Applying Self-Determination Theory to Further Our Understanding of Non-Suicidal Self-Injury

A. Ann Emery, M.A.

Department of Educational and Counselling Psychology

McGill University, Montreal

Ph.D. in School/Applied Child Psychology

September 2015

A thesis submitted to McGill University in partial fulfillment of the requirements of the degree of Doctor of Philosophy in School/Applied Child Psychology

Abstract

Self-determination theory (SDT; Deci & Ryan, 1985, 2000) is a theory of motivation, personality, and development that posits three basic psychological needs as essential nutrients for all humans' well-being and optimal functioning throughout the lifespan. Empirical evidence suggests that when the needs of autonomy, competence, and relatedness are satisfied via the social context, adaptive outcomes arise (Adie, Duda, & Ntoumanis, 2012; Milyavskaya & Koestner, 2011). Likewise, when satisfaction for needs is low, maladaptive outcomes and psychological ill-being result (Emery, Toste, & Heath, 2015). Non-suicidal self-injury is a clear indicator of psychological ill-being and maladaptive functioning. Considering the overlap between the SDT and NSSI literatures, the emphasis that SDT places on the social context and its inclusion of broad populations, self-determination theory may be a complementary framework with which to investigate and extend our knowledge of NSSI. Thus, the overarching goal of this dissertation is to apply a self-determination lens in order to further our understanding of NSSI. This dissertation is comprised of three manuscripts that contribute to the literature by demonstrating the value of acknowledging the role of distal environmental factors such as need satisfaction, along with more proximal intrapersonal factors, in NSSI engagement, ultimately showing the value of extending self-determination theory to the study of NSSI. The first manuscript examines the role of need satisfaction in differentiating young adults with (34 female, 6 male; *M*age = 20.10, *SD* = 1.66) and without a history of NSSI (42 female, 4 male; *M*age = 19.79, SD = 1.37), and in predicting NSSI engagement. Young adults who had a history of NSSI reported significantly lower levels of need satisfaction compared to young adults without a history of the behaviour. Furthermore, satisfaction of the need for competence significantly added to the prediction of NSSI history over and above the well-established NSSI correlate of

emotion dysregulation. The second manuscript investigates the role of need satisfaction in NSSI status and how perceived changes in need satisfaction over a 12-month period may influence NSSI onset and cessation. Young adolescents were classified into the NSSI Maintain (n = 30, 93% female), NSSI Start (n = 44, 80% female), NSSI Stop (n = 21, 62% female), or Control (n = 98, 80% female) groups based on NSSI status over the two time points. Participants in the NSSI Maintain and Start groups reported significantly lower levels of need satisfaction compared to participants in the Control group. Contrary to hypotheses, there was no significant group x time interaction. The influence of basic need satisfaction on NSSI onset, maintenance, and cessation is discussed. The third manuscript extends these findings to empirically evaluate a model built on SDT's tenets in young adolescents (N = 639, 53% female; M_{age} =13.38 years, SD = 0.51). Specifically, the study applies self-determination theory to examine a model whereby perceived parental autonomy support directly and indirectly affects NSSI engagement through difficulties in emotion regulation. Findings revealed significant direct effects of parental autonomy support and difficulties in emotion regulation on NSSI engagement, a direct effect of parental autonomy support on difficulties in emotion regulation, and difficulties in emotion regulation as a partial mediator between parental autonomy support and NSSI. The interplay of these variables and their effects on NSSI is discussed, as are the clinical implications of taking a self-determination theory perspective of NSSI.

Keywords: self-determination theory, needs satisfaction, non-suicidal self-injury

Résumé

La théorie de l'autodétermination (TAD; Deci & Ryan, 1985, 2000) est une théorie de la motivation, de la personnalité et du développement qui stipule qu'il y a trois besoins psychologiques fondamentaux qui sont essentiels au bien-être et au fonctionnement optimal des êtres humains tout au long de leur vie. Des données empiriques montrent qu'une sensation de bien-être se produit lorsque le besoin d'autonomie, le besoin de compétence et le besoin d'appartenance sociale sont satisfaits par le contexte social (Adie, Duda, & Ntoumanis, 2012; Milyavskaya & Koestner, 2011). En revanche, des troubles psychologiques et des comportements perturbateurs peuvent s'ensuivre lorsque ces besoins ne sont pas satisfaits (Emery, Toste, & Heath, 2015). L'automutilation non suicidaire (AMNS) est un indicateur de souffrance psychologique. Considérant que la littérature portant sur la TAD et sur l'AMNS se chevauche, et que la TDA met l'emphase sur le contexte social et inclut diverses populations, la théorie de l'autodétermination représente une approche complémentaire à l'étude de l'automutilation non suicidaire. Ainsi, l'objectif principal de cette thèse est d'utiliser les principes fondamentaux de la théorie de l'auto-détermination afin d'approfondir notre compréhension de l'automutilation non suicidaire. Cette thèse est composée de trois manuscrits qui contribuent à la littérature et démontre l'importance d'étudier les facteurs environnementaux distaux, tels que la satisfaction des besoins, et les facteurs intra-personnels proximaux, et leurs effets sur les comportements d'automutilation. Le premier manuscrit examine si la satisfaction des besoins fondamentaux différencie les jeunes adultes s'étant déjà automutilés (34 femmes, 6 hommes; *M* âge = 20.10, *SD* = 1,66) et ceux n'ayant aucun passé d'AMNS (42 femmes, 4 hommes; *M* âge = 19,79, SD = 1.37). Les jeunes adultes s'étant déjà automutilés ont signalé des niveaux significativement plus faibles de la satisfaction des besoins comparativement aux jeunes adultes

n’ayant aucun passé d’AMNS. En outre, les résultats ont révélés que la satisfaction du besoin de compétence est un facteur prédicteur de l’automutilation au-delà de la maitrise des émotions, suggérant ainsi que la TAD représente une approche supplémentaire pour étudier et conceptualiser l’AMNS. Le deuxième manuscrit examine l’influence des changements dans la satisfaction des besoins pendant 12 mois sur l’AMNS. Les jeunes adolescents ont été classés dans les groupes AMNS-Maintenance (*n* = 30, 93% de femmes), AMNS-Initiation (*n* = 44, 80% de femmes), AMNS-Arrêt (*n* = 21, 62% de femmes), ou Comparaison (*n* = 98, 80 % de femmes) dépendamment de la présence ou absence d’automutilation au deux moments de l'étude. Les participants du groupe AMNS-Maintenance et Initiation ont signalé des niveaux significativement plus faibles de la satisfaction des besoins par rapport aux participants du groupe de Comparaison. Contrairement à nos hypothèses, il n'y a eu aucune interaction significative entre les groupes et les moments de l’étude. Le troisième manuscrit évalue empiriquement un modèle reposant sur les principes du TAD chez les jeunes adolescents (N = 639, 53% de femmes; M_{age} = 13,38 années, SD = 0,51). Les résultats ont révélé que le soutien parental à l'autonomie et la maitrise des émotions ont un effet direct sur l'AMNS. De plus, le soutien parental à l'autonomie a un effet direct sur la maitrise des émotions. Finalement, la maitrise des émotions agit comme un médiateur partiel entre le soutien parental à l'autonomie et l'automutilation non suicidaire. L'interaction entre ces variables et leurs effets sur l'automutilation non suicidaire sont discutés.

