).

Category	Definition
spatial frames	immediate surroundings of the events happening
setting	socio-geographical environment in which the story is set in
story space	Space as it relates to the plot, and how the characters' actions relate to it
narrative world	the way readers complete the story's space in their imagination
narrative universe	the whole world as respresented by the text

Table 1. *Overview of Ryan's model of narrative space*

The levels or "laminations of narrative space" that Ryan presents here offer, as she suggests, a "static perspective" grounded in "the final products of interpretation" based on "our intuitive sense of space as the universal container of things" (Ibid.). While these distinctions provide a useful vocabulary to talk about articulations of space in narratives in more technical terms, they sometimes feel too restrictive or too broad when it comes to apply them to the works of literature themselves. Although Ryan illustrates the categories with exemplary passages from James Joyce's short story "Eveline", this sort of "scaled hierarchy" starting with the smallest unity (e.g. "spatial frames") and then gradually zooming out, might prove to be quite rigid when it comes to account for the more "dynamic" interlacing areas and "coexisting simultaneity" of setting, characters, and events (Hones 2011, 687).

As Hones suggests, to move beyond the traditional concept of a story-internal setting, which aligns "with conventional views of place and space (and text-centered critical reading practices), there is a need for new perspectives on space and place, as well as on textual meaning production (Ibid., 697). The updated framework I propose in this thesis emphasizes the variability and multiplicity of how narrative space is expressed textually.

Some Definitions of Setting and Narrative Space

In its broadest sense, narrative space can be defined as the "space involved in the construction of the fictional world" (Van Baak 1983, 3). The "setting" of a story comprises "the complex of spatial and material configurations and their properties by which a particular environment and the people belonging to that environment are identified in cultural and social behavior" (25). Setting is thought to "promote verisimilitude" and "indirect characterization", by also increasing the familiarity and predictability of a literary character and their behavior (Toolan 2001, 93). Ronen sees setting as akin to the space represented on a theatrical stage, defining it as "[…] the actual immediate surrounding of an object, a character or event" (Ronen 1986, 423). In this framework, the setting establishes and defines the interplay between a character's behavior and their environment, effectively initiating and shaping that relationship.

The literary critic Kenneth Burke was fascinated by the idea that that spaces and places possess an inherent power or quality. He argues that the setting of a story not only reflects but also partially shapes the narrative's unfolding events. As he puts it, "there is implicit in the quality of a scene, the quality of the action that is to take place within it" (Burke 1969, 6–7). The nature of the scene in literature is, according to Burke, conveyed through the "descriptive passages of novels" (Ibid.), serving as "a fit 'container' for the act, expressing in fixed properties the same quality that the action expresses in terms of development" (Ibid.).

Toolan writes that the relation between setting to characters and events "may be causal or analogical," stating that "setting may be (in part at least) either cause or effect of how characters are and behave" to the extent that "a setting may be like a character or characters in some respects" (104). In a similar vein, Phelan and Rabinowitz suggest "setting begins to merge with character –

among other things – because "environment" and psychology begin to intertwine, both causally and symbolically" (Phelan & Rabiowitz 2012, 85).

A character's perception, however, is not only directed to its physical environment, and may be affected by them, but also takes into account smells, sounds, and haptic impressions in a way that often presupposes the activity of the perceiving subject (as in "look at," "to touch," "to listen for" or "prick your ears"). Perception thus operates as an aspect of action, influencing how a character synthesizes space. This active process can play a crucial role in shaping and constituting narrative spaces.

This understanding of setting or narrative space aligns with what phenomenologists like Merleau-Ponty and Gaston Bachelard have described as "lived space," a concept that specifically examines space within the context of literature and human perception (Buchholz and Jahn, 553). Unlike "the three-dimensional, empty, and essentially unoriented spaces of physics and geometry," "lived space" refers to its humanly embodied counterpart (Ibid.). It is the "deictically oriented space" that we encounter and perceive in our everyday lives (Ibid.).

This concept emphasizes a setting that always involves a subject who is influenced by—and in turn influences—space. It highlights "a subject who experiences and reacts to space in a bodily way, a subject who "feels" space through existential living conditions, mood, and atmosphere" (Ibid.). These "subject-oriented interrelations" imbue space with the "rich semantics" it holds, both in real life and in narrative texts (Ibid.). Thus, lived space is fundamentally mediated by the body of the acting subject experiencing it.

By linking this idea to recent theories in cognitive science and cognitive narratology—particularly those addressing embodiment and its relationship to space—I aim to explore how the "experience" of setting is structured differently depending on how the perceiving agent interacts with and responds to it. As we will see, phenomenological and cognitive theories can be highly

useful for understanding how space is imagined in literature, as they allow us to anchor it in a concrete, perceptual environment.

Embodied Perception of Space: A Phenomenological Approach

A large body of work on space in literary and cognitive theory draws—explicitly or implicitly—on a phenomenological understanding of place and space. Concepts such as "experience," "sense of place," and "perception," often discussed in narratology for their relevance to narrative structure, are closely tied to the acting subject and its interaction with the environment. While phenomenology traditionally focuses on how individuals experience their immediate surroundings in everyday life, these theories have also been adapted to explore how "worlds" are perceived within fictional narratives.

Research in narratology, by drawing upon theories from cognitive linguistics and cognitive studies, has looked at the ways narratives facilitate the "transfer of the reader into the fictional reality" (Stanzel 1986, 122), or "deictic shift" in Herman's terms (2002, 271-274). Rather than analyzing individual elements within a narrative, such as character or plot, the focus has shifted towards understanding "narrative ways of worldmaking" (Herman 2009) more broadly. Ryan defines this process of "fictional recentering" as "[...] consciousness relocates itself to another world and … reorganizes the entire universe of being around this virtual reality" (Ryan 2001, 104).

The "virtual reality" or simulation aspect of narrative, which extends beyond the traditional mimesis or verisimilitude of the "real," has also been highlighted in cognitive psychology. This field conceptualizes language as "a set of cues to the comprehender to construct an experiential (perception plus action) simulation of the described situation" (Zwaan 2004, 36). In the context of literature, the German narratologist Monika Fludernik emphasizes the importance of

"experientiality," which relates to how a character perceives the "storyworld." She defines "experientiality" as "the quasi-mimetic evocation of 'real-life experience'" (Fludernik 1996, 9). Fiction, therefore, does not aim to mimetically replicate a given reality but instead conveys a sense of "what it's like" (Nagel 1974; see also Herman 2009) for a character to exist in this world. Fictional narratives encourage readers to adopt unfamiliar perspectives, empathize with characters, understand their thoughts and emotions, and experience the world through their perspective. Fludernik suggests that "[e]mbodiedness evokes all the parameters of real-life schema," which must always be situated within a specific temporal and spatial framework (Ibid.). Similarly, the motivational and experiential dimensions of human action are connected to the understanding of "one's physical presence in the world" (Ibid.).

Fludernik's concept of "embodiment" closely corresponds to Merleau-Ponty's idea of "corporeality," which challenges dualistic views of the body's relationship with its environment. Rather than being treated as a mere object in the world, Merleau-Ponty describes the body as "a phenomenal, lived body in continuous interaction with its environment" (Merleau-Ponty 1973, 78). This interaction, rooted in perception and movement, allows the body to "possess" and "flow[] over into a world" (78). For Merleau-Ponty, the body acts as a "center of potential action" (Merleau-Ponty 1945/2002, 121), emphasizing its dynamic engagement with the environment.

Rather than offering a neurological or "naturalistic explanation of consciousness" or concentrating on "psychological motivation," phenomenology seeks to describe "the experiential structure of our mental and embodied life," encompassing "perceptions, judgments, feelings, etc." (Gallagher and Zahavi 2008, 9). It defines phenomenological space as distinct from the frameworks put forth by Newton, Kant, and Einstein (Löw 2016, 35). Unlike the objective space of mathematics, phenomenological space is not merely a container for objects or a quantitative measure of them.

Instead, it is characterized by a sensory quality, shaped by the subjective experience of space and conditioned by the perceiving subject.

When narratologists engage with these concepts, they often investigate how readers cognitively process the worlds constructed in texts. They propose that stories allow readers to simulate experiences analogous to those in the real world. For example, Ryan argues that during the fictional experience, "the realm of possibilities is [...] recentered around the sphere which the narrator presents as the actual world" (Ryan 1991, 22). She terms this process "minimal departure," which encourages readers to "fill in the gaps [...] in the text by assuming the similarity of the fictional worlds to their own experiential reality" (Ryan 2005, 447). This process is commonly referred to as "narrative worldmaking", and, as Herman asserts, constitutes "perhaps the fundamental [...] requirement for narrative sense-making" (Herman 2009a, 71).

While learning more about the "cognitive processes underlying narrative ways of worldmaking" (Ibid.) is important, what is equally relevant is how these processes are represented textually. Additionally, although embodiment is a key focus in cognitive narratology, it often overlooks the actual embodied, world-oriented nature of these ideas (as they have been theorized by phenomenologists) and how they are expressed in fiction. This is not to say that there aren't any studies that focus on the spatial aspects of these worlds and their impact on a reader's mental construction of a storyworld (for instance, see Herman 2002, Caracciolo 2013, Ryan 2016, Caracciolo and Kukkonen 2021). Yet, the majority of these studies highlight the characters' consciousness, which is seen as central in how narratives evoke storyworlds. This emphasis is also evident in recent publications in renowned anthologies in narratology, where there is an

overwhelming focus on "fictional minds" (see for instance, Ciccoricco 2015, Bernaerts et al. 2013, Herman 2011, Jahner 2008, Palmer 2004).[6]

Herman argues that by "analyzing fictional minds," we simultaneously gain insights into "the readers' minds, too—how readers interpret specific textual details as information on how characters attempt to make sense of the world around them" (Herman 2007, 245). While his approach focuses on fictional representations of consciousness, my interest lies in exploring how characters engage with their physical surroundings, specifically investigating the linguistic strategies that guide readers in imagining these worlds.

As Richard Walsh points out, "every cognitive process is grounded in, and shaped by, the mind's physical embodiment, along with the continuity this embodiment entails between mental function and experiential environment" (Walsh 2017, 473–474). He emphasizes that while embodiment is essential for understanding "the limits and affordances of narrative," it is equally important to recognize "that narrative cognition does not reduce to embodiment but emerges out of it" (474). In this sense, cognition is both embodied and situated, precisely because of its embodied nature.

By focusing on the relationship between behavior and setting, we can explore the ways in which a character mediates space through bodily engagement. Here, behavior is understood as a mode of being and navigating space. In the following section, I will examine the metaphor of "worldmaking" as it has been employed in studies of spatiality in literary texts and assess its relevance to this project.

[6] These books are all part of the "Frontiers of Narrative Series" which puts forth new approaches to study storytelling across different media. To date there is no study on space.

From Setting to Narrative Worldmaking and Back

Herman proposes that narrative worlds function as "systems of verbal and visual cues" that guide readers to spatialize storyworlds into dynamic arrangements of participants, objects, and settings (Herman 2002, 263). Using the notion of "mapping" in a broader discursive context, Herman seeks to explore the "what," "where," and "when" aspects of a mentally constructed storyworld (Herman 2009, 71). By emphasizing the "referential or world-creating properties of narrative," he suggests that analyzing how readers interpret "textual cues" enables us to understand how they build "representations of the worlds evoked by stories, or storyworlds" (Herman 2009, 106). Examining how worlds are imagined in texts is therefore thought to closely parallel how individuals experience their surroundings in everyday life.

Through a qualitative analysis of online book reviews for Cormac McCarthy's novel *The Road*, Marco Caracciolo examines "the mental imagery evoked by spatial descriptions," arguing that "narrative space gains additional significance by shaping readers' emotional and evaluative responses to the text" (Caracciolo 2013, 452). Focusing on the notion of "place" as theorized by human geography, Caracciolo emphasizes the "experiential" aspect that places acquire when encountered by the "embodied subject." Drawing on the concept of "sense of place," he suggests that place has a "distinctive 'feel,' an experiential quality" to it (429). Based on a qualitative analysis of 453 Amazon reviews of the book, Caracciolo argues that "the mental images evoked by spatial references in narratives can draw in their wake emotions, embodied reactions, and thematic evaluations" (437). He thus places special emphasis on the affective or emotional qualities that space—or, in his case, more specifically "place"—is invested with, which correlates with "the vividness of readers' mental imagery" (437).

How readers come to imagine worlds in fiction is also the subject of *Dreaming by the Book* by Elaine Scarry. For Scarry, fiction, as opposed to daydreaming—which always remains somewhat "impoverished" or "feeble"—has the ability to allow for "mimetical perception" that sometimes approximates "real perception" (Scarry 2001, 13). While fiction, in contrast to "visual arts" such as painting or film, is "almost bereft of any sensuous content," it nonetheless allows the reader to imagine a reality of "acute mimesis of perception" (Ibid.). Scarry thus asks: "[B]y what miracle is a writer able to incite us to bring forth mental images that resemble in their quality not our daydreaming but our own (much more freely practiced) perceptual acts?" (14).

According to Scarry, the characters within a fictional world "report to us on the sensory qualities in there that we ourselves cannot reach or test" (22). Fiction mimics a reality that allows us to perceive things as if we were perceiving them ourselves. Scarry suggests that it is especially the sense of touch that is "key to the sense of the formation of solidity" (Ibid.). It is primarily structural objects, such as walls, ceilings, or floors, as well as the specification of the setting, that bring about the "solidity" required to imagine literary worlds in their vivacity. By emphasizing the tactile properties of the fictional worlds, narratives create mental images imbued with what Herman (2009) refers to as "feltness," or what Scarry calls "solidity".

Writers often use sensory details to vividly depict the setting of a story to make it realistic and accessible to the reader. Scarry contends, however, that it involves more than just "the sensory outcome (the way something looks, sounds, or feels beneath the hands)" (9); it also includes the "actual structure of production that gave rise to perception," namely, "the material conditions that made it look, sound, or feel the way it did" (Ibid.). For the narrative to achieve solidity, it needs to

"reproduce antecedent material causes" (18) (i.e., structures such as walls, floors, ceilings, etc., are important). [7]

While the studies I have discussed primarily focus on readers' experience of space, my approach shifts the focus toward examining how these notions are represented linguistically. The discussions above suggest that characters experience space or their surroundings in different ways: Ryan emphasizes motion and the navigation of characters through space; Scarry focuses on touch and solidity, which she considers essential to imagining fictional worlds; and Caracciolo explores the affective and emotional qualities attributed to places, which may, in turn, affect how readers respond to a given text.

What these approaches have in common is that they regard fictional worlds, or more specifically, place or setting, as a perceptual space centered around the character's behavior and embodied presence. Instead of adopting the broader metaphor of "storyworlds" or "worldmaking," which broadly refers to how "worlds" in stories are constructed through diegetic and extra-diegetic elements (and how readers interpret them), I want to stick to the notion of setting for the purpose of this study. My aim is to redefine it in a way that accounts for the specific interdependencies within the physical environment in which characters live and move.

To systematize the concept of setting and its relationship to character and behavior in literature, I employ a triadic model of setting proposed by German literary theorist Gerhard Hoffmann. Hoffmann's model is useful, because it distinguishes between different ways of how setting is experienced by the character without prioritizing one over the other. It thus can be used to formalize the theories presently discussed, by providing a triadic framework that allows us to

[7] A recent study in CLS provides evidence supporting this claim, showing that structural elements are most common in fiction and are primarily associated with physical behavior rather than affective or cognitive aspects (Piper and Bagga, 2022a).

study the different ways of how setting appears in texts more broadly. We shall look at Hoffmann's model more closely in the next section.

Hoffmann's Triadic Model of Setting

In Hoffmann's schema, *gestimmter Raum* refers to an emotional and pre-conscious experience of setting that is non-directional and independent of factors such as distance, proximity, or time. In contrast, *gestimmter Raum* encompasses objects that contribute to a specific mood or atmosphere without being directly related to a character's actions, while *Aktionsraum* centers on the interaction between the acting subject and the things within the space. The relationship between the character and the surrounding objects is described as "primarily functional" (Hoffmann 1978, 79). These objects function much like props in a play, appearing when needed or becoming noticeable only in their absence. Hoffmann writes:

> Dinge im Aktionsraum [sind] nicht mehr (wie im gestimmten Raum) auf Grund ihrer Ausdrucksqualität von Bedeutung […], sondern wegen ihrer Nützlichkeit bzw. Verfügbarkeit. Als etwas Greif- und Nutzbares haben sie ihren Platz im Raum, der hier zum Ort des Aufbewahrens und Hingehörens der Dinge wird, und zwar nach einer Festlegung des handelnden Subjekts. Diese Definition läßt bereits erkennen, daß die Beziehungen zwischen Subjekt und Objekt im Aktionsraum primär funktionell sind – das Ding wird oft erst dann bemerkt, wenn es fehlt, wenn man es vermißt, es hat keinen Selbstwert als in sich ruhender oder angeschauter Gegenstand.
>
> Things in *Aktionsraum* [are] no longer significant (as in *gestimmter Raum*) because of their expressive quality […], but because of their usefulness or availability. As something graspable and usable, they have their place in space, which here becomes the location where things are stored and belong, defined by the acting subject. This definition already indicates that the relationships between subject and object in *Aktionsraum* are primarily functional: the object is often only noticed when it is missing. It holds no intrinsic value as a self-contained object or as a contemplative entity. (Hoffmann 1978, 79)[8]

[8] All translations are mine unless otherwise indicated.

Anschauungsraum, the third category in Hoffmann's model, refers to a distant and detached space where objects, instead of being functional or of value due to their expressive relationship to the observer, are often perceived from a static position (Hoffmann 1989, 92).

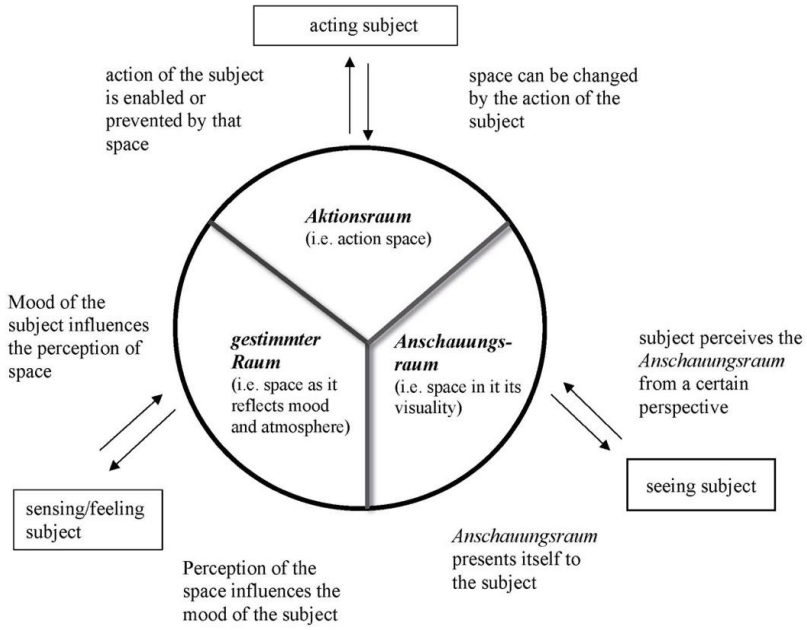

Figure 1. *Model of the different modes of perception of space.*[9]

Both *Aktionsraum* and *Anschauungsraum* differ from *gestimmter Raum* in their directional and centered qualities. In these spaces, the subject's sense of direction is apparent, as it moves in a way that distinctly separates the "here" of its body from any "there." In *Aktionsraum*, this directionality involves movement from one location to another, whereas the defining characteristic of *Anschauungsraum* lies in observing the relationship between "here" and "there" (Ströker 1977, 102 f.)

[9] Adapted from Birgit Haupt, 2004, p. 72.

While *gestimmter Raum* views proximity and remoteness as qualities tied to the subject's mood without measurable distances, *Aktionsraum*, in contrast, is inherently proximate (Ibid.). The active and attentive subject navigates through immediate space. *Anschauungsraum*, however, can be understood as a perspectival and distant space. The subject is no longer immersed "in the midst" of things, as in *gestimmter Raum*, but establishes a boundary between itself and the object, which can no longer be altered or appropriated through movement and is exclusively understood as a counterpart (Ibid. 104). *Anschaungsraum* consistently operates as a frontal space: nearby objects are entirely comprehensible, while those farther away may be partially covered by closer elements (Ibid. 117 f.). In this space, objects are no longer perceived as immediate or functional but rather detached from the subject, existing as counterparts.

While primarily focusing on the three modes employed by Hoffmann, I introduce a fourth category called "descriptive space" into the model. This concept relates to how characters are positioned within a given space by the narrative, even when a perceiving subject is not directly involved. Although "descriptive space" lacks the active engagement by the character found in the other types, it still constitutes a significant aspect of the world in which the character navigates and resides. While these categories aim to be comprehensive, covering the representation of "setting" in fiction and the way characters experience it, they do not include other instances of space in fiction, such as the spaces that are talked about, but the characters aren't present themselves, places that characters plan to go, or spaces that solely appear in dreams or are imagined without being prompted by a character's physical surroundings.

A Close Reading Using Hoffmann's Model

As an example attempt at understanding of how these different types of setting work in literature, and to elaborate on what I've discussed above, I now want to turn to a brief reading of Rilke's *Die Aufzeichnungen des Malte Laurids Brigge* (1910):

> Daß ich es nicht lassen kann, bei offenem Fenster zu schlafen. Elektrische Bahnen rasen läutend durch meine Stube. Automobile gehen über mich hin. Eine Tür fällt zu. Irgendwo klirrt eine Scheibe herunter, ich höre ihre großen Scherben lachen, die kleinen Splitter kichern. Dann plötzlich dumpfer, eingeschlossener Lärm von der anderen Seite, innen im Hause. Jemand steigt die Treppe. Kommt, kommt unaufhörlich: Ist da, ist lange da, geht vorbei. Und wieder die Straße. Ein Mädchen kreischt: Ah tais-toi, je ne veux plus. Die elektrische rennt ganz erregt heran, darüber fort, fort über alles. Jemand ruft. Leute laufen, überholen sich. Ein Hund bellt. Was für eine Erleichterung: ein Hund. Gegen Morgen kräht sogar ein Hahn, und das ist Wohltun ohne Grenzen. Dann schlafe ich plötzlich ein (Rilke 1910/2000, 8).

> The fact is, I can't give up sleeping with the window open. Electric tramcars with all their bells ringing rage through my room. Automobiles drive across me. A door slams. Somewhere glass from a broken window clatters to the ground. I can hear the big pieces laughing and the little splinters sniggering. Then suddenly a dull muffled sound from inside a house on the other side. Someone's coming up the stairs. Coming, coming, on and on, is there for a long time, goes past. Back in the street. A girl shrieks: 'Ah, tais-toi, je ne veux plus!' The tram, mad with excitement, races up, and across, and away. Someone is calling. People are running, overtaking one another. A dog barks. What a relief: a dog. Toward morning there's even a cock crowing, and what a boundless blessing it is. Then, abruptly, I fall asleep (Rilke 1910/2023, 8).

Throughout this passage, the perceiving subject becomes increasingly absorbed by its surrounding environment. As Malte sleeps with the windows open, he loses the ability to distinguish between what is inside and what is outside. Struck by the various sounds dominating the city, Malte's body becomes enmeshed in a neural web of different impressions that decenter the unity of perception, such as sight and hearing. The objects described in this passage take on their own agency, transcending what is physically and logically possible, encompassing not only the street and cityscape but also Malte's body (Koepnick 2006, 203).

Returning to Hoffmann's different types of setting, this scene would clearly be categorized as *gestimmter Raum*. Characteristic are the emphasis on mood and atmosphere, the prevalence of sounds that contribute to the expansion or contraction of space as well as the anthropomorphizing qualities of things that explore the interdependence between the various actors, and the absence of clear directions. Despite Malte being at the heart of the described setting, he perceives it as atmospheric and all-encompassing, becoming completely absorbed within that space. In this passage, the setting is exclusively experienced in relation to the momentary sensation.

While the mode of *gestimmter Raum* predominates in this scene, a few passages earlier we encounter other modes of perceptions of space that are equally important for the depiction of Malte's Paris. Let's take a look at the opening passage of the novel:

> September, Rue Toullier. So, also hierher kommen die Leute, um zu leben, ich würde eher meinen, es stürbe sich hier. Ich bin ausgewesen. Ich habe gesehen: Hospitäler. Ich habe einen Menschen gesehen, welcher schwankte und umsank. […] Ich habe eine schwangere Frau gesehen. Sie schon sich schwer an einer hoehen, warmen Mauer entlang, nach der sie manchmal tastete, wie um sich zu überzeugen, ob sie noch da sei. Ja, sie war noch da. Dahinter? Ich suchte auf meinem Plan: Maison d'Accouchement. Gut. Man wird sie entbinden – man kann das. Weiter, Rue Saint-Jacques, ein großes Gebäude mit einer Kuppel. […] Die Gasse begann von allen Seiten zu riechen. Es roch, soviel sich unterscheiden ließ, nach Jodoform, nach dem Fett von Pommes frites, nach Angst. […] Dann habe ich ein eigentümlich starblindes Haus gesehen, es war im Plan nicht zu finden, aber über der Tür stand noch ziemlich leserlich: Asyle de nuit (Rilke 1910/2000, 8).
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> September 11th, rue Toullier. Here, then, is where people come to live; I'd have thought it more a place to die in. I've been out. I've seen: hospitals. I saw a man reel and fall. People gathered round him, which spared me the rest. I saw a pregnant woman. She pushed herself heavily along beside a high warm wall, sometimes touching it as if to make sure it was still there. Yes, it was still there. […] The lane began to smell on all sides. It smelled, so far as I could make out, partly of iodoform, partly of the grease from the pommes frites, and partly of fear. All cities smell in summer. Then I saw a house strangely blinded by cataracts. It was nowhere on my map, but over the door and still quite legible were the words: 'Asyle de nuit' (Rilke 1910/2023, 6).

Dropped right in the middle of Paris, the reader follows the first-person narrator, as he searches for a hotel. While the passage is comparatively sparse in concrete spatial markers, it is rich in vivid

descriptions of perceptions of the scenery: what it looks and feels like, the tactility of it, how it smells. The few spatial details that are given, however, allow us to situate the character in a concrete, physical world. The street name introduced at the outset functions as a kind of anchor, establishing a specific and named location for both the characters and the reader. As the passage moves on, the physical space of the city becomes tangible and distinctive, emphasized through its affective qualities: the solidity and warmth of the wall providing stability for the woman, the unique scent of the alley, and the somewhat peculiar appearance of the house. These aspects of the setting contribute to our understanding of the character's circumstances, creating a unique atmosphere. But it not only does so through atmosphere and sensuous perception but also through movement. Equipped with a map, we follow our character trying to navigate his way through the streets of Paris. The descriptions of architectural sights and buildings on the other hand contribute to the visual imaginary of that space.

My intention in this analysis is to demonstrate that setting is not some kind of inert framework, that exists independently of the subject as a mere container. Contrary to being a passive backdrop to characters' actions, narrative setting has the potential to instigate actions and influence the way characters are and behave. Hoffmann's schema allows us to categorize the different ways how the experiencing subject is affected by or in turn brings its own attitudes to bear on space.

In order to elucidate just what I mean by the relationship between setting and behavior, I now want to turn to a passage of Theodor Fontane's *Irrungen, Wirrungen* ("Trials and Tribulations") (1888). Following the emotional life of the character Lene, we come to see that her feelings get increasingly determined by her surrounding environment. During her stay at a countryside inn with Botho, Lene becomes acutely aware of the deep class divide separating them. As she gazes at the paintings in the room, she finds herself unable to decipher their English titles, as she does not speak

the language. Realizing "[die] Kluft […], die sie und Bothe trennte" (Fontane 1888/1979, 76] ["the chasm that divided her and Botho" (Fontane 1888/2009, 56)] the passage continues:

> Dicht neben der Eingangstür, über einem Rokokotisch, auf dem rote Gläser und eine Wasserkaraffe standen, hing noch eine buntfarbige mit einer dreisprachigen Unterschrift versehene Lithographie: „Si jeuness savait", - ein Bild, das sie sich entsann in der Dörrschen Wohnung gesehen zu haben. Dörr liebte dergleichen. Als sie's hier wieder sah, fuhr sie verstimmt zusammen. Ihre feine Sinnlichkeit fühlte sich von dem Lüsternen in dem Bilde wie von einer Verzerrung ihres eigenen Gefühls beleidigt […] (Fontane 1888/1979, 76)

> Close to the entrance door, above a rococo table, on which stood some red glasses and a water carafe, hung a gay colored lithograph with an inscription in three languages: "Si jeneusse savait"—a picture which Lena remembered having seen at the Dörrs'. Dörr loved such things. When she saw it here again, she shivered and felt distressed. Her fine sensibility was hurt by the sensual quality of the picture as if it were a distortion of her own feeling […] (Fontane 1888/2009, 56).

The description of the baroque interior and the arrangement of the objects contribute to the characteristic atmosphere established in this scene. Thus, even without Lene "experiencing" the space directly, but rather viewing it from a certain distance—akin to Hofmann's *Anschauungsraum*—the material arrangement of things laid out, as referred to in the first sentence of the passage, already evokes specific expectations that will become distinctive for the character.

While Fontane's passage is set within a "typical" bourgeois environment, the setting significantly influences the behavior of the character, aligning closely with Lene's expectations of the space. As the narrative unfolds, the confined atmosphere and Lene's psychological state become increasingly intertwined, reinforced by the detailed depiction of the interior and its furnishings. The setting reflects the ambiguity and frivolous attitudes and expectations of the people who usually consort in these rooms and lay cause for Lene's *Verstimmung* ("unease").

Much like the passage from Rilke discussed earlier, the narrative shifts between different ways the character experiences the setting. The material arrangement of the room establishes a tone that anticipates the actions to come. As the narrative unfolds, the character becomes more and

more drawn into the scene described, functioning not as a detached observer, but starting to become affected and "moved" by the physical environment surrounding her.

Although it's not her home, Lene feels haunted by the traces left within the interior—particularly the picture she recently saw at Dörr's apartment, which embodies the very social circumstances she seeks to escape. Lene tries to distract herself from her upsetting thoughts by gazing out of the window:

> […] und so ging sie denn, den Eindruck wieder los zu werden, bis an das Giebelfenster und öffnete beide Flügel, um die Nachtluft einzulassen. Ach, wie sie das erquickte! Dabei setzte sie sich auf das Fensterbrett, das nur zwei Handbreit über der Diele war, schlang ihren linken Arm um das Kreuzholz und horchte nach der nicht allzu entfernten Veranda hinüber. Aber sie vernahm nichts. Eine tiefe Stille herrschte; nur in der alten Ulme ging ein Wehen und Rauschen, und alles, was eben noch von Verstimmung in ihrer Seele geruht haben mochte, das schwand jetzt hin, als sie den Blick immer eindringlicher und immer entzückter auf das vor ihr ausgebreitete Bild richtete. Das Wasser flutete leise, der Wald und die Wiese lagen im abendlichen Dämmer, und der Mond, der eben wieder seinen ersten Sichelstreifen zeigte, warf einen Lichtschein über den Strom und ließ das Zittern seiner kleinen Wellen erkennen. (Fontane 1979/1888, 76)

> […] and so, in order to shake off the impression, she went to the window and opened both sashes to let in the night air. Oh, how refreshing it was! She seated herself on the window-sill, which was only a couple of hands' breadth from the floor, through her left arm around the middle bar and listened to hear what was happening on the veranda. But she heard nothing. Deep stillness reigned, except that in the old elm there was stirring and rustling, and any discomfort that might have lingered in her mind disappeared at once, as she gazed with ever-growing delight on the picture spread out before her. The water flowed gently, wood and meadow lay in the dim evening light, and the thing crescent of the new moon cast its light on the stream and showed tremulous motion of the rippling waves (Fontane 1888/2009, 56).

Again, the passage shifts between different modes of depicting the setting in question. These modes do not refer to different spaces but to different situations experienced within it. In this case, although it refers to the same setting (as well as the setting already discussed in the previous passage), the narrative shifts from *Aktionsraum* to *gestimmter Raum*, due to changes in the behavior of the character within it.

The scene begins with the character moving through the room, sitting down at the windowsill, and wrapping her arms around the crosspiece for stability. Besides the defining "structure" of the window, the detailed descriptions of its composition and, equally important, the tactile experience of the character holding onto the crosspiece are central. Contrary to the emphasis theorists place on visual and auditory elements, Scarry argues that it is the sense of touch—whose mechanism is most distant from us in imagining—that is crucial for producing a sense of solidity in narratives (Scarry 2001, 12).

Here, it's particularly the auditory and atmospheric qualities with which the landscape is depicted that capture the character's attention and subsequently affect her mood. The experience of an object or landscape can vary in immediacy: While in the first sentence the relationship between the character and the setting is mainly "goal-directed" and functional, depicting space as something to be moved through, the preceding sentence describes how the character is drawn into the landscape she is gazing at, becoming absorbed by it. In its most "basic" makeup, similar to how space functions in real life, setting in fiction can be described as "a capacity or possibility for extended beings, or bodies to exist" (Scarry, 2001, 12). However, how this space is negotiated or interacted with depends on what matters to the agent or what it cares about. The personal and affective meanings with which a setting is invested are thus based on the different attitudes (*Haltungen*) that the subject brings to bear on this space.

When comparing the depiction of Rilke's setting to the one presented by Fontane, we can certainly detect historical (and stylistic) differences in how these spaces are described. In Rilke's passage, the emphasis is placed almost entirely on how the setting is experienced and filtered through the perception of the internal focalizer, rather than presenting the external world that the character inhabits. This contrasts with Fontane's novel, where the scene is dominated by the quantity and descriptive richness of objects.

This aligns with Auerbach's claim that the realist novel tends to "develop most fully a practice for registering the function of the interior space as an object-filled milieu for fictional people" (cf. Stanica 2014, 514) In Fontane's passage, an extensive description of the furniture and the various rooms of the house the character enters precedes the action. The narrative order in this passage thus "cements the function of space to accommodate character" (Ibid.).

This does not mean that the setting in Fontane's passage lacks atmospheric or affective qualities; on the contrary, it eventually begins to influence the character's emotional state and becomes a site of interaction for the fictional subject. However, the textual introduction of the setting differs significantly. In Fontane's passage, the narratorial description of the setting dominates the beginning of the scene, before transitioning to other ways in which space is experienced. By contrast, in Rilke's scene, such descriptive elements are almost entirely absent. Instead, the emphasis is placed on the character's active exploration of the physical surroundings from the outset, whether through movement or sensory perception.

While I will discuss the historical role of setting and how it has been theorized in literary studies more extensively in the third chapter of this thesis, by focusing on the selective passages provided above, we can indeed see historical differences in how the depicted spaces are rendered textually. When studying this quantitatively, we will see if the linguistic shifts that we've observed through close reading these two passages also hold up when examined at scale by including a considerably larger and more diverse range of texts to which we can apply these categories.

For the purpose of this study, it is important to note that I do not consider differences in perspective from which the story is told (e.g., internal or external focalizer). As Fludernik suggests, narratives are always "experiential" in nature, regardless of whose perspective the story is told from (Fludernik 1996, 9). Since I am interested in gaining insights into the relationship between behavior

and setting, distinguishing between different perspectives does not seem relevant to the research questions I aim to analyze.

As demonstrated in the close readings above, Hoffmann's tripartite framework is particularly useful for distinguishing various behavioral modes of the embodied agent within the depicted setting and for analyzing how the textual spatial structure of these lived spaces evolves.

Conclusion

This chapter, through a review of relevant literature on setting and space in narratives, establishes the theoretical foundation of this thesis. By incorporating theories from fields such as narratology, phenomenology, cognitive science, and literary studies, I have aimed to illustrate the breadth and depth with which space has been previously analyzed and theorized. A phenomenological approach to space in narratives allows us to move beyond viewing setting as a static backdrop, instead emphasizing its experiential and embodied qualities.

Phenomenological theories, therefore, help articulate a more embodied concept of setting in literary texts, despite phenomenology's usual focus on human perception of the physical environment rather than fictional worlds. Hoffmann's model, which builds specifically on Ströker's work and draws from phenomenologists like Heidegger, Husserl, and the German psychologist Karlfried Graf Dürckheim, provides a framework for applying these categories to fiction.

Building on the insights and model outlined here, the next chapter will focus on how Hoffmann's framework can be operationalized computationally. This will involve adapting his model to develop an annotation scheme that clearly delineates each category of spatial experience—*gestimmter Raum*, *Aktionsraum*, *Anschauungsraum*, and "descriptive space." By formalizing these categories, I aim to create a systematic method for identifying and analyzing

narrative space across a broader corpus of texts, thus bridging the gap between theoretical and computational approaches to literary analysis.

CHAPTER 2. Implementation and Model Building

This chapter focuses on putting the proposed model into practice, specifically its computational implementation, covering the steps from annotation to training and validating the model. It also includes a review of computational approaches that underpin this work. While the previous chapter elaborated on the theoretical foundation and conceptual model underpinning this study, this chapter aims to outline and detail the steps necessary to make the model—or the concept presented— "actionable" (Piper 2017, 654).

A "model" is most commonly thought of as a representation. In my case, it's a representation of the concept of setting and how it functions within narratives. To operationalize this representation, we must translate abstract concepts into measurable and analyzable components. A first step to do this, is to find several examples that apply to the different modes of setting outlined in my model and to annotate these attributes across different texts.

Bridging theoretical conceptualization and empirical analysis also allows us to adjust our model as we proceed. A model is not just a representation but can also serve as a "thinking tool," "to encourage thought, to allow inferences, discovery, and creative leaps" (Tversky 2018, 60). The process of labeling sentences according to the categories they refer to required me to have a clear understanding of what these categories mean. Language is nuanced, and not all sentences that I seek to map onto these categories fit neatly into either/or distinctions or can be marked as 0 or 1. Although there is a clear advantage in using a sentence-based classification model compared to dictionary-based methods for this task, it still has limitations.

While I will touch on some of the limitations at the end of this section, one issue already apparent during the annotation process is that not all categories—even at the sentence level—are mutually exclusive; they may overlap. Nevertheless, for the model to learn effectively, it is crucial

to include such “edge” cases, even if they involve a certain degree of uncertainty on the annotator’s part. Given that I annotated all sentences used for training myself, I can document these instances, adjust the model as needed, adapting the categories or even adding new ones if I feel that some aspects of how “setting” appears in the texts are not adequately captured by Hoffmann’s model.

Conceptualization thus does not end with the theory chapter, leaving the rest to be handled purely by algorithms and numbers. Using the model as a “thinking tool” means carefully documenting the process and moving back and forth between conceptualization and operationalization. After all, while using a model that has been pre-trained on German fiction, which I then fine-tune specifically for my task, it can only learn and generalize about the categories based on the information I provide during the fine-tuning process.

After the model has been successfully trained, we need to ensure that it is adequately capturing the categories at hand. The most straightforward method (and a standard in NLP) is to hold back some of the training data purely for testing. This means that not all examples gathered are used for training the model. Typically, one-third of the data is held back for testing and validating the model. This means that after training, I run the model on the testing data (examples that I labeled but that the model hasn’t seen yet) to evaluate how well it performs on unseen data.

To examine the annotations more closely, I will also provide visualizations that plot the final hidden state associated by my model to each of the annotated sentences from the training set as individual data points: Each such data point is a two-dimensional representation of the high dimensional vector assigned as the final hidden state by the model to the sentence. This approach allows us not only to understand relationships between different categories in the model’s learned representations but also, by examining examples of individual sentences, to gain insights into the model’s underlying functionalities, which reflect the underlying semantical structures in our classifications.

As an additional test, as well as to get a better sense of the model's proficiency I also inspect the model's output "in the wild." Applying the model to new data and inspect how it labels these data can give us a more robust sense of what it's doing. While ideally the examples that I labelled (and here the more examples is usually the better) should cover the breadth and depth of the corpus I apply it to, covering a wide range of texts, there is still a possibility that something has been missed during the annotation process, which might turn up when inspecting the model's output on unseen data more closely.

Such a close inspection of the output, beyond the validity measure provided by the run on the test data, is solemnly done in standard NLP work (Nguyen et al. 2020, 10). The testing data is called the "gold standard" in computational linguistics and NLP work, providing the "ground truth" of what the actual labels of the categorized data are. With regard to computational linguistics, Hammond et al. state: "ambiguity is almost uniformly treated as a problem to be solved; the focus is on disambiguation, with the assumption that one true, correct interpretation exists" (Hammond 2013, 2). In the realm of literary studies and the humanities more generally, categorizing something as objectively "true" is especially problematic, given the ambiguity and room for interpretation that literary data holds. As I stated in the introduction, the modeling process is always already an "interpretation" and is influenced by the choices the researcher makes.

Given that there is no clear notion of "ground truth" in this case, it is important to make clear to the reader—based on my theoretically-driven approach, why I have placed the data in these categories and not others. Thus, while in computational linguistics and NLP more generally, the focus of the analysis is often dependent on the "success" and accuracy of the predictor (i.e., the higher the F1 score, the better), these kinds of "approaches still center the task of prediction, rather than the generation of insights about relationships between theoretically-motivated constructs" (Nguyen et al. 2020, 9).

While it is undoubtedly important to assess the performance of the predictor, it is equally crucial to provide reasoning and examples for why I believe the categories cover the concept at hand, how they are theoretically motivated, and how they are best translated into a computational context. This, again, is not a linear process but requires moving back and forth between different steps, making adjustments along the way.

The first chapter, therefore, provided "the background concept"—i.e., "the full and diverse set of meanings that might be associated with a particular term" (cf. Ibid. see also Adcock and Collier 2001)—laying out the theoretical and conceptual foundation upon which this work is built, and "the systematized concept," i.e., "the formulation that is adopted for the study" (Ibid.). In my case, this is Hoffmann's model, which provides the most suitable theoretical framework—at least in my view—for the research question at hand. Hoffmann's model combines the flexibility needed to address different representations of setting in fictional texts with the formal structure required for computational analysis.

Adapting Hoffmann's model for this task required some rethinking and adjusting the categories to clarify their meanings and scope. While I generally agree with Hoffmann's tripartite model, I refined some definitions during close readings and data labeling. Additionally, I incorporated elements missing from his model, which emerged through close reading—most notably, an additional category I call "descriptive space."

Once the model has been built and we are confident in its ability to perform the required task consistently across a variety of texts, we can proceed to apply it to the datasets in question. Given the scarcity of available German-language corpora, I chose to build my own corpus using texts from the Gutenberg library available online.

Following existing guidelines and best practices, similar to those used for annotation and model building, [10] I aim to document the corpus construction process as thoroughly as possible. This is important because the decisions made during these processes, as well as how these processes are carried out and what steps they entailed, directly affect the functionality of the model. Making these decisions transparent is important to provide readers (and those who might want to replicate this work) with a full picture of the interpretative and technical choices involved.

Before outlining the annotation process, I will briefly discuss prior work in CLS that has addressed the concept of space in narratives. The next section presents an overview of studies that have approached this concept from a narrative-oriented perspective, as well as those focusing on the geographical aspects of space.

Computational Approaches to Space in Literature

As indicated in the introduction to this thesis, much work in CLS has focused on geographical approaches to space. Using tools such as named entity recognition (NER), topic modeling, and sentiment analysis, studies have explored how geographical space is constructed in literature. For instance, Evans and Wilkens (2018) examined geographical diversity in British Fiction and assessed the literary historical narratives underlying this diversity. Another study investigated how national literatures address their "home country" compared to other global locations and how they differ in their geographic representations (Wilkens 2021). In a similar vein, Erlin et al. (2021) analyzed how different "national literatures" approach "national themes." Others

[10] While guidelines specifically targeted at research in CLS are limited, some notable exceptions exist. For the annotation and modeling process here, I have primarily relied on the best practices and guidelines outlined by Nguyen et al. (2020). Although their study focuses more on computational text analysis within the field of social sciences, their insights—drawing on personal experiences and challenges encountered and using a case study to illustrate their points—have proven highly useful as guidance for my work here. For a more comprehensive perspective on how to theorize, conceptualize, and operationalize such a project, see also Piper (2017).

have analyzed how specific geographic or non-geographic spatial entities relate to emotions and affect using named entity recognition and sentiment analysis tools (Grisot & Hermann 2023, Heuser et al., 2016).

In addition to Grisot and Hermann (2023), another study specifically focusing on German-language literature, used NER to analyze spatial elements at the word level. This study examined concrete references to social space, interactions between characters, and their distribution within texts (Schumacher 2024). This body of research highlights how computational tools have been leveraged to better understand the representation and distribution of geographical and spatial elements across different literary traditions and socio-historical contexts.

Recent scholarship in CLS has started to examine the function of narrative space in fictional texts. In an exploratory study, Dennis Yi Tenen's essay (2018) employs Jakob von Uexküll's concept of *Umwelt* to illustrate how a character's immediate perceptual environment, or "effect space," is shaped by attention to surrounding objects. To investigate this, Tenen used a dictionary-based approach to count nouns related to things in a corpus of British fiction. Building on Tenen's work, Piper and Bagga (2022) applied machine learning models to a large corpus of historical and contemporary fiction to analyze the role of "things." While not explicitly focused on space, their study highlights the significance of material artifacts in narratives and their implications for a character's embodied agency.

Situating characters in their physical environments, Soni et al. (2023) analyzed the connections between characters and places (e.g., whether a character is in, at, or near a place) using LitBank's entity tagger and multi-classification models. A follow-up study by Wilkens et al. (2024) focuses specifically on how characters move through space in the context of English literature, measuring the "physical mobility" of characters across both geographical and non-geographical settings.

Moving from NER to analyzing things and character mobility, researchers have demonstrated how computational methods can provide deeper insights into the physical and geographical environments that literary characters navigate and inhabit. By quantifying these spatial and material dynamics, such studies offer new perspectives on how "geography is integrated into textual worlds" (Ryan 2003, 338) and on the relationship between characters and the places they occupy, highlighting the importance of spatiality as a key dimension of literary analysis.

Building on this prior work my approach aims to explore the relationship between setting and character behavior. By examining how different types of settings affect the actions and experiences of characters, I seek to better understand how setting shapes behavior, perception, and the overall narrative structure. This approach not only highlights the significance of the physical environment but also considers how settings actively influence and are influenced by the characters within them, ultimately shedding light on the interplay between narrative space and agency.

While some of the studies surveyed here make use of pre-existing pipelines such as BookNLP, or popular packages such as NER, which facilitate the automatic extraction of features for predefined tasks, others employ manual annotation to classify features that are too specific or too nuanced to be captured by any of these libraries. Annotation can be an arduous task, but when done carefully, it also affords the opportunity to sharpen one's analytical categories. Therefore, in the next section, I want to outline the steps it takes to translate Hoffmann's model into a computational context. Among other things, this will also require pondering the process of annotation a bit to demonstrate its benefits for a hermeneutically inspired computational reading.

Building a Model

Moving from "conceptualization" to "operationalization" requires making the proposed framework measurable. While I have already outlined Hoffmann's model and provided close readings to demonstrate its applicability to literary texts, we now need to prepare the data so that it can be processed by a computer. One initial step is to determine the length of the textual passages to be analyzed. Should we focus on lengthier passages, individual sentences, or word windows of a particular size? These questions are crucial because the computer requires a defined "unit" to process, and the choice of this unit—whether it is a word window of ten or one hundred tokens, a sentence, or a paragraph—must be made by the researcher preemptively and might affect the outcome.

While Hoffmann focuses on passages when discussing his categories, the frequent overlap between these categories makes them too ambiguous to apply effectively to entire passages. As we will see, narratives tend to use setting quite economically, frequently shifting between the different modes within scenes as proposed by Hoffmann. This dynamic nature of narrative setting can blur the boundaries between categories, making consistent categorization at the passage level challenging.

While it is logical for a researcher to select and closely read passages representative of specific categories or arguments, computational analysis necessitates careful consideration of the affordances (and limitations) of automated methods. Annotating at the sentence level allows for a more precise alignment between narrative content and the categories being analyzed, ensuring that each unit of text can be assigned to the appropriate category with minimal ambiguity (though some ambiguity may still exist even at the sentence level).

Furthermore, the scale of this study—analyzing approximately 6,000 books, representing the combined datasets to which I will apply the model—necessitates computational methods. Manually labeling such a vast volume of data would be unmanageable for a single researcher, whereas machine learning models can efficiently perform this task. By leveraging computational techniques, we can systematically apply Hoffmann's categories to a large corpus, uncovering patterns of setting not only in isolated passages or individual books but also across an extensive body of texts. This approach enables us to explore narrative space in ways that traditional close reading alone could not achieve.

However, before a computational model can be effectively used, it must be trained on annotated labels. Given the complexity of the task, these labels are created manually. By annotating a representative sample of sentences, we can train the model to recognize the diverse ways in which setting appears. Annotation thus bridges the gap between theoretical categories and machine learning.

The following section outlines the annotation process, detailing the rationale behind each category and the textual examples assigned to them, while also addressing challenges encountered during annotation. Although Hoffmann's framework was previously introduced, I will briefly recap the categories as they are applied here, providing specific definitions for each. These categories, while based on Hoffmann's model, have been adapted as needed throughout the annotation process.

Additionally, the manual annotation serves as a benchmark for evaluating the model's performance, allowing me to assess whether the classifier's output aligns with my interpretation of narrative setting as outlined here.

Annotation

What makes modeling space in narratives difficult is that space in fiction often appears to be overtly schematic, relying on the reader's "world knowledge" to fill in the missing gaps. Approaches such as dictionary matching often prove problematic due to word disambiguation. This is especially important for fiction, where specific words that refer to spatial entities (e.g., "der Grund," which can mean "ground, soil, or land" or "reason," as in "the reason for something") might also frequently appear in other contexts with different meanings, resulting in skewed classifications. Transformer models such as BERT, which I use in this project, do a significantly better job of modeling language and complex concepts such as "narrative space" compared to previous methods.

To get a better understanding of the role of setting in fiction at scale, I translate Hoffmann's model into a computational context. In order to do so, I annotate the different types of setting that Hoffmann suggests, and then train a model based on these annotations. Based on the categories outlined above I start by mapping Hoffmann's categories to textual units through the process of annotation. For example, sentences corresponding to the category of *Aktionsraum* typically describe spaces that are moved through by the character, a character's interaction with objects or the surrounding material environment, or obstacles that hinder the character's movement through space.

For instance, the sentence, "Margreth stand auf und ging in die Kammer" [Margreth got up and went into the chamber] (Droste-Hülshoff, *Judenbuche,* 1842), is a straightforward example of this space type. In contrast, a sentence such as "Ich hatte mich schon wirklich durch den Rosenhain, den Hügel hinab, glücklich geschlichen, und befand mich auf einem freien Rasenplatz, als ich aus Furcht, außer den Wegen durchs Gras gehend angetroffen zu werden, einen forschenden Blick um

mich warf" (Chamisso, *Schlemihl*, 1800) [I had hastily glided through the rosegrove, descended the hill, and found myself on a wide grass plot, when alarmed with the apprehension of being discoverd wandering from the beaten path, I looked around me with enquiring apprehension], is more complex. This sentence blends emotions with movements and perception. However, I'd suggest that movement is the predominant action here, and the sentence should thus be labeled as *Aktionsraum*. The emotions expressed are more related to the company of the people the character is fleeing from, rather than his physical surroundings.

Gestimmter Raum in my codebook refers to space as it reflects mood and atmosphere. Take for instance this sentence, drawn from Storm's *Viola Tricolor*: "Es war sehr still in dem großen Hause, aber selbst auf dem Flur spürte man den Duft von frischen Blumensträußen" [It was very quiet in the large house, but even in the hallway, one could sense the scent of fresh bouquets of flowers] (1874). Smells aren't typically perceived corporally (in a tactile or bodily sense), yet the peculiar choice of words here—using *spüren* instead of *roch*, for example—conveys a presence that can be felt, an almost physical awareness, but one that isn't easily traced to its source. *Spüren* in German, by definition, refers to something that "can be bodily experienced" (similar to "sensing" something in English) without being tied to specific senses like sight, sound, or smell. It's most closely linked to touch, emphasizing a tactile quality, as though felt on the skin. Although there is no character explicitly present in this passage, the use of the impersonal pronoun "man" subtly suggests an experiencing agent.

A character may also be emotionally affected by setting. Take, for instance, the following sentence from Joseph Roth's *Hotel Savoy*: "Ich gehe den Korridor entlang der Haupttreppe zu und freue mich über die schöne Quaderpflasterung des Hotelgangs, die rötlichen, sauberen Steine, das Echo meiner festen Schritte" [I walk along the corridor towards the main staircase and take delight in the beautiful stone paving of the hotel hallway, the reddish, clean stones, and the

echo of my firm steps] (1924). While the character is moving through that space, what is more prominent is the joy he feels about walking through that corridor, prompted by the appearance of the clean stones and the echo of his "firm steps." He is affected by the space, not only visually but also through sound. Thus, while in the examples illustrative of *Aktionsraum* setting is something to move through—getting from point A to point B—here, the setting and the attitude the character brings to bear on that space has a different quality. Although the character moves through it, the space also somehow affects his mood, which aligns with the concept of *gestimmter Raum*.

This space type also captures how setting itself may function as an "actor," exemplifying the anthropomorphic function setting occasionally takes on in narratives: "Schon sah er die Birke, die auf dem Steinwall stand; sie sah hoch und schlank und wohlwollend zu ihm her und wiegte in stummem Einverständnis leise ihr Haupt" [Already, he saw the birch standing on the stone wall; it looked tall, slender, and benevolent as it gazed at him, gently nodding its head in silent agreement] (Kröger, *Aus alter Truhe,* 1908). Here, while the character is looking at the tree, the anthropomorphic rather than the visual quality (as in *Anschauungsraum*) of the setting predominates, introducing an affective element. However, *gestimmter Raum* can also simply describe an atmosphere or mood without directly affecting a character's emotions or inner state. This still creates a *Stimmung* that can be felt by the experiencing agent. It often involves elusive sensory elements such as sounds, shadows, lights and darkness, or weather phenomena, as seen in this example: "Naß und zugig war's in den giebeligen Gassen, und manchmal fiel eine Art von weichem Hagel, nicht Eis, nicht Schnee" [It was wet and drafty in the gabled alleys, and occasionally a kind of soft hail fell—neither ice nor snow] (Mann, *Tonio Kröger*, 1903).

On the other hand, "descriptive space" is not related to any subject's agency, or a setting's ability to convey mood or atmosphere. It functions merely as a description—rendering a scene,

showing how things are positioned in space, and indicating where something is located, as in the following example: “Der Schlitten, eine einfache Schleife, auf der ein mit einem sogenannten »Plan« überspannter Korbwagen befestigt war, stand all die Zeit über ruhig auf dem Fahrdamm, hart an der Öffnung einer hier aufgeschütteten Schneemauer” [The sled, a simple sleigh with a wicker carriage covered by a so-called “plan,” stood calmly the entire time on the roadway, right by the opening of a snow wall that had been piled up here] (Fontane, *Vor dem Sturm*, 1878).

Anschauungsraum, while similarly descriptive and somewhat detached in nature, is nonetheless related to the subject—a subject that observes things from a more or less static point of view: “Sie führte mich in ein reinliches Zimmer, wo ich in der Ecke durch halbgeöffnete Bettvorhänge meine Schöne aufrecht sitzen sah” [She led me into a tidy room, where I saw my beloved sitting upright in the corner through half-opened bed curtains] (Goethe, *Wilhelm Meisters Wanderjahre*, 1821). Although there is some movement in this passage, the focus lies on what the character sees, on what is in front of him. At other times, it is even clearer that the character appropriates the space with his eyes rather than through touch and movement, as in this passage: “Er machte wieder eine kleine Pause, ließ seine Blicke über die andächtige Versammlung schweifen und richtete sie dann mit einem gewissen Triumph auf den Superintendenten, der sehr unruhig und rot wurde, denn nach den schon erlebten Unglaublichkeiten war er darauf gefaßt, sich selbst der Gemeinde als Wolf vorgestellt zu sehen” [He paused briefly again, let his gaze sweep over the devout congregation, and then fixed it with a certain triumph on the superintendent, who grew very restless and flushed, for after the incredible events that he had just witnessed, he was prepared to see himself presented to the congregation as a wolf] (Wolzogen, *Die Gloria-Hose,* 1908). This type of space also describes settings that present themselves to the acting subject, as in this sentence: “Vor ihnen schob sich einer jener zum Schutz des Ufers von Weidengeflecht und Geröll hergestellten Dämme in den Fluß hinein” [One of those dams made of willow wickerwork

and rubble, built to protect the riverbank, jutted out into the river before them] (Möllhausen*, Der Schatz von Quivira*, 1880).

When training a model, it is equally important to include many instances where no spatial element is present, such as: "Ruhig und fest blickte sie in sein Gesicht" [Calmly and steadily, she looked into his face] (Wassermann*, Lukardis*, 1920). However, ambiguous examples should also be considered. These are especially cases where the setting does not function as a concrete, lived space, but rather as an imagined or dreamt space: "Er träumte, er säße nackend auf dem Thron, da kamen vier junge Adler und trugen ihn weit in die Lüfte empor und weit fort in eine unermeßliche Ebene" [He dreamed he was sitting naked on the throne when four young eagles came and carried him high into the air and far away into an immeasurable plain] (Wassermann, *Alexander in Babylon*, 1905). This also includes settings that appear in a character's memory: "Michael erinnerte sich, daß Herr Hirsch schon oft im Leseklub mit ihm gesprochen, noch öfter ihm die Hand gedrückt hatte" [Michael remembered that Mr. Hirsch had often spoken with him in the reading club and had shaken his hand even more frequently] (Schickele*, Das gelbe Haus*, 1940); or those where the character plans to go or where the actions have not yet been realized: "Er hätte mit Felician auf das Schönsteinsche Gut fahren können" [He could have gone with Felician to the Schönstein estate] (Schnitzler, *Der Weg ins Freie*, 1908).

While I have deliberately chosen ambiguous examples for this demonstration—highlighting that, even at the sentence level, the way setting is represented requires a degree of interpretability from the annotator—I hope I have also been able to demonstrate the rationale behind why I have labeled a sentence with one category rather than another, while also briefly recapitulating the focus of each mode outlined in my model.

In the framework that I propose, we can roughly distinguish between a *functional/tactile* (immediate), i.e. *Aktionsraum*, *affective/emotional* (absorbed), i.e. *gestimmter Raum*, or

visual/pictorial (detached), i.e. *Anschauungsraum* relationship that structures the perceptual environment of a character. Descriptive space, on the other hand, is not part of this relationship; it is mainly ornamental in its function and may indeed correspond to the "material luxury" that Barthes sees as characteristic of realist literature (Barthes 1989, 148). I thus differentiate between a scene presented as "just" a description, without the acting subject experiencing it, and a character being at the "perceptual center" of things.

It is important to note that in my model, the basis for the narratively depicted space is exclusively the concrete, perceptible space. This implies that spaces that are imagined or dreamed of, lacking any concrete markers in the "actual" storyworld that could have prompted imagined space, are not included. Therefore, only references to settings that are indeed part of the storyworld are considered. See *Table 2* for an overview of the different categories, including an overview of the definitions and some more examples.

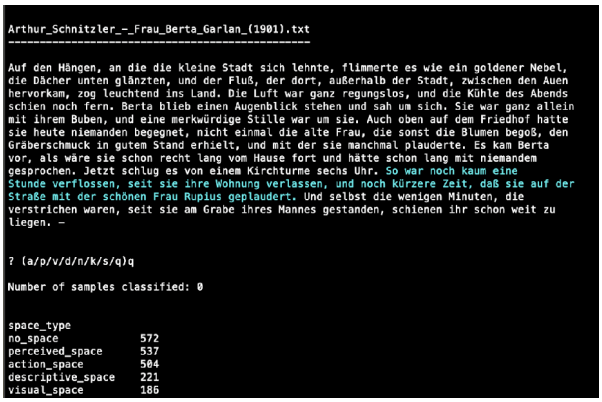
Type	**Definition**	**Example**
gestimmter Raum (i.e. space as it reflects mood and atmosphere)	- Space is perceived as atmospheric and immediate, space is anthropomorphic - emotional experience of space: character is moved and affected by setting - lack of directionality or orientedness	- Und wirklich, einen Augenblick, als eine schwarze Wolkenschicht es pechfinster um mich machte und gleichzeitig die heulenden Böen mich samt meiner Stute vom Deich herabzudrängen suchten, fuhr es mir wohl durch den Kopf: ›Sei kein Narr! Kehr um und setz dich zu deinen Freunden ins warme Nest. [And indeed, for one moment when a black screen of clouds made it pitch dark around me and at the same time, the howling gusts almost drove me and my mare down from the dike, it flashed through my mind: 'Don't be a fool! Turn back and sit down with your friends in the warmth of the nest'] (Storm 1888). - Die hohen Felsenmassen des Ufers schienen bedrohlich wackelnde Riesenhäupter [The tall mass of stones of the shore seemed as if they were heads of giants, rocking menacingly] (Heine 1893).

Aktionsraum (i.e. action space)	- space that is moved through by the character, goal-oriented, appropriation of space and things through movement - action of subject is enabled or prevented by that space	- Als er aus der Kabine wieder herauswollte, weil das Seewasser eindrang und er bis zu den Knien in dem Wasser stand, fand er die Türen verschlossen [As he tried to leave the cabin, because the sea was pressing in and he was up to his knees in the water, he found the door closed] (Dauthendey 1912). - Wir traten ein, steckten eine Kerze in unsern Handleuchter und machten Licht [We entered, placed a candle in our holder, and lit it] (Stifter 1857).
Anschauungs-raum (i.e. field of vison)	- space that is being looked at by the character from his/her point of view, space that presents itself to the character - appropriation of space not through movement but through the eyes - viewed from a static standpoint: ordering of the "there" relative to the "here"	- Von dem Fenster, woran ich sitze, sehe ich auf den ersten dieser Flüsse, der etwa so breit ist als die Themse bei London [From the window at which I am sitting I see the first of these rivers, which is about as wide as the London Themse] (Oppermann 1870). - An der Türe empfing Charlotte ihren Gemahl und ließ ihn dergestalt niedersitzen, daß er durch Tür und Fenster die verschiedenen Bilder, welche die Landschaft gleichsam im Rahmen zeigten, auf einen Blick übersehen konnte [At the door, Charlotte welcomed her husband and bade him sit down in such a manner that through the door and windows he could see the various pictures at a glance, showing the landscape, as it were, in a frame] (Goethe 1809).
Descriptive space	– description of setting or location – situating characters and objects, where something is located – described rather than actualized by characters, not contributing to atmosphere or mood	– Der Gast, der an dem Tische saß, trug eine blaue Brille und hatte einen Vollbart [The guest sitting at the table wore blue glasses and had a full beard] (Horváth 1938). – Das Bett nahm die Hälfte des Raumes ein, darin sich außerdem nur noch wenige Gerätschaften befanden [The bed took up one half of the room, which apart from that only contained few implements] (Voß 1889). – Dabei liegt aber meines Vetters Logis in dem schönsten Teile der Hauptstadt, nämlich auf dem großen Markte, der von Prachtgebäuden umschlossen ist und in dessen Mitte das kolossal und genial gedachte Theatergebäude prangt. [However, my cousin's lodging is located in the most beautiful part of the capital, namely on the grand market square, which is surrounded by magnificent buildings and dominated in the center by the

		colossal and ingeniously designed theater building] (Hoffmann 1822).
No space	– negative examples – spaces that are imagined by the characters, dreamt of, that appear in their memories, talked about without them being present, or places characters plan to go to	– Fräulein Emilie von Erdmann erwachte seufzend aus dem Morgenschlummer [Miss Emilie von Erdmann awoke from her morning slumber with a sigh] (Wassermann 1896). – Ich dachte mir, wenn du einmal ihr zu nahe kommst, dann ... ich konnte nicht, ich wollte nicht, ich hatte den Mut nicht dazu! [I thought to myself, if you ever get too close to her, then... I couldn't, I wouldn't, I didn't have the courage to do it!] (Ompteda 1901)

Table 2. *Examples and definitions for each individual category.*

To make sure that the annotations cover the complexity of the concepts they aim to approximate it is important to gather a variety of annotations (including many so-called "edge cases") for each instance of how a particular type of setting might appear in fiction. In order to do this, I built an annotation tool (shown in *figure 2*) that randomly samples passages with a word window size of 512 tokens from a corpus of 2700 books of German language fiction spanning two centuries.



791	Peter_Rosegger_-_Als_ich_noch_der_Wa	3545	Und knapp an der hinteren Tür trafen wir uns.	action_space
792	FW_Hackländer_-_Humoristische_Erzähl	654	Die Locomotive arbeitet hier garnicht, sondern der Zug läuft von selbst	action_space
793	Detlev_von_Liliencron_-_Die_Schlacht_b	27	Aus den geöffneten Kirchentüren in Stellau, ich höre es deutlich, klingt:	perceived_space
794	Heinrich_von_Kleist_-_Der_Zweikampf_(	105	Eben ging, diesem Schluß gemäß, die Mittagssonne des Margarethentag	action_space
795	Wilhelm_Jensen_-_Aus_See_und_Sand_–	175	Denn so wiedieser die Erde aus der Winterstarre erlöse, in warmen Lüfte	perceived_space
796	Friedrich_Gerstäcker_-_Der_Erbe_(1867)	6228	»Nun,« sagte der Actuar, »dann ist die Sache sehr einfach und er hat ihr	action_space
797	Heinrich_Federer_-_Der_Fürchtemacher_	525	Die Hirten und Sennen saßen abends ums Feuer, während der Vollmond	perceived_space
798	Gustav_Freytag_-_Soll_und_Haben_(185	6796	Während die Herren sich über das Getränk stritten, griff Eugen nach ein	action_space
799	Friedrich_Gerstäcker_-_Die_Sklavin_(184	358	Jetzt traten auch die übrigen Pflanzer und Kaufleute aus dem Hause und	action_space
800	Heinrich_Heine_-_Florentinische_Nächte	553	Monsieur Türlütüs Triangel kichertemanchmal so hämisch!	perceived_space
801	Karl_Wilhelm_Salice_Contessa_-_Die_Sch	199	Herr Wolfgang, welcher fürchtete, daß er das ganze Schloß in Aufruhr br	action_space
802	Eduard_Mörike_-_Der_Spuk_im_Pfarrhau	68	Während dieser Zeit blieb der Laden, der Vorhang und der natürliche M	descriptive_space
803	Paul_Scheerbart_-_Lesabéndio_(1913).tx	1323	Und Manesi kann überall, wo leereFlächen entstehen, seine Rankenpfla	action_space
804	Karl_Philipp_Moritz_-_Andreas_Hartkno	375	– Hartknopf wurde von ihnenfreundlich bewillkommnet, und man setz	action_space
805	Georg_Ebers_-_Homo_sum_(1878).txt	212	Seine tiefe Stimme klang weich und freundlich, als er das sagte; sie aber	no_space
806	Achim_von_Arnim_-_Mistris_Lee_(1809)	272	Mistris Lee, zwar in heftigerBewegung, schob doch der Ring zurück, er l	action_space
807	Paul_Scheerbart_-_Marduk_(1910).txt	598	Samasdan richtete den Südwestpalast wieder her, und die Sargonsburg	action_space
808	Arthur_Schnitzler_-_Frühlingsnacht_(m_	79	Und als es nun ganz still war, schritt der Mann langsam hinaus durch die	action_space
809	Peter_Rosegger_-_Heidepeters_Gabriel_(	801	Und sie riß der Magd die Flasche aus der Hand, langte ein glänzendes Tel	action_space
810	Louise_von_François_-_Fräulein_Muthch	209	»Die Sonnee, so fuhr Hermann fort, »ging in diesem Augenblick auf, hel	perceived_space
811	Eugenie_Marlitt_-_Das_Geheimnis_der_a	3508	Felicitas flüchtete hinauf und erfaßte droben taumelnd und mitversage	action_space
812	Franz_Kafka_-_Ein_Landarzt_(1916).txt	104	Zur Mauer, an die Seite der Wunde legen siemich.	action_space
813	Alma_Johanna_Koenig_-_Der_heilige_Pa	4225	An einer Stelle waren die flüchtigen Stiche aufgegangen und eine Strähr	descriptive_space
814	Johannes_Scherr_-_Brunhild_(1873).txt	331	Siegfried holte denFreund auf der nächsten Eisenbahnstation ab.	action_space
815	ETA_Hoffmann_-_Das_Majorat_(1817).tx	567	Das Wetter hatte nachgelassen, der Mond schienhell durch die zerrisser	perceived_space

Figure 2. *Snapshot of annotation process: left, annotation tool; right, the spreadsheet with annotations.*

Random sampling is important to avoid "selection bias," that is, deliberately seeking examples that fit my categories, which would prevent me from capturing the full variety with which these types appear in texts. However, this process also brought with it, as already mentioned before, a certain amount of uncertainty for the annotator.

While I had established my definitions and prepared some examples beforehand, these definitions were often challenged by passages that emerged during random sampling. Since I chose to use a strict either/or categorization system, where the categories are mutually exclusive, I was forced to make a decision even for ambiguous instances about which category the sentence belonged to. While, for most of the data, I felt confident in my labeling based on the definitions and characteristics I had outlined, other cases were more difficult and required further consideration or adjustments to determine which categories best fit the sentences.

What can be seen from the examples above in *Table 2* is that I restrict my analysis on sentences where concrete physical (things that can be touched or seen), or atmospheric markers (things that can be smelled, felt, or heard) are present. This means that my model excludes any instances where space is implied but no concrete or atmospheric markers of any kind are found,

e.g. "*Karl wacht auf.*" Since I am interested in the modes with which characters perceive setting or are affected by it, these instances are not considered.

One of the major challenges during annotation, as previously mentioned, is the occasional overlap between different types of setting, even at the sentence level. In such instances, during the annotation process, I categorized the setting that was most prominent. To illustrate this, let's look at an example:

> Robert trat auf den breiten steinernen, weit ins Wasser laufenden Landungssteg, an den gelehnt der kleine helle Dampfer seine Mittagsrast hielt, blickte zu den wenigen, fast unbeweglichen, weißen, gelben und rötlichen Segeln hin, die im Kanal erglänzten, und ließ seine Augen endlich nordwärts gleiten, wo die Enge, allmählich sich verbreiternd, das offene Meer ahnen ließ.
>
> Robert stepped onto the broad stone pier which ran far into the water, and at which side the small bright steamer rested for its lunch break; he turned his gaze to the few, almost motionless, white, yellow and red sails flashing in the canal; and then finally let his eyes glide north, were the straight slowly opened, giving a hint of the open sea. (Schnitzler, *Flucht in die Finsternis*, 1931)

In my annotation scheme, this scenario is considered an "edge case." Initially, Robert walks onto the landing pier, coming to a halt to view the landscape. We can trace his gaze as it moves from the stationary ship to the far end of the canal, extending into the sea. The sentence also evokes a certain atmosphere associated with this setting: the shimmering reflection of the sails on the canal and a hint of the sea, not yet visible but already anticipated.

The three types, therefore, exhibit overlapping characteristics, posing a challenge for annotation. According to my definitions, I would classify this sentence as *Anschauungsraum*. In this case, the character's act of observing the landscape and the narrative's description of what he sees, including what escapes his notice, take center stage. Although there are some atmospheric cues present, they do not currently impact the character's mood, at least not at this moment. If we continue reading:

> Er nahm den Hut ab, um sich die Sonne grade auf den Scheitel brennen zu lassen, atmete tief mit geöffneten Lippen, um den Salzgeschmack auf der Zunge zu spüren, und freute sich der linden Luft, die auf dieser südlichen Insel auch an solchen Spätoktobertagen oft noch mit sommerlicher Wärme schmeichelte.
>
> He took off his hat to let the sun get straight to the top of his head, took a deep breath with his lips opened so he could feel the taste of the salt on his tongue, and enjoyed the gentleness of the air, which on this southern island was often still warm even on such late October days (Ibid.).

This passage illustrates a distinct shift in the narrative—from the character merely observing the visual scenery before him to becoming affected by his surroundings. He now tastes the saltiness of the sea, feels the sun's burning touch on his forehead, and enjoys the warmth of the sunny October day. Despite both passages referring to the same setting in a general sense (the character standing on the pier), they clearly differ in the way the subject experiences and is impacted by it.

The impression that his surroundings made on him, prompt him to ruminate about the transience of time, a moment that he tries to hold onto:

> Allmählich kam ihm das Gefühl, als wäre der Moment, den er eben durchlebte, in Wirklichkeit längst vergangen und er selbst, so wie er eben dastand – auf dem Landungssteg, den Hut in der Hand, mit geöffneten Lippen –, ein verschwimmendes Bild seiner eigenen Erinnerung. Er hätte gewünscht, dieses Gefühl, das ihn keineswegs zum erstenmal und durchaus nicht als ein unheimliches, sondern eher als ein erlösendes überkam, länger festhalten zu können; aber mit dem Wunsche selbst war es auch geschwunden.
>
> Gradually, he began to feel that the moment he had just lived through had in fact long since passed, and he himself, as he stood there – on the landing stage, hat in hand, lips slightly parted – was a fading image of his own memory. He wished he could hold onto this feeling longer, which had come over him not for the first time and not as something uncanny but rather as something liberating; but with the wish itself, it too vanished. (Ibid.)

Prompted by the perception of his environment, the narrative continues to move inward, inviting the reader to learn more about the character's thoughts and feelings. The subjunctive mood to which

the text switches, also evokes that we've left the space of the character's immediate perception and instead participate in his cognitive processes and thoughts. Research in cognitive psychology has emphasized that "both in the description of static and dynamic scenes, attention often shifts from the environment to an internal state of the experiencer," which either expresses an emotion or cognitive state (Zwaan 2004, 47). We can observe a similar trend here. Note that the actual concrete markers have disappeared from the scene, as we are now in the "abstract" mode of thinking and hypothesizing, leaving us with an elusive image that the character conjures up in his memory.

Returning from this state of "interiority" and wishful thinking, the character now finds himself in a much more hostile environment then before:

> Und nun war ihm, als hätte er mit der Gegenwart sich entzweit; Himmel, Meer und Luft waren fremd, kühl und fern geworden, und ein blühender Augenblick welkte dürftig dahin. Robert verließ den Steg und beschritt einen der schmalen, wenig begangenen Pfade, die unter Kiefern und Steineichen, zwischen wildwachsendem Gestrüpp, ins Innere der Insel führten. Doch auch die Landschaft schien ihm duftlos, trocken und ihres gewohnten Reizes wie entkleidet. Er freute sich jetzt, daß die Stunde der Abreise nahe war, und in seiner Seele tauchten höchst lebendige Bilder von winterlich-städtischen Vergnügungen auf, nach denen ihn schon lange nicht mehr verlangt hatte.
>
> And now he felt as if he had become separated from the present; the sky, sea, and air had become strange, cool, and distant, and a blooming moment withered away. Robert left the landing stage and walked along one of the narrow, little-used paths that led under pines and holm oaks, through wild-growing underbrush, into the interior of the island. But the landscape, too, seemed to him scentless, dry, and stripped of its usual charm. He was glad now that the hour of departure was near, and in his soul there arose vivid images of wintry urban pleasures, which he had not longed for in quite some time. (Ibid.)

While the symbolism of the setting is significant here, we also observe a similar pattern when it comes to the analyzed space types. Moving from "action" to "attunement," the character again starts to conjure up a "vivid image" within himself, that is directly prompted by the effect that setting had on him before. Moving between the "actual" present, the past, and an "imaginary"

future this passage illustrates how the narrative anchors the character's perceptual reality in a concrete lived space that changes as the acting subject moves along.

In sum, I annotate approximately 2,800 samples at the sentence level. This dataset, referred to as the "training data," can now be used to fine-tune a pre-trained model. One third of the training data is held back during the training process for testing. In order to validate whether the model correctly categorizes the labeled data based on the examples we feed it, and to see how well it performs on unseen data (the data held back but labeled by me), we can determine the performance of the model. Before I move to the process of "validation" of the data, I want to briefly outline how the model was trained, which hyperparameters were used during training, and how well it performed.

Model and Training

Using the annotated data, I construct a classifier for the specified task. For fine-tuning, I employ the fiction-gBERT-large model, which is derived from the foundation model gBERT-large and tailored for fictional texts. I fine-tune a multiclass classification model to distinguish different types of settings. To evaluate the model's performance, I allocate 70% of the annotations for training and 30% for testing. The model undergoes training for five epochs with a fixed learning rate of 1e-5.

The overall results are outlined in *Table 3*, demonstrating the model's proficiency in accurately classifying various setting types. Additionally, I compare its performance to a baseline model—a logistic regression using TF-IDF-weighted token features—as well as a random baseline (shown in *Tables 4* and *5*). As we can see, the fine-tuned BERT model significantly outperforms the other two models.

I can already state that Hoffmann's claim that setting can be broken down into Aktionsraum, gestimmter Raum, and Anschauungsraum is empirically supported.

Category	Precision	Recall	F1	Support
Perceived Space	0.86	0.82	0.84	228
Action Space	0.91	0.81	0.86	222
Visual Space	0.79	0.88	0.83	89
Descriptive Space	0.78	0.84	0.81	98
No Space	0.86	0.93	0.91	217

Table 3. *Results of performance of the BERT-based classifier on the different space-types.*

Category	Precision	Recall	F1	Support
Perceived Space	0.59	0.66	0.62	234
Action Space	0.58	0.67	0.62	230
Visual Space	0.46	0.44	0.45	73
Descriptive Space	0.71	0.50	0.59	114
No Space	0.70	0.62	0.66	212

Table 4. *Performance results of the TF-IDF Logistic Regression Model.*

Category	Precision	Recall	F1	Support
Perceived Space	0.37	0.20	0.26	234
Action Space	0.24	0.27	0.25	230
Visual Space	0.12	0.12	0.12	73
Descriptive Space	0.12	0.22	0.15	114
No Space	0.22	0.20	0.21	212

Table 5. *Performance Results using a Random Baseline.*

Validation

To further validate the model's proficiency in accurately classifying sentences, I analyze the output from the model's hidden layers and plot them separately. During training, the model learns to encode various "features" in the dataset by processing the examples it receives. Each sentence is represented via an embedding into a high dimensional vector space, i.e., as a high-dimensional vector capturing the sentence's semantic properties produced by the model's pooled output.

Specifically, in the BERT architecture the pooled output is obtained by applying a small neural network to the transformer-produced vector representation of a special [CLS] token added during the encoding stage to each sentence. This embedding integrates all the features and hidden representations the model has learned during training, placing each classification in a specific region of embedding space. Given the complexity of working directly with high-dimensional data (1024 dimensions in my case), I first reduce the dimensionality of these embeddings using Principal Component Analysis (PCA) to around 50 dimensions, and then apply a further algorithm (t-SNE) to reduce the number of dimensions to two.

Using the reduced embeddings, I create a scatter plot (Figure 3) where each point represents a sentence, color-coded according to its classified space type. To visualize discrepancies between

my annotations and the model's output, I also plot the original labels I assigned, represented by slightly smaller points. When my classification of a sentence differs from the model's, the model's classification is shown as a dot with a smaller dot in a different color inside it, indicating the label I originally assigned.

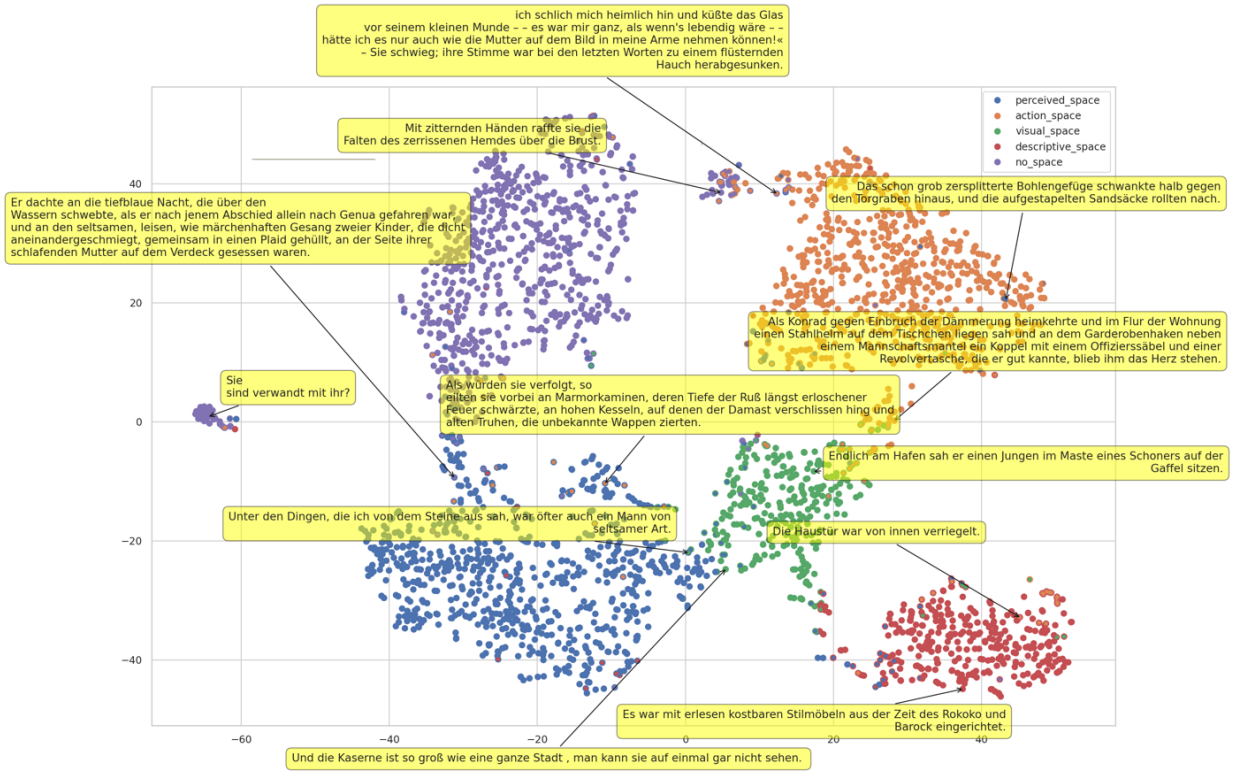


Figure 3. *Visualization of sentence classification embeddings plotted in 2D, with color-coded clusters corresponding to individual space types. If there is a smaller dot within a larger dot of a different color, this indicates a divergence between my annotations and the model's output.*

As we can see, distinct clusters emerge for each type of setting, suggesting that the embeddings for each category share semantic similarities that enable clear differentiation in the reduced space. Some clusters appear closer to each other, while others are more separated. However, as the high-performance scores suggest (*see Table 3*), the different types are generally distinct from one another, showing clearly defined clusters corresponding to each space type.

Clusters that are farther apart, like “no space” or “descriptive space,” suggest that they are significantly different in how they linguistically represent setting. In contrast, clusters closer to each other, such as *Anschauungsraum*, which is near and forms a “bridge” with both “descriptive space,” *gestimmter Raum*, and “no space” indicate more overlap in the way they present space. A similar relationship is observed between “descriptive space” and *Anschauungsraum*, as well as between “no space” and both *gestimmter Raum* and *Aktionsraum*, where slight overlaps are evident.

Examining one of the example sentences provides further insight. In the small cluster between *Aktionsraum* and “no space,” which includes data points from both types, the sentence “Mit zitternden Händen raffte sie die Falten des zerrissenen Hemdes über die Brust” [with trembling hands, she gathered the folds of the torn shirt over her chest] (Ganghofer 1900) is correctly annotated as “no space.” However, it contains a high frequency of action words, elements we would typically associate with *Aktionsraum*. This explains why, in the vector space, it is positioned closer to *Aktionsraum* rather than at the center of the “no space” cluster, where the more straightforward examples are located.

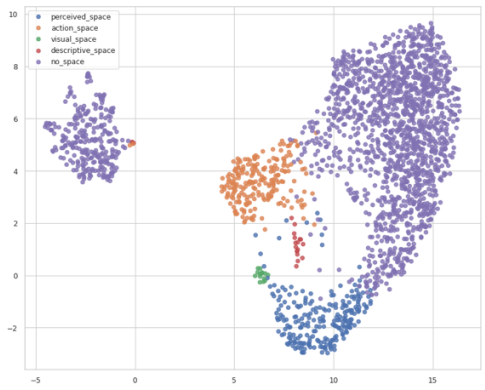
In the visualization, we also observe instances where the model’s classifications do not align with my annotations. For example, consider the sentence: “Unter den Dingen, die ich von den Steinen aus sah, war öfter auch ein Mann von seltsamer Art” [Among the things I saw from the stones, there was often a man of a peculiar kind] (Stifter 1853). Here, the model and I disagree. While I labeled it as *Anschauungsraum*, the model classifies it as *gestimmter Raum*. The model likely interprets the strangeness of the man’s appearance evoking affect (in combination with the word “things” introduced at the beginning, which does not, however, refer here to a specifically physical thing placed in an environment but to a person, among other things) as *gestimmter Raum*, rather than correctly recognizing it as *Anschauungsraum*, where the character observes from a static

point of view. This reflects how subtle nuances in sentence construction and semantic ambiguity can influence the model's categorization choices.

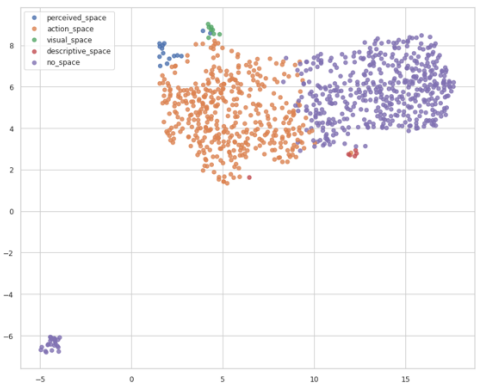
Another example can be found in the "descriptive cluster" with the sentence "Die Haustür war von innen verriegelt" [The front door was bolted from the inside] (Wichert 1881). Although the sentence does not explicitly mention an experiencing agent, during annotation I anticipated an agent discovering the locked door and thus annotated it as *Aktionsraum*. The model, however, labels it as "descriptive space." While this classification is not incorrect, one could argue that, when focusing solely on the sentence, it reads more as a description than an action. This discrepancy also highlights a limitation: since the model lacks context beyond the individual sentence, it does not associate the description with an experiencing agent.

These examples suggest that when the model classifies something "incorrectly," it is often not a straightforward error but rather a reflection of subtle nuances within the sentence that the model (or I) interpret differently. This highlights the complexity of categorizing certain sentences and also points us to the interpretative challenges, as well as the model's limitations, involved in such nuanced annotations.