Mots-clés: théorie de l'autodétermination, la satisfaction des besoins, l'automutilation non suicidaire

Acknowledgments

It is a pleasure to have the opportunity to formally thank the many individuals who contributed to this dissertation. First and foremost, I would like to extend my deepest gratitude to my graduate supervisor Dr. Nancy Heath. I consider myself absolutely fortunate to have had Dr. Heath as a mentor and coach. Her expertise, her drive, her consistency, her expectations, her investment, and her support, have spurred my academic, professional, and personal development over the past five years. I am also grateful to Dr. Jessica Toste for her friendship and mentorship even after she had left to pursue her own busy and successful academic career. I would like to extend my sincere appreciation to the members of my committee, Dr. Maria Rogers and Dr. Victoria Talwar for their critical insight and enthusiastic support throughout the dissertation process.

To those members of the Heath Lab who were an essential part of the data collection for this program of research – Dr. Jamie Duggan, Alyssa Baxter, Rick Noble, Michael Sornberger, and Melanie Jolie; thank you for your support, your dedication, and your friendship. I have fond memories of dragging rolling bags stacked full of questionnaires up icy Peel Street, through throngs of commuters on the metro, and out of car trunks after driving an hour out of town before dawn broke. The only reason that these memories are fond is because of the wonderful team that I shared them with. I want to also thank the present Heath Lab members who continue to foster this warm, collaborative, and productive team environment and who have supported me throughout this process: Amy Shapiro, Melissa De Riggi, Dana Carsley, Maryam Gholamrezaei, Melissa Stern, Samira Moumne, and Jessica Mettler. I want to especially thank Devin Mills for his integral collaboration in this research and for the humour, positivity, and kindness that he

brings with him. I am also grateful to my good friend Natalia Manay for commiserating and celebrating with me the many ups and downs that come with the process.

I am extremely fortunate to have the complete support of my husband, who in many ways has had to place life plans on hold while I pursue my degree. Ryan, I promise you retirement well before my own, not just because you are significantly older than me, but because you have been gainfully employed while I continued to cruise the student circuit. I am lucky to have two amazing mothers in law who have helped me significantly to achieve my goal. Sue, without your car there would be no data, and Laurie, without your SPSS there would be no data analyses. Along with their unconditional support and meals to go, my mothers in law, and my mother took care of our daughter throughout the summer so that I would be able to write; for this I am so appreciative. I am equally grateful to my father and step-mother who have held me accountable along the way and have celebrated every success, big and small.

I would like to acknowledge the many teachers and principles who interrupted their lessons and who took time out of their busy schedules to move forward this research program. I would especially like to thank the University and high school students who completed questionnaires and interviews. I would finally like to acknowledge the financial support of a research grant awarded to myself and a fellowship awarded to Dr. Nancy Heath by the Social Sciences and Humanities Research Council that made this research and my progress in the program possible. I would like to dedicate this dissertation to my daughter, Claire, who encapsulates my motivation.

Statement of Authorship

The projects described in this dissertation were first authored by myself and co-authored in various capacities by Dr. Nancy Heath, Dr. Maria Rogers, and Mr. Devin Mills. I was the originator of all concepts, research questions, and overarching conceptual framework for all three studies. With respect to Manuscript 1, I utilized an Dr. Nancy Heath's existing database and was responsible for all data analyses and writing. Dr. Nancy Heath and Mr. Devin Mills advised me throughout these processes.

With regards to Manuscripts 2 and 3, myself and Dr. Nancy Heath coordinated and managed the data collection and the data was collected by myself and members of the Heath Research team over a two-year period. As first author on both manuscripts, I was responsible for data analyses and writing, and Drs. Nancy Heath and Maria Rogers advised me through this process. Co-authorship on this thesis is in accordance McGill's Graduate and Postdoctoral Studies Thesis Guidelines. All three manuscripts have been submitted for publication.

Table of Contents

List of Tables and Figures

Manuscript 1

Manuscript 2

Manuscript 3

List of Appendices

Introduction

Non-suicidal self-injury (NSSI) is a public health concern that is affecting adolescents and young adults at alarming rates (Garisch & Wilson, 2015; Swannell, Martin, Page, Hasking, & St John, 2014). Once thought only to exist among clinical populations, NSSI is now relatively common in the community with the vast majority of North American school professionals having had students who engaged in NSSI (Duggan, Heath, Toste, & Ross, 2011). This commonality is reflected in the popular media, where NSSI is depicted more and more (Whitlock, Purington, & Gershkovich, 2009). Although many functions and risk factors have been associated with NSSI engagement, emotion regulation is one of the most documented functions of NSSI and difficulties with emotion regulation is the most empirically supported precursor to NSSI initiation (e.g., Andover & Morris, 2014; Klonsky, 2007a; Perez, Venta, Garnaat, & Sharp, 2012). That is, most often individuals engage in NSSI in order to alleviate intense and overwhelming negative emotions and, it follows that, those individuals who self-injure also report trait deficits in emotion regulation (e.g., Duggan, Heath, & Hu, 2015; Voon, Hasking, & Martin, 2014). The understanding of NSSI as a tool to escape, manage, or regulate emotions is a common thread running through theoretical perspectives of NSSI (See Andover & Morris, 2014, for a review). Although these theories have received empirical support and have guided an abundance of research programs (e.g., Anderson & Crowther, 2012; Garisch & Wilson, 2015; Hankin & Abela, 2011; Yurkowski et al., 2015), they may not place enough emphasis on more distal environmental factors and are not always relevant to the nonclinical populations to which they are applied.

Self-Determination Theory

Self-determination theory (SDT; Deci & Ryan, 1985, 2008; Ryan & Deci, 2000, 2013) is a theory of motivation, personality, and development that places the environment as central to the growth and mastery of all humans. Basic psychological needs theory (BPNT), a mini theory within the formal self-determination theory, outlines three universal, innate needs that serve as the avenue through which the social context influences development throughout the lifespan: autonomy, competence, and relatedness. BPNT posits that all three needs are essential; when they are fulfilled via the social context, an individual is in the position to maintain optimal functioning and achieve positive personal growth. However, when any one need is thwarted, an individual's overall well-being and psychological health are at risk (Ryan & Deci, 2000). Empirical research has consistently supported this tenet (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Howell, Chenot, Hill, & Howell, 2011; Milyavskaya & Koestner, 2011; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) and BPNT has provided a useful framework for understanding both adaptive and maladaptive behaviours (e.g., Adie, Duda, & Ntoumanis, 2012; Emery, Toste, & Heath, 2015; Meyer, Enström, Harstveit, Bowles, & Beevers, 2007).