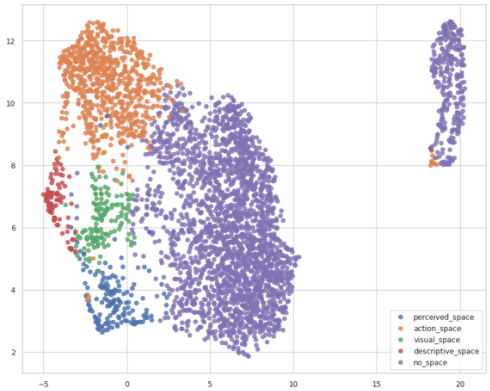
To illustrate how these classifications appear at the book level, I also plot four works drawn from the fiction corpus. In the visualizations of my annotations above, the clusters are fairly uniform in size, corresponding to the number of samples I provided for each group (as indicated by the "support" column in the model description above in *Table 3*). However, when plotting individual books, the data points are more "realistically" distributed. For instance, "no space" is much more prevalent, as expected, while the other types appear with comparatively lower frequency.



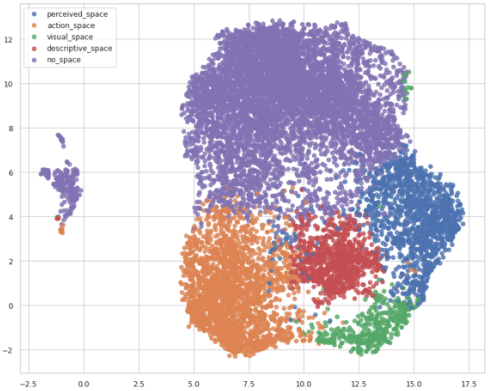
Johann Wolfgang Goethe, *Die Leiden des jungen Werther,* 1774



Heinrich von Kleist, *Michael Kohlhaas,* 1810



Franz Kafka, *Der Prozeß,* 1925



Adalbert Stifter, *Der Nachsommer,* 1857

Figure 4. *Visualization of sentence classification embeddings plotted in 2D for individual books in my corpus.*

Looking at individual books, we nonetheless can see significant differences in the way the different types of setting appear in those texts. While in Heinrich von Kleist's *Michael Kohlhaas* (1810) *Aktionsraum* is remarkedly high, leveling or even surpassing "no space," the other types are almost absent, suggesting that when setting appears in this story it's almost exclusively through *Aktionsraum*. This might come as no surprise for anyone familiar with the book. Taking place in the 16th century, the story centers around Michael Kohlhaas, a horse dealer who is almost always on the move fanatically fighting for justice.

In Goethe's *Werther* (1774) in turn, which is characteristic for the proto-romantic movement of *Sturm and Drang,* we can see that it features a high frequency of *gestimmter Raum,* here almost

levelling with the frequency of *Aktionsraum.* This predominance of *gestimmter Raum* speaks to the strong feelings and emotions rendered in the book—often expressed through the depiction of nature, as a reflection of the protagonist's emotional state.

Kafka's novel *Der Prozeß* (1925), in contrast, shows a comparatively high frequency of *Aktionsraum*, while the other types remain consistently low throughout the narrative. This could reflect the bureaucratic and busy world Kafka depicts, which leaves little room for affect, static description, or visuality. Notably, *Anschauungsraum* also features prominently in Kafka's work, whereas it is comparatively low in the other books plotted here. Lastly, Stifter's realist work *Der Nachsommer* (1857) stands out for its higher frequency of "descriptive space" (and *Anschauungsraum*) compared to the other books. This aligns with Stifter's reputation for lengthy descriptive passages.

By plotting these clusters for individual books, we can observe that the model successfully distinguishes the different types from each other by clustering them according to their semantic similarity, with minimal overlap. Moreover, the individual distributions resonate with our intuitive understanding of how setting functions in these works, offering another "sanity check" for the model's accuracy.

In addition to visualizing the model's output in clusters based on how they are presented in embedded space, I also browsed through several books from the corpus to evaluate how well the model classifies "in the wild." To do this, I adapted the "annotation tool" described earlier, transforming it into a "browser" (shown in *Figure 5*) that allows users to browse through any of the books in the corpus and view the classifications made by the model. To demonstrate this process, I revisit Schnitzler's example discussed above.

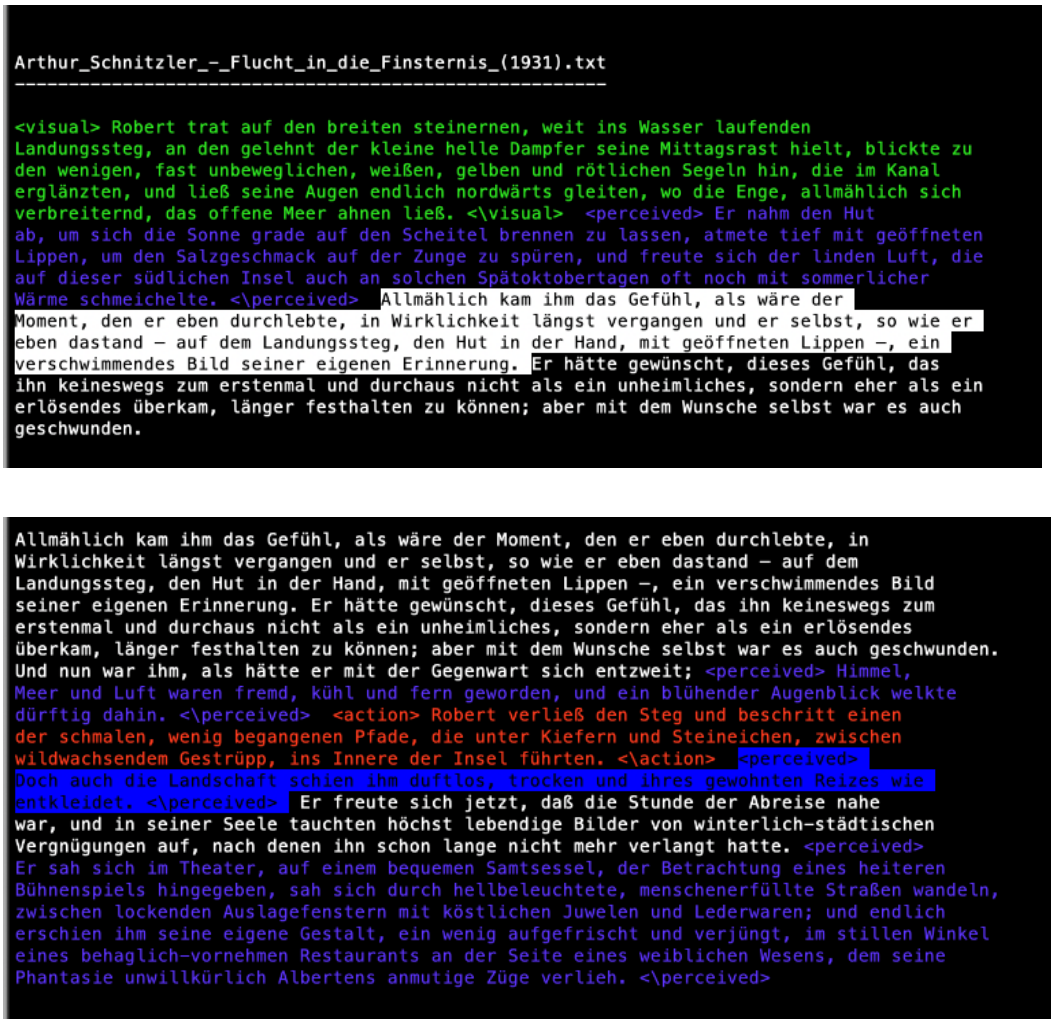


Figure 5. *Snapshot of browsing tool showing the model output of the classifier used. The different types of spaces are color-coded: green for "Anschauungsraum," purple for "gestimmter Raum," red for "Aktionsraum," white for "no space," and turquoise for "descriptive space" (which does not appear in this passage). "No space" is represented by white and is not labeled with a tag.*

When comparing the model's output against my own understandings of the categories these sentences should be placed in, we can observe that the model does a pretty good job of classifying the sentences correctly (see *Figure 5*). Where it "fails" is in cases where the vivid images of various locations that the character imagines before his "inner eye" almost resemble those of the actual fictional world. The passage reads as follows:

> Er sah sich im Theater, auf einem bequemen Samtsessel, der Betrachtung eines heiteren Bühnenspiels hingegeben, sah sich durch hellbeleuchtete, menschenerfüllte Straßen

> wandeln, zwischen lockenden Auslagefenstern mit köstlichen Juwelen und Lederwaren; und endlich erschien ihm seine eigene Gestalt, ein wenig aufgefrischt und verjüngt, im stillen Winkel eines behaglich-vornehmen Restaurants an der Seite eines weiblichen Wesens, dem seine Phantasie unwillkürlich Albertens anmutige Züge verlieh.
>
> He saw himself in the theater, on a comfortable velvet armchair, devoted to the contemplation of a cheerful stage play. He saw himself strolling through brightly lighted, crowded streets, between enticing shop windows displaying exquisite jewelry and leather goods; and finally his own figure appeared to him, somewhat refreshed and rejuvenated, in a quiet corner of a cozily elegant restaurant, accompanied by a female figure, to whom his imagination involuntarily endowed with Alberten's graceful features (Schnitzler 1931).

While the reader won't have any difficulties recognizing the scene described as taking place in the character's imagination and not in the "real" fictional world, the computer fails to do so. This also points us to the limitations of computational reading: Scattered with concrete and perceptual markers, the computer does not recognize the nuanced grammatical shift in "perspective", from the actual to the imaginary, brought forth by the reflexive "er sah sich …" ("he saw himself") that introduces the scene. Rather than classifying it as "no space," which would be the correct label according to my codebook, it identifies it as *gestimmter Raum*.

One way to address this issue would be to include more similar passages in the training data. However, this risks overfitting, where the model becomes overly specialized in recognizing specific details from the training data, reducing its ability to handle new, unseen examples effectively. This speaks again to the importance of random sampling: for the model being able to generalize, the annotations made should reflect the overall "state" of the data, by including a diverse range of examples in the training dataset, without prioritizing one specific aspect in it. This ensures the model remains robust and effective across various texts, not just those similar to the training set.

From a humanist perspective we could ask what's different or "special" about this passage so that the computer misclassifies it? How is it distinct from other, similar instances that describe such scenes? What other situations might we find that resemble the ones described above and what do they have in common? Or is it something specific to the author's style?

In her book, Scarry notes that when authors make us "imagine imagining, to picture the mental process of picture-making" (25), this process is much closer to what humans do when daydreaming, and thus lacks the "solidity," "persistence," or "constrainedness" of the material world the story is set in. We could thus ask to what extent imagined places textually differ from the ones in which the characters actually reside. In what ways are they less solid or constrained, facilitating their projected nature? How do narratives achieve solidity? And what does this tell us about the importance of setting in creating embodied perceptual worlds in fiction?

While the present project cannot answer all of these questions quantitatively, it is worth investigating them on a qualitative level. Focusing on passages where a model "fails," as demonstrated here, can present "opportunities for interpretation" (Long and So 2016) and invite us to further reflect on why it failed and does not seem to fit into the proposed framework. We might also ask whether the trend observed here, that a character is affected by its environment in a way that prompts psychological interiority, refers to a general pattern that is present in the data, and which could provide opportunities for further exploration. Moving between large-scale quantitative analysis and detailed qualitative approaches, thus not only allows us to "identify large-scale and long-term trends, but also [to] tell individual stories" (Nguyen et al. 2020).

Given my overall confidence in the accuracy of the model's predictions, based both on the evaluation metrics during training and on a closer inspection of the data, I can now proceed to apply the model to each book in my corpus. Before I do this, however, I will first outline the steps

involved in constructing the corpus for this analysis and describe the types of metadata that have been gathered.

Building a Corpus

When it comes to choosing a dataset for the research question at hand, it's important to keep in mind that the data used here is neither objective nor comprehensive. Most of the data that I gathered for this project stems from the German digital edition "Projekt Gutenberg" (henceforth: PG-DE), published in 2023.[11] This digital edition includes fictional and non-fictional works of German-language texts ranging from the 18th to the 20th century. To supplement works not represented in the digital edition, I also drew texts from the American Gutenberg (PG-US) library.[12] These mainly concern works that are still under copyright in Germany but have been released in the US due to differences in copyright law.

Describing the procedures for collecting, cleaning, and curating datasets is an important step in data-driven analysis "to expose the inevitably selective and limited collections that result from that construction" (Bode 2018, 25). Recognizing the "critical and constructed nature of bibliographies and mass-digitized collections" that underpin the creation of models is crucial when working with literary data at scale (Ibid). As Bode points out, "[…] neither the analog nor the digital record provides an unmediated or comprehensive view of the documentary past; both are partial, and not necessarily in ways that complement each other" (52). Consequently, Bode argues that neither libraries nor digital repositories such as Google Books or HathiTrust should be regarded as direct representations of literature as it was circulated and understood historically (44).

[11] Projekt Gutenberg DE. *Gutenberg-De Edition 16* (2023), https://www.projekt-gutenberg.org/.
[12] Project Gutenberg. https://gutenberg.org/.

While Bode does not question the value of analyzing digital libraries at scale to identify historical trends, she emphasizes the importance of acknowledging the selected, historically contingent, and partial nature of the sampled dataset. She suggests curating corpora that reflect a specific literary system during a particular period (e.g., 19th-century American juvenile fiction). According to Bode, such corpora should be accompanied by a "critical apparatus" that outlines "the decisions and arguments underpinning specific data construction" (55). Furthermore, by making the dataset publicly available upon publication, researchers provide "a consistent object for analysis that does not assume or pretend the stability of the documentary record" (54). Publishing datasets not only "offers a shared foundation for research" but also enables others to work with the same data, pose new questions, and "engage with each other's arguments in terms of both results and the data examined" (Ibid.). Following Bode's approach, I aim to provide some form of historical contextualization for the data, while also documenting the process and decisions involved in constructing the dataset.

Besides limitations in historical representativeness and unbalanced data distribution, machine-scanned digitized texts often contain issues like missing words, OCR errors, duplicates, or faulty metadata. In contrast to the HathiTrust Library, Project Gutenberg offers human-proofread and systematically checked texts (e.g., using spell-checking, HTML validity tests, and human review). Next to basic metadata such as "author," "title," and "year," the digital edition by Project Gutenberg that I used for this thesis also includes fine-grained metadata on "genre."

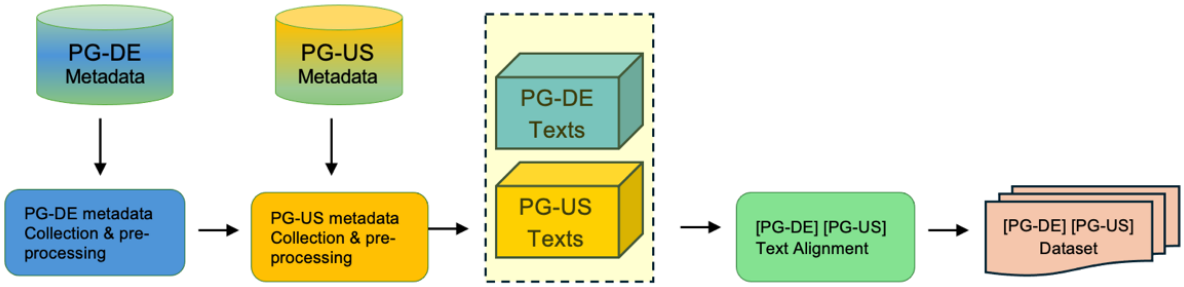


Figure 6. *Dataset construction workflow.*[13]

See *Figure 6* for an overall workflow consisting of four steps: (1) collecting and pre-processing Gutenberg metadata, (2) matching metadata from PG-DE with PG-US, (3) obtaining full texts, and (4) aligning texts.

The digital edition, from which most of the works were drawn, consists of all books published in the digital library until August 2023. It's important to note that both PG-DE and PG-US are continuously updated; therefore, the collection at hand presents a snapshot of data gathered by PG-US up until September 2023—when this dataset was created, and includes the works collected and listed by the Gutenberg Edition. The PG-DE Digital Edition comprises 11,784 texts (fiction and non-fiction, as well as translations into German) by 2,476 unique authors and is based on PG-DE's digital library.

Unlike platforms like HathiTrust or Google Books, which primarily aggregate digital collections from university libraries, PG-DE operates through a volunteer-driven model similar to PG-US and other related projects, aiming to digitize and preserve literary texts. Most works are selected based on analog bibliographies and literary lexicons spanning the 19th century to the

[13] This visualization has been adapted from Jiang et al. 2021, who use a similar workflow to present corpus construction.

present, although in some cases, they are chosen based on reader requests. Texts are acquired from antiquarian bookshops, scanned, and processed using OCR technology. Volunteers proofread each text in two rounds before they are spell-checked using Word by the Gutenberg team, after which the texts are converted into XML format. The physical books are cut up, shrink-wrapped, and archived. On average, the Gutenberg team estimates that each book requires 43.5 work hours to complete.[14]

What distinguishes PG-DE from other sister projects and the US instance of Project Gutenberg is its claim of copyright over its products and the restriction of access to web-browsable versions of its texts. It also operates its own distributed proofreading platform, allowing volunteers to sign up and contribute to the proofreading process.

This means that while the texts for PG-DE were scraped from the web version, for PG-US I used the .txt files for analysis. The HTML files were converted to text format. Cleaning the scraped HTML pages was relatively straightforward, as they did not contain much "noise" in terms of page numbers or extraneous text unrelated to the book (such as copyright declarations, information about the proofreaders, changes made, etc.). These elements were removed from the .txt files drawn from PG-US.

Due to its rigorous proofreading efforts, Project Gutenberg is considered a "gold standard" among digitized corpora (Jiang et al. 2021). However, the various "translations" from one medium to another (e.g., OCR software, Word, XML) mean that the information on page numbers and book length is not preserved. The books scanned by PG-DE do not retain the original page numbering, and this information is lost in the process. Although the metadata often lists the original length of the book in page numbers, this information is by far not comprehensive.

[14] For a more detailed overview of the process, see https://www.projekt-gutenberg.org/info/texte/Vom-Antiquariat-zum-E-Text.pdf .

In addition to this, details—especially regarding the publication year—are sometimes spotty. These are (most of the times) not subject to human errors but reflect the contingency and incompleteness of historical records. PG-DE distinguishes between the publication date of the edition that was digitized and the first publication date. For lesser-known works, first publication dates are often unknown. Instead of providing exact dates, the publication date is sometimes indicated as a range, such as between 1923 and 1924.

In cases where a publication date was missing, I manually added the date. For dates where a range was provided, I used the earliest year listed (e.g., 1923). For works where no original date of publication could be found, I used the earliest publication date that I found for the volume in question. In the rare case where no publication date for a work could be found (if the author died before the volume was published), I used the author's death year as a proxy for the historical period in which the work is set. This approach aligns with similar methods of estimating publication dates employed by others when constructing large datasets (see Underwood 2020). It is important to note, however, that only 8% of all works in the dataset had no publication date or only the observed date for the volume in question listed, thus comprising only a small fraction of the overall dataset.

presents an overview of the gathered metadata for the estimate of publication year:

first_published	*infer_date*	*last_vol*	*year*
date of first publication	date that could be found that either is before the author's death or, if not, lists the author's death year	publication date of the last volume that could be found	estimated publication year presented in the columns for each book

Table 6. *Estimated year of publication in metadata*[15]

[15] This table has been adapted following the structure proposed by Underwood (2020).

PG-US provides metadata only for “author,” “title,” and “year.” As the majority of books were obtained from the digital edition, I manually supplemented the missing metadata for genre for books from PG-US. To correctly match the metadata from both libraries and ensure that only books from PG-US that are not already included in PG-DE are added, I calculated the Levenshtein Distance for author name and title between each dataset and removed those that were below a certain threshold. For instance, if the match on author name was reasonably close—greater than 35% (e.g., “Hoffmann, E. T. A. (Ernst Theodor Amadeus)” vs. “Hoffmann, E.T.A.,” referring to the same author with a Levenshtein distance of only 35%), I then calculated the match for the title and only kept works by the same author that were below 90%. This step is necessary because the metadata provided by one library might differ from the other (e.g., alterations to the title—[“Wilhelm Meisters Lehrjahre” by Goethe is titled in the other corpus as “Wilhelm Meisters Lehrjahre. Band 1”]). Not considering this could risk either overlooking books that were not already part of PG-DE or, conversely, introducing duplicates.

The final fiction corpus encompasses 4,784 books, 1144 unique authors, and with a total of 17,130,609 sentences. The volumes span the years from 1780 to 1940, with the majority falling between 1850 and 1930. Refer to *Figure 7* for the distribution of the number of books in the corpus over time, along with the distribution of sentences per 10,000.

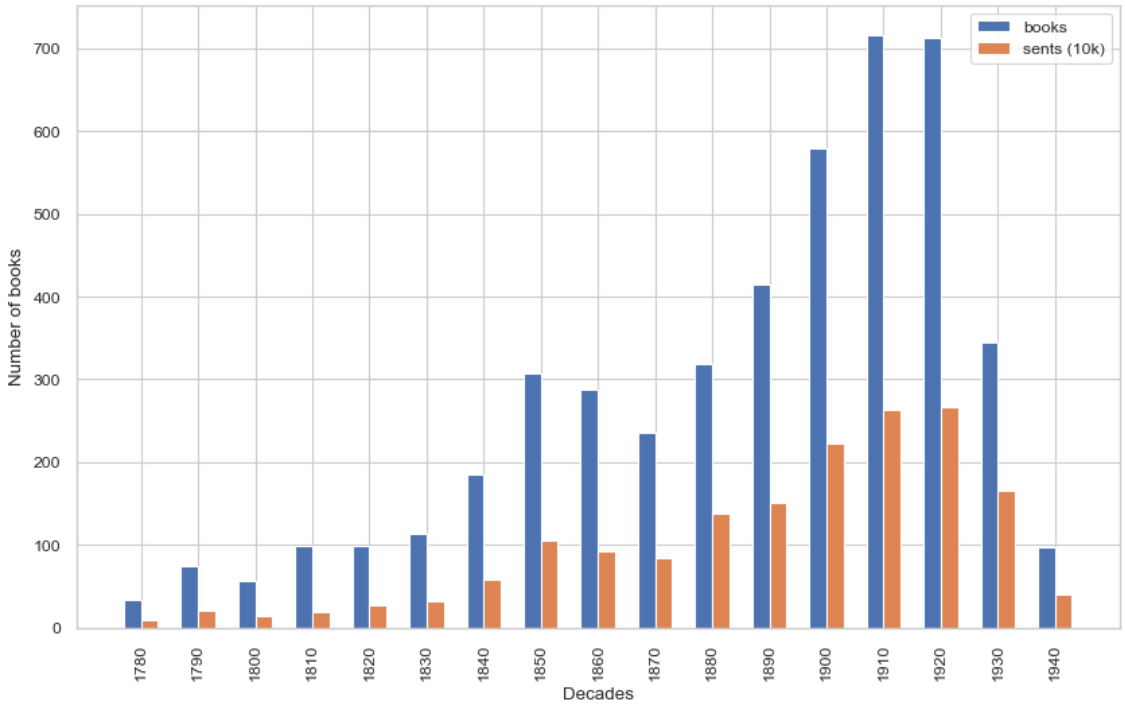


Figure 7. *Distribution of the number of books over time, "sents (10k)" corresponds to sentences per 10,000.*

By selecting 1780 as the starting year for the historical collection of German-language prose, this framework reflects the periodization proposed by historians such as Reinhard Koselleck and Michel Foucault. Although the dataset's primary focus begins in 1800, I've chosen to begin the corpus slightly earlier, in 1780, to capture potential shifts evident in the period leading up to 1800. The year 1800 signifies "a great conceptual break" in world history, emphasizing the constructed nature of history and the interconnection between the concepts of history and subjectivity (Palti 409, 2018). It marks the emergence of a new awareness of the subject's agency and a new "modern" way of experiencing temporality, characteristics that both Koselleck and Foucault identified as central to modernity. Beginning in 1780, the dataset extends until the end of 1930, a period culminating in the onset of the Second World War, which is widely regarded by historians as a "breaking point" between modernity and post-modernity. Thus, the dataset focuses modern

German-language prose from the late 18th century through the early 20th century, spanning approximately 160 years.

The information on genre and sub-genres in the corpus is based on the German "*WGS - Warengruppen Systematik*" ("merchandise category system"), thus reflecting how genre has been institutionally categorized by publishing houses and book traders. See *Figure 8* for an overview comparing the number of sub-genres to the number of "novels, novellas, and stories," which constitute the majority in my dataset.

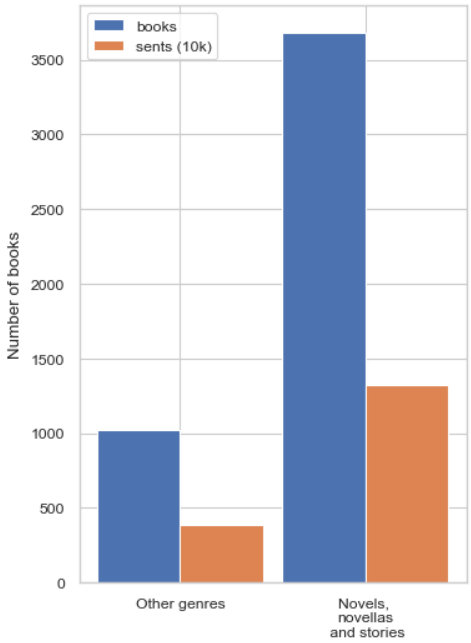


Figure 8. *Fiction dataset. Overview of genres.*

An overview of the diverse sub-genres (excluding "novels, novellas, and stories") is presented in *Figure 9*. Among these, historical novels constitute the most substantial portion in the corpus, followed by "crime fiction" and "fairy tales". Although the count for "horror," "science fiction," and "speculative fiction" books is relatively low, I chose not to merge any genres under a single

"banner" (e.g., combining "speculative fiction" and "science fiction") and opted to adhere to the categorization provided by the *WGS*.

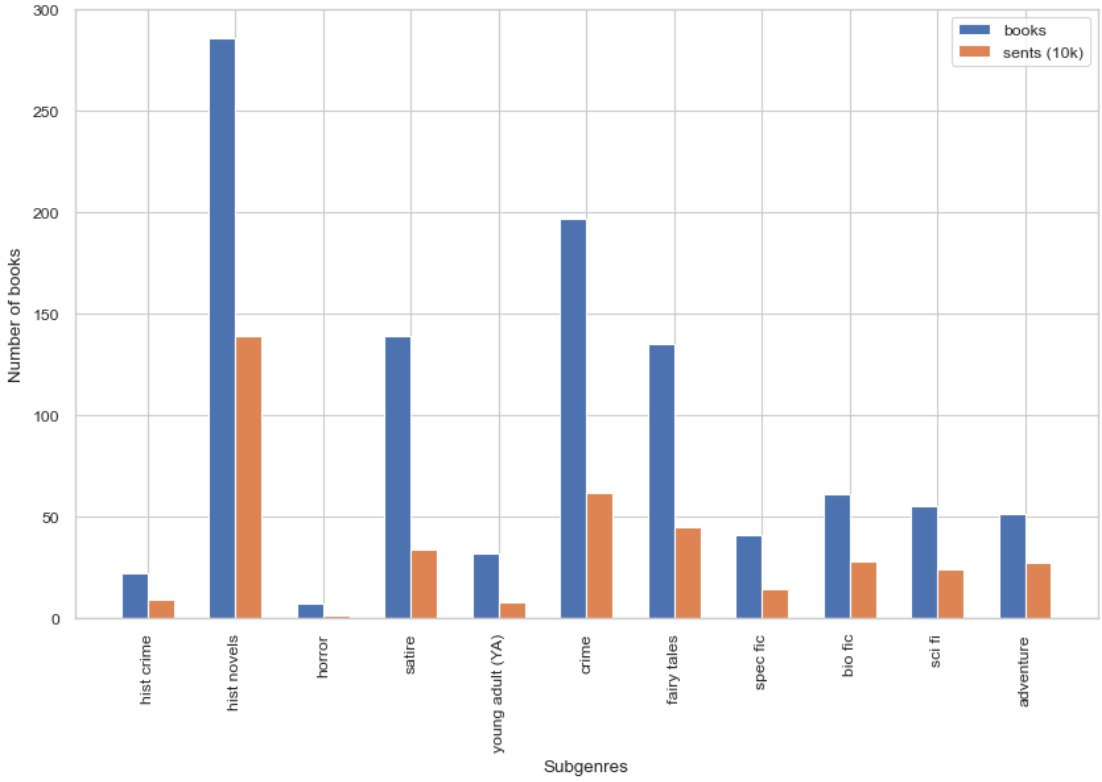


Figure 9. *Fiction Dataset. Literary sub-genres.*

Non-Fiction Dataset

In addition to the fiction dataset, I also created—using the works present in the PG-DE library—a smaller subset of non-fiction works. *Figure 10* presents a historical overview of the dataset, showing the number of books per decade, as well as the sentence counts for each decade. The non-fiction corpus includes 764 books and 3,064,259 sentences and 413 unique authors, covering the same timeframe as the fiction corpus. The non-fiction data is thus comparatively much smaller in number than the fiction data.

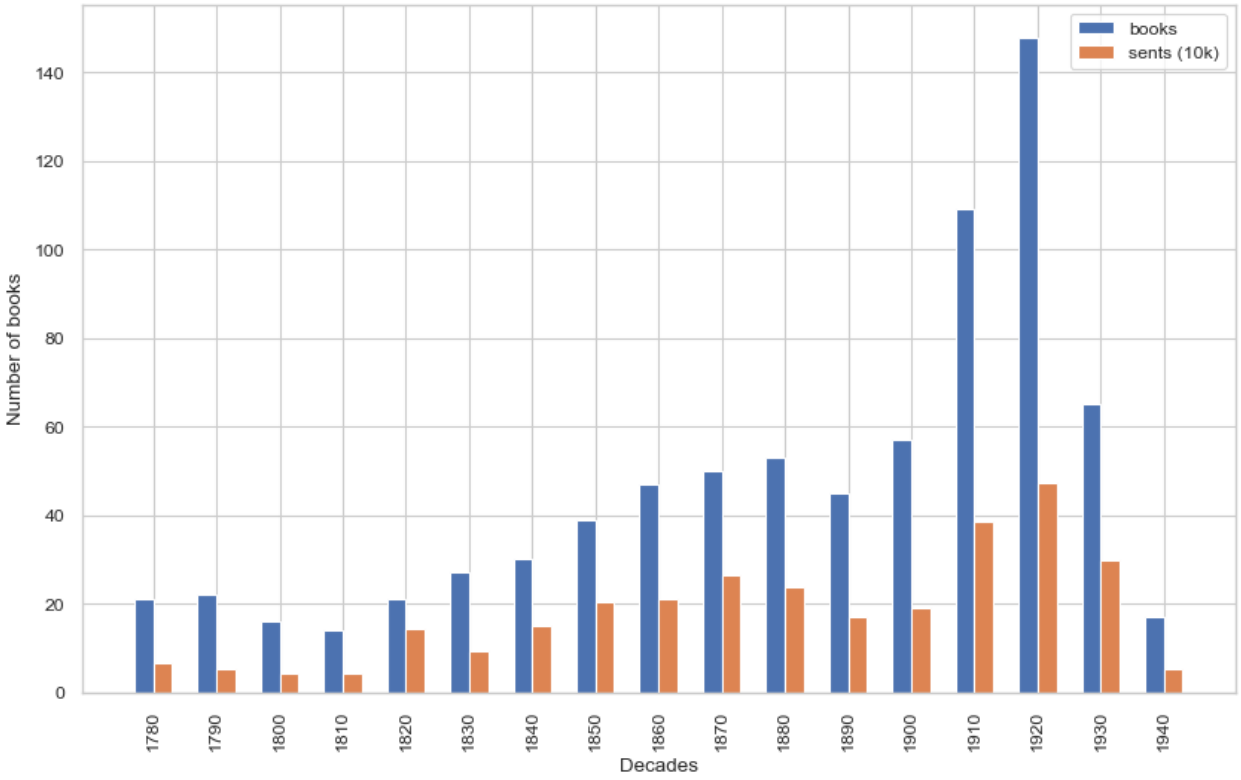


Figure 10. Non-Fiction Dataset. Number of books per decade.

Similar to the fiction data, I have also included the more detailed genre metadata provided by the digital edition for the non-fiction corpus. *Figure 11* shows the count of books and sentences categorized by genre, highlighting that "travelogues" and "history" constitute the largest segments of the dataset, followed by "philosophy."

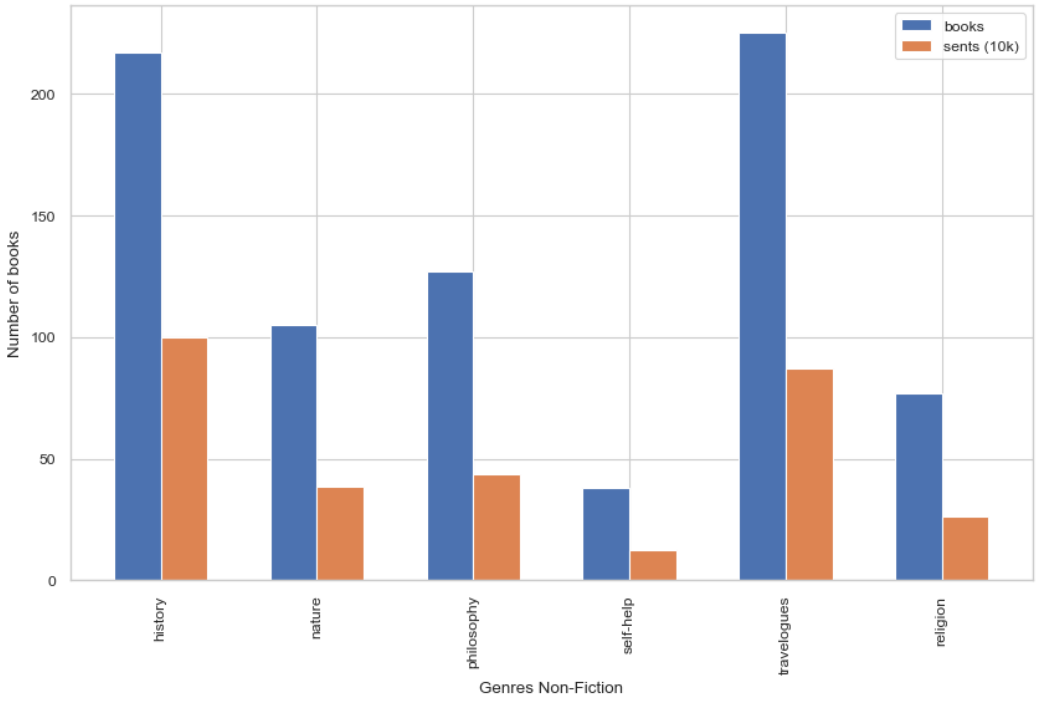


Figure 11. Non-Fiction Dataset. Number of books divided by genres per decade.

For preprocessing I used *stanza*[16] to perform tokenization and sentence segmentation.[17]

Conclusion

This chapter outlined the various steps needed to build a computational model and a dataset. Based on my theoretical framework, I demonstrated how to operationalize the model. To achieve this, I gathered a large database of example sentences used for training. As I've aimed to show, this is not a strictly linear process; it required multiple iterations, from close reading and developing a codebook for the model (i.e., gathering examples and definitions) to annotating based on random sampling, conducting an initial training round, reviewing the output, reworking the definitions,

[16] Peng Qi, Yuhao Zhang, Yuhui Zhang, Jason Bolton and Christopher D. Manning, "Stanza: A Python Natural Language Processing Toolkit for Many Human Languages", in: *Association for Computational Linguistics (ACL) System Demonstrations* (2020).
[17] A limitation of Stanza's sentence segmenter is that, at least for the German language, it segments sentences not only by periods but also by semicolons.

gathering additional samples, and so on. I went through several rounds of these steps to reach a point where I felt sufficiently confident in the model's ability to classify sentences accurately.

Creating tools that allowed me to easily review the model's output (i.e., comparing my annotations to the model's classifications) and browse individual books to examine classifications was essential during this process. This not only helped me to improve the model's quality but also sharpened my theoretical understanding of these categories. One of the most crucial insights I gained through this process is that, to develop a model capable of generalizing across a wide range of texts, it's essential to capture this variety through diverse annotations. While this might seem obvious, I was struck by the many ways setting is depicted in these texts. Although the categories I developed largely cover these variations, the nuances often go beyond what a single definition can capture.

This brings me to another insight: there's currently a certain lack of technical vocabulary to precisely describe, what is happening on a granular level when narrative space is phenomenologically constructed in texts. This limitation becomes especially apparent when examining passages that may not align neatly with theoretical expectations. In close reading, we often select passages that best fit our theories and concepts. However, when faced with a broad range of examples, it becomes clear that our current theoretical frameworks may not fully capture the diverse ways narrative bring forth different kinds of setting and the mechanisms through which it achieves this effect.

While I have already discussed some theories from phenomenology and cognitive narratology that address setting and space more broadly, these approaches only partially inform my work. As this thesis progresses, I will expand further, drawing insights not only from cognitive science but also from philosophy of mind, linguistics, and psychology. These additional perspectives will help refine our understanding of narrative space. This also means that I seek to

consistently update the framework of setting that I am using, incorporating the findings and interpretations made along the way.

Using the developed model, the next chapter will apply it to the fiction dataset to examine the historical role of setting, its function within genres, and its representation across narrative time. By systematically analyzing the metadata and patterns across a broad corpus, this approach will attempt to provide a comprehensive view of how setting has evolved over time and its significance within different literary contexts, as reflected in the analyzed corpus and timeframe. This investigation will shed light on the shifting role of narrative space and help us better understand how setting functions in and contributes to the construction of fictional worlds.

CHAPTER 3. "Lived Space": A Computational Study of Setting in German-Language Literature (1780-1940)

Having laid out the theoretical framework, model, and data for this analysis, I now turn to a quantitative investigation of these texts. This chapter focuses on different aspects of setting and how they correspond to the concept of "lived space" more broadly. Leveraging computational techniques in NLP and computational narrative understanding, I will apply my model to the data and metadata to study how the different types of setting are distributed over time, i.e., their historical role. Additionally, I will gain insights into how the different modes are used in relation to genre, narrative time, and their narrative function.

In doing so, I will connect these findings to existing research on the historical significance and function of setting in literature. Each section of this chapter will focus on one experiment, linking it to relevant research in the field. As we will see, contrary to the arguments of many theorists, setting is far more than a mere background feature. The quantitative findings presented here confirm that, regardless of the aspect examined—whether across historical time or within the narrative itself—setting, as an embodied concept, is integral to narrative function.

This chapter will conduct three experiments to analyze different aspects of space in German literature. Each experiment will include a theoretical motivation, briefly outlining how this specific aspect has been previously addressed by literary critics and narratologists. The three aspects this chapter will examine are (1) historical time, (2) genre, and (3) narrative time.

When looking at historical time, we can thus ask how the different modes of presenting setting in texts have changed over time. Is there, as critics have often argued, a measurable decline when examining the broader outline of literary history? Moreover, regarding "description," can we detect a primacy of description in earlier works compared to later ones, as literary theorists have suggested? By analyzing these questions, we can test these theories and provide further insights into setting's historical role.

Another experiment will use the corpus metadata to investigate how the different modes of setting vary across genres. Do genres have a preference for individual modes of how setting is perceived? Is there, for instance, a difference in how setting has been employed in "fairy tales" versus "speculative fiction"? What can the model tell us about how genres shape literary worlds, and how this is linguistically manifested within texts?

Finally, by focusing on narrative time, I will analyze how setting changes over the course of a book by aggregating the distribution of setting across narrative time in all books present in the corpus. Specifically, I will examine the notion of narrative beginnings.

The beginnings of narratives are often considered particularly spatial, serving as the first "entry point" into the literary world and establishing all relevant features. Thus, I will ask, when looking at a broad array of texts, whether we can detect an underlying structure in which setting—and, more specifically, different modes of setting—are particularly prevalent at the beginning of narratives compared to other sections, and what that implies for the function of space within narratives.

By placing my findings within the framework of embodied narratology, I aim to highlight the importance of setting in conveying the lived experience of fictional worlds, which extends beyond simply creating verisimilitude. By examining how fictional narratives textually construct the process of becoming attentive to the objects and settings represented, I intend to identify what is particular about the phenomenological effects generated by these texts.

Integrating the findings of quantitative research with established concepts in cognitive theory allows us to explore the formal features of texts and their role in shaping how experience is represented in literature. Literary critics often refer to Realism as *the* literary period that stands out in its capacity to provide readers with a "more immediate" sense of the particularities of the characters and settings depicted in fiction (Auyoung 2018, 19; see also Watt 1957, Brooks 2005).

However, the findings presented here complicate this claim, revealing that, at least in terms of the "experiential" notion of setting emphasized by the model used, this perspective may be limited. Drawing on research in cognitive psychology, which argues that language is rooted in action and perception (Zwaan and Madden 2009, 229), I aim to analyze what role setting plays specifically in how different modes of perception unfold in the narrative, creating a "lived" environment that characters act upon. This approach highlights the embodied agency of characters and offers insights into the broader question of how setting influences character behavior, and the perceptual realities created in these texts.

The Historical Prevalence of Setting

When it comes to the historical role of setting in literature—and as it has been outlined by narratologists and literary theorists alike, the general assumption is that setting has become less important over time. Michael Toolan argues that setting in fiction has "been more prominent in the early literature than more recently" (Toolan 2001, 92). He attributes this to the fact that "our post- or late modernist globalized condition makes particularity of setting unimportant" (Ibid.). This echoes similar claims by critics who perceive modernism as the key historical moment of change in spatial representation in the novel (Nünning 2001, Fludernik 1996). While setting or space in earlier texts often were viewed as ornament and static background "whose relevant features are largely assumed to be known," it is only with "the rise of the realist novel that detailed description of spatial elements becomes a functional feature of narrative discourse" (Buchholz und Jahn 2005, 553-554). Ian Watt suggests that while place or setting traditionally used to be "as general and vague as time in tragedy, comedy, and romance" (Watt 1957, 25), it enters the novel as a much more "minutely discriminated" physical environment, turning the setting into "a pervasive operating force" (Watt 1957, 26). At the onset of the 20th century, "the pauses of narratorial

description are largely replaced by perceptions of space shown from the perspective of an internal focalizer" (Buchholz und Jahn 2005, 554).

Setting, when discussed, is often equated with description. While description certainly pertains to various elements in a story (from characterization to setting, to descriptions of internal states), the so-called "block description" (as opposed to description that is more "distributed" or "pulverized" across the narrative, as Chatman (1990) describes it), was thought to be "the dominant mode of introducing characters and places in the eighteenth- and nineteenth-century novel" (Nünning, 106). However, such "set pieces" of description went out of fashion with the Modernist novel (Chatman 1990, 26), turning it into something "subjective, rendering characters' perceptions rather than mere quasi-objective background information" (Fludernik 1996, 151).