Although SDT has never been directly applied to further our understanding of NSSI, it has been useful in guiding research on the empirically supported related constructs of suicidal ideation, depression, and difficulties in emotion regulation (Brenning, Soenens, Van Petegem, & Vansteenkiste, 2015; Bureau, Mageau, Vallerand, Rousseau, & Otis, 2012; Emery et al., 2015; Roth, Assor, Niemiec, Ryan, & Deci, 2009; Van der Giessen, Branje, & Meeus, 2014; Véronneau, Koestner, & Abela, 2005). Moreover, within the field of NSSI, although the role of lowered satisfaction of the needs for autonomy, competence, and relatedness has not been examined directly, many NSSI correlates such as parental control, self-esteem, and support, are

conceptually related to the three basic needs (e.g. Baetens et al., 2014; Plener, Schumacher, Munz, & Groschwitz, 2015; Tschan, Schmid, & In-Albon, 2015). Considering these overlaps in the SDT and NSSI literature, it makes sense that SDT would be complementary to emotion-regulation based models of NSSI. Furthermore, SDT offers a well-founded empirical framework that makes predictions for all of humanity and emphasizes the social context; aspects that may be of particular importance in view of the high prevalence rates in community samples and the many starts and stops that contribute to the cyclical nature of NSSI (Walsh, 2006). The theory also provides a wealth of research avenues and may help to inform much needed therapeutic intervention and prevention efforts.

Proposed Research

Currently, there is significant overlap between the SDT and NSSI fields suggesting that SDT may be a useful theory to extend our knowledge and conceptualization of NSSI, however this application has yet to be empirically or theoretically examined. The overall objective of the current program of research is to apply self-determination theory in order to broaden our understanding of NSSI. This program of research is comprised of three manuscripts. Although each of these three studies is presented in separate manuscripts, they represent a continuous line of inquiry extending self-determination theory to expand current conceptualizations and understandings of NSSI. Study 1 will examine the relationship between basic psychological needs, emotion dysregulation, and NSSI in young adults. After examining the role of reported satisfaction of autonomy, competence, and relatedness in the NSSI engagement of young adults, the second study extends this research to the developmental period of adolescence, which corresponds to the time of highest risk for NSSI. Study 2 will examine group differences in reported need satisfaction as a function of NSSI status and how changes in the satisfaction of

autonomy, competence, and relatedness over time may correspond to changes in NSSI onset and cessation. The next step in this line of inquiry is to examine empirically a model of NSSI based on SDT's tenets. Study 3 will build upon Studies 1 and 2 by examining how perceived parental autonomy support influences NSSI engagement directly and indirectly through emotion regulation.

The three related manuscripts are presented in Chapters 2, 3, and 4, and each include an introduction and literature review, as well as methods, results, and discussion sections. A bridging manuscripts section is included between Chapters 2 and 3 and between Chapters 3 and 4 to detail the link between studies. The dissertation begins with a comprehensive review of the literature (Chapter 1) and ends with a conclusion (Chapter 5) that summarizes and integrates the findings from the three studies. As each study is built upon a similar overarching objective, there is a small degree of repetitiveness in the introductions and methods of the otherwise independent studies that make up this program of research. This dissertation was written in accordance with the guidelines established by the Faculty of Graduate and Postdoctoral Studies at McGill University.

CHAPTER 1

Review of Literature

Non-Suicidal Self-Injury: Definition, Prevalence, and Course

Non-suicidal self-injury (NSSI) can be understood as the deliberate and self-inflicted destruction of body tissue without suicidal intent and for purposes that are not culturally sanctioned (American Psychiatric Association, 2013). Methods include but are not limited to: skin cutting, burning, scratching, picking or interfering with wound healing, and punching oneself to cause bruising (e.g., Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007; Nock, 2010; Ross & Heath, 2002) The most common methods of NSSI are: cutting, which include scratching, scraping, or carving often inflicted with a knife, needle, razor, or other sharp object; burning; hitting; and biting to the point of leaving a mark or drawing blood (Klonsky, 2007b; Klonsky, Muehlenkamp, Lewis, & Walsh, 2011; Rodham & Hawton, 2009). Until more recently, NSSI was viewed solely as a symptom of a psychiatric disorder. However, NSSI occurs across many disorders and in otherwise typically developing individuals, leading researchers to conceptualize NSSI as a harmful behaviour unto itself and to push for NSSI to be classified as a disorder (Nock, 2009). This change in thinking has been reflected in Diagnostic and Statistical Manual revisions. In past versions of the Diagnostic and Statistical Manual (DSM-IV-TR; American Psychiatric Association, 2000) NSSI was included as a criteria of Borderline Personality Disorder (BPD), whereas in the current Diagnostic and Statistical Manual (DSM-5; American Psychiatric Association, 2013) NSSI is listed as a "condition requiring further study." This DSM reframing has recently been supported with research showing that NSSI occurred independently from BPD in a group of adolescent psychiatric patients, with overlap between the two disorders equal to overlap between BPD and other Axis I diagnoses (Glenn & Klonsky, 2013). These

results lend support to the view that NSSI is a disorder unto itself and should be classified as a distinct diagnostic entity.

Issues around defining NSSI have been one of the greatest obstacles to the literature (Nock, 2010). Labels such as non-suicidal self-injury, parasuicide, self-harm, deliberate self-harm, self-injury, self-carving, wrist-cutters syndrome, and self-mutilation were used interchangeably and became enmeshed, leading to a wide range of behaviours studied that may not always fall under the NSSI definition as is understood today. Furthermore, early research in the area neglected to differentiate between self-injurious behaviours with and without suicide attempt (Nixon & Heath, 2009). While NSSI is related to suicide and suicidal behaviours (Hawton et al., 2012; Victor, Styer, & Washburn, 2015), researchers agree that it is a separate phenomenon. Intent, lethality, frequency of the behaviour, methodology, levels of physiological pain, functions, and treatment approaches, differ substantially between NSSI and suicidal behaviours that may fall under the broader definition of deliberate self-harm; thus, it is essential to emphasize the distinction between terms (Lofthouse, Muehlenkamp, & Adler, 2009; Nock, 2010; Plener et al., 2015). Although the debate over what to call different self-harm behaviours has for the most part been resolved in the literature, issues over how to operationalize NSSI still loom (Nock, 2012). For example, participants may or may not be considered to engage in NSSI based on frequency and time frame of the behaviour and what constitutes tissue damage may be a subjective decision on the part of the researcher. This overlapping and lack of operalization has led to difficulties in terms of comparisons of prevalence rates, understanding specific correlates and predictors, as well as planning and evaluating effective interventions (Nixon & Heath, 2009; Nock, 2012). Researchers must pay close attention when drawing conclusions to

tease apart studies using measures that fit the narrow definition and studies that have included a wider array of self-harm behaviours with or without suicidal intent.

These complexities surrounding the definition of NSSI along with other methodological issues such as sample selection, study setting, and the way in which participants are questioned regarding their NSSI may explain why NSSI prevalence rates vary widely from one study to the next (Heath, Schaub, Holly, & Nixon, 2009; Swannell et al., 2014). Lifetime prevalence in clinical samples range from 38% to 82% among adolescents (Nixon, Cloutier, & Aggarwal, 2002; Nock & Prinstein, 2004) and 21% to 65% among adults (Briere & Gil, 1998; Claes, Vandereycken, & Vertommen, 2007). Lifetime rates of occurrence among community samples range from 13% to 48% among adolescents (e.g., Garisch & Wilson, 2015; Hankin & Abela, 2011;Heath, Toste, Nedecheva, & Charlebois, 2008 Klonsky & Muehlenkamp 2007; Lloyd-Richardson et al., 2007; Nock, 2009; Plener, Libal, Keller, Fegert, & Muehlenkamp, 2009; Yates, Tracy, & Luthar, 2008), and 12% to 20% among young adults (Heath et al., 2008;Whitlock, Eckenrode, & Silverman, 2006). Past year prevalence rates in adolescent community samples range from 7% to 12% (e.g., Andrews, Martin, Hasking, & Page, 2013; Duggan et al., 2015; Hankin & Abela, 2011; Tatnell, Kelada, Hasking, & Martin, 2014). Results from a recent meta-analysis found that after controlling for methodological differences across studies conducted in community samples, 17.2 % of adolescents and 13.4% of young adults report ever having engaged in NSSI (Swannell et al., 2014). Whereas reviews suggest that NSSI rates have remained stable over the past five years (Muehlenkamp, Claes, Havertape, & Plener, 2012), the frequency with which NSSI is discussed and portrayed in the media has increased (Whitlock et al., 2009).

Although these rates differ dramatically, even after methodological differences are controlled for, they suggest that NSSI is occurring at alarming rates and is not limited only to clinical cases. In terms of the course of NSSI, adolescence and young adulthood represent developmental periods that are particularly sensitive to the emergence, maintenance, and the cessation of the behaviour. Retrospective reports in community populations indicate that engagement in NSSI commonly begins in early to mid-adolescence, between the ages of 11 to 15 years (Heath et al., 2009; Jacobson & Gould, 2007; Nixon & Heath, 2009; Nixon et al., 2002; Nock & Prinstein, 2005; Plener et al., 2015; Rodham & Hawton, 2009; Ross & Heath, 2002). However, NSSI can begin at any age, with 7% of self-injurers reporting that they began NSSI before age 10, 70% reporting starting in mid-adolescence, and 23% reporting starting in young-adulthood (Whitlock, 2011). Research from community samples suggests that the course of NSSI typically lasts from two to four years (Whitlock & Selekman, 2014). During this time, NSSI behaviour is often cyclical with individuals reporting weeks, months, and sometimes years between episodes (Walsh, 2006). This cyclical nature of NSSI may make it difficult for researchers to make true comparisons between individuals who have stopped NSSI and individuals who are currently engaging in the behaviour. While some studies suggest differences in negative emotions, depressive symptoms, coping strategies, emotion regulation strategies, life satisfaction, self-esteem, and social support between participants who indicate that they currently engage in NSSI and participants who indicate that they have stopped the behaviour (Rotolone & Martin, 2012; Taliaferro & Muehelnkamp, 2014; Whitlock, Prussien, & Pietrusza, 2015), other research findings show no such differences (Brown, Williams, & Collins, 2007). Most research in the field assesses lifetime history of NSSI rather than current incidents, and it is not until more

recently that participants have been differentiated by current NSSI status to examine influences on NSSI onset and cessation (Taliaferro & Muehelnkamp, 2014).

Studies examining gender differences on the prevalence rate of NSSI within community samples of adolescents have been inconsistent. Some studies have found a higher prevalence of NSSI among females (e.g., Laye-Gindhu & Schonert-Reichl, 2005; Muehlenkamp & Gutierrez, 2007; Muehlenkamp et al., 2009; Nixon et al., 2008; Plener et al., 2009; Ross & Heath, 2002; Yates et al., 2008) while others suggest that this gender gap may be narrower (e.g., Claes, Houben, Vandereycken, & Bijttebier, 2010; Lloyd-Richardson et al., 2007; Muehlenkamp & Gutierrez, 2004; Zoroglu et al., 2003). There is more likely to be a significant gender difference in terms of prevalence of NSSI in clinical samples (Jacobson, Muehlenkamp, Miller, & Turner, 2008), however, this difference may likely be attributed to the fact that females are more prone to help seeking than males and that deliberate self-harm is often measured instead of NSSI. Deliberate self-harm includes overdose and inappropriate ingestion of medication without suicide intent, both behaviours which women are far more likely to engage in than men (Briere & Gil, 1998). In community samples this gender difference is also observed when the broader deliberate self-harm definition is applied, however, when investigations are limited to cutting, burning, self-hitting to bruise or other tissue damage acknowledged under the definition of NSSI, large gender differences are not found (Lloyd-Richardson et al., 2007).

Whereas lifetime prevalence of NSSI may not differ significantly between males and females, findings in clinical and community settings suggest that gender differences exist in NSSI methodology and body location. Males are more likely to report self-burning or hitting on the chest and face, whereas females are more likely to report cutting on areas such as the arms and legs (Claes et al., 2007; Heath et al., 2008; Laye-Gindhu & Schonert-Reichl, 2005;

Sornberger, Heath, Toste, & McLouth, 2010). Therefore, NSSI may not necessarily be a predominantly female behaviour, rather, the types and location of self-injury seem to differ by gender.

Although many functions and risk factors have been associated with NSSI engagement, emotion regulation is the most documented function of NSSI and difficulties with emotion regulation is one of the most empirically supported precursors to NSSI initiation (e.g., Andover & Morris, 2014; Klonsky, 2007a; Perez et al., 2012).