Whether discussing description or setting more specifically, critics largely seem to agree on its proclaimed decline. Given that my model covers various modes in which setting might appear in texts—from *Aktionsraum* (space as moved through, where a character interacts with their environment in a functional way), to *gestimmter Raum* (where a character is affected by space, with setting contributing to mood and atmosphere), to *Anschauungsraum* (where a character observes space from a detached viewpoint), and down to the mere description of setting itself (i.e. "descriptive space", the positioning of objects and people in space)—we can explore these shifts in more detail.

If we understand setting as merely a background feature, then, when applying our model to the dataset, we might expect to see not only a decline in the prominence of setting over time but also a historical prevalence of description, which begins to diminish and is replaced by more perceptive modes with the onset of Modernism. However, the findings I present below tell a different story. Given that my model captures not only how space is perceptually rendered through the "lived" experience of a character but also the "static" and "ornamental" functions of setting—

providing verisimilitude and background—it allows us to "test" the hypotheses proposed by literary theorists about the changing nature of setting across literary history.

To do this, I apply my model to the entire fiction corpus comprising 4,784 books and 17,130,609 sentences spanning from 1780 to 1940. Each sentence in the corpus is assigned a label corresponding to one of the five categories outlined, based on the model's predictions. Using the labeled data and the metadata in our corpus, we can plot the frequency with which different types of setting appear across historical time (see *Figure 12* for the distribution).

The graph shows that *Aktionsraum* remains the most prevalent category throughout the analyzed timeframe. While some shifts are noticeable in the 18th century, particularly during Romanticism—when *gestimmter Raum* gains more prominence compared to other historical periods—all three types of setting generally exhibit stability in the broader context. This contradicts claims of a decline in the prevalence of setting over time. Although there is a slight decrease in *Aktionsraum* starting in the 1870s and a corresponding increase in *gestimmter Raum*, these changes are relatively modest.

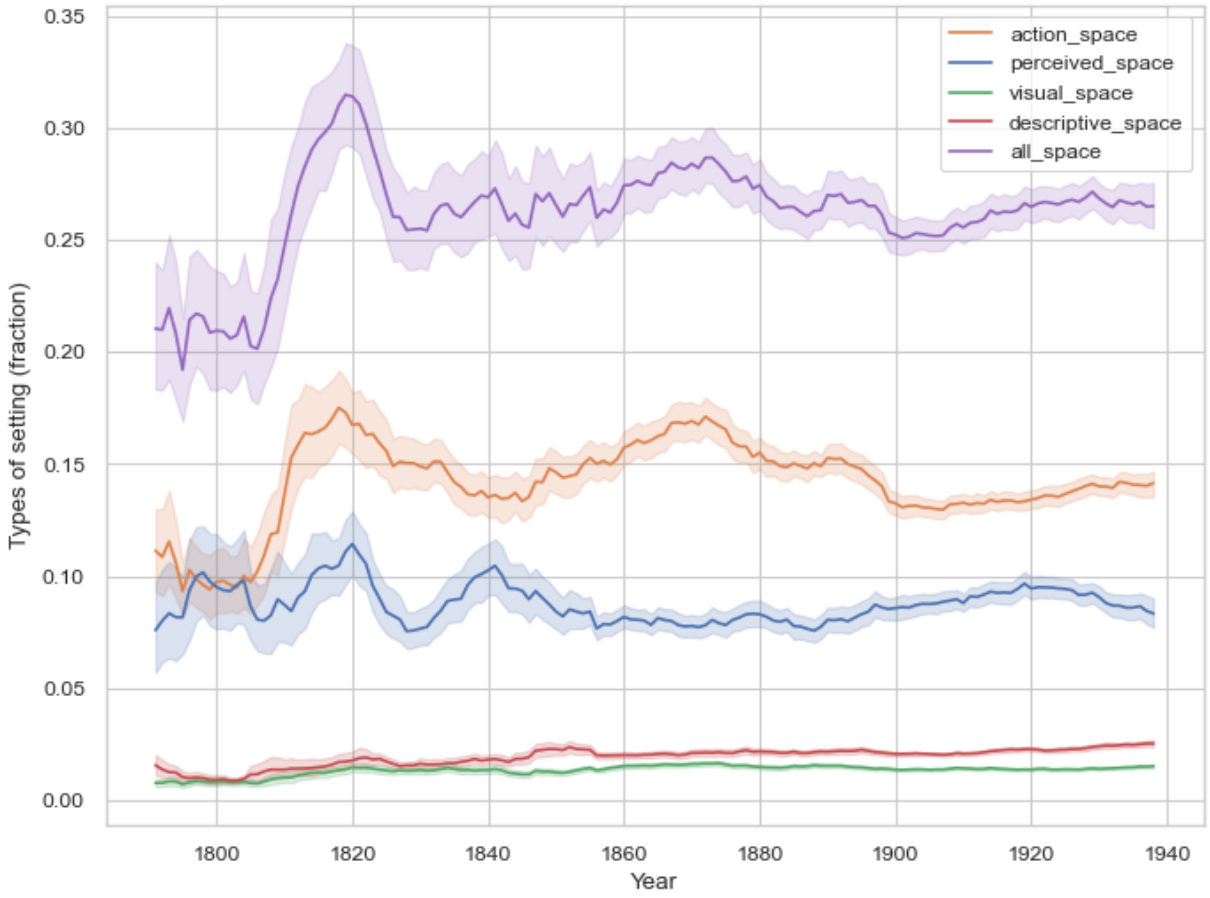


Figure 12. *Distribution of the different types of setting over time in fiction. For the labels: "perceived space" = gestimmter Raum, "action_space" = Aktionsraum, "visual_space" = Anschauungsraum; "all_space" encompasses the combined frequency of the 4 types.*

Contrary to the commonly held belief in a steady decline in the importance of setting, the findings suggest a more nuanced story. While some slight variations are observable, none of the types of setting presented here show significant decline. Notably, both *Anschauungsraum* and "descriptive space" remain consistently low throughout history, averaging around 2-3%. In contrast, the other two types, *gestimmter Raum* and *Aktionsraum*, appear at much higher levels overall, with *gestimmter Raum* averaging around 10% and *Aktionsraum* showing the strongest presence across history, maintaining a steady frequency of around 15%.

Readers may notice that there appears to be a significant increase in the representation of setting (specifically of *Aktionsraum*, but also overall) spanning the years from 1780 to 1820. It is

important to note, however, that this apparent spike might be an artifact of the data structure rather than being a real historical effect, due to the low number of texts present for these periods. While this does not rule out the possibility that these samples might tell us something about the overall trend in how these spaces have historically been employed, it does mean that individual books might have a significantly larger influence compared to later periods where the data is more evenly distributed. The presence of outliers in the data prior to 1820 may thus result in the overestimation of certain trends or the underrepresentation of others.

Gestimmter Raum highlights the importance of mood and atmosphere for setting, whereas *Aktionsraum* corresponds to its oriented and directional nature, where space is primarily moved through and interacted with through the sense of touch. In the framework employed, this implies that characters perceive space as a tangible and experiential entity, particularly through the senses of touch, sound, and smell. In contrast, visuality and descriptive detail are minimal, indicating that the dominant aspect lies in the immediate and embodied components associated with both *gestimmter Raum* and *Aktionsraum*. This runs counter to well-known theories around descriptive blocks that are especially characteristic of realist fiction. Rather than offering descriptions of fixed elements, setting facilitates the embodiment of agential actions within the fictional world.

This finding further emphasizes the interconnection between setting and the experiencing subject, pointing to a correlation or mutual dependency between the two. We can observe that setting, in general, is character-bound, emphasizing the "anthropocentric" focus of narratives and operating in close relation to the acting subject.

The pre-dominance of *Aktionsraum* throughout history suggests that setting and the things that make up and create space are mainly experienced as "functional" by the character. Spaces are moved through, things in narratives appear when they are needed—functioning as props rather than providing ornamental detail or static backdrop. This resonates with claims from a previous study

in CLS, which looked at the role of things in English-language fiction, which found that "structural things are more likely to cause characters to move and touch, not to think and emote" (Piper and Bagga 2022, 268-269). While their study does not make any claims about the role of setting in general, their findings relate closely to what we've subsumed under the notion of *Aktionsraum*.

Ryan et al. (2016) suggest that the movements of characters help readers construct "mental models of narrative space" that are centered on the characters and, in a sense, "grow out of them." (236). According to the authors, readers "gather spatial information" from literary texts primarily from "the movements of characters," who are themselves the focus of "interest in the fictional world […] rather than, for instance, fictional time or space or narrative situations" (Ibid.). Ryan et al. thus propose that characters (and subsequently readers) experience space in literature primarily through movement. A character moving *through* space mimics "the embodied experience of a traveler" (218). Experience in literature can, therefore, be understood as being grounded in spatial orientation.

Previous research has emphasized the importance of "embodiment" and "motion" in shaping characters' behavior, highlighting "the sensori-motor preference surrounding fictional agency" (Piper 2023). Although this study does not directly address the relationship between movement and space, the analysis presented here sheds light on the significance of setting in prompting action and movement in characters. Narratives, in this sense, mimic the embodied experience of a traveling, attentive agent who navigates space through movement and touch.

While *gestimmter Raum,* compared to *Aktionsraum,* figures less prominently throughout the analyzed time period in the corpus, the frequency of almost 10% consistently, is nonetheless striking and speaks to the importance of the role of setting not only as a motor of action but also in terms of its affective and atmospheric qualities for the narrative.

Given that the notion of *gestimmter Raum* subsumes different aspects of how space is perceived by the character and what effect this might have I can't make any judgement (yet) to what extent setting might also prompt emotional responses in characters. However, I nonetheless have enough evidence, to state that multimodal sensory perception of setting, the "feltness" (Herman 2009) of it plays an important role in fiction in the analyzed timeframe. In *gestimmter Raum* the character becomes attuned to the affective qualities of its surrounding physical environment in a bodily way, which primarily happens through sensory perception rather than cognitive processes.

To help further illustrate these points, I want to briefly look at example passages drawn from the literary corpus. The passage stems from Adalbert Chamisso's novella *Peter Schlemihls wundersame Geschichte* published in 1814. After arriving at the port and finding accommodation, the main character on which the novella centers, Peter Schlemihl, hurries to meet Mr. John, whose acquaintance he hopes to make—possibly to find work, though the reader is not told exactly why:

> <visual> Nachdem ich die lange Norderstraße hinaufgestiegen, und das Tor erreicht, sah ich bald die Säulen durch das Grüne schimmern – "also hier", dacht ich. <\visual> <action> Ich wischte den Staub von meinen Füßen mit meinem Schnupftuch ab, setzte mein Halstuch in Ordnung, und zog in Gottes Namen die Klingel. <\action> <action> Die Tür sprang auf. <\action> <action> Auf dem Flur hatt ich ein Verhör zu bestehn, der Portier ließ mich aber anmelden, und ich hatte die Ehre, in den Park gerufen zu werden, wo Herr John – mit einer kleinen Gesellschaft sich erging. <\action> Ich erkannte gleich den Mann am Glanze seiner wohlbeleibten Selbstzufriedenheit (1814/2023).[18]

> <visual> After I had gone through the long North-street, and reached the gate, I saw the columns glimmering through the green trees. "It is here, then," I thought. <\visual> <action> I wiped the dust from my feet with my pocket handkerchief, arranged my cravat, and rung the bell. <\action> <action> The door flew open; <\action> <action> the servants narrowly examined me in the hall, but the porter at last announced me, and I had the honour to be summoned into the park, where Mr. Jones was walking with a small company. <\action> I knew him instantly by his portly self-complacency (1814/2008).

[18] In some of the subsequent close readings, I will include the model's color-coded output tags when referring to the classifications made in the text. This will give the reader a sense of how the model classified the sentences. I have added them to the English translations as well, but it is important to note that they correspond to the classifier's predictions on the German texts only. The reader should keep in mind, however, that while the model generally performs well, not all tags align with how I would have labeled them. I will not address these discrepancies in the close readings, as doing so would go beyond the scope of the analyses presented in the individual chapters.

Moving from his hotel up to the residence where Mr. John lives, the setting presented in this passage is remarkably barren. The character is ushered through the residence—without the reader learning much about what the house looks like—out to the park, where a small party of people is already gathering, and where he finally meets Mr. John. The narrative continues with the same speed and economy, following the party as they make their way up the hill, where Schlemihl makes the first acquaintance with the devilish "grey man":

> <action> Ein stiller, dünner, hagrer, länglicher, ältlicher Mann, der neben mitging, und den ich noch nicht bemerkt hatte, steckte sogleich die Hand in die knapp anliegende Schoßtasche seines altfränkischen, grautaffentnen Rockes, brachte eine kleine Brieftasche daraus hervor, öffnete sie, und reichte der Dame mit devoter Verbeugung das Verlangte. <\action> <action> Sie empfing es ohne Aufmerksamkeit für den Geber und ohne Dank, die Wunde ward verbunden, und man ging weiter den Hügel hinan, von dessen Rücken man die weite Aussicht über das grüne Labyrinth des Parkes nach dem unermeßlichen Ozean genießen wollte. <\action>
>
> <perceived> Der Anblick war wirklich groß und herrlich.<\perceived> <perceived> Ein lichter Punkt erschien am Horizont zwischen der dunklen Flut und der Bläue des Himmels. <\perceived> <action> „Ein Fernrohr her!" rief John, und noch bevor das auf den Ruf erscheinende Dienervolk in Bewegung kam, hatte der graue Mann, bescheiden sich verneigend, die Hand schon in die Rocktasche gesteckt, daraus einen schönen Dollond hervorgezogen, und es dem Herrn John eingehändigt (1814/2023). <\action>

> <action> A silent, meagre, pale, tall elderly man, who stood next to me, and whom I had not before observed, instantly put his hand into the close-fitting breast-pocket of his old fashioned, grey taffeta coat, took out a small pocket-book, opened it, and with a lowly bow gave the lady what she had wished for; she took it without any attention to the giver, and without a word of thanks. <\action> <action> The wound was bound up, and they ascended the hill, from whose brow they admired the wide prospect over the park's green labyrinth, extending even to the immeasurable ocean. <\action>
>
> <perceived> It was indeed a grand and noble sight. <\perceived> <perceived> A light speck appeared on the horizon between the dark waters and the azure heaven. <\perceived> <action> "A telescope, here!" cried the merchant; and before any one from the crowds of servants appeared to answer his call, the grey man, as if he had been applied to, had already put his hand into his coat pocket: he had taken from it a beautiful Dollond, and handed it over to Mr. Jones (1814/2008). <\action>

Following the story, our character has covered quite some distance—from his hotel to Mr. John's residence, to the park where he met Mr. John and his guests, and up the hill. It seems as though the character is constantly moving, but the actual scenery he moves through lacks any detail or specific

description. Everything that appears in this passage serves a purpose; it is motivated: be it the handkerchief he uses to dust off his shoes, hinting at his lower economic status compared to the seemingly wealthy Mr. John, the letter he hopes will provide him entry into this society, the plaster for the woman's wound, or the looking glass to get a better view of the sky. Structural things, such as doors, are there to be opened, or flown open as in the passage above; bells are rung, corridors to be moved through. These objects "afford" corporal actions in characters.

Drawing on Gibson's theory of "affordances," research in the philosophy of mind, has emphasized the importance of an object's "affordance" for how we perceive the environment around us (Gibson 1986, 127–46). This perspective suggests that when encountering a physical or natural object (like a tree), we do not primarily focus on its visual characteristics or aim to form a clear mental image of it. Instead, we perceive it in terms of its potential utility or interaction—for instance, a doorbell that can be pushed or pulled, or a ladder that can be climbed.

The results presented here suggest that stories function in a similar way, with *Aktionsraum* clearly dominating. Rather than understanding the environment through a character's visual perspective, characters, as embodied agents, actively explore their surroundings through physical interaction (how things are) rather than passive observation (how things look). The affordances provided by the environment also shape the narrative's course of action. This suggests a dynamic interplay between physical embodied action and the progression of the plot.

Occasionally, the narrative is interrupted by atmospheric markers, such as the sublime view from the hill as in the passage above. However, even in these moments, the reader is not given much detail about what the view looks like but rather what it *feels* like to the character. What is rendered is a perception that follows an emotion, rather than a descriptive picture of the observed scene.

Aktionsraum is thus not merely a space to be moved through, but also a setting that affords the possibilities for action and movement. As Guignon (2003), drawing on Heidegger explains "there is a reciprocal relationship between our purposive agency and the practical contexts in which we find ourselves. Our goals, interests, and needs structure the ways in which things will count for us in the context" (183). Similarly, in fiction, the characters' interests, goals and needs structure the narrative's action. In narratives, the things, objects, and structures that appear are almost never incidental. Even the pillars—one of the first elements the character notices of the house—serve a purpose. They function as a frame for the character's gaze, constrain the view, and solidify the setting.

The two most prevalent modes appearing here, *Aktionsraum* and *gestimmter Raum*, can be traced back to—and Ströker heavily builds on these theories—what Heidegger termed *Dasein* and *Stimmung*. Crucially, Heidegger sees these concepts as closely tied to how people interact with and inhabit space.

For Heidegger, *Dasein* ("being-in-the-world") is, as Colombetti (2013) describes, "purposeful and goal-oriented; it is 'projected' toward its realization" and is also "fundamentally (necessarily, constitutionally) characterized by care (*Sorge*) for its activities and projects" (11). Similarly, narratives are often driven by characters' motivations and what they care about. In the example above, the character's actions are motivated by a desire to settle in the town where he has just arrived and gain acceptance into society. Later, these plans are toppled by the character's fateful decision to sell his shadow to the grey man in exchange for an endless supply of gold—a choice that leads to his alienation and rejection from society.

At a micro level, we observe that the character's actions are shaped by the things he attends to—or, in Heideggerian terms, by what he cares about. When setting appears, it is almost always noticed by the character, either directly (through touch) or affectively. Instances where space is left

unattended and reduced to mere description are minimal. My findings further suggest that characters' interaction with space are generally marked by immediacy; setting is perceptually present. As the data above illustrates, it is rare for characters to perceive their surroundings from a detached, static viewpoint. Instead, when setting appears, characters actively engage with it—whether directly and functionally or affectively and emotionally.

According to Heidegger, *Stimmung* (or "mood") "[…] bezieht sich nicht zunächst auf Seelisches, ist selbst kein Zustand drinnen, der dann auf rätselhafte Weise hinausgelangt und auf die Dinge und Personen abfärbt (1926/1967, 137)" [is not initially related to something psychical, it is itself not an inner condition which then in some mysterious way reaches out and leaves its mark on things and persons] (1926/1962, 129). Instead of treating mood as a cognitive or emotional state, he proposes that: "Die Stimmung überfällt. Sie kommt weder von »Außen« noch von »Innen«, sondern steigt als Weise des In-der-Welt-seins aus diesem selbst auf (1926/1967, 136)" [Mood assails. It comes neither from 'without' nor from 'within,' but rises from being-in-the-world itself as a mode of that being] (1926/1962, 129).

Heidegger, therefore, refrains from defining *Stimmung* as purely subjective or objective, instead framing it as an intermediary experience that "assails" individuals. While our concept of *gestimmter Raum* is more narrowly defined than Heidegger's, who argues that people are always already attuned in some way to their surrounding environment, in narrative texts, this attunement must somehow be conveyed. Nevertheless, Heidegger's idea of *Stimmung* offers a framework for understanding the dynamic interplay in fiction where either the setting or the character can serve as the source of affect.

Here, being affected "bodily" refers to a somewhat diffuse "background feeling," which doesn't necessarily prompt an emotional or psychological response from the character but can be "subtly felt" (cf. Colombetti 2013, 123). What the character becomes attuned to (the German

word *stimmen* also means "to tune," as in "to tune a guitar," or *das stimmt*, meaning "that's right," to indicate accordance with something someone said) is not the physical or material objects governing the space—although their "expressiveness" (*Ausdrucksstärke*) may contribute to a mood—but rather the affective qualities of the depicted environment.

Given that *gestimmter Raum* appears quite infrequently in the preceding passages and doesn't provide much material for interpretation, let's continue reading the story to better understand what this concept could mean when articulated in a text:

<perceived> Man hätte sich gern auf den Rasen, am Abhange des Hügels, der ausgespannten Landschaft gegenüber gelagert, hätte man die Feuchtigkeit der Erde nicht gescheut. <\perceived> Es wäre göttlich, meinte wer aus der Gesellschaft, wenn man türkische Teppiche hätte, sie hier auszubreiten. <action> Der Wunsch war nicht so bald ausgesprochen, als schon der Mann im grauen Rock die Hand in der Tasche hatte, und mit bescheidener, ja demütiger Geberde einen reichen, golddurchwirkten türkischen Teppich daraus zu ziehen bemüht war. <\action> Bediente nahmen ihn in Empfang, als müsse es so sein, und entfalteten ihn am begehrten Orte. <action> Die Gesellschaft nahm ohne Umstände Platz darauf; <\action> <visual> ich wiederum sah betroffen den Mann, die Tasche, den Teppich an, der über zwanzig Schritte in der Länge und zehn in der Breite maß, und rieb mir die Augen, nicht wissend, was ich dazu denken sollte, besonders da niemand etwas Merkwürdiges darin fand. <\visual> […]

<perceived> Die Sonne fing jetzt stärker zu scheinen an, und ward den Damen beschwerlich; <\perceived> die schöne Fanny richtete nachlässig an den grauen Mann, den, so viel ich weiß, noch niemand angeredet hatte, die leichtsinnige Frage: ob er nicht auch vielleicht ein Zelt bei sich habe. (1814/2023)

<perceived> They would willingly have remained longer on the sod of the sloping hill, and have stretched themselves over the outspread turf, had they not feared its dampness. <\perceived> "Now it would be enchanting," said somebody of the company, "if we had Turkey carpets to spread here." <action> The whish was hardly expressed ere the man in the grey coat had put his and into his pocket, and with modest, even humble demeanor, began to draw out a rich embroidered Turkey carpet. <\action> It was received by the attendants as a matter of course, and laid down on the appointed spot. <action> Without further ceremony the company took their stand upon it. <\action> <visual> I looked with new surprise on the man, the pocket, and the carpet, which was above twenty paces long, and ten broad. <\visual> I rubbed my eyes, not knowing what to think, and especially as nobody else seemed moved by what had passed. […]

<perceived> The sun now began to shine more intensely, and to annoy the ladies. <\perceived> The lovely Fanny carelessly addressed the grey man, whom, as far as I know, nobody had addressed before with the frivolous question: "had he a marquee?". (1814/2008)

Here, it's primarily through weather or weather-induced conditions that become to "impress themselves" on the characters' perception. Shying away from the dampness of the ground, the group contemplates how "divine" it would be to have a blanket. Needless to say, their wish is immediately granted. Later, as the sun's intensity becomes bothersome for the ladies, the desire for a tent to provide cover is quickly expressed.

Atmosphere here functions as "a feeling that is experienced as pervading the situation one finds oneself in" (Colombetti 2013, 179). It's not something that just lingers in the air but rather conveys an experience or mood. As Colombetti explains, "in mood, we experience our surroundings in distinctive ways, which depend on how those surroundings impinge on or impress our body, it [the body] thus contributes to the quality of how we are attuned to the world" (14). Similar, in the passage above, the setting is not passive but intertwined with the characters' perceptions, shaping both their cognitive state and external actions.

What both notions, *Aktionsraum* and *gestimmter Raum*, have in common is that they bring forth a "setting" closely tied to a character's immediate bodily experience, actively influencing its behavior. This significance is absent in both "descriptive space" and, though it belongs to the "perceptual modes" of setting, also in *Anschauungsraum*. Ströker, in her book, describes the *Anschauungsraum* io doubly distanced space (*doppelter Fernraum*), characterized by a detached and externally focused perspective. In Ströker's words:

> Ferne meint hier einmal ein räumlich Entfernungsmäßiges zwischen den Dingen und mir […]. Die andere Bedeutung der Ferne liegt hier in einer eigentümlichen Entferntheit des Leibes bezüglich seiner selbst […]. Im Anschauungsraum ist der Leib im ganz anderen Sinne über sich hinaus, und dies Kraft der Eigentümlichkeit der Sehfunktion, die eine entscheidende Rolle in der sinnlichen Anschauung spielt. […] Sehen geschieht nicht durch den Leib als Körperleib wie das Handeln. […] Anschauend bietet sich der Leib in einer Funktionsweise, die zwar in der eigenen Körperlichkeit eine Grundbedingung hat, die aber den Leib selbst nicht zur Mitgegebenheit bringt. Die Höherwertigkeit […] der Sehfunktion ist eben darin gelegen, daß in ihr der anschauende Leib von sich ab-sieht, sich selber fernbleibt, wie er denn seine Funktion auch nur in bestimmter räumlicher Entfernung vom Leibe wirksam aufnehmen kann. (Ströker 1965/1977, 100 f.)

> First, it means a spatial remoteness between the things and myself. […] The second meaning consists of a characteristic remoteness of the body in relationship to itself. […] In the space of intuition the body is beyond itself in an entirely different sense, and this by virtue of the distinctness of the visual function which plays a decisive role in sensory intuition. […] Vision does not occur through the body as corporeal in the same way as with handling. […] While intuiting, corporeity appears in a mode of functioning that has its fundamental conditions in its own body, but does not bring corporeity itself into view. The higher value […] of the visual function lie in that the intuiting corporeity looks away from itself, since it can effectively assume its function only in a specific spatial remoteness from corporeity. (1965/1987, 89 f.)

The "self-oriented", central to *Aktionsraum* and *gestimmter Raum*, which presents an environment organized around the subject's body, is overcome in *Anschauungsraum,* favoring an "objectifying" stance that depicts space as external and detached.

As my findings demonstrate, rather than portraying setting as independent of a character's actions—serving merely as a static backdrop—setting in fiction is almost always intertwined with a character's bodily engagement. Narratives tend to depict settings that characters physically interact with through touch and movement, or that influence them in sensory and affective ways, conveyed through atmosphere, smells, or sounds. Central to this is the dynamic interplay between character and environment, where setting is not passive but active, shaping and being shaped by the characters' actions and perceptions.

This contrasts with static descriptions and sceneries that contribute to the setting's *Anschaulichkeit* ("visuality"), merely informing the reader about the environment. In this sense, narratives construct a lived, phenomenological experience of setting that goes beyond mere description. Space becomes less about an external, detached reality and more about the fluid interaction of perception, emotion, and action.

A Note on Canonicity

When literary theorists analyze the historical relevance of setting in fiction, they often focus on highly canonical works. For example, detailed descriptions in realist literature are often associated with authors like Stifter and Fontane. Works from Romanticism are characterized by their idyllic and atmospheric depiction of nature, as seen in the works of Joseph von Eichendorff or E. T. A. Hoffmann. In contrast, Modernist authors such as Rilke and Alfred Döblin are known for their focus on how the environment is filtered through a character's perception. Could it be, then, that when sampling canonical works, i.e., those reviewed in prominent anthologies, a different pattern emerges?

Research in CLS has repeatedly shown that a manually curated dataset—i.e., one created based on certain distinct features—produces different results compared to a more diverse and heterogeneous one. Prior work has demonstrated that canonical works often differ in style and lexical diversity from non-canonical ones (e.g.: Algee-Hewitt et al. 2016, Underwood and Sellers 2016, Koolen et al. 2021, Brottrager et al. 2021).

For Pascale Casanova, the canon "embodies the very notion of literary legitimacy," representing the standard of what is "formally" acknowledged as *Literature*, serving as a benchmark (or "unit of measurement") for evaluating other literary works (2004, 14). While my model focuses "just" on setting, can we observe any differences in the way this concept is represented in canonical works compared to non-canonical ones? In other words, could it be that a different pattern emerges in the canonical data—one that aligns more closely with what critics have traditionally historicized about setting?

To analyze this, I apply my model to a sampled dataset of German canonical fiction, manually curated by researchers working on canonicity in computational literary studies

(Brottrager et al. 2022). Since their data only includes books published up to 1914, I manually supplemented the dataset with books from subsequent years to ensure that the canonical sample approximates the timeframe covered in my corpus. 202 texts were manually added resulting into a corpus of 719 canonical works of German fiction. *Figure 13* shows the count for the number of books in each decade as well as the number of sentences.

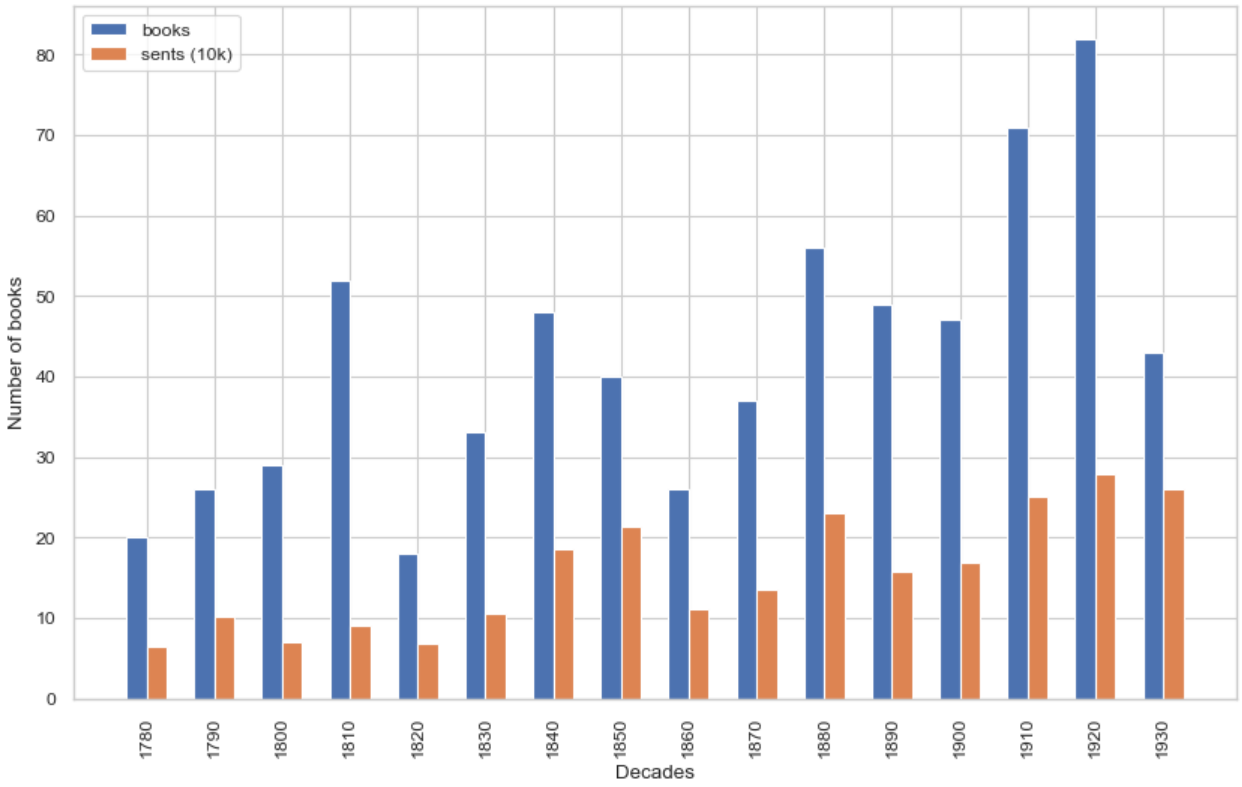


Figure 13. *Distribution of the number of books in canonical dataset, "sents (10k)" corresponds to sentences per 10,000.*

Refer to *Figure 14* for the historical distribution of each individual space type in canonical works compared to the larger dataset presented above, which includes both canonical and non-canonical works. he shaded light green area highlights the regions where there is a significant difference between the distributions of the two datasets. To test for significance, I employed a t-

test, which assesses whether the differences in means between the two datasets are statistically significant rather than due to random variation.

While the overall trend mirrors that observed in the full corpus, periodical fluctuations are generally more pronounced in the canonical dataset. Three observations stand out: (1) *Gestimmter Raum* has a notably higher frequency in the canonical corpus between 1800–1810 and again between 1850–1880. (2) "Descriptive space" shows a significant "bump" in the canonical corpus from 1850 to 1880 that is not visible in the larger corpus. (3) *Anschauungsraum*, though relatively low compared to other types, is more frequent in the canonical works between 1800–1840 and 1850–1880. For *Aktionsraum*, the only notable variation occurs between 1800 and 1820 where its significantly higher in the canonical data as well as between 1920 and 1940.

Overall, the distribution of "all_space" (i.e., the combined frequency of all space types) shows a slightly higher frequency in the canonical dataset during earlier periods, peaking in the early 19th century at nearly 80% and dipping to around 50% by the early 20th century. In contrast, the non-canonical dataset remains more stable, fluctuating between 50% and 60%. The canonical dataset exhibits more pronounced fluctuations, with combined frequencies spiking around 1810–1820, rising again around 1840, and then declining near 1900. It finally dips slightly below the non-canonical dataset as it enters the early 20th century.

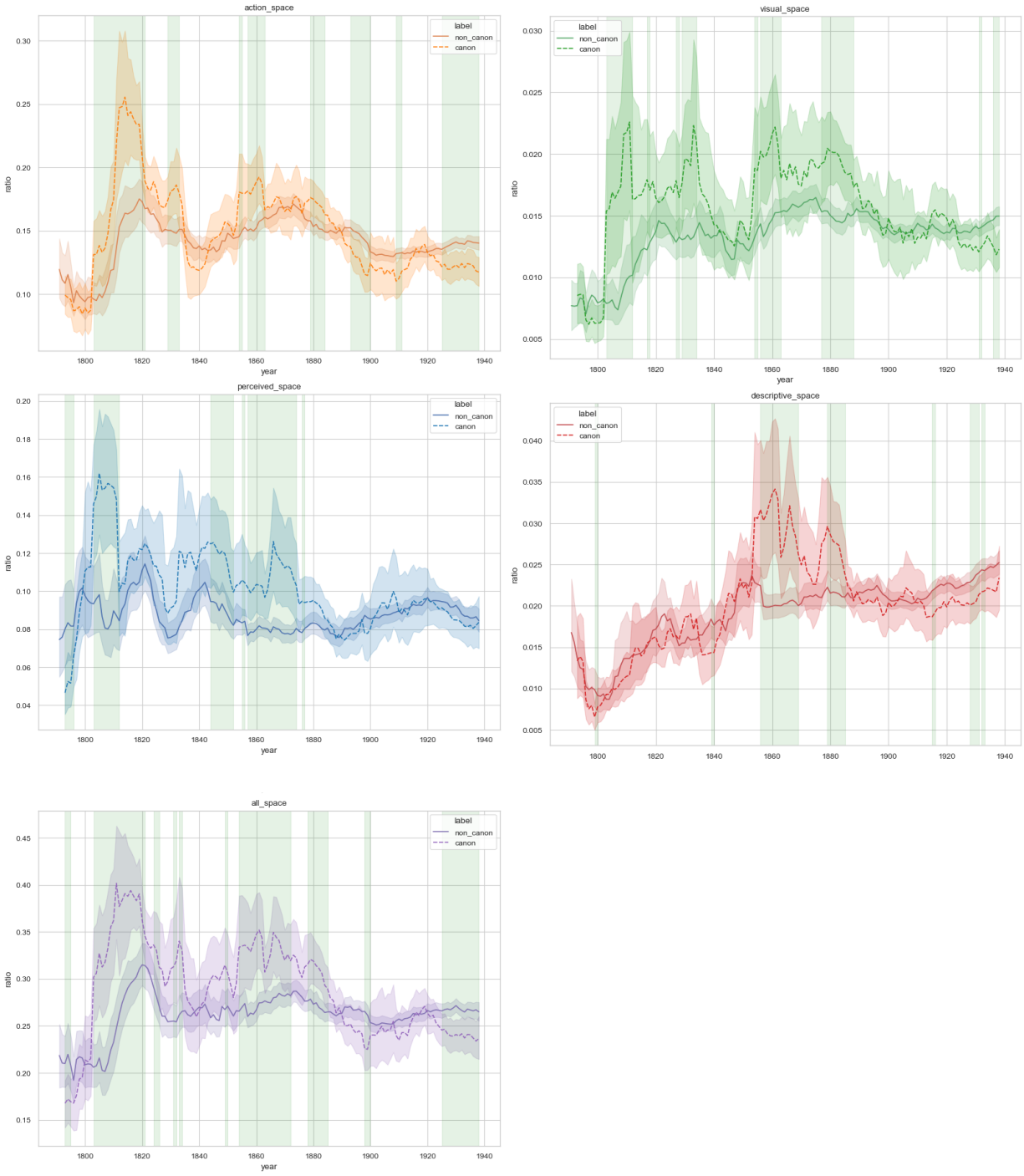


Figure 14. *Historical distribution of canonical texts compared to the non-canon dataset for each space type. The shaded light green area indicates regions where the difference between the distributions is statistically significant according to the t-test.*

Thus, while the trend—*Aktionsraum* and *gestimmter Raum,* dominating across history, and descriptive notions holding minimal importance, mirrors the larger dataset, there are some

variations in frequency, particularly in earlier texts. The higher frequency of "descriptive space" during Realism, while still significantly lower than the other two dominant types, nonetheless suggests that within canonical works, this period features a significantly higher ratio of descriptive space compared to non-canonical works. The most notable difference for *gestimmter Raum* occurs in the early 19th century, where its frequency is significantly higher than in non-canonical works.

To rule out the possibility that this trend is an artifact of the canonical dataset's significantly smaller size compared to the larger corpus, I created multiple random samples of the larger corpus, approximating the number and historical distribution of the books present in the canonical corpus. While *Figure 15* presents only one such random sample for visualization purposes, all the random samples consistently showed a similar historical distribution. This consistency confirms that the findings hold robustly when sampling randomly from the larger dataset.

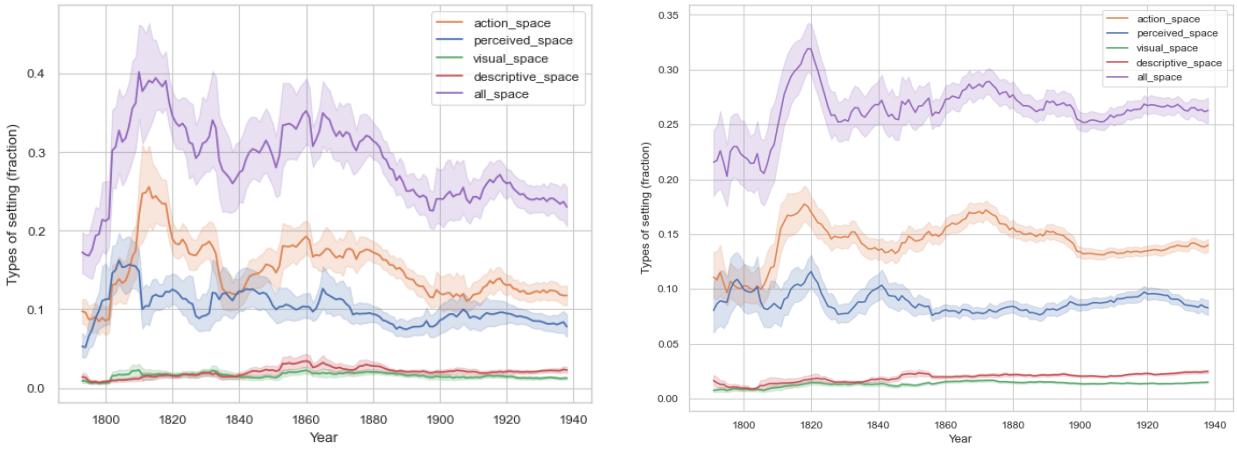


Figure 15. *Historical distribution of canonical (left) versus random sample (right) of the larger corpus.*

When examining the distribution of the individual types in *Figure 14*, one notable observation is the width of the shaded area around the solid lines in the canonical dataset, which is significantly wider than in the random sample. The shaded area represents the confidence

interval (CI) of the plotted data, indicating the variability or uncertainty around the main trend line. This suggests a higher frequency of outliers in the canonical set compared to the random sample from the larger dataset, which exhibits greater consistency in how works in this sample use setting.

This variability is particularly evident during periods with greater fluctuations in the use of different types of setting compared to the non-canonical sample analyzed earlier. While the visualization (*Figure 14*) highlights that the CI is much wider for canonical works, this could be attributed to the smaller number of texts in this sample compared to the larger corpus. However, random sampling allows us to control for this by approximating the canonical sample in both size and historical distribution, thereby accounting for potential discrepancies.

By examining the data points with especially high frequencies of specific space types, we can determine whether certain authors in the canonical set are driving these spikes. When plotting the authors and books associated with these high-frequency data points for each type of space, it becomes apparent that the pool of authors involved is quite small. It turns out that a few highly canonical authors play a significant role in these trends, with three of them particularly standing out.

Figure 16. *Scatterplot of space types across history in the canonical sample. Each dot in this plot represents an individual book.*[19]

[19] For readability, I have only plotted the titles and authors of the works (with the titles abbreviated here) that fall within the timespan where we previously observed a difference in the distribution of the individual types of setting in the canonical sample versus the larger dataset (e.g. for "descriptive space" the years between 1840 and 1880).

This is especially striking for "descriptive space," where Stifter's body of work is prominently represented among the data points with the highest frequency of this type. It's safe to say that the slight increase observed in Realism is mainly driven by Stifter's works, which consistently show a significantly higher use of "descriptive space" compared to other authors.

For *gestimmter Raum*, it is the Romanticist author Ludwig Tieck whose oeuvre is driving a spike in this period. Whereas greater fluctuation in *Aktionsraum* at the beginning of the 19th century seems to be primarily driven by the works of Heinrich von Kleist, and again Tieck, with most of their works published between 1800 and 1820.

While canonical authors overall seem to use space slightly more frequently compared to the broader body of German literature, the observed spikes are largely attributable to the works of a few individual authors whose style shows a particular preference for one or two space types, setting them apart from their contemporaries within the same period. When these authors are removed from the sample, the fluctuations marking specific periods largely disappear (see Appendix for visualization).

While Stifter's high use of "descriptive space" may resonate with readers, this brief examination of canonical works suggests that the "selectiveness" of these works might contribute to certain assumptions about stylistic features specific to a given period. In other words, the perceived emphasis on certain types of space being higher in one period than another is primarily driven by the works of individual authors rather than by a larger, more representative sample of the period. Thus, even when focusing solely on canonical works, stylistic distinctions—at least in terms of the analysis of setting conducted here—can largely be attributed to a few highly canonical authors. These authors stand apart from others in their periods, who demonstrate a more consistent and uniform use of the various types of setting.

It is often these authors, known for their distinctive style, who are highlighted in literary discussions. For instance, Stifter is frequently cited as exemplary for his extensive descriptions, which are characteristic of Realist literature, while Tieck is renowned for his idyllic depictions of nature, which are considered typical of the author's work and representative of the Romantic period more generally. While these characteristics may resonate with readers and are empirically validated here, they disappear entirely when looking at the broader, more heterogeneous body of literature.

This further emphasizes that the canon is shaped by a select few well-known authors, who, in turn, shape what is commonly perceived as characteristic—at least in case presented here, where the increased use of a specific space type is tied to such influential figures. Returning to Casanova's "units of measurement," we can indeed confirm that individual canonical authors are responsible for a perceived trend or bias toward a particular type of setting within a given period. When examining the broader historical trendline, however, these assumptions appear to be overturned: there is neither a decline in the use of setting nor an increased use of description in earlier works compared to later periods. By analyzing a larger corpus that includes both canonical and non-canonical works, we can identify significant structural trends in literary history that might be overlooked in more traditional, narrower approaches.

Shifting from "historical time," the next section will focus on genre. Given that my data includes metadata not only on publication year but also on genre and sub-genre, I can explore whether and how the different modes outlined in my model vary across genres. While the majority of the dataset consists of novels and novellas (with a smaller proportion of shorter tales), it also includes a significant variety of other genres, ranging from "historical novels" to "fairy tales" to "YA."

Genre in literature is generally understood as a way to categorize texts based on shared features (Pyrhönen 2007, 109). If we view genre not just as the result of an author's (or publisher's)

intent but also as a pattern of textual features that readers may recognize, what can our model tell us about how the various types of settings are used across genres? How does science fiction, for instance, differ from other genres, such as fairy tales or crime novels, in its depiction of setting?

The following section will therefore focus on how genres represent different kinds of "spatio-temporal worlds." Using my model, I aim to identify differences in how particular genres respresent the "lived space" associated with their respective worlds.

Setting and Genre

In *The Dialogic Imagination*, Bakhtin proposes that genres can be understood as representations of various "chronotopes"—the interconnected way in which time and space are artistically represented in a narrative. These different qualities of fictional worlds are thought to distinguish works in one genre from those in another. For Bakhtin, these chronotopes are considered to be a fundamental element of the form of a narrative (e.g., the "chronotope of the road" or the "chronotope of the threshold") that signify the underlying structure of a text. For instance, the "chronotope of the threshold" is "connected with the breaking point of a life, the moment of crisis, the decision that changes a life (or the indecisiveness that fails to change a life, the fear to step over the threshold)" (Bakthin 1981, 248).

Bakhtin's concept of the "chronotope" is also closely linked to movement, specifically the mobility of characters within a fictional world. Taking her cue from Bakhtin's notion of the chronotope, Friedman simply defines narrative "as the representation of movement within the coordinates of space and time" (Friedman 1993, 12). While I have already established that "movement" or "mobility" is particularly important to narratives (subsumed under the notion of *Aktionsraum*), do genres, beyond the common tropes they depict (e.g., the "quest" in fairy tales or

"space/time travel" in science fiction), also differ in how they textually represent the different types of spaces outlined in our model? Can we investigate whether there is something distinct about how "setting" is represented across various genres? In other words, what role does space play in the construction of a "world" in a genre?

To investigate the relationship between setting and genre, I calculate the frequency of each space type within each genre in my dataset. See *Figure 17* for the distribution of each space type across genres. I find that while *Aktionsraum* remains the most dominant space overall (followed by *gestimmter Raum*)—consistent with its historical distribution, there are notable variations between genres, particularly regarding *Aktionsraum* and *gestimmter Raum*.

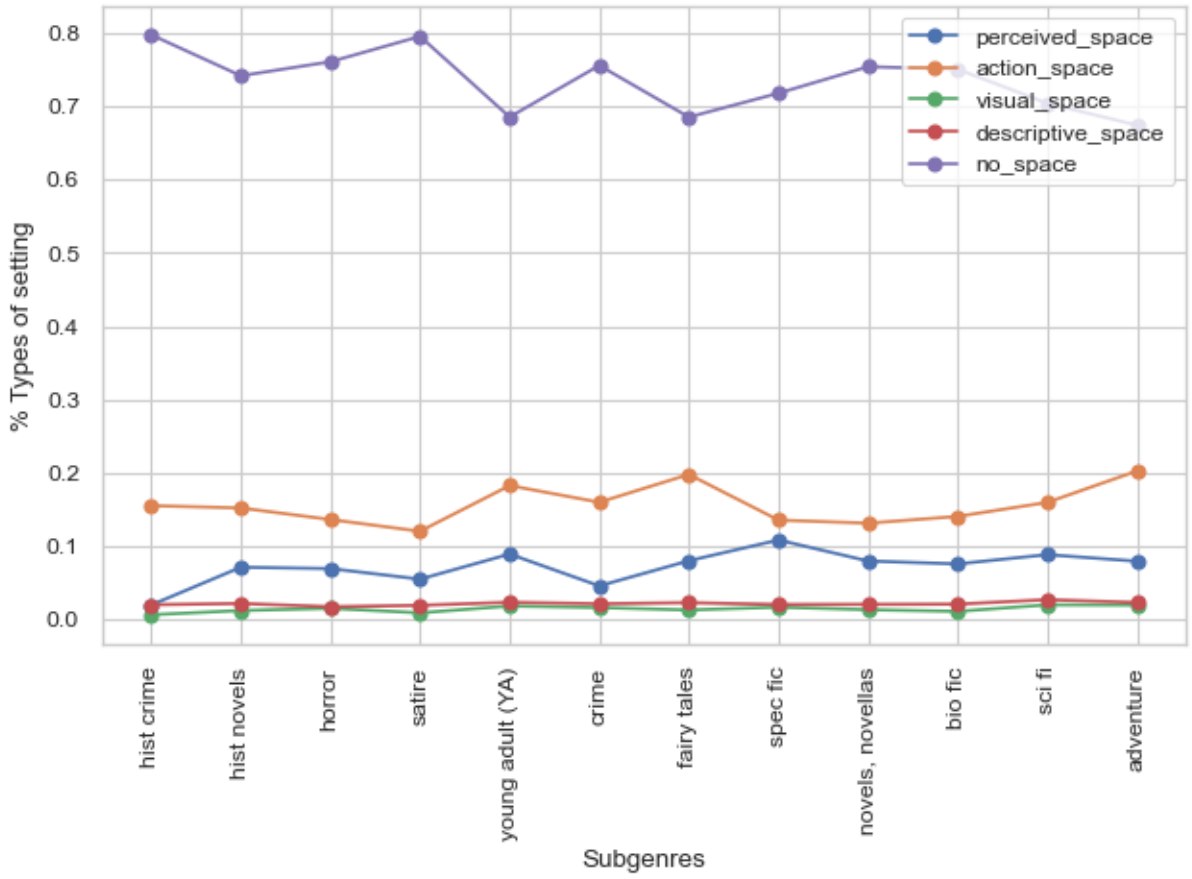


Figure 17. *Distribution of space-types across genres.*

Applying a post-doc pairwise Tukey test (HSD) to this data, further corroborates the findings shown above. The Tukey test, also known as Tukey's Honest Significant Difference (HSD) test, is a method used to compare the means of different groups while controlling for Type I errors (false positives). Overall, the Tukey test shows statistically meaningfully difference across genres, for all space types, except for "descriptive space." This suggests that genre might be a "stronger" predictor of setting than literary period, especially when it comes to the dominant types of *Aktionsraum* and *gestimmter Raum* where the mean differences between genres are much higher than for "visual space" or "descriptive space." This indicates that the influence of genre on setting is more pronounced for certain space types, suggesting a clear genre-based differentiation in how spaces are used within the texts.

Given that there are 12 genres in my dataset and four individual space types, the number of comparisons is quite large. The Tukey test compares the mean differences between each genre and all other genres for each individual space type. To visualize this, I use a heatmap (*Figure 18)*, where each box represents a comparison between individual genres.

To help interpret the visualization, let me provide an example. The left diagonal of each box shows the p-values, while the right diagonal represents the mean differences. For instance, if we look at *Aktionsraum* (the first box labeled "action_space") and start from the bottom left comparing the genres in the x-axis with those on the y-axis, we see a comparison between "historical crime" and "adventure." The p-value is 0.0 (i.e. $p<0.001$), suggesting that these genres are significantly different from each other in their use of *Aktionsraum*. The right diagonal shows the mean differences between each genres. Comparing "adventure" on the x-axis with "historical crime" on the y-axis we can see that the mean difference is 4.7. This indicates that the use of *Aktionsraum* in "adventure novels" is 4.7 points higher than in "historical crime" novels.

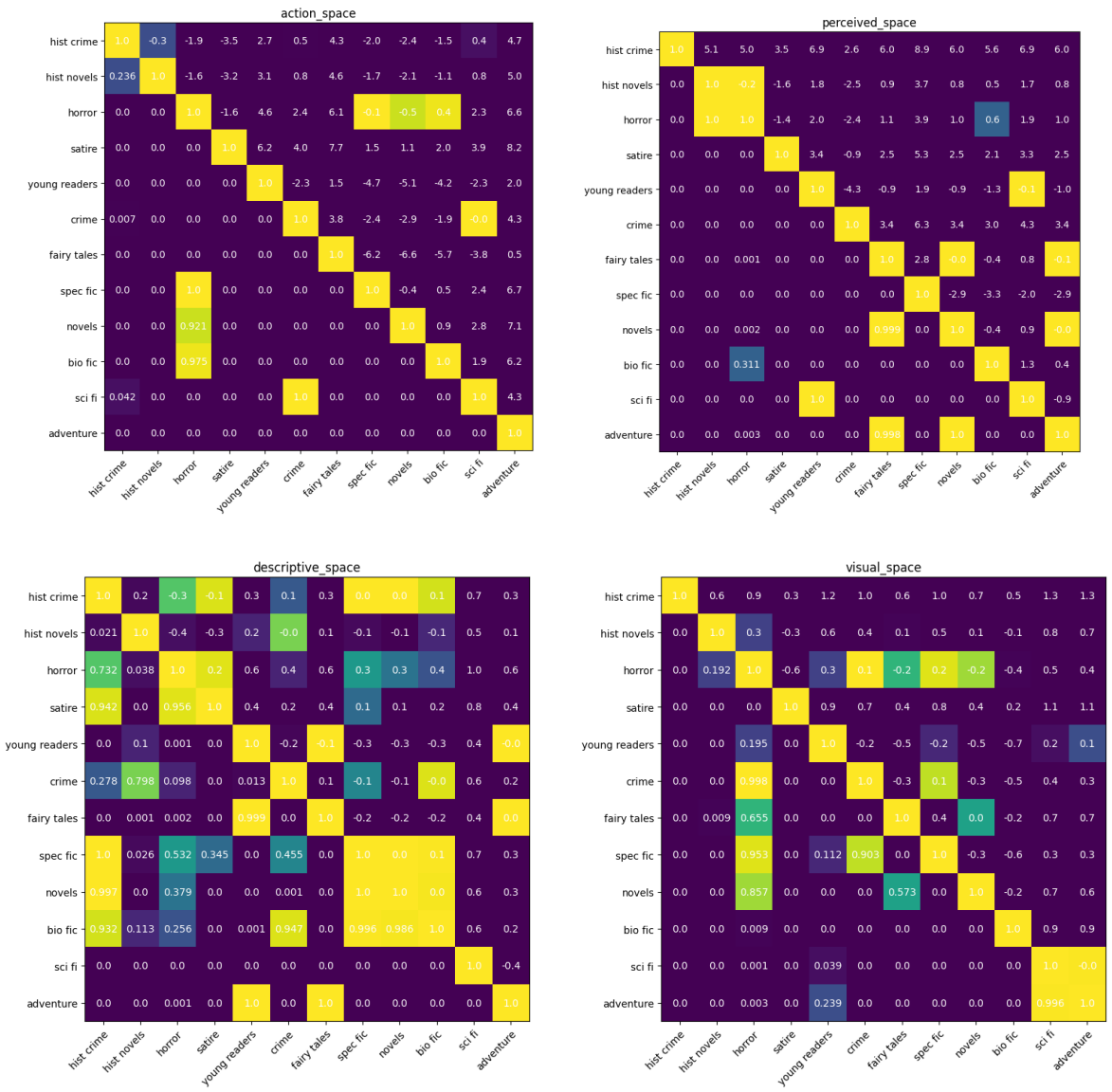


Figure 18. *P-values (<0.001) and mean differences Tukey-Kramer (HSD) test. The values in the left diagonal correspond to the p-values, the values on the right the mean differences.*

The colors correspond to the level of significance: the darker the color, the more significant the difference. Lighter colors (such as blue, green, and yellow) indicate no significant difference between genres in the use of a specific space type, with yellow representing the highest p-value (p = 1). For example, in the case of *Aktionsraum*, "crime" and "science fiction" share a mean difference of 0.0, meaning they exhibit the same frequency of *Aktionsraum*. With a p-value of 1,

this confirms that the difference between these genres for this space type is not statistically significant.

"Fairy tales," for instance, prominently feature *Aktionsraum*, reflecting action-driven spaces where movement and quests are central. Alongside "adventure novels" (32%), "fairy tales" (31%) exhibit the highest frequency of setting overall—11% higher than "historical crime" and "satire," and 7% higher than the larger bulk of texts in the corpus, which consist of novels and novellas. The two genres also display a similar use of space types, with no significant differences in the use of *gestimmter Raum* and "descriptive space" between them. Even when examining *Aktionsraum* and *Anschauungsraum*, the mean differences are slight (M=0.5 and M=0.7, respectively), though statistically significant.

This makes intuitive sense, as quests and movement are central to both genres. A comparatively high use of *gestimmter Raum* also underscores the atmospheric quality often depicted in these genres; one need only think of enchanted castles or magical forests.

By grouping certain genres, we can identify similarities in their use of space types despite statistical differences between them. "Speculative fiction," "YA," and "science fiction" display a higher frequency of *gestimmter Raum*, reflecting the affective and atmospheric qualities characteristic of the representation of space in these genres. For "YA," this might illustrate how the settings in this genre contribute to the development of subjectivity in characters, giving them a much more "emotional" and "affective" function than in other genres. "Speculative fiction" stands out with a consistently higher use of *gestimmter Raum* compared to all other genres in the dataset, distinguishing it in this regard. For instance, the mean differences are particularly notable when compared to "historical crime" ($p<0.05$, M=8.9), where "speculative fiction" shows an 8.9-point higher frequency of *gestimmter Raum*. In contrast, "historical novels," "historical crime," and

“adventure novels” show a higher prevalence of *Aktionsraum*, suggesting a focus on action-oriented spaces where movement is central.

It is important to note, however, that the findings indicate correlations rather than causation. While the high use of *gestimmter Raum* in “speculative fiction” and “YA” aligns with their focus on atmosphere and subjectivity, these patterns likely reflect co-evolving genre conventions rather than a direct causal relationship. This thus does not imply that genre directly dictates the use of space types or vice versa. Instead, these patterns may result from broader, more complex interactions between genre traits, authorial choices, and historical-cultural contexts.

While an in-depth qualitative examination of the different genres and their use of the various kinds of spaces falls beyond the scope of this project, the differing effects observed across genres regarding these types lend further evidence to the distinctive role that genre plays in the construction of literary worlds. To gain a clearer sense of how “setting” is presented in different genres and where they may diverge, I will provide a brief case study in the next section. This study will explore two individual genres, examining how each might afford different worlds and make distinctive use of setting.

Case Study: A Tale of two Genres

The first passage is drawn from Ludwig Tieck’s fairy tale *Der Runenberg* published in 1802. The story centers on a young hunter named Christian, who, driven by a vague feeling of longing, leaves his hometown and wanders into the nearby mountains:

> <action> So trieb ich mich um, bis ich an einem Morgen den Entschluß faßte, das Haus meiner Eltern auf immer zu verlassen. <\action> <action> Ich hatte in einem Buche Nachrichten vom nächsten großen Gebirge gefunden, Abbildungen einiger Gegenden, und darnach richtete ich meinen Weg ein. <\action> Es war im ersten Frühlinge und ich fühlte mich durchaus froh und leicht. <visual> Ich eilte, um nur recht bald das Ebene zu verlassen, und an einem Abende sah ich in der Ferne die dunkeln Umrisse des Gebirges vor mir liegen.

<\visual> <perceived>Ich konnte in der Herberge kaum schlafen, so ungeduldig war ich, die Gegend zu betreten, die ich für meine Heimat ansah; <\perceived> mit dem frühesten war ich munter und wieder auf der Reise. <perceived> Nachmittags befand ich mich schon unter den vielgeliebten Bergen, und wie ein Trunkner ging ich, stand dann eine Weile, schaute rückwärts, und berauschte mich in allen mir fremden und doch so wohlbekannten Gegenständen. <\perceived> <perceived> Bald verlor ich die Ebene hinter mir aus dem Gesichte, die Waldströme rauschten mir entgegen, Buchen und Eichen brausten mit bewegtem Laube von steilen Abhängen herunter; mein Weg führte mich schwindlichten Abgründen vorüber, blaue Berge standen groß und ehrwürdig im Hintergrunde. <\perceived> Eine neue Welt war mir aufgeschlossen, ich wurde nicht müde. <action> So kam ich nach einigen Tagen, indem ich einen großen Teil des Gebürges durchstreift hatte, zu einem alten Förster, der mich auf mein inständiges Bitten zu sich nahm, um mich in der Kunst der Jägerei zu unterrichten. <\action> (1802/2023).

<action> I drifted around like this until one morning I decided to leave my parents' house for good. <\action> <action> I had found in a book some descriptions of the nearest mountains, with pictures of the neighbouring districts, and thereafter I directed my way. <\action> It was in the early spring, and I felt myself quite light and joyful. <visual> I hastened with all speed to leave the plain; and, one evening, I saw in the distance the dim outline of the mountain-chains lying before me. <\visual> <perceived> I could scarcely sleep in the inn, so impatient was I to tread the region which I regarded as my home: with the earliest dawn I was awake, and again upon my journey. <\perceived> <perceived> In the afternoon, I found myself already below my much-loved hills; and, as a drunkard, I went on, then stopped awhile, looked backward, and felt as if intoxicated with the strange and yet familiar objects. <\perceived> <perceived> Soon the plain behind me was lost to my sight; the forest-streams were rushing to meet me; beech-trees and oaks sounded down to me from steep precipices, with waving boughs; my path led me past giddy abysses; and blue hills were standing high and solemn in the distance. <\perceived> A new world was unlocked to me. I was not weary. <action> So I came, after certain days, having traversed a great part of the mountains, to an old forester, who, at my earnest request, took me to instruct me in the arts of the chase. <\action> (1802/1845)

The spaces depicted here are abstract and broad, lacking concrete boundaries that would ground the character's experience in a tangible setting. This "spatial indeterminacy" (Propp 1928/1968, 151), characteristic of fairy tales—where space often remains largely unspecified—does not imply, however, that space is absent. As the results above indicate, fairy tales surpass almost all other genres in their use of space. While space pervades this passage, it lacks the specificity or concreteness that we might find in passages from other genres (such as crime fiction, which I will discuss shortly) or the close readings I've already provided. The character, as he leaves

his home, traverses plains and mountains, encounters forest streams and steep slopes, but nothing in this scene has any immediate physical relevance to him. Almost everything remains in the abstract, which is also manifested linguistically, using more abstract concepts rather than referring to concrete objects or structures (e.g., the "things" (*Gegenstände*) making an impression on him, the aforementioned "areas" (*Gegenden*) he traverses). There is almost nothing, that ties the character down in space.

This is interesting, and it's also something that my model doesn't directly account for, at least not in its current set up. In terms of *Aktionsraum,* the scene above suggests that space is merely moved through, but the other aspect covered under the notion of *Aktionsraum*—the character touching and interacting with things, which would suggest a more concrete and direct encounter with the physical world—is completely absent here.

Bakhtin argues that in "adventure novels," the worlds depicted are intentionally abstract and interchangeable because "all initiative and power belongs to chance" (100). The same could be said of fairy tales. According to Bakhtin, adding concrete details would "restrict the freedom and flexibility of the adventures and limit the absolute power of chance" (Ibid.). Each detail would bring its own set of rules and structures, as well as connections to "human life," becoming interwoven with events, which "would find themselves participating in this order, subject to its ties" (Ibid.). Anchoring the "movement of adventures" organically in time and space, would thus, according to Bakhtin, undermine the "power of chance" (Ibid.).

Given that *Aktionsraum* in my model doesn't differentiate between moving through space and moving through space by also interacting with it, I can't assess whether that's indeed typical for the genre of fairy tales and adventure novels more broadly. What my data shows, is, that these two genres are indeed very similar, both in respect to the overall frequency of setting, but also how they use the different modes of settings.

What we can see from the model's tags in the passage above, however, is that the sentences are not classified as *Aktionsraum*. What dominates here in terms of frequency—and aligns with my reading and interpretation of the overall passage—is *gestimmter Raum*. Thus, while the character is indeed moving (as implied by the passage), another aspect takes precedence—namely, the affective and emotional depiction of space.[20]

Nature, or the setting, appears to directly mirror the emotions of the perceiver. The character becomes immersed in the surrounding landscape, which seems animated and "alive" (the river rushes toward him, the trees rustle beside him). In contrast, the character has almost no agency in this scene. It is as if nature itself is carrying him along the path, while he becomes overwhelmed by the surrounding sensory impressions. The passage also speaks of feelings of drunkenness and dizziness, further emphasizing his lack of control.

This contrasts with the example from "crime fiction" in my corpus, which I will examine next. In this genre, it is the "everyday" and the "private" that take center stage, situating us primarily in the domestic and personal spaces inhabited by the characters. In relation to Bakhtin's claims about the adventure novel, it could be argued that crime fiction fulfills everything the former does not: it incorporates "props" that take on heightened significance, often serving as crucial elements that drive the plot forward, introduce rules, and establish connections to "human life." Rather than presenting an indeterminate setting, crime or detective fiction frequently unfolds in clearly delineated, concrete settings.

To demonstrate this and gain a better sense of how setting functions in this genre, I will analyze a passage from E.T.A. Hoffmann's *Fräulein von Scuderi*, published in 1819. In this scene,

[20] To achieve a more granular classification of *Aktionsraum*, as suggested above, a different setup or annotation scheme would be required. For example, this could involve allowing for non-mutually exclusive classifications or focusing on specific aspects, such as mobility and how it relates to abstract movement (space that is moved through) versus interactive movement (space that is both moved through and interacted with).

the Martiniere, the servant of the residence where Fräulein Scuderi lives, is struck with great fear and surprise as an unexpected guest persistently pounds on the door late at night:

> <action> Sowie sie die Türe kaum geöffnet, drängte sich ungestüm die in den Mantel gehüllte Gestalt hinein und rief, an der Martiniere vorbeischreitend in den Flur, mit wilder Stimme: Führt mich zu Eurem Fräulein! <\action> <perceived> Erschrocken hob die Martiniere den Leuchter in die Höhe, und der Kerzenschimmer fiel in ein todbleiches, furchtbar entstelltes Jünglingsantlitz. <\perceived> <action> Vor Schrecken hätte die Martiniere zu Boden sinken mögen, als nun der Mensch den Mantel auseinanderschlug und der blanke Griff eines Stiletts aus dem Brustlatz hervorragte. <\action> Es blitzte der Mensch sie an mit funkelnden Augen und rief noch wilder als zuvor: "Führt mich zu Eurem Fräulein, sage ich Euch!" […]
>
> <action> Sie warf die Türe ihres Gemachs, die sie offen gelassen, schnell zu, trat vor dieselbe und sprach stark und fest: "In der Tat, Euer tolles Betragen hier im Hause paßt schlecht zu Euren kläglichen Worten da draußen, die, wie ich nun wohl merke, mein Mitleiden sehr zu unrechter Zeit erweckt haben. <\action> Mein Fräulein sollt und werdet Ihr jetzt nicht sprechen. (1819/2023)

> <action> She had barely opened the door when the cloaked figure burst in and shouted wildly, pushing past Martinière into the hall, "Take me to your mistress!" <\action> <perceived> Martinière, startled, lifted up the candlestick, and the candle's flickering light fell on the deathly-pale, dreadfully contorted face of a young man. <\perceived> <action> Martinière was so terrified she almost fainted when the man tore his cloak open and the shining hilt of a dagger appeared protruding from his belt. <\action> The man glared at her with flashing eyes, and shouted even more wildly than before: "Take me to your mistress, I tell you!" […]
>
> <action> She hastily slammed shut the door of her chamber, which she had left open, planted herself in front of it and said in strong, firm tones: "You know, your crazed behaviour here indoors doesn't match the pitiful words you were uttering outside: I can see all too clearly now that you were simply trying to play on my sympathy. <\action> You chose the wrong time. You cannot and will not speak to Mademoiselle now. (1819/2020)

The encounter between the unknown visitor and the household servant, who seeks to protect her mistress from this uninvited guest, stands out for its dynamic actions. Typical of detective or crime fiction, the scene is set in an enclosed space. However, as in the close readings I've conducted in earlier chapters, there is a notable lack of detailed description of the room itself. The specifics of what the room looks like are less important than what happens within it. Once again, *Aktionsraum* is dominant: doors are slammed, hallways are traversed, candleholders are raised and so forth.

Compared to Tieck, whose passage as I've just established would in my framework fall under *gestimmter Raum,* here it's clearly *Aktionsraum* that is central. Although Hoffmann's passage is also somewhat atmospheric (darkness, candlelight), contributing to the tense and violent

Stimmung (“mood”) of the scene, these aspects are secondary and do not directly affect the characters in any way. Here, the focus is on the action between the characters and how the setting is seamlessly integrated into this action.

Although not mentioned in the passage above, the unwelcome visitor is determined to hand the Martinière a small jewelry box—an important “prop” in the story—which sets the subsequent events in motion. While the description of the setting is sparse, it nonetheless provides ontological solidity, achieved through structural elements and the everydayness in which these events unfold, similar to Chamisso’s passage. Unlike the fairy tale passage, which feels remarkably “aloof” in its presentation of setting and offers readers little to engage them bodily or provide a concrete perceptual experience, the crime fiction passage presents everyday spaces with a perceptual experience resembling, as Troscianko suggests, “going through the motions” of actual perception (2014, 20).

These example passages, drawn from different works but belonging to roughly the same period, illustrate what we observe in the statistical results above, which take into account a much wider range and higher frequency of texts. Here, we can see that *Aktionsraum* is dominant in crime fiction, with *gestimmter Raum* comparatively low. In fairy tales, this relationship is more balanced within the genre and, when compared to others, suggests a higher frequency of *gestimmter Raum* overall. Descriptive passages in both genres hold minimal importance compared to the other, more dominant types, and crime fiction seems to use less space overall. This makes sense intuitively, as crime fiction often focuses more on character interaction and dialogue. In this genre, space is presented only when it can be integrated into a character’s actions, serving a specific purpose or goal.

While the computational results provide an indication of how space is realized differently across genres—and statistically confirm that there is indeed a difference, aligning with our

intuitions—a more granular analysis across a larger number of texts would be necessary to uncover additional, more specific details.

The close readings above also highlight areas for future quantitative study. For instance, using the database of "fairy tales" and "adventure novels" provided here, researchers could refine the model to allow for a more detailed analysis of *Aktionsraum*. This could include aspects such as mobility and "spatial indeterminacy," as suggested by Propp, to investigate how these genres handle setting differently. Such work could also engage with Bakhtin's claims about "adventure novels," which are characterized by their low degree of "specificity" and "concreteness" (Bakhtin 1981, 100), and compare them to other genres like "science fiction."

Could we confirm, for example, that fairy tales render the background inactive, emphasizing the "anonymity of the location" (Robert & Powell 1969, 53), yet maintain high mobility? How does the "adventure novel" compare to "science fiction," which, while similar in plot structure, incorporates time travel and futuristic settings? The model and data used here thus provide a robust foundation that can be adapted for future research aimed at addressing these questions.

Having analyzed the historical transformation of different types of settings across samples of canonical and non-canonical works as well as genre, the question remains as to what these different modes do within narratives, in terms of the overall structure of a book, considering not just individual texts, but the entire dataset. To better understand whether and how these space types vary over the course of a narrative—with a specific focus on *Beginnings* and their presumed spatial composition. In the next section, I will conduct an investigation at the book level, aiming to provide a deeper understanding of the function of setting within narratives.

On Narrative Beginnings

David Herman highlights the significance of "narrative beginnings," arguing that "story openings prompt interpreters to take up residence [...] in the world being evoked by a given text" (Herman 2012, 14). Beginnings are "meant to be noticed," with the narrative's essential features introduced and established to serve as "points of entry into the narrative and orient the reading" (Mikkonen 2020, 4). Critics have emphasized the importance of beginnings in German literary discourse, often as the subject of reflection in authors' prize speeches at book fairs or during *Poetikvorlesungen* ["poetry lectures"] (Polaschegg 2020, 15).

As part of its permanent exhibition, the *Museum of Modern Literature* in Marbach, Germany, showcases the original first page of Kafka's handwritten manuscript *Der Prozeß*. Given Kafka's prominence not only in German literary discourse but also worldwide, it's perhaps unsurprising that a literary museum would choose to exhibit an original manuscript by this author. However, the choice to display the novel's first page specifically speaks again to the cultural and symbolic importance that the beginning of a literary work holds. Visitors not only have the chance to read the beginning (or the first manuscript page) of Kafka's novel but can also see the edits the author made when revising it (see *Image 1*). As Polaschegg has shown, authors, critics, and readers alike seem to spend a great deal on reflecting on the "magic of the first sentences" (15).

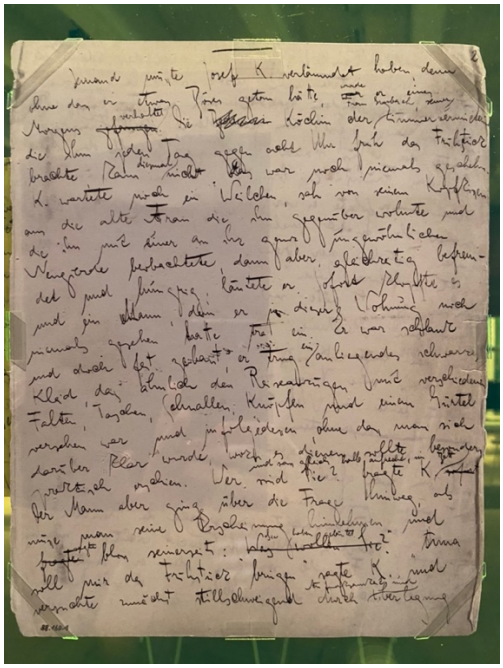


Image 1. *First page of the handwritten manuscript of Kafka's Der Prozeß.*[21]

Authors' focus on beginnings is evident not only in prize speeches and editing processes but also within the narratives themselves. Perhaps most famously, in the German context, is E.T.A. Hoffmann's *Der Sandmann* (1816), where the narrative's concern with beginnings becomes subject of the story itself. Starting with three letters from different characters, the fictive narrator then addresses an imaginary reader, debating how best to start the tale. He contemplates whether to begin traditionally—with the archetypal "*Es war einmal* …," [once upon a time] as in fairy tales—or jump straight into the action, "in medias res," with a line like "In der Provinzialstadt S. lebte," [In the provincial town of S., there lived...] as novellas often do. Ultimately, the unnamed narrator chooses to abandon these conventions altogether. After initially contemplating letting the story's characters speak for themselves through their letters (a nod to the epistolary novel), he decides to

[21] Exhibited in the *Museum of Modern Literature* in Marbach, Germany. Photo is mine. Can also be accessed through the museum's app (with the transcribed and more readable handwriting): literaturbewegen.

take on the task of narrating the tale himself, using the letters merely as an *Umrißzeichnung* (or "outline").

The significance of the opening, which Hoffmann's narrator—and by extension, the author—so painstakingly tries to sidestep by making the beginning itself a metareflection on its own subject, underscores that a beginning is, while sometimes arbitrary, always a necessary condition of sorts. It is always already preceded by something else (in Hoffmann's case, conventions of story openings) and is therefore never entirely "original" in this sense, and cannot, in fact, be so easily circumvented.

The question of what it means to begin, the "presentations of […] beginnings of ideas about beginnings" (25) is also the subject of Edward Said's book *Beginnings: Intention and Method* (1975). For Said, beginnings are not only important for their structural or formalistic reflections in literary works; he also seeks to approach this topic from a cultural or anthropological perspective. For him, beginnings articulate a vast range of potentialities—the potential for knowledge, language, and individuality (Polaschegg 2020, 27). Focusing more on textual aspects, Norbert Miller, in his book on novel openings, suggests that the beginning serves as a kind of microcosm, reflecting in various ways—through its stylistic possibilities, conventionality, or originality—the larger universe, or macrocosm, of the text. (Miller 1965, 8)

Long before Digital Humanities entered literary departments, researchers collected and indexed the opening sentences of books, making them available in reference dictionaries. The largest project in this regard is Bruce L. Weaver's *Novel Openers: First Sentences of 11,000 Fictional Works* published in 1995 in the English context, which is arranged topically with Subject, Keyword, Author, and Title indexing for readers' reference. A similar but much smaller project also exists in German: Harald Beck's collection of the first sentences of 500 German novels published in 1992 (see also Polaschegg 2020, 31-32).

As the brief literature review suggests, understanding beginnings not only as structural necessities but also as important entry points for what's to come—giving the reader a sense of what the world depicted in the story looks and feels like—raises an interesting question: can we identify specific textual features in the representation of space that distinguish beginnings from the rest of the narrative? In other words, is there something particular or unique about how beginnings make use of setting that sets them apart from the rest of the narrative?

Research in cognitive psychology has emphasized the importance of "setting" in the telling of oral narratives. Studies suggest that narratives commonly begin with an "orientation," introducing the participants (or characters, in this case) along with "the time, the place, and the initial behavior"—answering the questions of "who," "when," and "where" (Labov & Waletzky 1997, 4). In this way, setting serves as a key entry point into the story and helps the readers to orient themselves.

A quantitative study in psycholinguistics investigated some of these questions by examining "narrative arcs" in English-language narratives, including 40,000 texts ranging from novels to TED talks, and sought to identify, among other things, "textual markers" related to the beginning of stories (Boyd et al. 2020). They found that the use of "staging-related words" (in their case, a higher percentage of articles and prepositions) is indeed most frequent at the beginning of a narrative and then decreases as the story progresses.

While their article relies solely on singular linguistic features, such as "articles and prepositions," to measure how story openings linguistically differ from the rest of narratives, my model allows for a deeper understanding of not only whether or not space is important in the beginnings of stories and how this is manifested linguistically, but also what function it serves. This approach provides better insights into how and why these openings are distinct. I can thus further test this theory by using my model to measure the extent to which setting appears more frequently

at the beginning of stories and to examine whether there are any differences among the individual types of settings.

Before diving into the computational analysis, however, let's briefly look at two beginnings drawn from the corpus. I'll start with the opening passage of Thomas Mann's novella *Tod in Venedig* ("Death in Venice") published in 1912.

> Gustav Aschenbach oder von Aschenbach, wie seit seinem fünfzigsten Geburtstag amtlich sein Name lautete, hatte an einem Frühlingsnachmittag des Jahres 19.., das unserem Kontinent monatelang eine so gefahrdrohende Miene zeigte, von seiner Wohnung in der Prinzregentenstraße zu München aus allein einen weiteren Spaziergang unternommen. Überreizt von der schwierigen und gefährlichen, eben jetzt eine höchste Behutsamkeit, Umsicht, Eindringlichkeit und Genauigkeit des Willens erfordernden Arbeit der Vormittagsstunden, hatte der Schriftsteller dem Fortschwingen des produzierenden Triebwerkes in seinem Innern, jenem »motus animi continuus«, worin nach Cicero das Wesen der Beredsamkeit besteht, auch nach der Mittagsmahlzeit nicht Einhalt zu tun vermocht und den entlastenden Schlummer nicht gefunden, der ihm, bei zunehmender Abnutzbarkeit seiner Kräfte, einmal untertags so nötig war. So hatte er bald nach dem Tee das Freie gesucht, in der Hoffnung, daß Luft und Bewegung ihn wiederherstellen und ihm zu einem ersprießlichen Abend verhelfen würden (1912/2012)

> On a spring afternoon of the year 19—, when our continent lay under such threatening weather for whole months, Gustav Aschenbach, or von Aschenbach as his name read officially after his fiftieth birthday, had left his apartment on the Prinzregentenstrasse in Munich and had gone for a long walk. Overwrought by the trying and precarious work of the forenoon—which had demanded a maximum wariness, prudence, penetration, and rigour of the will—the writer had not been able even after the noon meal to break the impetus of the productive mechanism within him, that *motus animi continuus* which constitutes, according to Cicero, the foundation of eloquence; and he had not attained the healing sleep which—what with the increasing exhaustion of his strength—he needed in the middle of each day. So he had gone outdoors soon after tea, in the hopes that air and movement would restore him and prepare him for a profitable evening (1912/2021).

As we can see, the narrative takes all steps required for "orientation" (the name of the character, the time, and place of the story) already in the very first sentence. Almost like an establishing shot in a movie, the narrative first gives us the "full" picture by then zooming into the details of who, where, and when. We learn more about the character's occupation, his struggles, and, in passing, that he went for a walk to decompress from work. The tone, typical of Mann's style, is detached and descriptive.

Let's contrast this with the beginning of Theodor Storm's *Der Schimmelreiter* ("The Rider on the White Horse") published more than 100 years earlier in 1888. After the outer frame narrative starts with the narrator's memory of reading the story as a child in the sheltered corners of his grandmother's house, the "inner frame," to which the narrative then almost seamlessly shifts, recounts the actual events as he remembers them from the story he read, and contrasts starkly, in the depiction of setting, with the homely description that precedes this passage. It starts as follows:

> Es war im dritten Jahrzehnt unseres Jahrhunderts, an einem Oktobernachmittag – so begann der damalige Erzähler –, als ich bei starkem Unwetter auf einem nordfriesischen Deich entlangritt. Zur Linken hatte ich jetzt schon seit über einer Stunde die öde, bereits von allem Vieh geleerte Marsch, zur Rechten, und zwar in unbehaglichster Nähe, das Wattenmeer der Nordsee; zwar sollte man vom Deiche aus auf Halligen und Inseln sehen können; aber ich sah nichts als die gelbgrauen Wellen, die unaufhörlich wie mit Wutgebrüll an den Deich hinaufschlugen und mitunter mich und das Pferd mit schmutzigem Schaum bespritzten; dahinter wüste Dämmerung, die Himmel und Erde nicht unterscheiden ließ; denn auch der halbe Mond, der jetzt in der Höhe stand, war meist von treibendem Wolkendunkel überzogen. (1888/2023)

> It was in the third decade of our century, on an October afternoon—thus began the story-teller of that time—that I rode through a mighty storm along a North Frisian dike. For over an hour I had on my left the dreary marshland, already deserted by all the cattle; on my right, unpleasantly near me, the swamping waters of the North Sea. I saw nothing, however, but the yellowish-grey waves that beat against the dike unceasingly, as if they were roaring with rage, and that now and then bespattered me and my horse with dirty foam; behind them I could see only chaotic dusk which did not let me tell sky and earth apart, for even the half moon which now stood in the sky was most of the time covered by wandering clouds. (1888/2009)

Similar to Mann's passage, the "who," "where," and "when" are introduced within the very first sentences, as the unnamed protagonist—now narrating from his perspective—recounts the events that occurred while he was riding along a North Frisian dyke during a stormy October night. Due to the weather, the protagonist can barely discern anything. The character's perception of the environment around him is immediate and affective. Nature, here taking on anthropomorphic qualities, almost acts as an agent, its force nearly overpowering the terrified subject.

Both narratives thus differ quite significantly in the way they establish the narrative world. Whereas Storm's setting is highly perceptual, allowing us to connect to the character through the environment, in the paragraph from Mann's novella, the setting serves primarily as descriptive background, mainly functioning to inform us about where the character lives, giving us the exact name of the place and the street. It's only in the second paragraph that we gain some impression of what the place looks and feels like, with the main protagonist, Aschenbach, navigating this space on a sunny yet "muggy" spring day.

> Es war Anfang Mai und, nach naßkalten Wochen, ein falscher Hochsommer eingefallen. Der Englische Garten, obgleich nur erst zart belaubt, war dumpfig wie im August und in der Nähe der Stadt voller Wagen und Spaziergänger gewesen. Beim Aumeister, wohin stillere und stillere Wege ihn geführt, hatte Aschenbach eine kleine Weile den volkstümlich belebten Wirtsgarten überblickt, an dessen Rand einige Droschken und Equipagen hielten, hatte von dort bei sinkender Sonne seinen Heimweg außerhalb des Parks über die offene Flur genommen und erwartete, da er sich müde fühlte und über Föhring Gewitter drohte, am Nördlichen Friedhof die Tram, die ihn in gerader Linie zur Stadt zurückbringen sollte. (1888/2013)

> It was the beginning of May, and after cold, damp weeks a false midsummer had set in. The English Gardens, although the foliage was still fresh and sparse, were as pungent as in August, and in the parts nearer the city had been full of conveyances and promenaders. At the Aumeister, which he had reached by quieter and quieter paths, Aschenbach had surveyed for a short time the Wirtsgarten with its lively crowds and its border of cabs and carriages. From here, as the sun was sinking, he had started home, outside the park, across the open fields; and since he felt tired and a storm was threatening from the direction of Föhring, he waited at the North Cemetery for the tram which would take him directly back to the city. (1888/2009)

As the character moves through the garden and along the street, the reader learns about the weather, the feel of the air ("dumpfig" [muggy]), and the specific locations he passes (the English Garden, the Aumeister, the hostelry, the park, and the cemetery). However, there is no immediate interaction between the character and the setting, neither direct nor affective; we learn about it only through the protagonist's—and by extension, the narrator's—detached perspective. In contrast, Storm's passage lacks such specificity, placing the character "in the midst" of things and telling the story from his perspective. Directions are nearly absent in Storm's scene, contributing to a sense

of decentered perception and disorientation, whereas Mann's setting is not only clearly defined but also directional.

While in the first paragraph of Storm's novella, the focus is primarily on the visual scenery, or more specifically, on what the character cannot see, as well as the landscape that seems to engulf him from all sides. In the next paragraph, as the character's visibility worsens with the approaching darkness, the auditory features are becoming much stronger, further contributing to his sense of disorientation:

> Es war eiskalt; meine verklommenen Hände konnten kaum den Zügel halten, und ich verdachte es nicht den Krähen und Möwen, die sich fortwährend krächzend und gackernd vom Sturm ins Land hineintreiben ließen. Die Nachtdämmerung hatte begonnen, und schon konnte ich nicht mehr mit Sicherheit die Hufen meines Pferdes erkennen; keine Menschenseele war mir begegnet, ich hörte nichts als das Geschrei der Vögel, wenn sie mich oder meine treue Stute fast mit den langen Flügeln streiften, und das Toben von Wind und Wasser. Ich leugne nicht, ich wünschte mich mitunter in sicheres Quartier. (1888/2023)

> It was ice cold; my clammy hands could scarcely hold the reins, and I did not wonder that the croaking and cackling crows and gulls were always letting themselves be swept inland by the storm. Nightfall had begun, and already I could no longer discern the hoof of my horse with any certainty. I had met no human soul, heard nothing but the screaming of the birds when they almost grazed me and my faithful mare with their long wings, and the raging of the wind and water. I cannot deny that now and then I wished that I were in safe quarters (1888/2009).

In contrast to Mann's passage, the setting in Storm's novella feels vast, raging and chaotic. The character is uncertain about the proximity or distance of the things happening around him—he can't trust his senses, which seem overwhelmed by the various impressions affecting him. Since he can't see anything, these impressions are mainly auditory (the growling of the waves, the screeching of the birds), or kinetic and bodied (the splashing of the sea against his feet, the dampness of the air).

While everything in this passage is (hyper) present, the opening of Mann's novella, by contrast, is utterly uneventful and calm. Although both texts depict action in the form of movement (in Mann's case, going for a walk; in Storm's, riding a horse along the dyke), this is not central.

What's central in Storm's passage is the immediacy with which the character perceives and experiences the environment around him. By contrast, in Mann's opening, it's the detached indifference with which the character registers his surroundings that the narrative captures, with descriptive elements dominating.