Emotion Dysregulation

NSSI is considered an overdetermined behavior in that it may serve multiple functions simultaneously (Klonsky & Olino, 2008; Lloyd-Richardson, 2008; Prinstein, 2008). However, the majority of individuals who self-injure report that their NSSI primarily serves a function of intrapersonal negative reinforcement wherein overwhelming negative emotions are avoided and regulated through NSSI (Klonsky, 2007a). It follows that those individuals who engage in NSSI often report deficits in emotion regulation. Emotion regulation is a complex construct and there has been debate as to how to operationally define and comprehensively measure its intricacies (see Gratz & Roemer, 2004; Gross & Barrett, 2011; Gross & Jazaieri, 2014). Within the NSSI literature, most empirical studies examining emotion regulation employ the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) as a measurement tool (Andover & Morris, 2014). The DERS was structured and validated based on Gratz and Roemer's (2004) conceptualization of emotion regulation as:

> Involving the (a) awareness and understanding of emotions, (b) acceptance of emotions, (c), ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions, and (d) ability to use situationally appropriate

> emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands. (pp. 42-43)

Emotion dysregulation occurs when all or some of these abilities are impaired in an individual**.** Research in both clinical and community settings shows increased difficulties in emotion regulation among individuals who engage in NSSI. Self-reports of emotion dysregulation employing the DERS reliably differentiate between those with a history of NSSI and those without (Gratz, Breetz, & Tull, 2010; Gratz & Chapman, 2007; Gratz & Roemer, 2008). Increased emotion dysregulation has also been associated with increases in the frequency with which one self-injures (Adrian, Zeman, Erdley, Lisa, & Sim, 2011; Gratz & Chapman, 2007; Jenkins & Schmitz, 2012).

The understanding of NSSI as a tool to escape, manage, or regulate emotions is a common theme among many theoretical perspectives of NSSI (See Andover & Morris, 2014 for a review). Linehan's (1993) biosocial model stems from the Borderline Personality Disorder population and views emotion regulation deficits resulting from invalidating family environments in which children do not feel allowed to express negative emotions. Without ever having learned how to adaptively express and regulate emotions, NSSI becomes an alternative maladaptive option. The experiential avoidance model (Chapman, Gratz, & Brown, 2006) of NSSI posits that when an emotionally evocative event occurs, this external stimuli triggers an emotionally aversive internal response. The individual engages in NSSI to eliminate or reduce emotional arousal and thus, the behavior is negatively reinforced. More recently, Nock's (2009) conceptual model of NSSI suggests that individuals develop inter and intrapersonal vulnerabilities that predispose them to respond to stressful events with emotion dysregulation, creating a need for NSSI to self-regulate.

These models offer strong frameworks under which to conceptualize NSSI onset and maintenance and have guided research that has progressed the field (e.g., Anderson & Crowther, 2012; Hankin & Abela, 2011; Yurkowski et al., 2015). However, while these models place much emphasis on emotion regulation, less attention is given to outlining the role of the environmental stressors that may precipitate emotional arousal. Considering the cyclical nature of NSSI, that is, individuals often have many lapses between NSSI episodes that may last from weeks to months to years (Walsh, 2006), it is likely that the social context one finds themselves in plays a key role in the waxing and waning of NSSI behaviour. Furthermore, in light of the high prevalence rates of NSSI outside of clinical samples, a theory that makes broad predictions throughout the lifespan may give further insight into NSSI behaviour within community settings. Finally, the field of NSSI would benefit from the application of a widely accepted theoretical framework to guide further research and therapeutic intervention and prevention efforts.

Self-Determination Theory

Self-determination theory (SDT; Deci & Ryan, 1985, 2008; Ryan & Deci, 2000) may be a good candidate to complement existing models of NSSI etiology, maintenance, and cessation and to further our understanding of the behaviour. First, SDT's emphasis on the responsibility of the social context in promoting versus thwarting self-fulfilment and optimal functioning could give added insight into fluctuations in NSSI behaviour. Second, SDT makes predictions for all humans across the lifespan; a relevant element considering the high prevalence rates of NSSI documented among community adolescents and young adults. Certainly, although SDT has never been directly applied to NSSI, as further discussed below, there is much overlap between the two fields, suggesting that SDT would hold particularly valuable explanatory power if extended to the study of NSSI.

Self-determination theory (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000) is an organismic approach built on the assumption that people are actively involved in their own development with evolved tendencies towards growth and mastery. Basic psychological needs theory (BPNT), a mini theory within the formal self-determination theory, outlines three universal, innate needs that serve as the avenue through which the social context influences development throughout the lifespan: autonomy, competence, and relatedness. Autonomy is seen as a deep evolutionary based tendency for self-regulation of action and coherence in behavioural aims (Ryan & Deci, 2000). Thus, when the need for autonomy is fulfilled, an individual is acting out of his or her own volition and in accordance with his or her personal values. Much basic psychological needs research has focused on autonomy support within the influential early caregiving environment (Joussemet, Landry, & Koestner, 2008; Koestner, Ryan, Bernieri, & Holt, 1984; Ryan & Deci, 2013). Autonomy as understood within self-determination theory as distinct from the more common intuitive concept of autonomy as individualism and separation; when parents support a child's need for autonomy, they are encouraging a child's capacity to be self-initiating. This has been operationalized in terms of four factors: (a) providing rationale and explanation for behavioural requests; (b) recognizing the feelings and perspective of the child; (c) offering choices and encouraging initiative; and, (d) minimizing the use of controlling techniques (Koestner et al., 1984). Based on this definition, autonomy is not synonymous with independence or breaking free from parental bonds; on the contrary, parental structure and involvement is seen as complementary to autonomy support (Joussement et al., 2008).

The need for competence reflects an individuals' innate enjoyment of learning for the sake of learning. The general tendency towards competence begins in infancy with early motor play, the manipulation of objects, and exploration of one's surroundings, and grows into

adulthood in the form of activities and practices that are challenging yet achievable (Ryan & Deci, 2000). It follows that when one's need for competence is fulfilled, feelings of self-efficacy and self-esteem may be at the center of more general feelings of well-being.

According to SDT, humans are social beings and have a need for deep and meaningful connections with close others, as well as a need for broader connections to society in general (Ryan & Deci, 2000). This need likely originated as an evolutionary strategy, as early human hunter-gatherers united with others in groups to increase the likelihood of survival (Stevens & Fiske, 1995). Our need for relatedness is satisfied when we experience social support and feel close to others (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000).

There has been much empirical evidence with developmentally diverse populations to support the association between satisfaction of intrinsic needs and various indices of psychological well-being, such as momentary happiness (Howell, et al., 2011), vitality, positive affect (Adie et al., 2012; Bartholomew et al., 2011; Milyavskaya & Koestner, 2011; Reis et al., 2000; Sheldon, Ryan, & Reis, 1996), self-esteem (Amarose, Anderson-Butcher, & Cooper, 2009; Heppner et al., 2008; Ilardi, Leone, Kasser, & Ryan, 1993), relationship functioning and quality (Patrick, Knee, Canevello, & Lonsbary, 2007), and security of attachment (La Guardia, Ryan, Couchman, & Deci, 2000). Furthermore, there is empirical evidence to suggest that when needs are not fulfilled, negative psychological consequences result such as unhappiness, dissatisfaction with life, lack of self-actualization (Meyer et al., 2007), disordered eating, burnout, depression, anxiety, negative affect, and physical symptoms (Baard, Deci, & Ryan, 2004; Bartholomew et al., 2011; Quested et al., 2011; Thogersen-Ntoumani, Ntoumanis, & Nikitaras, 2010).