While the two tales follow a similar structure and share similarities in terms of setting, they clearly differ in how this setting is realized. When applying our model to texts in our dataset, calculating the frequency with which these types appear within a book, and then examining the aggregate measure across all books, what insights can this provide about how setting is distributed throughout narratives? Do we observe a similar preference, as suggested by the literature review and close readings here, for a dominance of setting at the beginning of the narrative? If so, how does this compare to its presence throughout the rest of the story? Furthermore, in considering the different types identified by our model, are certain modes especially prevalent at the beginning of stories while others appear less frequently (*gestimmter Raum* in Storm, "descriptive space" in Mann's case)?

To analyze this, I begin by categorizing the types of settings according to their narrative placement, examining their frequency and distribution at various points within the text. For this analysis, I split the text in various "chunks" or sections, to identify how each of the individual space types changes across narrative time. I then aggregate this across all the books present in my corpus. By quantifying the prevalence of specific modes in story openings versus later parts, I aim to determine the extent to which initial settings serve as "anchors" or "entry points" into the fictional world and how this orientation shifts as the story progresses. Refer to *Figure 19* for the distribution across narrative time for each individual space type.

Figure 19. Distribution of the different types of setting across narrative time. All_space shows the aggregate measures of all types combined.

When looking at setting across narrative time, we observe significant differences between the ways the different types of settings are distributed (see *Figure 12*). We can see that while "descriptive space," *gestimmter Raum,* and *Anschauungsraum,* feature high in the very first sections of a book, they then gradually decrease (except for *gestimmter Raum*, which goes slightly up again at the end of narratives). This is the exact opposite for *Aktionsraum,* which features low

at the beginning and then rises while falling it the end of narratives. When looking at the "aggregate" of all space types, we can also see that overall narratives show a slighter higher distribution of settings in their opening sections compared to the rest of narratives.

To further test this and to determine whether there is a statistically significant elevated distribution of *gestimmter Raum* and "descriptive space," and *Anschauungsraum* at the beginning of stories, as the plots above suggests, I employ a time series regression analysis. This approach allows us to statistically model the relationship between individual space types and narrative time, providing insights into how different types of settings vary across sections of a book. I use sine and cosine components, along with a normalized time variable, to capture any cyclical trends in my dataset. This is important because conventional time series analysis often assumes a linear relationship—i.e., the outcome variable consistently increases or decreases over time. This assumption does not necessarily apply to literature, where different space types may not be best represented by a linear relationship (as we can see already in the line graphs above). A cyclical pattern, on the other hand, accounts for trends that are not necessarily linear. Rather than identifying a consistent upward or downward trend, this method captures repeating patterns, showing how a variable might rise and fall in a wave-like manner over time.

The statistical analysis reflects what we've already observed in the plot above. The regression analysis finds that "descriptive space" and *gestimmter Raum* are indeed significantly higher at the beginning of texts, compared to the other parts of a book. *Aktionsraum* in turn, is lower at the beginning, and then increases across narrative time. The model suggests that *Aktionsraum* tends to increase over the course of narratives, with some slight cyclical fluctuations throughout. This effect is statistically significant ($\beta = 0.0539$, $p < 0.001$), suggesting that as the narrative progresses *Aktionsraum* becomes more prevalent. Descriptive space ($\beta = -0.0402$, $p < 0.001$) and *gestimmter Raum* ($\beta = -0.0636$, $p < 0.001$) in turn are more prevalent at the beginning

of narratives and decrease over time. Both types exhibit slight cyclical pattern similar to *Aktionsraum*. The effect we've observed in aggregate, with "all space" being high at beginnings and then declines is also statistically significant ($\beta = -0.0530$, $p < 0.05$). For *Anschauungsraum*, however, the statistical analysis found the perceived trend of a decline over the course of the narrative to be non-significant ($\beta = -0.0031$, $p = 0.324$). Refer to the appendix for the complete regression table results.

This analysis provides statistical evidence that the beginnings of narratives, when viewed in aggregate across a large corpus of books, significantly differ in spatial composition from the rest of the narrative. Rather than emphasizing "action," the beginnings focus more on the "atmospheric" components of setting, offering a sense of what the introduced world feels like along with its descriptive qualities. This aligns with the intuitive assumption that narratives devote more time at the outset to establishing the look and feel of the world they are presenting to readers.

From the visualizations, we can see that it is precisely at this point—where *gestimmter Raum* and "descriptive space" decline—that *Aktionsraum* rises steeply in importance. Interestingly, while descriptions generally remain less prevalent than the two dominant types, they are most frequently found at the beginning of narratives. This suggests that when descriptions do play a role, they are most likely to appear at the outset of the story.

It has to be noted, however, that the residuals in the data are not normally distributed, violating the so-called "normality assumption" required for this kind of analysis. Given the distribution of the data, which is rather irregular and cannot be well approximated by any standard statistical model (at least to my knowledge), this could impact the reliability of the regression's

estimates. Exploring alternative models or transformations of the data that better accommodate its distinct distribution could thus yield more accurate results.[22]

The Embodied Function of Setting

Summarizing the results based on the data I used, we can assert that the embodied experience of setting—a character interacting with its environment in a bodily way, affecting and being affected by its surroundings, is much more prevalent than "visuality" (i.e., a character looking at things, detached from what it observes) or mere description. In fiction, setting functions not simply as a backdrop but as a co-productive agent closely linked to character and plot. Its experiential structure, meaning the way it is perceived and interacted with by an experiencing subject, whether that of the narrator or the character, is far more important than evoking recognizable reality through description. My findings challenge established assertions in literary criticism, suggesting that setting "sets the character off," representing "the place and collection of objects 'against which' [the character's] actions and passions appropriately emerge" (Chatman 1993, 141).

In his essay on the *Reality effect* in fiction, Barthes saw the "superfluous details" that "correspond to a kind of narrative luxury," that have no influence on the progression of the plot or of the description of characters, as characteristic for 19th century literature (Barthes 1989, 148). According to Barthes, it is through such details that "the reality effect is produced, the basis of that unavowed verisimilitude which forms the aesthetic for all the standard works of modernity" (Ibid.). Thus, while "useless" for narrative development, these details are thought to refer to the category of the real as such.

[22] However, research has shown that, in datasets with large sample sizes (like ours), linear models tend to be robust to violations of the normality assumption. Transformations of the data might even have a detrimental effect, introducing new biases (See Schmidt and Finan, 2018)

This conception of space—or the rendering of things as such, stands in stark contrast to my findings. Rather than providing descriptive detail, setting plays an important role in how characters are and behave—either through spatial markers like things and objects or through atmosphere, sounds, and smell. Understanding the character as an embodied agent driven by motivations and objectives, the subject acts in close tandem with its immediate surrounding environment.

This understanding of the role of setting and the way it appears in literature can be subsumed under the theory of "embodied cognition." Proponents of this movement reject the Cartesian duality between body and mind and instead argue that "there is no cognition without embodiment" (Gallagher and Zahavi 2021, 131). These theories arose largely from phenomenological approaches to cognition (Ibid., 5).

Recent work in computational literary study has shed some light on the question of embodied cognition and its relation to a character's physical surrounding (Piper and Bagga 2022; Tenen 2018). In their study on narrativity Andrew Piper and Sunyam Bagga found that setting or "concretization" is an important predictor for narrativity in fictional texts. They theorize that "what is being dramatized in narrative is not an entire simulated "world", but rather a continual stream of extended cognition through an available object-world" (896).[23]

Indeed, the mental representations of scenes that narratives ask readers to create based on texts often lack the detailed delineation that analysts sometimes attribute to them when discussing how readers build mental models of narrative worlds. Ryan herself, when trying to map-out the storyworld of a text she read, remarked, the reading left her with a "a vivid, though spotty visualization of the setting" (Ryan 2003, 218). In this study she empirically analyzed how readers map spatial dimensions in narratives by having them draw the scenes they read in texts. She

[23] See also: Andrew Piper and Sunyam Bagga, "A Quantitative Study of Fictional Things", 2022.

concluded that "people read for the plot and not for the map" (Ibid., 138), generally paying little attention to the setting, unless it plays a role in the text's meaning. In this context, Ryan equates "setting" with the map (i.e. *where* something is located) or a given layout of a scene.

Rather than asking readers to *visualize* a detailed delineated storyworld, what setting does, is to help to "activate and combine experiential traces" that allow us to simulate or experience the represented events (Zwaan and Madden 2009, 10). The vividness of fictional worlds thus arises not from the visualization of the setting itself but from the integration of spatial elements into embodied experiential frames that readers can relate to. Research in cognitive psychology suggests that "rather than simply constructing mental representations of who-did-what-to-whom out of mental Lego blocks, we perform experiential simulations that necessarily imply a spatio-temporal perspective on the described situation" (Ibid., 234) What the narratives make readers *attuned* to—and what the findings above emphasize—is to convey the "felt experience" (Herman 2009) of the scenes depicted. Given that there is "no clear demarcation between perception, action, and cognition" (Zwaan and Madden, 10), I propose that setting is essential in activating the experiential traces that allow us to simulate or experience the represented events in fiction.

Conclusion

This chapter began by exploring different models of setting, ranging from linguistic to historical perspectives. Throughout the historical models, I focused on whether, and to what extent, we can trace the proclaimed decline of setting, as proposed by literary theorists and narratologists alike. My analysis demonstrates that, contrary to critics' assumptions about the historical role of setting, computational analysis of a large dataset of German-language fiction shows that setting does not decline over time. Furthermore, when focusing on the role of "descriptive space," I found that it

holds minimal importance overall, contrasting sharply with the more embodied and affective notions of *Aktionsraum* (space of action) and *gestimmter Raum* (space reflecting mood and atmosphere). These finding challenges theories that emphasize the primacy of description with regard to setting, particularly in pre-modernist works. What the findings suggest, then, is that, rather than serving as a static, preexisting backdrop, setting in literature is almost always already integrated with a character's actions, playing a central role in shaping perception.

When sampling by canonical works, I found that the trend is slightly different from the larger sample previously analyzed with the model and may indeed show a slight decline over time, as well as a slightly higher prominence of descriptive space (though still significantly less than *Aktionsraum* and *gestimmter Raum*) during the period of Realism. However, a closer inspection of individual data points suggests that this trend is primarily driven by a few highly canonical authors. When these authors are removed from the sample, the data shows more or less the same trend as observed in the larger corpus.

This finding supports the idea that theories suggesting a higher prominence of specific types of space in certain periods (e.g., "descriptive space" during *Realism*, *gestimmter Raum* in *Romanticism*) may be largely influenced by the works of a select few canonical authors. This lends support to the concept of "benchmarking," where an author's style—in the present project's case, specifically, the way space is depicted—becomes a model for of what is seen as characteristic of a particular literary period.

Moving from historical time to genre, and then to narrative time in the last experiment, this analysis shifts from examining the broader socio-cultural and temporal framework, or the formal and thematic qualities of a text (as related to a given genre), to exploring how setting, in aggregate, unfolds at the book level. Given critics' emphasis on the importance of setting in narrative beginnings—where it plays a crucial role in establishing the world readers are about to enter—I

have focused my analysis primarily on this aspect, while also examining how setting evolves over the course of narratives.

My findings largely confirm critics' intuitions about the importance of setting in establishing the fictional world in the opening passages of books. Specifically, I found that "descriptive space" and *gestimmter Raum* are highly concentrated in introductory passages and decline as the narrative progresses, while *Aktionsraum* shows the opposite trend. Previous work in cultural analytics has already emphasized the importance of "staging" at the beginnings of narratives. My research builds on these insights by not only exploring a different language and cultural context but also analyzing how beginnings differ in their use of setting—not only linguistically but also in terms of its semantic function and its role within the plot.

Building on the work presented here, the final chapter will focus specifically on comparing the fiction data to a set of non-fiction works to explore what differentiates fiction's treatment of setting from that of non-fiction. In particular, I will examine the genre of travelogues, given its similarity to fiction in how it employs the phenomenological experience of space, and contrast it with works of fiction. By digging deeper into the narrative function of setting and expanding on existing theories, the next chapter aims to investigate more closely what is unique to fiction in its treatment of setting.

CHAPTER 4. On Mimesis, or Setting's Role in Shaping Fictional Worlds

Incorporating my findings into the larger conceptual framework of cognitive psychology and cognitive science helps advance our understanding of how narratives construct fictional worlds for readers and allows us to develop a more "psychologically realistic" model of setting and narrative space (Caracciolo and Kukkonen 2021, 80). This approach accounts for the relationship between texts and readers without focusing on the interpretive processes that are often at the center of reader-response theory. However, these theories often overlook (or do not consider) whether, or to what extent, literary narratives differ linguistically from non-fictional narratives, and what implications this might have for the broader study of fictionality. As a result, the distinctly fictional qualities inherent to these narratives are often overlooked.

As discussed in the previous chapter, the analysis presented here employs a more dynamic model of setting than what is typically used. Setting, in literary theory or narratology alike, has often been treated as a "container," merely serving as the background for the story's events. In contrast, my analysis explores the phenomenological effects of setting—how it's used in the narrative to contribute to action and perception, centered on a character's behavioral agency, and how these "effects" might potentially extend to the reader. While the model doesn't allow us to directly assess how readers interpret the spaces within narrative texts, it does enable us to examine how the notion of setting is manifested linguistically and semantically within narrative texts.

For example, in his analysis of realist fiction, Jameson argues that 19th-century novels train their readers bodies to develop "new habits of perception" (Jameson 2013, 56). While Jameson focuses his argument largely on the notion of "affect," suggesting that the vividness of realism arises from the affective immediacy of the sensory and physical experiences depicted in these texts, which revolve around the character's body, I aim to highlight the importance of setting in "framing

perception." This approach links "affect" or "embodiment" not just to a character (or, by extension, its body), but also to the concrete, lived space that the character inhabits.

While perhaps not immediately evident, the study of "setting" significantly contributes to the question of the "real" and "realism" in literature. Whether through historical analyses by critics like Auerbach in *Mimesis* (1946), Watt in *The Rise of the Novel* (1957), Jameson in *The Antinomies of Realism* (2013), Barthes in *The Reality Effect* (1986), or through narratological explorations of "space", "experientiality," "embodiment," and "perception" by scholars such as Fludernik, Herman, Ryan, Friedman, Bal, and Caraccioli,—whose work I have already discussed in previous chapters—a recurring theme in these theories is how literature mimics or simulates a given reality. Instead of addressing "realism" as a stylistic state, I aim to investigate how perception subjects "realism" to this cognitive process (making the "real" something that is cognitively realistically experienced rather than static) and what role setting plays in it.

The question of fiction's relationship to the "real"—or mimesis—more generally, has been a constant, in scholarship in literary theory and narratology alike. While theorists have proposed mimesis as something that's inherent to all narratives, arguments how it is textually realized differ at times greatly. Auerbach, for instance, argues that fiction mirrors the historical reality in which the author lived in, thus suggesting that literary texts *imitate* the real. This notion of mimesis as the equation of imitation, was also put forth by other studies concerned with how a text comes to record "the vicissitudes of human existence" (Furst 1995, 103) which thought to experience its "height" in literary Realism.

Others see mimesis as more integral to the narrative itself. Ricoeur, who considers mimesis central to his account of *Time and Narrativity* (1983), develops different stages through which the narrative comes to represent reality, thus emphasizing its processual nature (Walsh 2003, 118; Petterson 2016, 50). These stages are: "prefiguration," which roughly relates to the real-world

experiences readers bring to the text; "configuration," the actual construction or "emplotment" of narrative; and "refiguration," how readers interpret or make sense of the narrative in regard to their own lived experience.

Building on Ricoeur's ideas, Fludernik introduces a concept of mimesis that heavily depends on the cognitive experiences readers bring to a text, forming the foundation of her cognitive and experiential narratology. She treats narrativity and experientiality as interchangeable, using them to describe what she calls the "quasi-mimetic," a term she explicitly distinguishes from imitation. Fludernik explains the mimetic as "the artificial and illusionary projection of a semiotic structure which the reader recuperates in terms of a fictional reality" (Fludernik 1996, 35). However, her theorization of mimesis strongly centers on how readers use their real-world experiences to interpret fiction. Rather than focusing on how readers make sense of texts, I aim to understand how mimesis is created within narratives.

While mimesis for Ricoeur also relates to how emplotment works in narrative, for Fludernik, it's more about the reader's reception of a text. Despite these differing approaches, both emphasize the central role mimesis plays in the creation and interpretation of narratives (Petterson 2016, 50).

Although Fludernik emphasizes experientiality and the "embodied schemata" related to it, she has surprisingly little to say about the role of space or setting. While she occasionally touches on the importance of perception, she explicitly situates "the mimetic evocation of a fictional world" in the "mediating function of fictional consciousness," which she sees as central to narrativity (Fludernik 1996, 36). She suggests that fiction, over the course of history, has trained its readers "in tuning in on [...] mind reading," by "foregrounding reflective thought rather than the mute registration of externalities" (128; see also Kahler 1973). This mirrors the approaches of other critics, who view the representation of a character's psychological interiority as the "signpost" of

fictionality, clearly distinguishing it from other forms of textual discourse (Cohn 1987; see also Hamburger 1973).

While I am not debating that gaining insight into another's consciousness is an important aspect of fiction, I would also suggest, as I have already touched on in previous sections, that it cannot (nor should it) be decoupled from a character's relation to the "externalities" of their environment.

Research in CLS has begun to shed light on the questions of "consciousness" and "embodiment" in literature. Findings suggest that—at least in the context of English-speaking literature—"consciousness," rather than being separated from the character's body and, by extension, its physical environment, is highly embodied.[24] This indicates a "sensori-motor preference surrounding fictional agency," which also distinguishes fictional characters from non-fictional ones (Piper 2023, 2).

While I cannot make any claims about the extent to which setting plays a role in rendering a character's consciousness, my approach emphasizes precisely this "sensori-motor preference," that is specific to a character's agency and proves to be an important component in how a character relates to its environment. What I can investigate is how this distinct embodied notion of agential behavior and its relation to setting is specific to fiction, and what this might reveal about the role of setting in mimicking the vivacity of perceptual objects represented in narrative worlds.

By depicting the lived, phenomenal worlds that characters inhabit, stories provide insights into how the environment shapes what is perceived. While I have already outlined the specifics of the different types of settings in several close readings in previous chapters, this chapter will focus on the particularities of how perceptual experience is created in texts and the role setting plays in

[24] Here, embodiment refers to physical actions such as touching, smiling, gesturing, moving, and sensing, while cognitive or emotional actions involve thinking, wondering, and reflecting (see Piper 2023, 2)

this process. Non-fictional works, especially in the genre of travelogue and travel writing, offer an apt contrast through which we can examine—on a quantitative as well as qualitative level—how fiction functions in this regard.

In essence, I argue that the narrative's capacity to simulate perceptual experience makes the mimetic potential of setting one of its most important characteristics. In other words, as Caracciolo suggests, "experience cannot be separated from the environment with which the experiencer interacts" (Caracciolo 98); the way setting is synthesized reflects different kinds of perceptual-cognitive schemata. The vividness of fictional worlds thus stems from reproducing different perceptual structures rooted in a tangible, lived environment. It is especially the embodied notion of setting—brought to life through movement, touch, and other sensory perceptions like smell and sound—that enables us to imagine the perceptual worlds presented in stories more concretely and vividly. Rather than focusing solely on the representation of consciousness, I suggest that one of the central properties of fictional texts is to mediate subjects' experiences and understanding of the world *through* their active engagement with setting—that is, their surrounding perceptual environment. The significance of setting in fiction, therefore, lies in its function to direct and shape perception.

To better understand the relationship between setting and perception in fiction, I will compare the non-fiction books in my dataset to the fictional ones. Since the non-fiction data includes metadata on genre, we can further subdivide by genre. This is important because readers likely won't be surprised to find that works in philosophy have a much lower frequency of "setting" than fictional works. However, with the variety of genres present in the dataset, we can examine how different genres represent various types of settings, identify any genres that more closely align with fiction, and analyze how they differ in this respect.

When looking at example passages from different genres, we can see that the depiction of setting can be equally induced with atmosphere and *Stimmung*—corresponding to the different types outlined in our model, as seen in the fiction corpus. Take, for instance, this passage from *Eiszeit und Klimawechsel* by Wilhelm Bölsche, from the "nature" genre, published in 1934:

> <perceived> Der Wanderer im Riesengebirge, der auf einem früher fast ungangbaren, neuerlich etwas gebesserten Pfade von der sogenannten großen in die kleine Schneegrube klettert, sieht sich vor dem bedeutsamsten Landschaftsbild. <\perceived> […] <perceived> Wo der zerfressene Granitgrat sich in die kleine Grube senkt, erscheint in dieser eine liebliche Alpental-Matte, je nach der Jahreszeit mit violettbraunem Türkenbund, rosig angehauchtem weißem Berghähnlein (Narzissenanemone) und den hohen Stauden tiefblauen Eisenhuts und Enzians in dichtem Pflanzenfilz über murmelnden Wassern. <\perceived> <visual> Unwillkürlich sucht der Blick im tiefsten Grunde der Matte den Gletscher, der aber fehlt. <\visual> Um so deutlicher prägen die Spuren sich aus, daß er einmal da war. <visual> Man glaubt noch zu erkennen, wo er zuletzt, den großen Grubenkessel ausräumend, geruht hat, – sieht niederschauend vor den ersten dickpelzigen Gebirgsfichten unten den gewaltigen Schuttring, den er schmelzend, ersterbend, zurückweichend als Seiten- und Stirnmoräne aus dem Gestein, das ursprünglich in sein kriechendes Eis eingebacken war, gehäuft. <\visual> <perceived> Ein kleiner Schneefleck zeigt sich öfter auch sommerlich noch am innersten Grubenhang erhalten, – offenbar mangelte sehr wenig, den Eisriesen selber wieder aufzuerwecken. <\perceived> <perceived> Hier, wo die Volkssage Rübezahl umgehen läßt, scheint auch sein Gespenst noch greifbar zu spuken. <\perceived> (1934/2023)

> <perceived> The hiker in the Giant Mountains, climbing from the so-called Great Snow Pit to the Small Snow Pit on a path that had once been nearly impassable but had recently been somewhat improved, finds himself in front of the most significant landscape view. <\perceived> […] <perceived> Where the eroded granite ridge descends into the Small Pit, a charming alpine valley appears, seasonally adorned with violet-brown Turk's cap lilies, rosy-tinged white mountain anemones (narcissus anemone), and dense clusters of tall, deep blue monkshood and gentians above murmuring waters. <\perceived> <visual> Instinctively, the gaze searches for a glacier at the deepest part of the meadow, but it is absent. <\visual> <visual> All the more vividly, the traces of its former presence are imprinted, revealing where it last rested, carving out the vast pit—visible below, where the first thick-furred mountain spruces stand, is the massive ring of debris it left behind as it melted, died, and retreated. <\visual> This debris, originally embedded in the creeping ice, formed its lateral and terminal moraine. <perceived> A small patch of snow often remains on the innermost slope of the pit, even in summer—apparently, it would take very little to revive the ice giant itself. <\perceived> <perceived> Here, where the folklore places *Rübezahl* roaming, his ghost still seems almost tangibly to haunt the area. <\perceived>

The description of space here is almost reminiscent of the powerful and mystical depictions of nature prevalent in Romanticism or, more specifically, in fairy tales. It may not be coincidental that

the author evokes the legend of the folkloric mountain spirit *Rübezahl* at the end of this passage, anchoring its stylistic roots within this tradition. Nature is portrayed as something animated and supernatural, possessing its own agency and taking a central role as it presents itself to the perceiving subject. Based on the tags from the classifier, we see that *gestimmter Raum* as well as *Anschauungsraum* are prevalent in this passage. Movement corresponding to a subject's agency is absent. The depiction of setting entirely dominates, and while there is an experiencing subject present in this scene, i.e. the traveler—indicated by the focalized rendering of what is perceived (e.g., "es zeigt sich," (it presents itself) "man glaubt noch zu erkennen" (one still believes to recognize))—assumes a passive and almost disembodied role in this passage.

As we've observed earlier, fictional texts often depict settings in an anthropocentric manner, seeing the experiencing agent as central to perception. However, this passage distinguish itself from that pattern, presenting a perceiving subject who is present but remains detached, lacking the embodied and perspectival situatedness characteristic of the fiction examples previously discussed.

However, this passage also demonstrates that non-fiction is by no means devoid of the phenomenological depictions of setting that I seek to investigate. One of the aims of this chapter is, therefore, to identify what is specific to fiction in terms of how setting is constructed within narratives. Contrasting fiction passages with non-fiction ones may help us pinpoint what gives fictional worlds their "perceptual vivacity."

Historical Distribution and Genre

The historical distribution of different types of settings in the non-fiction data, shown in *Figure 20*, exhibits significantly more variability and volatility, as indicated by the shaded variance in the data, compared to the distribution observed in our fictional data, which shows a more controlled use of

setting with fewer fluctuations and greater consistency over time. While this variability is partly attributable to the smaller number of books in earlier periods, the variation remains notable in later years as well. This difference is expected, as there is generally more stylistic consensus among fiction authors regarding the use of setting.

We also observe that the individual types of setting are much closer in frequency compared to the fiction data. Although the overall frequency is lower than in the fiction data, the high frequency of settings in non-fiction is nonetheless striking and warrants further investigation.

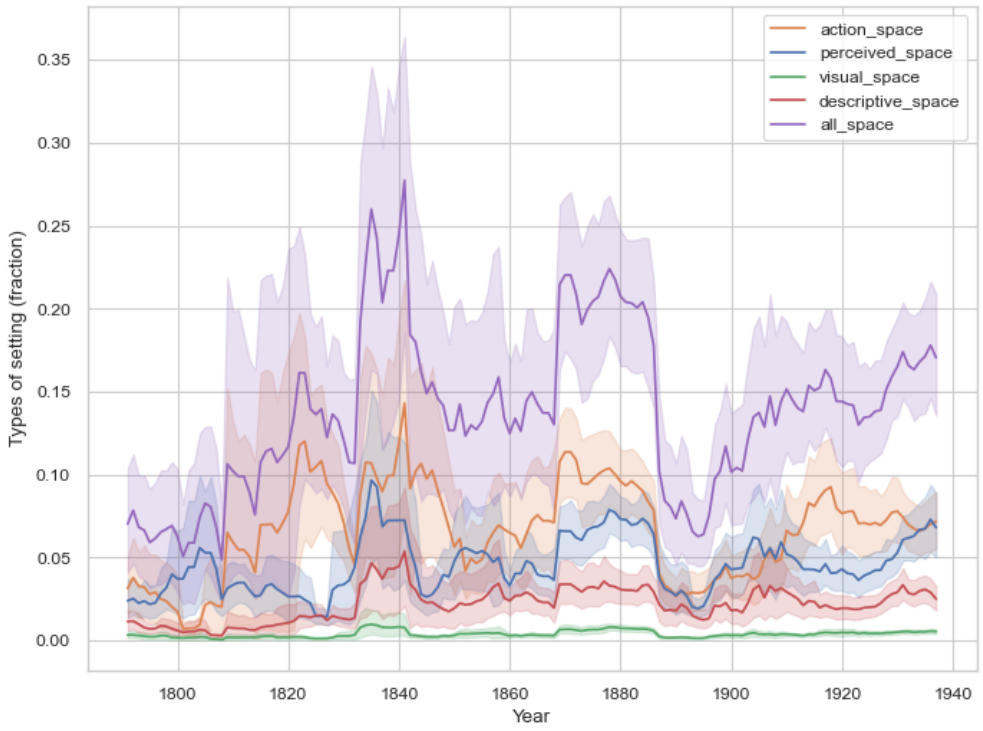


Figure 20. *Historical distribution of different types of setting in non-fiction*

If we look at the frequency of different types of settings divided by genre (as shown in *Figure 21*), we can see that the relatively high overall frequency of use of setting is mainly driven by travelogues. While in books categorized as "philosophy," the frequency of different types of spaces is close to zero, it's much higher for genres such as "nature" or "travelogues."

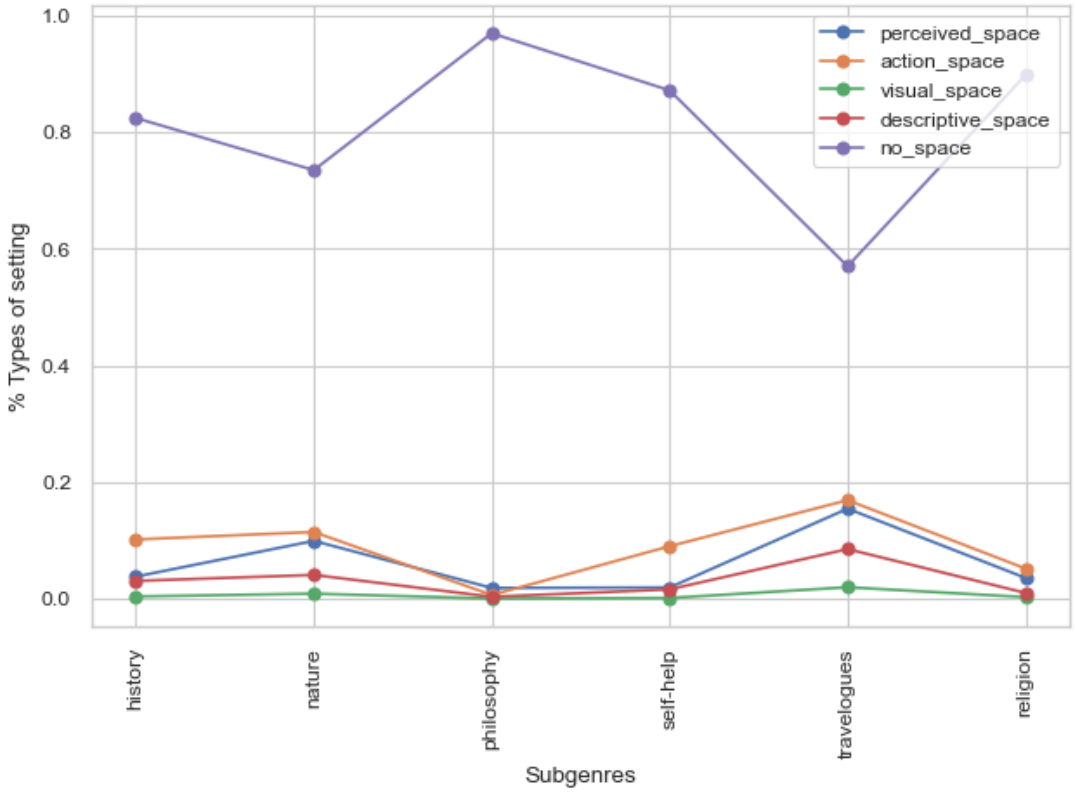


Figure 21. *Fraction of different types of setting by genre.*[25]

We observe that *gestimmter Raum* in the "nature" and "travelogue" genres is particularly prominent, nearly matching the frequency of *Aktionsraum*. As seen in the example passage from the "nature" genre, the environment is depicted with vivid descriptions, where atmospheric impressions take precedence.

What stands out is the high frequency of descriptions in travelogues, a phenomenon not observed in the fiction dataset. With 40% of the overall use of different types of settings, travelogues surpass any genre in the fiction dataset. Travelogue is a tricky genre in this context, falling somewhere between fiction and non-fiction. This is also evident in the metadata. It was

[25] The original German terms for these categories are, in the order presented in *Figure 21* above: *Geschichte*, *Natur*, *Philosophie*, *Praktisches* (which, for lack of a better term, I have translated here as "self-help," including various subjects from advice books to cookbooks and erotica*), Reiseberichte und Reiseerzählungen*, and *Religion*.

quite common for writers, especially in the 19th century, to engage in other fields such as nature, history or geography. The relatively high overlap of authors appearing in both datasets is primarily due to books categorized as travel writing or travelogues. For instance, these include works by authors such as Theodor Fontane, Annette von Droste-Hülshoff, Stefan Zweig, Heinrich Heine, or Johann Wolfgang von Goethe (e.g., his "travel report" *Italienische Reise* (1816)).

The way spaces are described, perceived, and interacted with forms the core content of this genre, making it inherently spatial. This is not to say that there aren't other genres that blur generic boundaries, or that non-fiction books cannot already contain fictional elements and vice versa. The distinction between, for example, a memoir and a novel might be more fluid than that between a work of philosophy and a novel. However, since space is a central element in this genre, with a focus on the detailed depiction of the physical environment the traveler encounters, aptly reflecting the phenomenological approach of my analysis, I've opted to treat it separately in the subsequent analysis.

To get a better grasp of how space is represented in this genre, let's look at an example drawn from the "travelogues":

> <action> Der Umzug war rasch bewerkstelligt und schon am Mittag, nachdem mich nun auch der vom Feld heimgekehrte Hofherr, Mr. Williams mit stummem Händedruck willkommen geheißen hatte, war ich in der Farm Wern wohnlich eingerichtet. <\action> <descriptiv> Blanke Stufen von schwarzem Schiefer führten in die Flur. <\descriptiv> <descriptiv> Das Zimmerchen links – welches mir zum Wohnen angewiesen ward – hatte seinen Kamin, seine Polsterstühle, Sofa und Fußdecke. <\descriptiv> <visual> Durch das emporgeschobene Fenster sah man über wogendes Getreidefeld bergab zu den Bäumen und dem dichten Gehäge, welches unsre Farm abgränzte. <\visual> <visual> Denn gleich dahinter lief die Landstraße, ein breiter, fester, stets reinlicher Pfad, auf welchem man bald die bäuerlichen Fuhrwerke und beladenen Erntewagen, bald die Karossen der benachbarten Gentry fahren, oft aber auch Landmädchen auf ihren kleinen, muntren Pferden vorübertraben sah. <\visual> <perceived> Noch tiefer brausten von Zeit zu Zeit Dampfzüge vorüber, und dicht an den Schienenweg heran ebbte und fluthete die See. <\perceived> <perceived> Man konnte jede Welle sehn, man hörte ihr Rauschen, so stille pflegte es zu sein – und wie das Wogen der See das der Kornfelder nur in anderen Farben fortzusetzen schien, so klang auch das Murmeln und Rauschen beider, für die Seele wundersam beruhigend, in einander. <\perceived> (Rodenberg 1858/2023)

<action> The move was quickly accomplished, and by noon, after the head of the farm, Mr. Williams, who had just returned from the fields, had welcomed me with a silent handshake, I was comfortably settled at the Wern farm. <\action> <descriptiv> Polished steps made of black slate led into the hallway. <\descriptiv> <descriptiv> The little room on the left—assigned to me for living—had its own fireplace, upholstered chairs, a sofa, and a carpet. <\descriptiv> <visual> Through the open window, one could look out over a rolling field of grain, down to the trees and the dense hedge that marked the border of our farm. <\visual> <visual> For just behind it ran the country road, a wide, solid, and always tidy path on which one could occasionally see peasant carts and loaded harvest wagons, sometimes carriages of the neighboring gentry, and often country girls trotting by on their lively little horses. <\visual> <perceived> Even further down, trains roared by from time to time, and the sea ebbed and flowed close to the railway tracks. <\perceived> <perceived> One could see every wave, hear its rushing, so quiet it tended to be—and as the motion of the sea seemed to continue that of the grain fields, only in different colors, so too did the murmuring and rushing of the two sound together, wondrously calming to the soul. <\perceived>

This passage is from Julius Rodenberg's travelogue *Ein Herbst in Wales* ("An Autumn in Wales"), published in 1858. What becomes immediately evident is the level of detail with which the "setting" in this narrative is described. This is reflected in the comparatively high frequency of both "descriptive space" and *Anschauungsraum*. Told in the first person, the author meticulously narrates what the room looks like, what he sees when looking out the window, and finally, what he hears—from the roaring of the trains to the rushing and murmuring of the waves—and the calming effect these impressions have on his soul.

Despite the meticulous attention to physical detail and spatial orientation, the tone and depiction of setting or space here are not entirely distinct from some of the example passages we've already seen. The paragraph begins with the traveler moving into his residence, followed by a description of the room, the agent looking out of the window (though his movement through the room is not mentioned), and finally a description of what he sees, accompanied by the emotional impact the landscape has on him. The focus, therefore, lies on what he sees, on the appearance and its effects on him, while bodily actions play a minimal role, as the experiencing agent remains largely detached and non-corporeal in this scene.

Reading further, what becomes apparent, and what distinguishes it clearly from the fiction passages that we've encountered, descriptive passages—and so-called descriptive blocks are present exceedingly. Shortly after this passage, the narrator goes on describing the kitchen, meticulously mapping out every detail in it. Just to give the reader an impression, here is a brief passage from the "descriptive block":

> <descriptiv> – Auf der andren Seite der Flur lag die Küche. <\descriptiv> <descriptiv> Der Herd mit seinen glänzend schwarzen Eisenplatten war in die Wand gemauert, unter einem rein gescheuerten Waßerkeßel ward stets ein mächtiges Holzfeuer unterhalten. <\descriptiv> <descriptiv> An der Breitewand standen zwei massive Schränke von braun gebohntem Holze, Schloß und Riegel blank von Messing; <\descriptiv> <descriptiv> auf dem einen die Kannen, Gläser und Zierrath von Porzellan, auf dem andren die blauen Schüsseln, Teller und Platten in reichem Vorrath. <\descriptiv> <descriptiv> Von der Flur aufwärts die schmale Holztreppe hinan führten Teppiche und auch mein Schlafkämmerchen mit Waschtischchen und Himmelbett lud zur Behaglichkeit ein. <\descriptiv> (Rodenberg 1858/2023)

> <descriptiv> – On the other side of the hallway was the kitchen. <\descriptiv> <descriptiv> The stove, with its gleaming black iron plates, was built into the wall, and beneath a freshly scrubbed water kettle, a mighty wood fire was always kept burning. <\descriptiv> <descriptiv> Against the long side of the wall stood two massive cupboards made of brown polished wood, with locks and latches polished in brass; <\descriptiv> <descriptiv> on one, stood the jugs, glasses, and porcelain ornaments, on the other the blue bowls, plates, and platters in abundance. <\descriptiv> <descriptiv> From the hallway, a narrow wooden staircase, carpeted, led upward, and even my little bedroom with its washstand and canopy bed invited a sense of coziness. <\descriptiv> (Rodenberg 1858/2023)

The primary focus of this passage is on the appearance of the space rather than on what it means for the perceiving subject to experience it. Unlike other passages we've examined, where objects and structural elements are gradually introduced as the subject moves through space, here they are presented as already established; the subject encounters them passively rather than actively. What is almost entirely absent in this scene is an agent who is sensorimotor-connected with the represented world. Instead, the scene is merely described rather than being bodily or perceptually experienced. To better understand how the dominance of description versus bodily perceptual experience of space unfolds across texts, let's compare the different corpora.

When looking at the ratios of the various space types across fiction, non-fiction, and travelogues (*see Figure 18*), we find that travelogues far exceed both fiction and other non-fiction genres. The same pattern applies to *Anschauungsraum* and *gestimmter Raum*. Only in *Aktionsraum* does fiction come close to travelogues, though it still lags slightly behind. Overall, travelogues display the highest ratio across all spatial modes, clearly distinguishing them from both fictional and other non-fictional texts.

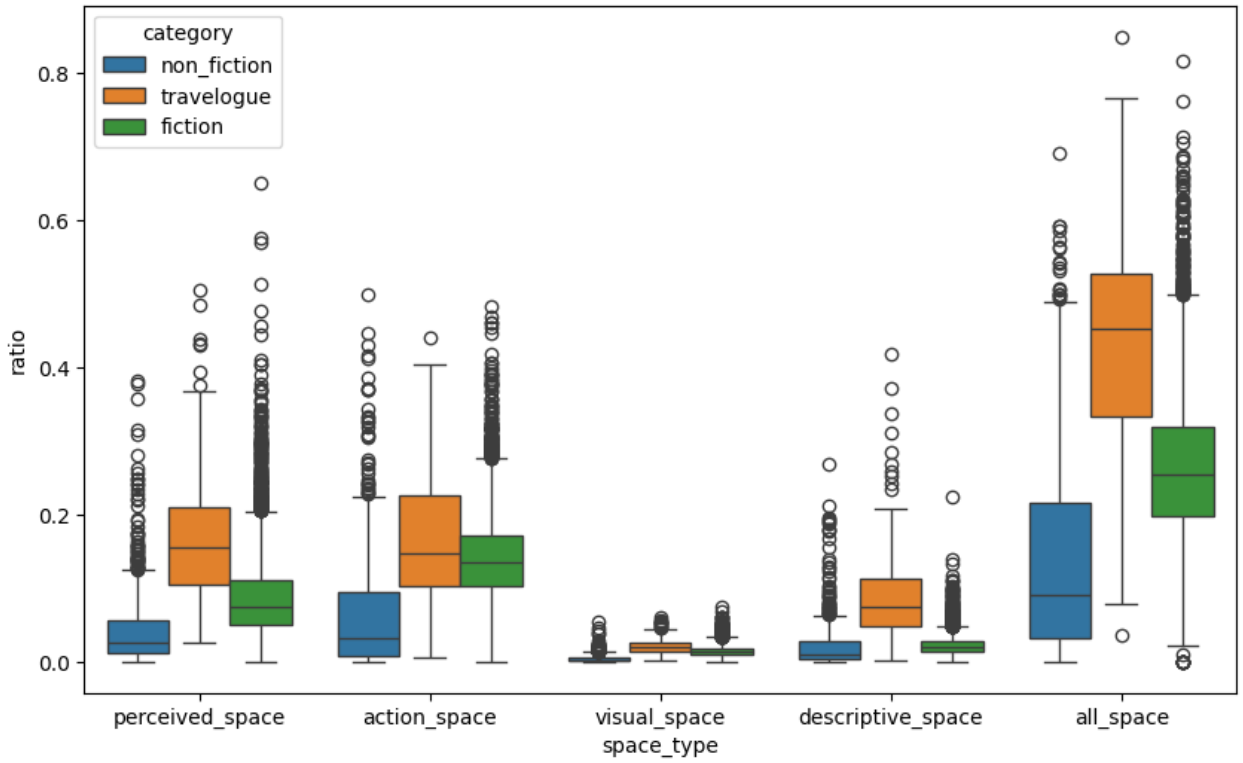
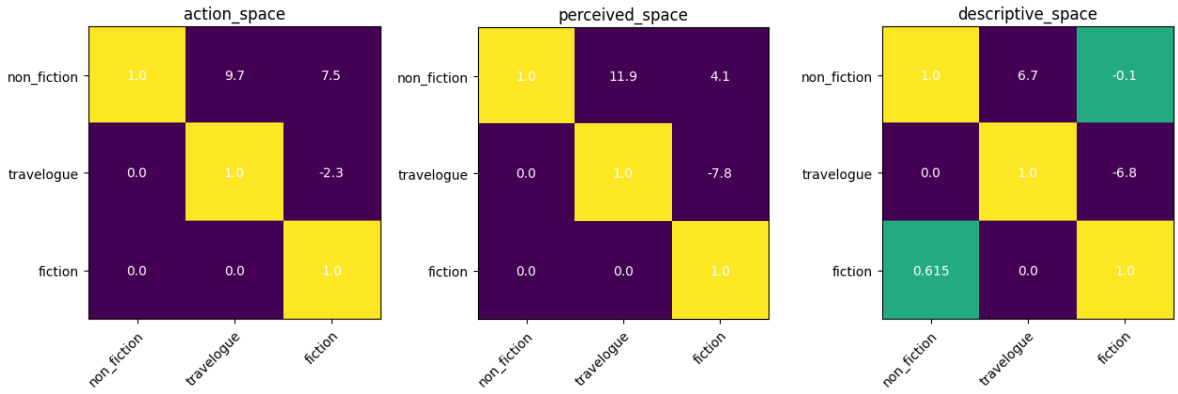


Figure 22. *Boxplots comparing fiction to non-fiction and travelogues for each individual space type.*

A post-hoc pairwise Tukey test shows significant differences across all categories, except for "descriptive space," when comparing fiction to non-fiction. When aggregating all space types, the mean value for fiction is 12.4 points higher than for non-fiction. This trend is primarily attributed to *Aktionsraum* ($p < 0.001$, $M = 7.5$) and *gestimmter Raum* ($p < 0.001$, $M = 4.1$), highlighting the embodied nature of setting that distinguishes fiction from non-fiction. In contrast, the effects of

descriptive space (p = 0.615, M = -0.1) and *Anschauungsraum* (p < 0.001, M = 1.0) are minimal. While the mean value for *Anschauungsraum* is slightly higher in fiction compared to non-fictional texts, "descriptive space" is lower in fiction. This suggests that these space types do not significantly differentiate fiction from non-fiction.