Since its introduction, SDT and BPNT in particular, have guided prolific empirical research and have been applied to understand individual functioning, motivation, and well-being

in areas spanning education, health care, sports and exercise, relationships, and psychotherapy (e.g., Gunnell, Crocker, Wilson, Mack, & Zumbo, 2013; Halvari, Halvari, Bjørnebekk, & Deci, 2013; Pavey, Greitemeyer, & Sparks, 2011; Soenens, Sierens, Vansteenkiste, Goossens, & Dochy, 2012; Zuroff, Koestner, & Moskowitz, 2012). This immense and wide-ranging body of literature is a testament to the theory's utility in explaining and structuring research on a variety of individual behaviour. Suggesting that SDT may be a useful framework under which to conceptualize and further our understanding of NSSI, the theory has guided the investigation of constructs that are closely related to NSSI: suicidal ideation, depression, and emotion regulation.

SDT Applied to Suicidal Ideation

Although by definition, the act of NSSI excludes any suicidal intent, there has been consistent support in the literature showing that individuals who engage in NSSI are at higher risk for suicidal ideation and suicide attempts (Brausch & Gutierrez, 2010; Hamza et al., 2012; Martin et al., 2010; Zetterqvist, Lundh, & Svedin, 2013). Highlighting the significant overlap between NSSI and suicide attempts, Nock, Joiner Jr, Gordon, Lloyd-Richardson, and Prinstein (2006) found that 70% of their sample of inpatient adolescents with recent NSSI reported a lifetime history of at least one suicide attempt. Furthermore, for some, NSSI may serve an anti-suicide function, whereby engaging in actions of self-harm without the intent to die staves off actual suicidal impulses (Breen, Lewis, & Sutherland, 2013). Thus, although NSSI and suicidal ideation and attempts are distinct, there is evidence to suggest that the behaviours are related.

Applying self-determination theory to suicidal ideation, Bureau, Mageau, Vallerand, Rousseau, and Otis (2012), hypothesized that highly self-determined individuals (i.e., individuals who regulate their behaviours according to personal values and preferences) would be less vulnerable to suicidal ideation in the face of negative life events, as these individuals would be

more adept to cope with environmental stress. A sample of high school and college students was divided into a high self-determination group and a low self-determination group according to responses on the Global Motivation Scale (Guay, Mageau, & Vallerand, 2003). Using structural equation modeling, J. S. Bureau and colleagues concluded that self-determination moderated the direct and indirect effects of negative life events on suicidal ideation. Specifically, although negative life events were significantly correlated with hopelessness and suicidal ideation for both high and low self-determination groups, all coefficients were smaller for the high self-determination group than for the low self-determination group, indicating that the negative life events had a lower effect on suicidal ideation for those who were highly self-determined. Self-determination may, therefore, act as a protective factor against suicidal ideation.

Although J. S. Bureau and colleagues (2012) did not use an inventory that specifically measured the need for autonomy in their study, self-determination as operationalized in the Global Motivation Scale can be understood as synonymous with autonomy. An individual who is self-determined is acting in accordance with their values and interests, and thus, experiencing a sense of freedom and vitality (Ryan & Deci, 2000). This individual would also be experiencing high satisfaction of the need for autonomy. In contrast, an individual who is low on self-determination acts to achieve behavioural standards that are not self-endorsed but imposed by others (Grolnick & Raftery-Helmer, 2013; Ryan & Deci, 2000). This individual would be experiencing maladjustment and low satisfaction of the need for autonomy. Thus, autonomy and self-determination are intertwined constructs. As suicidal ideation and NSSI have been found to consistently overlap in individuals, J. S. Bureau and colleagues' findings suggest that self-determination theory, and the need for autonomy, in particular, may be key to understanding

NSSI engagement. Related to NSSI and to suicidal ideation are depressive symptoms, which SDT has also been applied to.

SDT Applied to Depressive Symptoms

The association between NSSI and depressive symptoms has been well-documented (e.g., Duggan et al., 2015; Garisch & Wilson, 2015; Hankin & Abela, 2011; Jacobson & Gould, 2007; Nock, Joiner Jr, Gordon, Lloyd-Richardson, & Prinstein, 2006; Plener et al., 2015). Although self-determination has not been directly applied to the understanding of NSSI, SDT has recently been extended to understand depressive symptoms in child and adolescent populations (Emery et al., 2015; Véronneau et al., 2005).

Véronneau, Koestner, and Abela (2005) were the first researchers to use reported levels of autonomy, competence, and relatedness as predictors of depressive symptoms among 135 third graders and 196 seventh graders. When examining the elementary and high school samples together, competence was found to be the only significant predictor of depressive symptoms. This predictive ability remained consistent, with the same effects being measured in the sample in a six-week follow-up. Furthermore, the researchers combined levels of autonomy, competence, and relatedness, in order to assess overall need satisfaction across contexts, finding that satisfaction at home and at school, but not with friends, were significant predictors of depressive symptoms.

Assessing the role of need fulfillment in depressive symptoms in two separate samples of children and adolescents, like Véronneau and colleagues (2005), Emery, Toste, and Heath (2015) found that low satisfaction of the need for competence was the only significant predictor of depressive symptoms in children. However, low satisfaction of the needs for autonomy and relatedness predicted depressive symptoms in the adolescent sample, while competence was not

significant. The authors argued that some needs may be particularly salient in relation to depressive symptoms at different developmental periods (Emery et al., 2015).

Associations between a lack of parental autonomy support and depressive symptoms in children and adolescents have been well-documented in cross-sectional research (La Guardia et al., 2000; Soenens, Park, Vansteenkiste, & Mouratidis, 2012; Soenens, Vansteenkiste, & Sierens, 2009). Recently, Van der Giessen et al. (2014) assessed 923 early adolescents and 390 middle adolescents on depressive symptoms and reports of parental autonomy support on five occasions over five years. Results of a cross-lagged path analysis revealed concurrent and longitudinal negative associations between participants' reports of parental autonomy support and depressive symptoms. This longitudinal design provided evidence of the SDT hypothesized effect of parental autonomy support on depressive symptoms over time. Together, these studies suggest that SDT is a good model under which to study the closely related NSSI construct of depressive symptoms. Research under the SDT umbrella has been informative in another construct closely related to NSSI: emotion dysregulation.

SDT Applied to Emotion Dysregulation

SDT describes three types of emotion regulation profiles: emotion suppression (when one is not aware, clear, or actively denies their emotions), emotion dysregulation (when one experiences their emotions as out of control), and emotion integration (when one is able to be aware and differentiate their emotions and to use adaptive strategies in how to express and control them) (Ryan, Deci, Grolnick, & LaGuardia, 2006). According to SDT, a lack of parental autonomy support leads children to either: (a) internalize requests and self-regulate but in an inflexible and pressured way (emotion suppression), leading to internalizing problems; or (b), reject parental requests and fail to self-regulate (emotion dysregulation), leading to externalizing

problems (Ryan et al., 2006). Indeed, this theoretical avenue has received some empirical support.