For "descriptive space," travelogues differ significantly from both non-fiction and fiction, suggesting that, while they also exhibit disparities in *Aktionsraum* and *gestimmter Raum*, their primary distinguishing feature lies in description. When comparing the mean differences in descriptive space between fiction and non-fiction, the difference is not significant (M = -0.1, p = 0.615). The mean difference for *Anschauungsraum* between fiction and non-fiction, while significant, is only 1.0. These findings suggest that the primary factor distinguishing fiction from non-fiction lies in the embodied nature of space within fictional texts (subsumed under *Aktionsraum* and *gestimmter Raum*), which clearly sets fiction apart from non-fiction and, more specifically, from the spatially rich genre of travelogues.



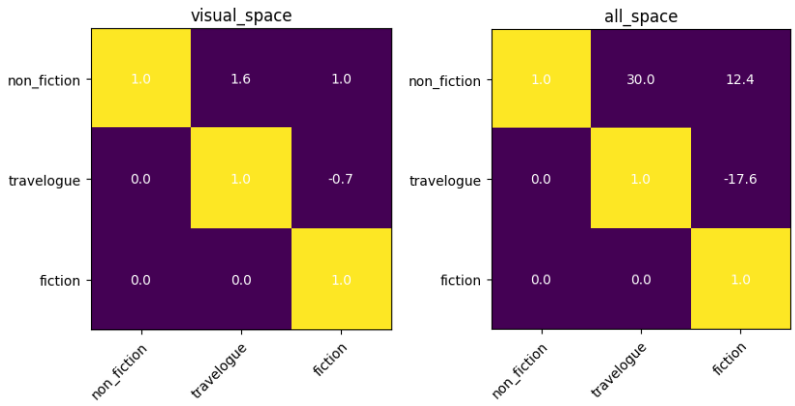


Figure 23. *P-values (< 0.001) and mean differences (M) of the HSD Tukey-Kramer test. The boxes on the left diagonal show the p-values, the ones on the right diagonal show the mean differences.*

The distinct use of space in fiction demonstrates the genre's ability to create immersive and affective worlds that engage the reader primarily through embodied depictions of space, setting it apart from non-fictional narratives. Fictional texts use setting in a way that's essential to the narrative's progression, depicting a "character-in-action" constantly in contact with their physical environment. Rather than achieving verisimilitude through mere description or visual detail, fiction relies on the concrete, embodied interactions between characters and their surroundings. This embodied interaction is the defining feature of fiction in terms of setting, even when compared to travelogues, which rely heavily on descriptive space and are clearly different in this respect.

In her concept of the "principle of minimal departure," Ryan suggests that fiction offers a kind of "provisional reality," arguing that "once we become immersed in fiction, the characters become real for us, and the world they live in momentarily takes the place of the actual world" (Ryan 1991, 21). Readers are thus thought to project their own lives and experiences onto the narrative, filling in gaps with real-world knowledge, assessing whether the fictional world aligns with reality, and making adjustments as needed.

I propose that the role of space or setting in fiction is not to present a fragmented world for readers to complete in order to accurately reflect (their) reality. Rather, its purpose is to create a

world that can be felt and experienced, regardless of how schematic or incomplete it may be. The spatial details that narratives direct their readers' attention to are imbued with affective qualities typically channeled through the character's body. To examine how this unfolds textually, let us close read an example from the fiction corpus and compare it to another passage from the travelogues.

I begin with a passage from Kafka's *Das Schloß* ("The castle") published 1926. The protagonist, K., who claims to be a land surveyor called by the authorities of the castle, makes his way through the town, hoping to reach the castle. Along the way, he gets caught in a snowstorm. Seeking temporary shelter, he knocks on the door of a nearby farmhouse. A man opens the door, and K. is fortunate enough to be invited inside:

> »Darf ich ein wenig zu Euch kommen?« sagte K., »ich bin sehr müde.« <action> Er hörte gar nicht, was der Alte sagte, dankbar nahm er es an, daß ihm ein Brett entgegengeschoben wurde, das ihn gleich aus dem Schnee rettete, und mit ein paar Schritten stand er in der Stube. <\action> <perceived> Eine große Stube im Dämmerlicht. <\perceived> <visual> Der von draußen Kommende sah zuerst gar nichts. <\visual> <action> K. taumelte gegen einen Waschtrog, eine Frauenhand hielt ihn zurück. <\action> <perceived> Aus einer Ecke kam viel Kindergeschrei. <\perceived> <perceived> Aus einer anderen Ecke wälzte sich Rauch und machte aus dem Halblicht Finsternis. <\perceived> <descriptive> K. stand wie in Wolken. <\descriptive> »Er ist ja betrunken«, sagte jemand. »Wer seid Ihr?« rief eine herrische Stimme und wohl zu dem Alten gewendet: »Warum hast du ihn hereingelassen? <perceived> Kann man alles hereinlassen, was auf den Gassen herumschleicht?« <\perceived> – »Ich bin der gräfliche Landvermessen«, sagte K. und suchte sich so vor den noch immer Unsichtbaren zu verantworten. (1926/2023)

> 'May I come into your house for a little while?' asked K. 'I'm very tired.' <action> He did not hear what the old man was saying, but gratefully he realized that a plank was being pushed his way. <\action> <action> This got him clear of the snow straight away, and a few more paces took him into the parlour of the cottage. <\action> <perceived> It was a large, dimly lit room. <\perceived> <visual> Coming in from outside, he could see nothing at first. <\visual> <action> K. staggered and nearly fell over a washing trough; a woman's hand caught him. <\action> <perceived> He heard a number of children shouting in one corner. <\perceived> <perceived> Steam billowed out of another, turning the twilight into darkness. <\perceived> <descriptive> K. might have been surrounded by clouds. <\descriptive> 'He's drunk,' someone said. 'Who are you?' cried a peremptory voice, and added, probably turning to the old man: 'Why did you let him in? <perceived> Are we to let in everyone who goes slinking around the streets?' <\perceived> 'I'm the count's land surveyor,' said K., by way of justifying himself to the still-invisible speaker. (1926/2009, 42-43)

Similar to Hoffmann's passage discussed in the previous chapter, the solidity of the setting does not arise from detailed descriptions of the environment or a fixed background. Instead, structural elements are introduced into the narrative as needed (e.g., a wooden board to jump on, a door to open, a washing trough to stumble upon). These elements serve a narrative purpose rather than merely fulfilling an ornamental function.

What the narrative again lacks, however, is any indication of what this room looks like. Upon entering, the character finds the room filled with smoke and dim lighting, barely able to discern anything failing his perception. Atmospheric elements such as light, shadow, and smoke feature strongly here, as does sound.

The scene, however, doesn't merely render atmosphere; instead, it presents the character in a sensory and kinesthetic coupling with the surrounding environment, with light and smoke playing central roles. This impression doesn't simply linger ominously in the air; it actively affects the character in various ways. Unable to see due to the smoke, the character must rely on the sounds or *Stimmen* around him. The narrative thus evokes the fictional world through various types of perception, initiating the character's cognitive process—what he makes of the sight of this room based on the perceptual fragments available to him. The objects perceived individually afford different modes of perception (sounds to be heard, objects to be touched or stumbled upon, smoke blocking one's sight, etc.).

Once the smoke has waned the character is finally able to see what's in front of him:

<perceived> Endlich verflüchtigte sich ein wenig der Rauch, und K. konnte sich langsam zurechtfinden. <\perceived> Es schien ein allgemeiner Waschtag zu sein. <descriptiv> In der Nähe der Türe wurde Wäsche gewaschen. <\descriptiv> <perceived> Der Rauch war aber aus der anderen Ecke gekommen, wo in einem Holzschaff, so groß, wie K. noch nie eines gesehen hatte – es hatte etwa den Umfang von zwei Betten -, in dampfendem Wasser zwei Männer badeten. <\perceived> <perceived> Aber noch überraschender, ohne daß man genau wußte, worin das Überraschende bestand, war die rechte Ecke. <\perceived> <perceived> Aus einer großen Lücke, der einzigen in der Stubenrückwand, kam dort, wohl vom Hof her, bleiches Schneelicht und gab dem Kleid einer Frau, die tief in der Ecke in einem hohen Lehnstuhl müde fast lag, einen Schein wie von Seide. <\perceived> […]

<action> »Setzt Euch!« sagte der eine der Männer, ein Vollbärtiger, überdies mit einem Schnauzbart, unter dem er den Mund schnaufend immer offenhielt, zeigte, komisch anzusehen, mit der Hand über den Rand des Kübels auf eine Truhe hin und bespritzte dabei K. mit warmem Wasser das ganze Gesicht. <\action> <descriptiv> Auf der Truhe saß schon, vor sich hin dämmernd, der Alte, der K. eingelassen hatte. <\descriptiv> (1926/2023)

<perceived> At last some of the steam drifted away, and gradually K. was able to get his bearings. <\perceived> This seemed to be wash-day for everyone. <descriptiv> Clothes were being washed near the door. <\descriptiv> <perceived> But the vapour came from the left-hand corner, where two men were having a bath in steaming water in a wooden tub larger than any K. had ever seen before; it was about the size of two beds. <\perceived> <perceived> But even more surprising, although it was hard to say just why, was the right-hand corner of the room. <\perceived> <perceived> Through a large hatch, the only opening in the back wall of the parlour, pale snowy light came in, no doubt from the yard, and cast a sheen like silk on the dress of a woman almost lying, for she looked so tired, in a tall armchair far back in that corner. <\perceived> […]

<action> Sit down,' said one of the men, a bearded, moustached fellow who kept his mouth open all the time under his moustache, breathing noisily. <\action> <action> Raising his hand above the side of the tub, a comical sight, he pointed to a chest, and in doing so splashed hot water all over K.'s face. <\action> <descriptiv> The old man who had let K. in was sitting on the chest too, lost in thought. <\descriptiv> (1926/2009, 43)

As indicated by the model's tags, *gestimmter Raum* clearly dominates this passage. K. gradually identifies the source of the smoke—a huge bathtub in one corner of the room. What strikes him even more, though he's not exactly sure why, is a woman lying in another corner, her dress catching the light from outside and making it appear like silk.

The narrative mediates the character's outlook on the setting and his embodied situatedness– what he perceives, where he moves, where he stands. The "world" depicted here is one that, in Edward Casey's words, we can "sense ourselves coming up against [with] resistance" (2006, 454). It creates the impression of ontological solidity. It has objects, surfaces, and edges. The narrative presents the character as an embodied agent, that emerges in his "perceptual engagement with the world as an "open form" that reaches out to and questions its environment" (Simonsen and Koefoed 16). This mainly happens through touch and movement, but also, like here, through other sensory impressions such as vision and sounds.

Researchers in cognitive psychology, drawing on Merleau-Ponty, have emphasized the touch-like character of vision referring to it as "palpation with the eyes" (cf. Noë 2006, 72). Rather than perceiving an entire scene all at once, we bring it into contact with ourselves, exploring and discerning its structure through interaction and movement. This is also how vision, and more generally perception, is enacted here. While *Anschauungsraum* consistently remains low across history, this does not mean that there is no visual component to how characters perceive setting.

The way these visual components are woven into the narrative, rarely have the "picturesque" quality of the spaces described in the example of the travelogues above. Instead of presenting the reader, with a complete and detailed view of what a room looks like, the character's gaze—in this passage—wanders along objects, things, and people that draw his attention to, whose (atmospheric) presence, the way they are embedded in this space, affects the way how he sees them. This does not happen all at once, but unfolds "in time," having setting and plot, perception and cognitive processes (what the character makes of these things) feed into each other.

The character's point of view—his embodied position and situatedness within a given setting—limits what he is able to see or perceive. This reflects the partial nature of perceptual experience in everyday life, where perception remains always incomplete and limited with regard to the objects that are perceived, which may be "experienced more or less directly" (Gallagher and Zahavi 2008, 90). In fiction, as the findings presented here show, the contact between a character and their environment is primarily direct and characterized by immediate embodied perceptual interactions.

Based on the quantitative evidence, this contrast is less stark in travelogues. While travelogues also exhibit comparatively high levels of *Aktionsraum* and *gestimmter Raum*, descriptive notions of space feature equally prominently. Rather than focusing solely on direct perception, this suggests the genre's tendency to provide detailed, objective portrayals of the places encountered.

Let's briefly contrast this with a passage from the travelogues. This excerpt is from Karl Philip Moritz's *Reisen eines Deutschen in England im Jahre 1782* ("Travels of a German in England in the year 1782"). On his journey through England, the traveler visits one of the famous "pleasure gardens" called Ranelagh, which was very popular in England at the time:

<action> Ich langte also in Ranelagh an, und nachdem ich beim Eingange meine halbe Krone erlegt hatte, fragte ich nach der Tür zum Garten, man zeigte mir diese, und zu meiner großen Verwunderung trat ich in einen ziemlich unansehnlichen, schwach erleuchteten Garten, wo ich nur wenige Personen antraf. <\action> <action> Es währte auch nicht lange, so wurde ich von einer jungen Lady, die da spazieren ging, und mir ohne Umstände ihren Arm bot, gefragt: warum ich hier so einsam ginge? <\action> <action> Ich schloß nun, dies könne unmöglich das prächtige, gepriesne Ranelagh sein, als ich nicht weit von mir verschiedne Leute in eine Türe gehen sahe, denen ich folgte, um etwa dadurch wieder ins Freie zu kommen, oder die Scene zu verändern. <\action>

<perceived> Aber welch ein Anblick, als ich auf einmal aus der Dunkelheit des Gartens in ein von vielen hundert Lampen erleuchtetes rundes Gebäude trat, das an Pracht und Schönheit alles übertraf, was ich noch dergleichen gesehen hatte! <\perceived> <descriptiv> Alles war hier Cirkelförmig: oben eine Galerie mit abgeteilten Logen, und auf einem Teil derselben eine Orgel mit einem schöngebauten Chore, von welchem Instrumental- und Vokalmusik herunterschallte; <\descriptiv> <descriptiv> unter dieser Galerie rund umher schön ausgemalte Nischen für diejenigen, welche Erfrischungen zu sich nehmen wollen; <\descriptiv> <descriptiv> der Fußboden mit Teppichen belegt, in der Mitte desselben vier hohe schwarze Pfeiler, innerhalb welcher zierliche Kamine zur Zubereitung von Kaffee, Tee und Punsch angebracht sind, und um welche in der Rundung mit allerlei Erfrischungen besetzte Tische stehen. <\descriptiv> (1783/2023)

<action> So I arrived at Ranelagh and, after I had paid my half crown at the entrance, I asked for the door to the garden. It was shown to me, and to my great surprise, I stepped into a rather unimpressive, dimly lit garden where I met only a few people. <\action> <action> It did not take long before a young lady walking there, who without much ado offered me her arm, asked why I was walking here so alone. <\action> I concluded that this could hardly be the magnificent, renowned Ranelagh, as I saw several people not far from me entering a door. I followed them, hoping either to get back outside or to change the scene.

<perceived> But what a sight greeted me! Suddenly, out of the darkness of the garden, I stepped into a circular building illuminated by hundreds of lamps, surpassing in splendor and beauty anything of its kind I had ever seen! <\perceived> <descriptiv> Everything here was of circular shape: above, a gallery with separate boxes, and on one side of it an organ with a beautifully constructed choir, from which instrumental and vocal music resonated. <\descriptiv> <descriptiv> Beneath this gallery, beautifully painted niches surrounded the space for those who wished to take refreshments. <\descriptiv> <descriptiv> The floor was covered with carpets, and in the middle stood four tall black pillars, within which elegant fireplaces were installed for preparing coffee, tea, and punch. <\descriptiv> <descriptiv> Around these, tables laden with all kinds of refreshments were arranged in a circular formation. <\descriptiv>

The overall dominance of "descriptive space" in travelogues is also evident in this passage. After entering the gardens and expressing his amazement at what he sees, the narrative shifts to a lengthy description of the surroundings. Beyond the naturally more factual tone that the non-fiction passage adopts, I would argue that the key difference in how space is portrayed in travelogues—compared to this passage and others we've encountered from fiction—is that perception in fiction is dramatized as an active and eventful experience, rather than appearing passively in the narrative. It's something that happens to the character, and the way readers come to understand the objects and worlds depicted in stories is shaped by *how* the acting subject experiences them.

In fiction, the things that make up space primarily "afford" opportunities for action. As Noë suggests, "to perceive is (among other things) to learn how the environment structures one's possibilities for movement and so it is, thereby, to experience possibilities of movement and action afforded by the environment" (2004, 105). It's thus not so much about the visual appearance of things—what they look like or how they visually connect to other things—but rather about what they can "afford," whether through touch, atmosphere, or other sensory impressions.

By contrast, in the example from the travelogue, few elements are presented in their perceptual directedness. Everything appears to be already "there," with the relevant features of the scene established without much interaction from the agent. While fictional narratives, as we have seen, often make economical use of spatial details, those details rarely exist passively. Instead, they serve to direct the reader's attention to specific parts of the physical world and their relationship to the character, while other elements remain unspecified or implied. This also means—and the findings presented here and in the previous chapter support this—that setting rarely functions as mere background.

The fictional passages presented here effectively modulate perspective through the character's embodied situatedness. In contrast, as observed in the non-fiction passages analyzed

here, this rarely occurs. Instead of narrating events from the character's viewpoint—whether through third-person or first-person perspective—the focus often shifts away from the focalizer to more passive observations of the scene. This results either in purely descriptive passages or in the adoption of an impersonal viewpoint (e.g., "man konnte jede Welle sehen …" [one could see every wave …] instead of "ich sehe jede Welle" [I can see every wave], which would provide a more direct impression) from which the scene is told.

In fiction, while we can't fully grasp what the scenery might look like in its "fullness," we generally remain bound to the narrator's or character's partial view of it. Thus, while I would not suggest that readers complete the picture by filling in the gaps based on the schematic views provided by the narrative, such narratives offer spatial elements in their extension, inviting us to imagine that there is something more to this world without necessarily knowing (or needing to know) what this "something" is (Auyoung 2015, 586).

This openness to potentiality, the coexistence of "the real" and "the possible" brings us back to the mechanics of mimetic representations inherent to fictional narratives (Iser 1990, 950). The kind of "hypothesized realities" communicated in fiction (Halliwell 2002, 16), the *what-ifs*, lie at the center of Aristotle's view of mimesis. He states: "The poet's function is to describe, not the thing that happened, but a kind of thing that might happen" (Aristotle 1941/2001, 1463). The way a narrative is configured, acts not on actual data (like non-fiction would do), but acts on "what it proposes to itself," and thus requires an "element of indirectness" (Walsh 2003, 119).

Mimesis in fiction, as I would argue, does not solely operate based on what the reader makes of a text, but should indeed be understood as a process (in Ricoeur's sense) that unfolds as the narrative progresses. Narratives do not just "represent or describe experience" but "catch experience in the act of making the world available" (Noë 2004, 176). What's mediated by mimesis is thus not "the narrative content, but the narrative act" (Walsh 2003, 118).

Narrative's *emplotment*, its temporally configured nature and its inevitable linear (at least for the reader) drive forward, makes it almost impossible (if not unnecessary) to present a world in its spatial completeness. This recalls Lessing's famous distinction between the "temporal" and the "spatial" arts, which is often cited as *the* reason for narratology's century-long negligence of space (Buchholz und Jahn 2005, 551). According to Lessing, spatial arts, such as painting or sculptures, are best suited to present static moments or scenes, conveying visual detail and spatial relationships in pictorial mimesis. Temporal arts in turn, such as poetry or prose, are associated with dynamic actions and events, unfolding in time, without allowing detailed descriptions of visual scenes to interrupt its flow (Lessing 1766/1986).

Rather than suggesting that "space" or setting holds a somewhat inferior position compared to time in narratives, I would argue that its importance lies elsewhere—beyond merely providing a backdrop or location for the story. Narratives engage readers in a perceptual simulation, depicting an agent's bodily intentionalities, motivations, and goals as they interact with and are affected by objects and things in their immediate physical environment. This simulation reflects "the fundamental experience of living in a body that navigates space almost constantly" (Farmasi 2023, 5).

In her book *The Feeling Body*, drawing on Jakob von Uexküll's concept of *Umwelt*, Giovanna Colombetti suggests that "[f]or a living system to be a sense-making system is to live in a world that is always an *Umwelt*, namely, an environment that has a specific significance or value for it" (Colombetti 2013, 17). Similarly, in the fictional world, setting does not exist independently of the acting subject; rather, it is shaped through the subject's bodily movement and perception, which serve as the primary means of engaging with the surrounding environment.

The way fiction mimics or simulates the perceptual experience of our everyday lives can perhaps best be explained through the "enactivist approach" put forth by cognitive scientists and

philosophers of mind.[26] At its core, this approach suggests that the world we experience is "enacted" or brought forth through our bodily activities (Varela, Thompson, and Rosch 2017, l6).

Enactivism posits that perception depends on understanding "sensorimotor contingencies"—the ways sensory input shifts in response to movements made by either the perceiving subject or the perceived object. Noë argues that perception can be understood as an action: it is an active, exploratory process, "it is something [that] we do" (2006, 1). The conspicuous absence of descriptive modes in fictional narratives, the lack of *Anschaulichkeit* can be explained by the fact that narratives provide readers with a vivid perceptual simulation of the story's world. Rather than simply seeing through the character's eyes, or relying on a detached narrator to visually map the setting out for us, fictional narratives ask us to experience the world through the character's perceptual and embodied actions, which significantly contributes to its imaginability. This imaginability, however, is not based on its visual completeness or its richness in pictorial detail. Instead, it stems from the processual and embodied ways in which the narrative engages the reader's sensorimotor understanding.

The findings presented above highlight the importance of the situated, embodied experience of setting, which mutually intercedes with different agential patterns of behavior in characters. The affective and kinetic qualities of "lived space" in fiction thus help to make the represented world palpable and experiential to the reader. Rather than relegating setting to a secondary, descriptive role, experience unfolds through the character's close engagement with and affective response to their physical environment.

[26] In his book "The Experientiality of Narrative. An Enactivist Approach" (2014) Caracciolo specifically draws on enactivist perspectives to explore how readers experientially and imaginatively engage with narratives, both through "mental" and "perceptual" simulation. While he occasionally addresses the concept of space, his primary focus is on how readers align their "virtual body" with that of the character and the role space plays in this process. See also *With Bodies. Narrative Theory and Embodied Cognition* by Caracciolo and Kukkonen (2021)

Conclusion

The goal of this chapter was to explore how fictional texts create a sense of immediate perceptual experience within their worlds. By combining this exploration with an analysis of the role of mimesis in fiction, the chapter suggests that mimesis extends beyond mere imitation or realistic description; it functions as a dynamic act that actively engages how readers cognitively and perceptually process the narrated world.

Through a comparison with non-fiction, particularly travelogues, the analysis quantitatively showed that embodied perceptions—manifested through movement, intentional interactions, sensory impressions, and atmosphere—distinguish fiction in its treatment of setting. Fictional narratives do not merely depict space as a static background; they actively engage readers through perceptual simulations that reflect characters' physical and affective interactions with their surrounding environment.

The quantitative data has shown that fiction primarily employs setting to foreground sensory and motor interactions, evoking the lived, experiential worlds of its characters. This contrasts with travelogues, where descriptive detail often dominates, presenting space as a detached observation focused on visual and ornamental details. In fiction, characters are placed directly within these spaces, enabling readers to experience the fictional world through the characters' embodied perspectives and situatedness.

This analysis highlights the broader implications of setting for understanding mimesis in fiction. By privileging perceptual experience and embodied interaction, fictional narratives demonstrate how setting functions as a crucial framework for shaping and directing perception within the storyworld. Fiction's emphasis on sensory and motor perceptions allows it to construct

vivid, tangible worlds, offering readers a sense of "being there" in ways that non-fiction—especially the closely related genre of travelogue—does not replicate to the same extent.

Conclusion: Aspects of Space

Instead of limiting "setting" to a restricted focus on "location" and "description," as is often the case, this thesis reconceptualizes "setting" by offering a theoretical framework that allows a discussion of "how a text not only acknowledges but also generates different kinds of space" (Hones 2006, 44).

Using this framework and theoretical vocabulary, we can interpret texts not simply as narratives of events occurring in space, but as narratives that actively are "doing space" (Ibid.). As demonstrated, setting in stories consistently situates characters within their environments, and their engagement with and perception of setting often directly inform action and, consequently, plot development.

Combining close reading with computational analysis, I have demonstrated not only how setting functions within individual stories but also how it operates more broadly across a large corpus of German literary works, spanning various time periods and genres. Each of the quantitative experiments presented here focuses on a specific aspect—ranging from historical time to genre, narrative time, and fictionalization. These experiments are informed by theories that address how each aspect has been previously explored in scholarship.

To reach the point where we can meaningfully engage with and test these theories on a more quantitative level, we first need a conceptual framework to apply them to. Building on the discussions about setting and narrative space presented in *Chapter 1*, I introduced a framework—adapted from the German scholar Gerhard Hoffmann—that captures how setting is phenomenologically presented in stories. At the core of this framework are the ways in which subjects experience their environment, breaking it down into three distinct perceptual modes: *Aktionsraum*, *gestimmter Raum*, and *Anschauungsraum*.

Since setting in stories is not homogeneous but instead "subject to limitations, hiatuses, and discontinuities, filled with obstacles, privileged points and directions, with colors, sounds, smells, and tactile properties" (Van Baak 1983, 125), the model presented here systematically captures this heterogeneity by breaking it into distinct components.

To operationalize this concept, I trained a BERT model which classifies these categories at the sentence level. While the primary focus was on the embodied notions of space, I noticed during close readings that descriptions—instances where narratives position characters and objects in space without direct perception by a subject—should also be included in the model. Although this does not directly relate to a character's perception of space, it nonetheless plays an important role in how stories present setting.

To fine-tune the model, I manually annotated roughly 2,800 examples at the sentence level. After successful training, the model was applied to the different corpora. *Chapter 2*, while focusing on the process required to fine-tune the model and validate its output, also outlines the construction of the datasets. The datasets presented here—the fiction and non-fiction sets—are, to the best of my knowledge, the first of their kind in terms of size and granularity of metadata, encompassing over 5,500 books in German-language texts. The majority of these works is fiction, while a smaller sample also includes works in non-fiction.

Having presented the literature review and the theoretical framework in *Chapter 1*, as well as the process of model building and implementation in *Chapter 2*, the thesis then moved on to applying the developed model to the dataset.

The first quantitative experiment in *Chapter 3* starts with the question of how setting has changed over time. Contrary to the theorists' assumptions, setting has not declined throughout literary history. As demonstrated, the distribution of the different space types within the analyzed timeframe remains relatively stable. My findings also challenge claims of a primacy of description

in earlier works. Instead, the more embodied notions of space—comprising *Aktionsraum* and *gestimmter Raum*, clearly dominate in my model, compared to more descriptive categories of "descriptive space" and *Anschauungsraum*).

The high frequency of *Aktionsraum* suggests that setting plays a key role in facilitating corporal behavior in characters. This means that when setting appears in fiction its primarily moved through. Things, when they appear, tend to serve a functional purpose within the narrative and are engaged with by the character, mainly through the sense of touch. *Gestimmter Raum*, which also features prominently in its historical deployment, highlights the atmospheric and affective qualities imbued within spaces. This suggests that alongside physical interaction, characters are also attuned to their environment in affective—and at times, emotional—ways.

When applying my model to the diverse subgenres present in the dataset, I found that this trend remains consistent across different genres. However, when comparing individual genres to one another, the findings suggest that genre exerts a stronger influence on spatial representation than literary period, particularly for dominant space types such as *Aktionsraum* and g*estimmter Raum*.

While the data for the various subgenres is relatively limited—comprising only a smaller fraction of the overall corpus, which primarily consists of novels, novellas, and shorter tales—we could nonetheless statistically assess that the various genres differ significantly in their use of setting. This supports narratologists' arguments that genres not only differ in themes and tropes, but also in the ways of how these themes and tropes are textually manifested. Individual genres thus show distinct ways in how setting is realized within narratives, suggesting different "protocols of worldmaking" (Herman 2009, 79).

Narrowing further into how setting is textually realized and functions narratively, and linking it to theories of language comprehension, the third experiment examined how setting evolves across

narrative time. Specifically, I focus on the concept of "narrative beginnings" and their significance in literary discourse. Consistent with previous critical arguments, I found that the beginnings of stories exhibit a higher distribution of setting overall, providing further evidence for the idea that setting plays an essential role in establishing the fictional world at the start of narratives, helping readers orient themselves within the spatial and sensory framework of this world.

When aggregating the different space types for each individual book in my corpus and analyzing how these trends manifest across all books, I found that it is primarily at the beginning of stories that a more descriptive focus on space appears, emphasizing pictorial representation and atmosphere over action and movement.

Whether examining the historical function of setting, its role across different genres, or its evolution across narrative time, the findings suggest that setting is more than just a background feature in narrative; it is integral to its structure, actively influencing how a narrative unfolds and shaping the conventions of different narrative genres.

Building on this evidence, *Chapter 4* further explored what specifically differentiates the way setting is constructed in fiction compared to other types of narratives (in this case, non-fiction genres). Drawing on work in cognitive science, psychology, and the philosophy of mind, I focused particularly on how setting—understood as an embodied notion—affords different kinds of perception. As I have argued, the value of setting lies in its function of framing perception.

Focusing on the concept of mimesis and how it has been theorized in literature, I aimed to identify ways in which literature mimics the perceptual reality we encounter in our everyday lives. Since my model is based on a phenomenological experience of space, the poetic depiction of space in narratives is connected to the (presumed) fact that the depicted world resembles a real, text-external, materialized world. The character's perception of the phenomenal fictional world serves to represent the interaction between subject and space. Rather than presenting a world that merely

mirrors our own in its spatial representation, I argue that what fiction simulates, and thus mimics, is how this world takes shape precisely through the character's perceptual engagement with it. The setting depicted in stories is thus thoroughly affected; it's not "lifeless," but is of significant value to the embodied agent who navigates and enacts it.

While I reflected on reading practices and how they change or unfold when done computationally (in tandem with the more traditional approach of close reading) in the *Introduction* and the methods section of this thesis (*Chapter 2*), I want to revisit this topic here and discuss the "transformative" effect it had on me.

Specifically, it not only provided opportunities for close readings but also broadened the context from which I draw interpretations. This, in turn, affected the way I analyzed those texts. Since narratological analysis primarily focuses on the structures and mechanics of a text by examining specific aspects such as time, characters, or plot, my close readings, which focus specifically on setting, do not diverge from this approach. Similar to how narratologists close-read, I have provided selective examples from literature to study how setting or space is constructed in narratives.

When annotating texts, I did not intentionally seek out specific passages but instead worked with random samples (using the random sampling tool demonstrated in *Chapter 2*) drawn from a large and diverse array of texts. While the focus was on the sentence level, the sentences were not presented in isolation. Instead, they were placed in context (in the form of a passage), and I annotated them with an awareness of that context.

The numerous possibilities and variations I encountered in the way setting appears in fiction through computational annotation were by no means comparable to the insights gained from close readings. This doesn't mean that one is better than the other, but simply suggests that, while similar, they belong to two different practices. Annotating texts computationally provided a broader perspective on how setting functions, even if it offered only a small glimpse into the fictional world

of each book (since I couldn't possibly read all the books the annotations were drawn from for this project, as opposed to the close readings I did). In turn, the more traditional close-reading practices allowed for a deeper understanding, not only of how the model functions within texts but also in supporting the interpretative arguments I've made based on the results and visualizations.

These methods also overlap to some extent. The annotations sharpening my focus on what to look for when thinking about setting and how it operates across a variety of different texts, which in turn guided adjustments to the model. Close readings, on the other hand, served as a basis for developing my model in the first place. The close readings that later followed in the analysis helped to illustrate the points made, showcasing what "doing space" looks like in narratives as well as going deeper into some of the found effects. This iterative process highlights the cyclical nature of computational modeling, where insights from one method inform and improve the other.

With this understanding, I returned to the theoretical framework, seeking technical vocabulary that would best articulate my observations about the function of space in fiction. I drew on research from cognitive linguistics to better understand how we process language, as well as insights from psychology, philosophy of mind, and cognitive narratology. My goal was not to develop an entirely new framework or completely rethink the concept of setting (at least not in the way Hoffmann has outlined it). Rather, by synthesizing insights on embodiment and perception from these fields, I aimed to extend existing theories of setting. My approach provides a more embodied account than Hoffmann's, one that roots perception directly within a character's immediate environment or setting, shaping and constituting what and how a character perceives.

I aimed to show that, contrary to claims questioning the relevance of the concept of "setting" in its traditional sense, retaining the concept of setting offers affordances that allows us to study a variety of perceptual and affective phenomena emerging from this perspective. This is not to say that this approach is without limitations. While I have discussed some of the conceptual as well as

technical problems in previous chapters, I will now provide an outlook on how future studies that seek to investigate the role of setting in fiction might approach these issues.

Limitations and areas for future research

When it comes to the limitations of the computational approach I used here, the challenge lies not so much in the technical or methodological aspects—I am confident in the model's ability to classify the sentences correctly, but more in aligning them with traditional research. While I had good reasons for annotating at the sentence level rather than focusing on the passage level, as traditional research in narratology might do, this decision could nonetheless influence the outcome of the analysis. To briefly recap, my rationale for using sentences instead of passages was that, in aggregate, a passage where the majority of classifications belong to, let's say, *Aktionsraum*, is still a passage focused on action. Annotating on the passage level would also be challenging due to the frequent overlap of the different categories, thus introducing much more uncertainty on the annotator's part. However, annotating on the passage level, would certainly offer more contextual coherence, than a smaller unit such like a sentence would do.

To annotate at the passage level, one also first has to define what constitutes a passage. Are we referring to a text window that approximates the typical length of a passage, or are we using paragraphs (assuming paragraph breaks are available in the data)? Both a fixed word window and paragraphs pose additional challenges: while they provide more context than sentences, it is uncertain if a paragraph or set word window captures the meaningful coherence of an entire scene. Alternatively, if we consider scenes as passages, we face an additional high-level challenge in NLP, of first having to define what a scene *is* (where it starts, where it ends) and then successfully training the computer to reliably detect it.

Using sentences in turn has the advantage of offering more granularity, allowing us to precisely label the specific spatial elements that we seek to capture (a character moving, a character being affected by space, etc.) without bundling them with other related content (such as the high frequency of "no-space" in the data). Since I am seeking to analyze how the different aspects of setting functions in narratives, I felt more comfortable to classify the sentences individually rather than as a part of a broader category within a passage.

This is just to briefly showcase the challenges one encounters, and the decision one makes when using such an approach. As I've aimed to show, annotating on the sentence level is not necessarily a limitation, but just provides different affordances, then when focusing on larger text units. It ultimately also always depends on the goals of the analysis, and on the questions asked. Where we interested, for instance, on how narratives transition between different types of space, i.e. to learn more about the way when and how a specific mode of setting (i.e. *Aktionsraum)* transitions to another one (i.e. *gestimmter* Raum) a focus on the passage level, or ideally a "scene" would be more useful.

A bigger issue, as critics have pointed out, is that the classifications the computer makes (and in my case are mutually exclusive), meaning either/or, are usually referring to some "ground truth" meaning its either True or False. This arguably does away with some of the levels of ambiguity inherent in literary prose, and language more broadly, that researchers using more traditional approaches are ready to confront. While I address the ambiguities to which my model is subject, it still ultimately provides an output that reflects a clear position. This is necessary, however, for the model to work effectively, and for providing results that we can interpret.

This also highlights the different affordances that these media, and by extension the different approaches using them, bring to the table. When analyzing texts with the computer, I gain the affordance of being able to include a much larger, more varied database of texts as the basis of my

analysis. What is lost, however, is some of the levels of ambiguity that we embrace in close readings. Using the computer necessarily requires me to decide how, in our case, to categorize a given sentence. In traditional close readings, we can acknowledge and explore this ambiguity, pointing to the limitations of such a systematized approach.

However, the need for clarity does not originate with the computer. Building a theoretical model already requires us to strip away some ambiguity when approaching a specific project theoretically. The very process of systematization and formalization thus already reduces some of the more nuanced, multi-layered qualities that literary texts possess. This reduction is not *per se* a flaw but rather a necessary trade-off to allow for structured analysis and interpretation. By setting certain parameters and defining clear categories, we create a framework that, while somewhat limited in scope, enables us to make meaningful comparisons across a wide array of texts.

As I hope to have demonstrated, this approach does not preclude discussing the ambiguities that are lost. These moments of "failure," as I've argued, can also open up new avenues for interpretation and further analysis. In other words, many of the limitations I encountered during this project (and I outlined some of the more technical or specific limitations related to the individual experiments in previous chapters) present possibilities for meaningful further research, some of which I want to touch on here. The close readings that I provided in chapters, not only had the function to illustrate a point already made based on the results, but also allowed opportunities for exploration, going deeper into some of the aspects found, and making arguments based on the readings *and* the quantitative results.

Bridging these approaches required me to not just translate literary concepts into computational terms but translating computational results back into a form meaningful for literary interpretation. For instance, after identifying a significant trend in the distribution of *Aktionsraum* over time, I would seek out individual instances within the corpus where this type of setting was

particularly prominent. By closely examining these passages, I could interpret the data in a way that bridged quantitative findings with qualitative literary analysis, adding depth to the statistical insights.

I have used this analysis to illustrate how a quantitative approach can help us to learn more on the literary past. While I hope to have shown that these models can indeed capture the complexity of literary language and the nuances specific to my framework, a remaining challenge—again an issue of "alignment"— lies in relating these findings to theories on how setting has been previously approached in the context of the literary past. Although there is no shortage of claims regarding the role of space or setting across literary history, what critics mean when they refer to the setting of a story often remains ambiguous, and examples that clarify its use are often scarce.

There is thus a discrepancy between the way I employ "setting," which is highly specific and based on numerous training samples that are available for reference, and the broader historical understanding of the concept to which I attempt to apply these findings. This is not to suggest that the model I've used here fully captures the variety or distinct properties of the literary use of setting. Quite the opposite, in fact. Especially regarding the most dominant space types, more differentiation could be fruitful. We've observed that movement and interaction with objects (e.g., touch) are important, but what the model does not capture is how these aspects function individually. We could thus ask: why do characters seem so physically attached to their material surroundings? And how does this attachment differ from instances where spaces are merely moved through, as Bakhtin has suggested is characteristic of the adventure novel?

In the case of *gestimmter Raum*, we have grouped three different aspects, each of which could be further explored independently. When is setting used merely to create atmosphere, and when does it contribute to psychological depth in characters, evoking emotional responses?

Additionally, we could examine the anthropomorphic nature of space—when does space itself serve as an actant? Finally, how do these questions connect to their underlying socio-historical narratives? Is there, for instance, as critics have suggested, a relationship between the rise of subjectivity in characters and the emergence of domesticity as a public value?

These are challenging questions to measure, but they also highlight that we've only just begun to scratch the surface of what's important about the "lived" experience of setting as depicted in texts throughout history and across different genres. While I've aimed to establish that there is indeed something distinct about its use—especially when it comes to the embodied conception of setting and how it relates to the literary experience—future models that seek to learn more about the phenomenological representation of setting might want to use different annotation schemes that would help us better understand some of the individual aspects specific to setting, not fully captured here.

Researchers can not only build on the theoretical work presented here but also leverage the methodological foundation, including both the methods used and the codebase that was instrumental in operationalizing these concepts. It's worth noting that this thesis partly relies on hundreds of lines of code developed elsewhere, which are not only available for replicating this project but also for expanding its functionalities.[27] The resources provided—encompassing the code, annotations (available as CSV files), and a cleaned dataset of German fiction and non-fiction (the first of its kind in terms of size and granularity of the metadata)—offer a robust foundation for future researchers working in German literature to build upon.

This is not to say that only Digital Humanities (DH) scholars, familiar with statistical methods and programming, can benefit from this project. However, it is fair to acknowledge that for researchers from more traditional backgrounds, with no programming experience, it could be

[27] See my GitHub repository: https://github.com/katrinrohrb/aspects-space.

difficult to replicate this study and make use of the computational resources here (if they wished to do so). While I've emphasized the complementary nature of "close" and "distant" reading, it's also important to distinguish some individual steps that might be useful to scholars in and outside of DH.

Take, for instance, the dataset. Creating a dataset, documenting the steps involved in its creation, publishing it alongside finer-grained metadata that provides additional information, should itself be regarded, as Gabi Kirilloff suggests, as a "valuable piece of scholarly labor, regardless of whether it immediately produces novel interpretations" (2022, 3). Some of the tools and workflows I developed along the way (e.g., a workflow for an annotation task, a tool that can be used for annotations, and a system to browse them afterward) can likewise serve as valuable resources, adaptable for others' analyses.

While I've spent a great deal on analyzing how the computational evidence aligns with previous approaches to setting in literature, and subsequently how the findings presented here challenge the ones posed by researcher before, I also went on in interpretating those findings, offering new perspectives on the broader function of setting within storytelling. This in turn, can help researchers to explore new avenues, computationally or not, based on the interpretations and hypothesis offered here.

While I have primarily focused on how the notion of setting is manifested within the language of fiction more broadly and have only tentatively touched on how this might influence the reading experience, my work also contributes to a growing body of research in cognitive narratology that examines how readers imagine and construct mental models of the worlds created in narratives. Scholars have thus asked what allows readers to experience fiction—at times—so vividly and "perceptually real." In developing these theories, they relied, for instance, on personal experience (Scarry 1999), a set of book reviews (Caracciolo 2013), or on a small number of reader

reports (Auyoung 2018). To my knowledge, there are no empirical studies that focus specifically on the more "experiential" aspects—rather than the visual, such as having participants draw a represented scene—of how readers interpret space or setting in literature.[28] This could thus be an avenue for future research: studying how the frameworks, observations, and concepts discussed here translate into how actual readers perceive, interpret and respond to texts.

Throughout this project, I have aimed to continuously shift between macroscopic and microscopic perspectives on the texts. By combining computational analysis with close reading, I was not only able to address questions that would have been impossible to tackle with either approach alone but also to achieve a deeper, more nuanced engagement with the concept of setting.

My goal was to integrate computational research with scholarly insights into how setting has been previously addressed, in terms of its historical function, within genres, across narrative time, and in fiction more generally. I have demonstrated how closely previous intuitions about setting align with quantitative data. The quantitative analysis has uncovered significant new timelines in the historical evolution of setting. But setting's historical role is not the only aspect of interest here; using computational methods, we have also gained new insights into how setting functions across genres and within narrative texts, offering a new perspective on how characters live within and react to the spaces around them in storytelling.