To investigate SDT's proposed links between parenting practices that support versus thwart autonomy, emotion regulation profiles, and adaptive and maladaptive outcomes, Roth et al. (2009) asked ninth graders and their teachers to complete measures of parental practices, emotion regulation, and academic engagement. Results of structural equation modeling supported SDT's tenets, finding that parenting practices that undermine autonomy predicted emotion suppression and dysregulation and corresponding grade-focused academic performance and academic disengagement in adolescents. Conversely, adolescents with autonomy supportive parents showed emotion integration and interest-focused academic engagement.

Building on these findings, Brenning et al. (2015) asked young adolescents to report on their perceived maternal autonomy support, emotion regulation, depressive symptoms, and self-esteem at two time points over a twelve-month period. Results of cross-lagged analyses revealed that maternal autonomy support was predictive of decreases in depressive symptoms, increases in self-esteem, and decreases in emotion suppression over time. Interestingly, autonomy support was not predictive of decreases in emotion dysregulation, but initial levels of emotion dysregulation predicted decreases in perceived maternal support over time, indicating that the direction of the relationship may not be as hypothesized. Testing for the mediating role of emotion regulation, results showed that the indirect path from autonomy support to self-esteem through emotion integration was not significant and that the indirect path from autonomy support to depressive symptoms through emotion suppression was marginally significant ($p = .06$). The authors argue that although findings pointed in the direction of a mediation model, the indirect effects may not have reached significance because of the conservative nature of the testing where

the effects of within time associations and initial levels of the variables were controlled for. Together, these studies lend some initial, although variable, support for SDT's proposed associations between parental autonomy support, emotion regulation, and adaptive and maladaptive outcomes.

Thus, although SDT has never been directly applied to further our understanding of NSSI, within the SDT literature, evidence suggests that the theoretical framework has informed our understanding of the NSSI related constructs of suicidal ideation, depression, and emotion dysregulation. It makes sense then that SDT may possibly lend structure and exploratory power to the study of NSSI. In the same vein, within the NSSI literature, satisfaction of the needs for autonomy, competence, and relatedness have not been explicitly examined in terms of their relation to NSSI, however, many of the documented NSSI risk and protective factors are conceptually related to SDT's three basic psychological needs.

Low Satisfaction of the Need for Autonomy as a Risk Factor for NSSI

Although SDT's need for autonomy has not been investigated as a risk factor for NSSI, research consistently suggests that parental practices that undermine autonomy, such as rigid values, parental criticism, perceived family invalidation, psychological control, and informational justice are associated with NSSI in youth (J. F. Bureau et al., 2010; Buser et al, 2012; Gratz, 2006; Gratz & Chapman, 2007; Halstead et al., 2012; Hamza & Willoughby, 2013; Martin et al., 2011; Saldias et al., 2013; Wedig & Nock, 2007; Wichstrom, 2009; Yates et al., 2008; You & Leung, 2012).

Halstead, Pavkov, Hecker, and Seliner (2012) examined the relationship between rigid family characteristics and self-injurious behaviours. Results revealed a significant positive correlation between duration of self-injury (calculated from the difference between participants'

age of onset and age at cessation) and rigid family characteristics. Also closely related to autonomy support, You and Leung (2012) examined the role of perceived family invalidation in the occurrence and repetition of NSSI among a very large (n = 4,782) community sample of Chinese adolescents over a two-year period. Results revealed that perceived family invalidation in the first year was significantly related to the occurrence of NSSI at Year 2. Parental criticism is another correlate similar to autonomy support that has received attention in the NSSI literature. In community samples of adolescents and young adults, researchers have found links between youth reports of parental criticism and the probability of engagement in NSSI, and NSSI frequency (Hamza & Willoughby, 2013; Wedig & Nock, 2007; Yates et al., 2008). Yates, Tracy, and Luthar (2008) examined developmental pathways by which parental criticism could contribute to NSSI in both a cross sectional and a longitudinal sample of upper middle class youth. Results revealed that reports of parental criticism predicted the initiation of NSSI in both samples and predicted the frequency of NSSI in boys. Perceived youth alienation from parents was a significant process underlying this pathway from parental criticism to NSSI. With a longitudinal sample, the directionality of this relationship could be tested, showing that perceived parental criticism in Grades 6 through to 8 increased the likelihood of engaging in NSSI six years later.

The idea of control is central to the basic psychological need for autonomy. In the NSSI literature, results generally have been mixed as to the importance of parental control as a risk factor for NSSI engagement. These mixed results may be in part due to the approach with which autonomy support is examined; where only one aspect of the larger construct is examined in isolation of its supporting parts. Paternal and maternal control was not significantly correlated with NSSI age of onset, number of methods, or duration in a sample of adult psychiatric

inpatients (Saldias et al., 2013). In a sample of 96 male undergraduate psychology students, Gratz and Chapman (2007) found that while physical abuse and emotion dysregulation predicted deliberate self-harm, parental control was not a significant predictor. Bureau and colleagues (2010) obtained similar results with a very large sample of male and female undergraduate psychology students. Parental control successfully discriminated between students who had a history of NSSI and students who did not report such behaviours. However, when parental control was entered among other dependent variables in a binary logistic regression predicting NSSI group membership, its relative contribution was not significant. The authors concluded that parental control may be an important factor in distinguishing those with and without NSSI only due to its correlation with other variables such as parental fear and alienation. Recently, Tschan et al. (2015) found that adolescents currently engaging in NSSI, adolescents without a history of NSSI but with other current diagnoses, and adolescents without clinical diagnoses did not significantly differ in their reports of maternal and paternal behavioural and psychological control.

In support of a link between parental control and NSSI, Gratz (2006) found that psychological control was significantly positively correlated with both the presence and the frequency of self-harm in a sample of female undergraduate psychology students. Similarly, in a large sample of Norwegian high school students, Wichstrom (2009) found that individuals who engaged in NSSI reported significantly higher levels of parental control compared to those who did not report such behaviours. Martin, Bureau, Cloutier, and Lafontaine (2011) compared three groups of undergraduate university students, those with no NSSI thoughts or actions, those with NSSI thoughts but without actions, and those with NSSI actions, on maternal and paternal control and a host of other invalidating family environmental characteristics. Results revealed

that both the NSSI-thoughts-only group and the NSSI-action group showed significantly higher levels of maternal control compared to students who did not think about or engage in NSSI. More recently, Baetens and colleagues (2014) found that preadolescents who had engaged in NSSI perceived more behavioural and psychological control from their parents compared to youth who did not report a history of the behaviour. Results of a logistic regression examining parent's reports of behavioural control and support on their children's NSSI engagement revealed a significant interaction effect such that the combination of high control and low support increased the odds of being classified in the NSSI group significantly.