[28] Ryan et al. (2016), while focusing on space, incorporate a small-scale empirical study in which they ask a group of students to draw scenes from literary passages they had read earlier. Similarly, Troscianko (2014), in her study on cognitive realism in Kafka's oeuvre, asked participants to draw scenes after reading the opening passage of Kafka's *Das Schloß*. Thus, while some studies have addressed how readers respond to the representation of space in texts from a more empirical perspective, they primarily focus on the "mental maps" readers form based on the settings presented, investigating how much readers remember from stories. However, this focus has been relatively narrow, often centered on a single author's oeuvre. To date, there has been no study that addresses the larger implications—both in terms of how readers experience the narrative world beyond a purely visual or pictorial perspective, and in terms of expanding the scale of such studies to include a larger group of participants.

APPENDIX

CHAPTER 3

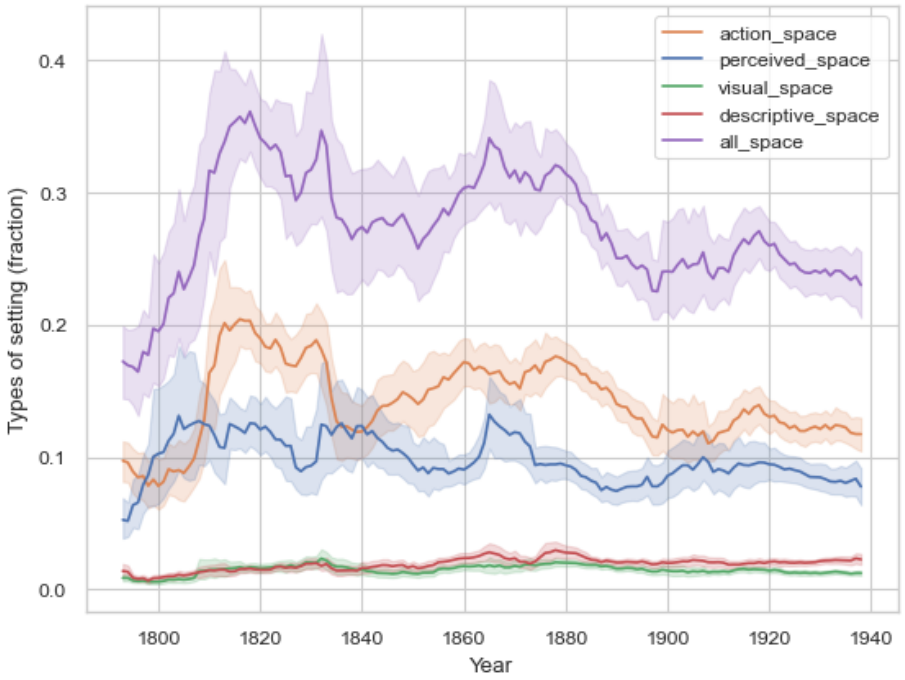


Figure A.1. *Historical Sample of Canon with the authors Tieck, Stifter, and Kleist removed.*

Regression Results for `action_space`

Model:	OLS	Adj. R-squared:	0.003
No. Observations:	95420	Log-Likelihood:	96842.
Df Model:	5	F-statistic:	53.10
Df Residuals:	95414	Prob (F-statistic):	3.13e-55
R-squared:	0.003	Scale:	0.0076917

	Coef.	Std.Err.	t	P> |t|	[0.025	0.975]
const	0.0392	0.0238	1.6468	0.0996	-0.0074	0.0857
time_tf	0.0539	0.0151	3.5762	0.0003	0.0244	0.0834
sin	0.0284	0.0034	8.2800	0.0000	0.0217	0.0351
cos	0.0749	0.0232	3.2345	0.0012	0.0295	0.1203
sin2	-0.0120	0.0046	-2.5822	0.0098	-0.0211	-0.0029
cos2	0.0114	0.0016	7.2115	0.0000	0.0083	0.0145

Table A.1. *Regression Results for "action_space" in narrative time analysis.*

Regression Results for `perceived_space`

Model:	OLS	Adj. R-squared:	0.002
No. Observations:	95420	Log-Likelihood:	1.0171e+05
Df Model:	5	F-statistic:	40.97
Df Residuals:	95414	Prob (F-statistic):	2.87e-42
R-squared:	0.002	Scale:	0.0069460

	Coef.	Std.Err.	t	P> |t|	[0.025	0.975]
const	0.2062	0.0226	9.1266	0.0000	0.1619	0.2505
time_tf	-0.0636	0.0143	-4.4435	0.0000	-0.0917	-0.0356
sin	-0.0305	0.0033	-9.3676	0.0000	-0.0369	-0.0241
cos	-0.0937	0.0220	-4.2574	0.0000	-0.1369	-0.0506
sin2	0.0159	0.0044	3.6055	0.0003	0.0072	0.0245
cos2	-0.0109	0.0015	-7.2292	0.0000	-0.0138	-0.0079

Table A.2. *Regression Results for "perceived_space" in narrative time analysis.*

Regression Results for `descriptive_space`

Model:	OLS	Adj. R-squared:	0.012
No. Observations:	95420	Log-Likelihood:	2.0504e+05
Df Model:	5	F-statistic:	228.2
Df Residuals:	95414	Prob (F-statistic):	4.95e-243
R-squared:	0.012	Scale:	0.00079631

	Coef.	Std.Err.	t	P> |t|	[0.025	0.975]
const	0.0928	0.0076	12.1343	0.0000	0.0778	0.1078
time_tf	-0.0402	0.0048	-8.2972	0.0000	-0.0497	-0.0307
sin	-0.0136	0.0011	-12.3232	0.0000	-0.0158	-0.0114
cos	-0.0566	0.0075	-7.5895	0.0000	-0.0712	-0.0420
sin2	0.0092	0.0015	6.2007	0.0000	0.0063	0.0122
cos2	-0.0044	0.0005	-8.5624	0.0000	-0.0053	-0.0034

Table A.3. *Regression Results for "descriptive_space" in narrative time analysis.*

Regression Results for `visual_space`

Model:	OLS	Adj. R-squared:	0.001
No. Observations:	95420	Log-Likelihood:	2.4793e+05
Df Model:	5	F-statistic:	14.48
Df Residuals:	95414	Prob (F-statistic):	3.27e-14
R-squared:	0.001	Scale:	0.00032412

	Coef.	Std.Err.	t	P> |t|	[0.025	0.975]
const	0.0190	0.0049	3.8898	0.0001	0.0094	0.0285
time_tf	-0.0031	0.0031	-0.9864	0.3240	-0.0091	0.0030
sin	-0.0004	0.0007	-0.6217	0.5341	-0.0018	0.0009
cos	-0.0039	0.0048	-0.8130	0.4162	-0.0132	0.0055
sin2	0.0007	0.0010	0.7251	0.4684	-0.0012	0.0026
cos2	-0.0000	0.0003	-0.0602	0.9520	-0.0007	0.0006

Table A.4. *Regression Results for "visual_space" in narrative time analysis.*

Regression Results for `all_space`

Model:	OLS	Adj. R-squared:	0.000
No. Observations:	95420	Log-Likelihood:	50887.
Df Model:	5	F-statistic:	9.261
Df Residuals:	95414	Prob (F-statistic):	7.92e-09
R-squared:	0.000	Scale:	0.020153

	Coef.	Std.Err.	t	P> |t|	[0.025	0.975]
const	0.3571	0.0385	9.2808	0.0000	0.2817	0.4326
time_tf	-0.0530	0.0244	-2.1737	0.0297	-0.1008	-0.0052
sin	-0.0162	0.0055	-2.9126	0.0036	-0.0270	-0.0053
cos	-0.0792	0.0375	-2.1130	0.0346	-0.1527	-0.0057
sin2	0.0139	0.0075	1.8460	0.0649	-0.0009	0.0286
cos2	-0.0038	0.0026	-1.4986	0.1340	-0.0088	0.0012

Table A.5. *Regression Results for "all_space" in narrative time analysis.*

BIBLIOGRAPHY:

Abbott, H. Porter. *The Cambridge Introduction to Narrative.* Cambridge: Cambridge University Press, 2008.

Adcock, Robert, and David Collier. "Measurement Validity: A Shared Standard for Qualitative and Quantitative Research." *American Political Science Review* 95, no. 3 (2001): 529–546. https://doi.org/10.1017/S0003055401003100.

Algee-Hewitt, Mark, et al. "Canon/Archive: Large-Scale Dynamics in the Literary Field." *Pamphlets of the Stanford Literary Lab*, no. 11 (2016). Accessed July 26, 2024. https://litlab.stanford.edu/LiteraryLabPamphlet11.pdf.

Aristotle. *The Poetics of Aristotle.* Translated by Stephen Halliwell. London: Duckworth Press, 1987.

Auerbach, Erich. *Mimesis: Dargestellte Wirklichkeit in der abendländischen Literatur.* Tübingen: Francke, 2001.

Auyoung, Elaine. *When Fiction Feels Real: Representation and the Reading Mind*. New York, NY: Oxford University Press, 2018.

Baak, J. J. Van. *The Place of Space in Narration.* Amsterdam: Rodopi, 1983.

Bachelard, Gaston. *Poetik des Raumes.* Frankfurt am Main: Fischer Taschenbuch, 1987.

Bal, Mieke. *Narratology: Introduction to the Theory of Narrative.* Toronto: University of Toronto Press, 2017.

Bakhtin, M. M. *The Dialogic Imagination: Four Essays*. Edited by Michael Holquist. Translated by Caryl Emerson. Austin: University of Texas Press, 1981.

Barthes, Roland. "The Reality Effect." In *The Rustle of Language*, translated by Richard Howard. Berkeley: University of California Press, 1989.

Bamman, David, Ted Underwood, and Noah A. Smith. "A Bayesian Mixed Effects Model of Literary Character." In *Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, 370–379, 2014. https://doi.org/10.3115/v1/P14-1035.

Beck, Harald. Roman - Anfänge. Rund 500 erste Sätze. Verlag: Haffmans Zürich, 1992.

Bernaerts, Lars, Dirk de Geest, Luc Herman, and Bart Vervaeck, eds. *Stories and Minds : Cognitive Approaches to Literary Narrative*. Lincoln: University of Nebraska Press, 2013.

Betz, Frederick. *Theodor Fontane, Irrungen, Wirrungen*. Stuttgart: P. Reclam, 1979.

Bode, Katherine. *A World of Fiction: Digital Collections and the Future of Literary History.* Ann Arbor: University of Michigan Press, 2019. https://doi.org/10.3998/mpub.8784777.

Bodenhamer, D. J., Corrigan, J., and Harris, T. M., editors, (2010). *The spatial humanities:*
GIS and the future of humanities scholarship. Spatial humanities. Indiana University Press, Bloomington.

Bourdieu, Pierre. *The Rules of Art: Genesis and Structure of the Literary Field*. Stanford, California: Stanford University Press, 1996.

Boyd, Ryan L, Kate G Blackburn, and James W Pennebaker. "The Narrative Arc: Revealing Core Narrative Structures through Text Analysis." *Science Advances* 6, no. 32 (2020): eaba2196. https://doi.org/10.1126/sciadv.aba2196.

Bölsche, Wilhelm. Eiszeit und Klimawechsel. 1934. Projekt Gutenberg-DE, 2013. Accessed June 2024. https://www.projekt-gutenberg.org/boelsche/eiszeit/chap001.html.

Brooks, Peter. *Realist Vision*. New Haven, CT: Yale University Press, 2005.

Brottrager, Judith, et al. "Predicting Canonization: Comparing Canonization Scores Based on Text-Extrinsic and -Intrinsic Features." In *Proceedings of the Conference on Computational Humanities Research CHR2021*, edited by Maud Ehrmann et al., 195–205. CEUR Workshop Proceedings, 2021. Accessed September 6, 2024. http://ceur-ws.org/Vol-2989/#short paper21.

Buchholz, Sabine, and Manfred Jahn. "Space in Narrative." In *Routledge Encyclopedia of Narrative Theory*, edited by David Herman, Manfred Jahn, and Marie-Laure Ryan, 551–556. London: Routledge, 2005.

Burke, Kenneth. *A Grammar of Motives.* Berkeley: University of California Press, 1969.

Caracciolo, Marco. "Narrative Space and Readers' Responses to Stories: A Phenomenological Account." *Style* 47, no. 4 (2013): 425–444.

—. *The Experientiality of Narrative: An Enactivist Approach.* Berlin: De Gruyter, 2014. https://doi.org/10.1515/9783110365658.

Caracciolo, Marco, and Karin Kukkonen. *With Bodies Narrative Theory and Embodied Cognition*. Columbus: The Ohio State University Press, 2021.

Caracciolo, Marco, Guédon, Cécile, Kukkonen, Karin and Müller, Sabine. "The Promise of an Embodied Narratology: Integrating Cognition, Representation and Interpretation"
In: *Emerging Vectors of Narratology* edited by Per Krogh Hansen, John Pier, Philippe Roussin and Wolf Schmid, 435-460. Berlin, Boston: De Gruyter,
2017. https://doi.org/10.1515/9783110555158-021.

Casanova, Pascale. *The World Republic of Letters*. Translated by M. B. DeBevoise. First Harvard University Press paperback edition. Cambridge, Massachusetts: Harvard University Press, 2004.

Casey, Edward. "David Carr on History, Time, and Place." *Human Studies* 29, no. 4 (2006): 445–62.

Chambers, Nathanel, and Daniel Jurafsky. "Unsupervised Learning of Narrative Event Chains." In *Proceedings of ACL-08: HLT*, 789–797. Columbus, OH: Association for Computational Linguistics, 2008.

Chamisso, Adelbert von, *Peter Schlemihls wundersame Geschichte*. 1814. Project Gutenberg-DE, 2013. Accessed June 21, 2024. https://www.projekt-gutenberg.org/chamisso/schlemil/schlemil.html.

Chamisso, Adelbert von; Moley, Henry, *Peter Schlemihl*. 1814. Project Gutenberg eBook #5339, Release Date: June 17, 2008. Accessed June 21, 2024. https://www.gutenberg.org/ebooks/5339

Chatman, Seymour. *Story and Discourse: Narrative Structure in Fiction and Film.* Ithaca, NY: Cornell University Press, 1993.

Cheng, Jonathan. "Fleshing Out Models of Gender in English-Language Novels (1850–2000)." *Journal of Cultural Analytics* 5, no. 1 (2020): 11652. https://doi.org/10.22148/001c.11652.

Cheong, Y. G.: *A Computational Model of Narrative Generation for Suspense*. PhD Thesis, Department of Computer Science, North Carolina State University, 2007.

Ciccoricco, David. *Refiguring Minds in Narrative Media*. Lincoln: University of Nebraska Press, 2015.

Cohn, Dorrit. *Transparent Minds: Narrative Modes for Presenting Consciousness in Fiction.* Princeton, NJ: Princeton University Press, 1978.

Colombetti, Giovanna. *The Feeling Body: Affective Science Meets the Enactive Mind*. Cambridge, MA: MIT Press, 2013. http://site.ebrary.com/id/11204352.

Dauthendey, Max. *Der Geist meines Vaters*. 1912. Projekt Gutenberg-DE, 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/dauthend/dergeist/dergeist.html

Droste-Hülshoff, *Judenbuche*. 1842. Project Gutenberg eBook #45798, Release Date: May 28, 2014. Accessed May 10, 2024. https://www.gutenberg.org/epub/45798.

Elson, David; Dames, Nicholas and Kathleen McKeown: Extracting social networks from literary fiction.In: Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics, Uppsala, Sweden. Association for Computational

Linguistics, 2010, 138–147.

Erlin, Matt, Andrew Piper, Douglas Knox, Stephen Pentecost, Michaela Drouillard, Brian Powell, and Cienna Townson. 2021. “Cultural Capitals: Modeling Minor European Literature.” *Journal of Cultural Analytics* 6 (1). https://doi.org/10.22148/001c.21182.

Evans, Elizabeth F., and Matthew Wilkens. “Nation, Ethnicity, and the Geography of British Fiction, 1880–1940.” *Cultural Analytics*, July 13, 2018.

Farmasi, Lilla. *Narrative, Perception, and the Embodied Mind: Towards a Neuro-Narratology*. Abingdon, Oxon: Routledge, 2022.

Fludernik, Monika. *Towards a “Natural” Narratology.* New York: Routledge, 1996.

—. *An Introduction to Narratology.* London: Routledge, 2009.

Fontane, Theodor, and Katharine Royce. *Trials and Tribulations a Berlin Novel*. New York: Mondial, 2009.

Fontane, Theodor. *Vor dem Sturm*. 1878. Projekt Gutenberg-DE 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/fontane/vorsturm/vorsturm.html

Friedman, Susan Stanford. “Spatialization: A Strategy for Reading Narrative.” *Narrative* 1, no. 1 (1993): 12–23.

Furst, Lilian R. *All Is True: The Claims and Strategies of Realist Fiction.* Durham, NC: Duke University Press, 1995.

Gavin, Michael, and Eric Gidal. “Scotland’s Poetics of Space: An Experiment in Geospatial Semantics.” *Journal of Cultural Analytics*, November 16, 2017.

Gerrig, Richard J. *Experiencing Narrative Worlds: On the Psychological Activities of Reading.* New Haven, CT: Yale University Press, 1993.

Gallagher, Shaun, and Dan Zahavi. *The Phenomenological Mind: An Introduction to Philosophy of Mind and Cognitive Science.* Abingdon: Routledge, 2008.

Ganghofer, Ludwig. *Die Mühle am Fundsee*. 1900. Projekt Gutenberg-DE 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/ganghofe/fundense/fundense.html.

Gibson, James J. *The Ecological Approach to Visual Perception*. Classic ed. London: Routledge, 2015. https://doi.org/10.4324/9781315740218.

Gius, Evelyn, and Janina Jacke. “The Hermeneutic Profit of Annotation: On Preventing and Fostering Disagreement in Literary Analysis.” *International Journal of Humanities and Arts Computing* 11, no. 2 (2017): 233–254.

Goethe, Johann Wolfgang von. *Wilhelm Meisters Wanderjahre*. 1821. Project Gutenberg eBook #2409, Release date: November 1, 2000. Accessed May 10, 2024. https://www.gutenberg.org/epub/2409.

Goethe, Johann Wolfgang von. *Die Wahlverwandtschaften.* 1809. Projekt Gutenberg-DE, 2023. Accessed May 10, 2023. https://www.projekt-gutenberg.org/goethe/wahlver2/wahlver2.html.

Grisot, Giulia, and Berenike Herrmann. "Examining the Representation of Landscape and Its Emotional Value in German-Swiss Fiction between 1840 and 1940." *Journal of Cultural Analytics*, vol. 8, no. 1, Aug. 2023.

Guignon, Charles. Moods in Heidegger's Being and Time. In What Is an Emotion? Classic and Contemporary Readings, ed. R. C. Solomon, 181–190. Oxford: Oxford University Press, 2003.

Halliwell, Stephen. *The Aesthetics of Mimesis: Ancient Texts and Modern Problems.* Princeton, NJ: Princeton University Press, 2002.

Hamburger, Käte. *The Logic of Literature.* 2nd rev. ed. Bloomington: Indiana University Press, 1973.

Hammond, Adam, Julia Brooke, and Graeme Hirst. "A Tale of Two Cultures: Bringing Literary Analysis and Computational Linguistics Together." In *Proceedings of the Workshop on Computational Linguistics for Literature*, 1–8. Atlanta, GA: Association for Computational Linguistics, 2013.

Haupt, Birgit. „Zur Analyse des Raums." In Peter Wenzel (ed.), *Einführung in die Erzähltextanalyse: Kategorien, Modelle, Probleme*. Wvt-Handbücher Zum Literaturwissenschaftlichen Studium, Bd. 6. Trier: WVT Wissenschaftlicher, 2004. S. 69-87.

Heidegger, Martin. *Sein und Zeit*. Elfte unveränderte Auflage. Tübingen: Niemeier, 1967 [1926].

—. Being and Time. Trans. J. Macquarrie and E. Robinson. Oxford: Blackwell, 1962 [1926].

Herman, David. Story Logic: Problems and Possibilities of Narrative. Lincoln and London: University of Nebraska Press, 2002.

—. "Cognition, emotion, and consciousness." In: Herman David, ed. The *Cambridge Companion to Narrative*. Cambridge: Cambridge University Press 2007, 245-259.

—. Herman, David. "Narrative Ways of Worldmaking". Narratology in the Age of Cross-Disciplinary Narrative Research, edited by Sandra Heinen and Roy Sommer, Berlin, New York: De Gruyter, 2009a, pp. 71-87. https://doi.org/10.1515/9783110222432.71

—. Herman, David. *Basic Elements of Narrative.* Malden, MA: Wiley-Blackwell, 2009b.

—. Herman, David, ed. Routledge encyclopedia of narrative theory. London: Routledge, 2010.

—. Herman, David, ed. *The Emergence of Mind: Representations of Consciousness in Narrative Discourse in English.* Lincoln: University of Nebraska Press, 2011.

Heuser, Ryan, Moretti, Franco, and Erik Steiner. "The Emotions of London." Technical Report 13, Stanford University, Stanford, 2016.

Heine, Heinrich. *Der Rabbi von Bacherach*. 1893. Projekt Gutenberg-DE 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/heine/bachrach.html

Hoffmann, Gerhard. *Raum, Situation, erzählte Wirklichkeit: Poetologische und historische Studien zum englischen und amerikanischen Roman.* Stuttgart: Metzler, 1978.

Hoffmann, E.T.A. *Des Vetters Eckfenster.* 1822. Projekt Gutenberg-DE 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/etahoff/eckfenst/eckfenst.html.

—. *Das Fräulein von Scuderi.* 1819. Projekt Gutenberg-DE 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/etahoff/scuderi/scuderi.html.

—. *Der Sandmann.* 1816. Projekt Gutenberg-DE 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/etahoff/sandmann/sandmann.html.

Hoffmann, E. T. A., and Andrew Brown. *Mademoiselle de Scudéri*. London: Alma Books, 2020.

Hones, Sheila. "Space, Setting, and the Adventure Story: Or, with Perry in Japan." *Genre: Forms of Discourse and Culture* 39, no. 3 (2006): 39–56. https://doi.org/10.1215/00166928-39-3-39.

—. "Literary Geography: Setting and Narrative Space." *Social & Cultural Geography* 12, no. 7 (2011): 685–699.

Horváth, Ödön von. *Ein Kind unserer Zeit*. 1938. Projekt Gutenberg-DE. Accessed May 10, 2024. https://www.projekt-gutenberg.org/horvath/kindzeit/kindzeit.html.

Husserl, Edmund. *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy: Second Book.* Trans. R. Rojcewicz and A. Schuwer. Dordrecht: Kluwer, [1952] 1989.

Iser, Wolfgang. "Fictionalizing: The Anthropological Dimension of Literary Fictions." *New Literary History* 21, no. 4 (1990): 939–955.

Jahner, Elaine. *Spaces of the Mind : Narrative and Community in the American West*. Lincoln: University of Nebraska Press, 2004.

Jameson, Fredric. *The Antinomies of Realism.* London: Verso, 2013.

Koepnick, Lutz. "Rilke's Rumblings and Lang's Bang." *Monatshefte* 98, no. 2 (2006): 198–214.

Labov, William, and Joshua Waletzky. "Narrative Analysis: Oral Versions of Personal Experience." *Journal of Narrative & Life History* 7, nos. 1–4 (1997): 3–38. https://doi.org/10.1075/jnlh.7.02nar.

Löw, Martina. *The Sociology of Space : Materiality, Social Structures, and Action*. Translated by Donald Goodwin. *Springer eBooks*. New York: Palgrave Macmillan, 2016. https://doi.org/10.1057/978-1-349-69568-3.

Kahler, Erich. *The Inward Turn of Narrative.* Translated by Richard Winston and Clara Winston. Princeton, NJ: Princeton University Press, 1973.

Kafka, Franz. Anfang des Manuskripts von *Der Process*. 1914/1915. Museum of Modern Literature in Marbach, 2024.

—. *Das Schloß*. 1926. Projekt Gutenberg-DE 2013. Accessed July 13, 2024. https://www.projekt-gutenberg.org/kafka/schloss/schloss.html.

Kafka, Franz, Anthea Bell, and Ritchie Robertson. *The Castle*. Oxford: Oxford University Press, 2009.

Koolen, Corina, et al. "Literary Quality in the Eye of the Dutch Reader: The National Reader Survey." *Poetics* 79 (April 2020): 101439. https://doi.org/10.1016/j.poetic.2020.101439.

Kukkonen, Karin. *Probability Designs: Literature and Predictive Processing.* Oxford: Oxford University Press, 2020.

Kröger, Timm. *Aus alter Truhe.* 1908. Projekt Gutenberg-DE. Accessed May 29, 2023

Lessing, Gotthold Ephraim. *Ästhetische Schriften: Laokoon.* Accessed April 29, 2023 https://textgridrep.org/browse/rkbr_0.

Long, Hoyt, and Richard Jean So. "Literary Pattern Recognition: Modernism between Close Reading and Machine Learning." *Critical Inquiry* 42 (2016): 235–267. https://doi.org/10.1086/684353.

Lotman, Yuri M. *Die Struktur des künstlerischen Textes.* Frankfurt am Main: Suhrkamp Verlag, 1973.

Lukács, György. “Narrate or Describe?” In *Writer & Critic, and Other Essays*, edited by Arthur David Kahn, 110–128. New York: Grosset & Dunlap, 1970.

Margolin, Uri. Cognitive science, the thinking mind, and literary narrative. In: Herman, David (Ed.). Narrative Theory and the Cognitive Sciences. Stanford, Calif.: CSLI Publications, 2003.

Mann, Thomas. *Tonio Kröger*. 1903. Project Gutenberg eBook #38692, Release Date: January 27, 2012. Accessed May 10, 2024. https://www.gutenberg.org/files/38692/38692-h/38692-h.htm

Mann, Thomas and Kenneth Burke. *Death in Venice.* 1912. Project Gutenberg eBook # #66073, Release Date: August 16, 2021. Accessed January 5, 2024. https://www.gutenberg.org/ebooks/66073.

—. *Tod in Venedig.* 1912. Project Gutenberg eBook #12108, Release Date: January 27, 2012. Accessed January 5, 2024. https://www.gutenberg.org/ebooks/12108.

Merleau-Ponty, Maurice. *The Prose of the World*. Evanston: Northwestern University Press, 1973.

—. *Phenomenology of Perception.* Translated by Colin Smith. London and New York: Routledge, 2002.

Meister, Jan Christoph. *Narratology beyond Literary Criticism: Mediality, Disciplinarity*. *Narratology beyond Literary Criticism.* Berlin, New York: Walter de Gruyter, 2008. https://doi.org/10.1515/9783110201840.

Mehta H., Collins C., Bradley A., and Hancock M. “Metatation: Annotation as Implicit Interaction to Bridge Close and Distant Reading.” *ACM Transactions on Computer-Human Interaction* 24, no. 5 (2017). https://doi.org/10.1145/3131609.

Miller, Norbert, ed. *Romananfänge: Versuch zu einer Poetik des Romans.* Berlin: Literarisches Colloquium, 1965.

Moritz, Karl Philip. *Reisen eines Deutschen in England im Jahre*. 1783. Projekt Gutenberg-DE 2013, Accessed August 2024. https://www.projekt-gutenberg.org/moritz/england/index.html.

Mostafazadeh, Nasrin et al. “CaTeRS: Causal and Temporal Relation Scheme for Semantic
Annotation of Event Structures”. In: Proceedings of the Fourth Workshop on Events. California: Association for Computational Linguistics, 2016, pp. 51–61.

Möllhausen, Balduin. *Der Schatz von Quivira*. 1880. Projekt Gutenberg-DE. Accessed May 10, 2024. https://www.projekt-gutenberg.org/moellhsn/quivira/quivira.html.

Nagel, Thomas: What Is It Like to Be a Bat. Philosophical Review, 83, 1974, 435-450.

Nguyen D, Liakata M, DeDeo S, Eisenstein J, Mimno D, Tromble R and Winters J (2020) How We Do Things With Words: Analyzing Text as Social and Cultural Data. Front. Artif. Intell. 3:62. doi: 10.3389/frai.2020.00062

Noë, Alva. *Action in Perception*. Cambridge, Mass.: MIT Press, 2004.

Nuttall, A. D. Openings: *Narrative Beginnings from the Epic to the Novel*. Oxford [England], New York: Oxford University Press, 1992.

Nünning, Ansgar. "Towards a Typology, Poetics and History of Description in Fiction." In *Description in Literature and Other Media*, edited by Werner Wolf and Walter Bernhart, 91–128. Amsterdam: Rodopi, 2007.

Oatley, Keith. "Fiction: Simulation of Social Worlds." *Trends in Cognitive Science* 20, no. 8 (2016): 618–628.

Ompteda, Georg Freiherr von. *Maria da Caza*. 1901. Projekt Gutenberg-DE, 2023. Accessed May 2024. https://www.projekt-gutenberg.org/ompteda/maria/chap01.html.

Oppermann, Heinrich Albert. *Hundert Jahre*. 1870. Projekt Gutenberg-DE, 2023. Accessed May 2024. https://www.projekt-gutenberg.org/opperman/100jahre/100jahre.html.

Ouyang, Jessica and McKeown, Kathleen. "Modeling Reportable Events as Turning Points in Narrative". In: Proceedings of the 2015 Conference on Empirical Methods in Natural Language Processing. Lisbon: Association for Computational Linguistics, 2015, pp. 2149–2158.

Palmer, Alan. *Fictional Minds*. Lincoln: University of Nebraska Press, 2004.

Palti, Elías. "Koselleck—Foucault: The Birth and Death of Philosophy of History". *Philosophy of Globalization*, edited by Concha Roldán, Daniel Brauer and Johannes Rohbeck, Berlin, Boston: De Gruyter, 2018, pp. 409-422. https://doi.org/10.1515/9783110492415-030.

Pettersson, Bo. *How Literary Worlds Are Shaped: A Comparative Poetics of Literary Imagination.* Berlin: De Gruyter, 2016. https://doi.org/10.1515/9783110486315.

Peng Qi, Yuhao Zhang, Yuhui Zhang, Jason Bolton and Christopher D. Manning, "Stanza: A Python Natural Language Processing Toolkit for Many Human Languages", in: *Association for Computational Linguistics (ACL) System Demonstrations* (2020).

Phelan, James; Rabinowitz Peter J. "Narrative Worlds: Space, Setting, Perspective." In *Narrative Theory: Core Concepts and Critical Debates*, ed. Herman et al., 84–97. Columbus: Ohio State University Press, 2012.

Piatti, Barbara. *Die Geographie der Literatur Schauplätze, Handlungsräume, Raumphantasien.* Wallstein: Göttingen, 2008.

Piper, Andrew. Enumerations: Data and Literary Study. Chicago: The University of Chicago Press, 2019.

—. “Think Small: On Literary Modeling.” *PMLA* 132.3 (2017): 651-658.

—. “Novel Devotions: Conversional Reading, Computational Modeling, and the Modern Novel.” New Literary History 46, no. 1 (2015): 63–98.

Piper, Andrew; Bagga, Sunyam: “A Quantitative Study of Fictional Things.” CEUR Workshop Proceedings, Belgium, 2022a, pp. 268-279.

—. “Toward a Data-Driven Theory of Narrativity.” *New Literary History* 54.1, 2022b: 879-901.

Piper, Andrew; Xu, Hao; Kolaczyk, Eric D.: Modeling Narrative Revelation. In: CEUR Workshop Proceedings, France 2023, pp. 500-511.

Polaschegg, Andrea. *Der Anfang Des Ganzen : Eine Medientheorie Der Literatur Als Verlaufskunst*. Gottingen: Wallstein Verlag, 2020. http://public.eblib.com/choice/PublicFullRecord.aspx?p=6210660.

Propp, Vladimir. Morphology of the Folktale. 2nd edn. Trans. Laurence Scott. Austin: University of Texas Press, 1968[1928].

Prince, Gerald. *Narratology: The Form and Functioning of Narrative.* Berlin: De Gruyter Mouton, 1982. https://doi.org/10.1515/9783110838626.
Prince, Gerald: A Dictionary of Narratology. 2nd ed. Lincoln: University of Nebraska Press, 2003.

Projekt Gutenberg DE. Digitale Edition. *Projekt Gutenberg-DE*. 2023, https://www.projekt-gutenberg.org/.

Pyrhönen, Heta. “Genre.” In *The Cambridge Companion to Narrative*, edited by David Herman, 109–126. Cambridge: Cambridge University Press, 2007.

Radak T, Burnard L, Francois P, Hilger A, Jannidis F, Palkó G, Patras R, Preminger M, Santos D, Schöch C. Towards a computational history of modernism in European literary history: Mapping the Inner Lives of Characters in the European Novel (1840-1920). Open Res Eur. 2024.

Richardson, Brian. Introduction: Narrative Beginnings. In Richardson, B., editor, Narrative University of Nebraska Press, Lincoln, 2008.

Ricœur, Paul. *Time and Narrative*. Translated by Kathleen McLaughlin and David Pellauer. Chicago: University of Chicago Press, 1988.

Rilke, Rainer Maria, and Hansgeorg Schmidt-Bergmann. *Die Aufzeichnungen Des Malte Laurids Brigge*. Originalausg., 1. Aufl. Frankfurt: Suhrkamp, 2000.

Rilke, Rainer Maria, *The Notebooks of Malte Laurids Brigge*. Translated by Edward A Snow. First ed. New York: W. W. Norton & Company, 2023.

Ritter, Alexander. *Landschaft Und Raum in Der Erzählkunst*. Darmstadt: Wissenschaftliche Buchgesellschaft [Abt. Verl.], 1975.

Robert, Marthe, and Wyley L. Powell. "The Grimm Brothers". Yale French Studies 43, 1969, pp. 44–56. https://doi.org/10.2307/2929635.

Rodenberg, Julius. *Ein Herbst in Wales*. 1858. Projekt Gutenberg-DE 2023. Accessed June 5, 2024. https://www.projekt-gutenberg.org/rodenber/wales/wales.html

Romagnolo, Catherine. Opening Acts: Narrative Beginnings in Twentieth-Century Feminist Fiction. Lincoln: University of Nebraska Press, 2015. http://site.ebrary.com/id/11090870.

Ronen, Ruth. (1997). ‘‘Description, Narrative and Representation.’’ Narrative 5(3), 274–86.

Roth, Joseph. *Hotel Savoy.* 1924. Projekt Gutenberg-DE. Accessed May 10, 2024. https://www.projekt-gutenberg.org/roth/savoy/savoy.html.

Ryan, Marie-Laure, "Cognitive Maps and the Construction of Narrative Space," in Narrative Theory and the Cognitive Sciences, ed. David Herman, Stanford, CA: Center for the Study of Language and Information, 2003.

—. *Toward a Definition of Narrative.* In *The Cambridge Companion to Narrative*, edited by David Herman, 22–38. Cambridge: Cambridge University Press, 2007.

—. *Narration in Various Media.* In *The Living Handbook of Narratology*, edited by Peter Hühn, John Pier, Wolf Schmid, and Jörg Schönert. Hamburg: Hamburg University, 2012a. Accessed May 2, 2024. https://www.lhn.uni-hamburg.de/node/53.html.

—. *Possible Worlds.* In *The Living Handbook of Narratology*, edited by Peter Hühn, John Pier, Wolf Schmid, and Jörg Schönert. Hamburg: Hamburg University, 2012b. Accessed May 2, 2024. https://www.lhn.uni-hamburg.de/node/54.html.

Ryan, Marie-Laure, Kenneth E. Foote, and Maoz Azaryahu. *Narrating Space/Spatializing Narrative: Where Narrative Theory and Geography Meet.* Columbus: Ohio State University Press, 2016.

Sandeep Soni, Amanpreet Sihra, Elizabeth Evans, Matthew Wilkens, and David Bamman: Grounding Characters and Places in Narrative Text. In: *Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, pages 11723–11736, Toronto, Canada. Association for Computational Linguistics, 2023.

Said, Edward W. *Beginnings: Intention and Method*. [1st English edition.]. London: Granta Books, 1997.

Scarry, Elaine. *Dreaming by the Book.* Princeton, NJ: Princeton University Press, 2001.

Schumacher, Mareike K. *Orte und Räume im Roman: Ein Beitrag zur digitalen Literaturwissenschaft.* Berlin and Heidelberg: Springer, 2023.

Schickele, René. *Das gelbe Haus*. 1940. Projekt Gutenberg-DE. Accessed May 10, 2023. https://www.projekt-gutenberg.org/schickel/gelbhaus/gelbhaus.html.

Schmidt, Amand F., and Chris Finan. "Linear Regression and the Normality Assumption." *Journal of Clinical Epidemiology* 98 (2018): 146–151.

Schnitzler, Arthur. *Der Weg ins Freie*. 1908. Projekt Gutenberg-DE. Accessed May 10, 2024. https://www.projekt-gutenberg.org/schnitzl/wegfreie/wegfreie.html.

—. *Flucht in die Finsternis.* 1931. Projekt Gutenberg-DE. Accessed May 10, 2024. https://www.projekt-gutenberg.org/schnitzl/flucht/flucht.html.

Simonsen, Kirsten, and Lasse Koefoed. *Geographies of Embodiment: Critical Phenomenology and the World of Strangers.* London: SAGE Publications, 2020.

Stanica, Miruna. "Bundles, Trunks, Magazines: Storage, Aperspectival Descriptions, and the Generation of Narrative." *Style* 48, no. 4 (2014): 513–528.

Stanzel, Franz Karl. *Theorie des Erzählens.* Göttingen: Vandenhoeck & Ruprecht, 1986.

Stifter, Adalbert. *Der Nachsommer*. 1857. Projekt Gutenberg-DE, 2023. Accessed May10, 2024. https://www.projekt-gutenberg.org/stifter/nachsomm/nachsomm.html.

—. *Granit*. 1853. Projekt Gutenberg-DE, 2023. Accessed May10, 2024. https://www.projekt-gutenberg.org/stifter/buntestn/bunte101.html.

Storm, Theodor. *Viola Tricolor*. 1874. Project Gutenberg eBook #8922, Release date: September 1, 2005. Accessed May10, 2024. https://www.gutenberg.org/ebooks/8922.

—. *Der Schimmelreiter.* 1888. Projekt Gutenberg-DE, 2013. Accessed May10, 2024. https://www.projekt-gutenberg.org/storm/schimmel/

Storm, Theodor, and James Wright. *The Rider on the White Horse: And Selected Stories*. New York: New York Review Books, 2009.

Ströker, Elisabeth. *Investigations in Philosophy of Space.* Ohio: Ohio University Press, 1965.

Tenen, Dennis Yi. “Toward a Computational Archaeology of Fictional Space.” *New Literary History* 49, no. 1 (2018): 119–147.

Tieck, Ludwig. *Der Runenberg.* Projekt Gutenberg-DE, 2013. Accessed June 10, 2024. https://www.projekt-gutenberg.org/tieck/runenbrg/runenbrg.html.

Tieck, Ludwig, and James Anthony Froude. *Tales from the “Phantasus,” Etc. Of Ludwig Tieck*. London: James Burns, 1845. http://nrs.harvard.edu/urn-3:FHCL:12107354.

Toolan, Michael J. *Narrative: A Critical Linguistic Introduction.* London: Routledge, 2001.

Troscianko, Emily. *Kafka’s Cognitive Realism*. New York: Routledge, 2014.

Tversky, Barbara. “Multiple Models: In the Mind and in the World.” *Historical Social Research, Supplement* 31 (2018): 59–65. https://doi.org/10.12759/hsr.suppl.31.2018.59-65.

Underwood, Ted, and Jordan Sellers. "The ‘Longue Durée’ of Literary Prestige." *Modern Language Quarterly* 77, no. 3 (September 2016): 321–344. https://doi.org/10.1215/00267929-3570634.

Underwood, Ted, Patrick Kimutis, and Jessica Witte. “NovelTM Datasets for English-Language Fiction, 1700-2009.” *Journal of Cultural Analytics* 5, no. 2 (2020). https://doi.org/10.22148/001c.13147.

Varela, Francisco J., Evan Thompson, and Eleanor Rosch. *The Embodied Mind: Cognitive Science and Human Experience*. Revised edition. Cambridge, Massachusetts: The MIT Press, 2017.

Voß, Richard. *Die Mutter der Catonen*. 1889. Projekt Gutenberg-DE, 2023. Accessed May 10, 2023. https://www.projekt-gutenberg.org/vossr/mutterca/mutterca.html

Walsh, Richard. “Fictionality and Mimesis: Between Narrativity and Fictional Worlds.” *Narrative* 11, no. 1 (2003): 110–121.

—. “Beyond Fictional Worlds: Narrative and Spatial Cognition.” In *Emerging Vectors of Narratology*, edited by Per Krogh Hansen, John Pier, Philippe Roussin, and Wolf Schmid, 435–460. Berlin and Boston: De Gruyter, 2017.

Wassermann, Jakob. *Melusine*, 1896. Projekt Gutenberg-DE, 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/wasserma/melusin/melusin.html.

—. *Alexander in Babylon*, 1905. Projekt Gutenberg-DE, 2023. Accessed May 10, 2024. https://www.projekt-gutenberg.org/wasserma/babylon

—. *Lukardis*. 1920. Projekt Gutenberg-DE. Accessed May 10, 2024. https://www.projekt-gutenberg.org/wasserma/lukardis

Watt, Ian P. *The Rise of the Novel: Studies in Defoe, Richardson, and Fielding.* Berkeley: University of California Press, 1964.

Weaver, Bruce L. *Novel Openers: First Sentences of 11,000 Fictional Works, Topically Arranged with Subject, Keyword, Author, and Title Indexing*. Jefferson, N.C.: McFarland & Co., 1995.

Wichert, Ernst. *Ansas und Grita*. 1881. Projekt Gutenberg-DE. Accessed May 10, 2024. https://www.projekt-gutenberg.org/wichert/ansas/ansas.html.

Wilkens, Matthew. "Too Isolated, Too Insular: American Literature and the World." *Journal of Cultural Analytics* 6 (3), 2021. https://doi.org/10.22148/001c.25273.

Wilkens, M., Evans, E. F., Soni, S., Bamman, D. & Piper, A., (2024) "Small Worlds: Measuring the Mobility of Characters in English-Language Fiction", *Journal of Computational Literary Studies* 3(1), 1-16. doi: https://doi.org/10.48694/jcls.3917.

Wolzogen, Ernst von. *Die Gloria-Hose.* 1908. Projekt Gutenberg-DE. Accessed May 10, 2023. https://www.projekt-gutenberg.org/wolzogen/gloriahs/gloriahs.html

Zwaan, Rolf A. "The Immersed Experiencer: Toward an Embodied Theory of Language Comprehension." In *The Psychology of Learning and Motivation: Advances in Research and Theory*, edited by Brian H. Ross, 35–62. Vol. 44. Amsterdam: Elsevier Science, 2004.

Zwaan, Rolf A., and Carol J. Madden. "Embodied Sentence Comprehension." Chapter. In *Grounding Cognition: The Role of Perception and Action in Memory, Language, and Thinking*, edited by Diane Pecher and Rolf A. Zwaan, 224–45. Cambridge: Cambridge University Press, 2005.