Applying a construct from the field of organizational behaviour, Buser, Buser, and Kearney (2012) investigated the relationship between parental informational justice and frequency of NSSI. Informational justice in the parent-child relationship reflects a parent's justification of decisions and truthfulness. College students with higher frequency of NSSI were more likely to perceive parents as failing to communicate in candid ways and to provide explanations for decisions affecting them. The authors reason that parental deficits in informational justice may contribute to an individual's sense of losing control in important areas of life, which in turn may prompt NSSI as a means of regaining some degree of control over experiences.

Taken together, these variables are conceptually related to SDT's parental autonomy support and thus suggest that a lack of autonomy support may be associated with NSSI and that SDT may be a useful paradigm in which to explain this association. Examining whether parental autonomy support specifically is related to NSSI is worthwhile as it may extend the previous research to include a parenting dimension that is highly amenable to intervention (Joussement, Mageau, & Koestner, 2014). Similar to parental autonomy support, although SDT's basic

psychological need for competence has not been directly investigated in terms of its relationship with NSSI, variables conceptually related to this need have received attention.

Low Satisfaction of the Need for Competence as a Risk Factor for NSSI

Self-esteem, self-derogation, self-criticism, ineffectiveness, and self-competencies (e.g., Brausch & Gutierrez, 2010; Hodgsen, 2004; Klonsky, Oltmanns, & Turkheimer, 2003; Ross et al., 2009; Wichstrom, 2009) are NSSI correlates that are conceptually related to SDT's need for competence. Individuals who engage in NSSI consistently report lower levels of self-esteem compared to those who do not engage in such behaviours (Brausch & Gutierrez, 2010; Cawood & Huprich, 2011; Hamza & Willoughby, 2013; Hawton, Rodham, Evans, & Weatherall, 2002; Lundh, Karim, & Quilisch, 2007).

Similarly, evidence suggests that individuals who are high on self-derogation are at increased risk for NSSI engagement (Herpertz, Sass, & Favazza, 1997; Klonsky et al., 2003). This variable has recently been examined in Internet settings. Adams, Rodham, and Gavin (2005) conducted online focus group interviews with members of NSSI-related Web sites. Findings revealed that participants' self-judgments were largely negative; they reported a sense of inadequacy about the self, feelings of worthlessness, and an internal locus of control, seeing their personal inadequacy as the main cause of aversive events in their lives. Using a similar qualitative approach, Breen, Lewis, and Sutherland (2013) investigated descriptions of NSSI experiences embedded in online autobiographical accounts of NSSI drawn from personally constructed Web sites. Participants described NSSI as a way to express negative self-appraisals and as a way to manage negative emotions directed towards the self. Furthermore, participants linked their NSSI to painful feelings of the self as deeply flawed and inadequate. This

qualitative research in online settings is a novel compliment to the self-report paradigms that dominate the NSSI literature.

Self-criticism, like self-derogation, has been found to be high in individuals who engage in NSSI (Glassman, Weierich, Hooley, Deliberto, & Nock, 2007; Hodgsen, 2004). Whereas parental criticism may reflect low levels of parental autonomy support, self-criticism likely reflects low levels of satisfaction of the need for competence. Indeed, research has supported a relationship between self-criticism and perceived competence in a variety of domains (Fichman, Koestner, & Zuroff, 1996).

Ross, Heath, and Toste (2009) found that university students who engage in NSSI report an increased sense of ineffectiveness. It seems likely that this sense of ineffectiveness, along with the low self-esteem, self-derogation, and self-criticism found among individuals who engage in NSSI, would translate into perceptions of lowered self-competence in a variety of life domains. It is important to make the distinction here between perceptions of competence and actual competence. Indeed, many individuals who engage in NSSI are perfectionists who are very high functioning and competent university students (Hoff & Muehlenkamp, 2009; Miskey, Hill, & Huelsman, 2012), however, the reviewed research suggests that these individuals may not perceive themselves in this way.

Perceived self-competencies have received very little attention in the NSSI literature, however, research suggests that adolescents with a history of NSSI report lower perceived competence in a variety of domains (e.g., social, academic, global) compared to their non-injuring peers (Baetens, Claes, Muehlenkamp, Grietens, & Onghena, 2012; Claes et al., 2010; Wichstrom, 2009).

In sum, although the satisfaction of the need for competence has not been examined within the NSSI literature, conceptually related variables suggest a likely association. Examining whether SDT's need for competence is linked to NSSI would be important as it would extend the present research to understand the behaviour within a single cohesive theory. Likewise, multiple variables conceptually related to SDT's need for relatedness have been investigated within the NSSI literature.

Low Satisfaction of the Need for Relatedness as a Risk Factor for NSSI

Support, connectedness, and attachment (e.g., Claes et al., 2010; Crowell et al., 2008; Hallab & Covic, 2010; Muehlenkamp et al., 2013) are variables associated with NSSI that are conceptually related to the psychological need for relatedness. Evidence suggests a lack of social support in general may be a risk factor for NSSI engagement with individuals who engage in NSSI reporting significantly less social support compared to those who do not engage in the behaviour (Muehlenkamp et al., 2013; Rotolone & Martin, 2012; Wichstrom, 2009). In a prospective study, NSSI was assessed in community youth at baseline and at follow-up two and a half years later. Lack of social support at follow-up was a significant predictor of new NSSI behaviour (Hankin & Abela, 2011). Additional longitudinal data offers evidence that low satisfaction with social support predicts future engagement in NSSI (Wichstrom, 2009).

When considering social support specifically from parents and friends, results generally confirm group differences between those who do and do not engage in NSSI on both of these variables (Brausch & Guttierez, 2011; Muehlenkamp et al., 2013). Similarly, individuals who engage in NSSI often report a lack of connectedness from their families (Crowell et al., 2008; Kaminski et al., 2010; Taliaferro, Muehlenkamp, Burowski, McMorris, & Kugler, 2012). These results are consistent with reports of youth who engage in NSSI describing themselves as loners

and as experiencing high levels of loneliness (Adler & Adler, 2005; Briere & Gil, 1998; Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boergers, 2011).

Reflecting the importance of the early parent-child relationship and a deep need for relatedness, the variable of attachment has been examined as a correlate of NSSI. Attachment difficulties and disruptions have been shown to contribute to NSSI engagement and NSSI frequency (van der Kolk, Perry, & Herman, 1991). Results from administering the Inventory of Parent and Peer Attachment (Gratz et al., 2002; Armsden & Greenberg, 1987) in community samples consistently reveal that those who engage in NSSI report lower attachment scores compared to those who do not engage in such behaviours (Bureau et al., 2010; Hallab & Covic, 2010; Hamza & Willoughby, 2013; Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008).

Similarities between the constructs of support, connectedness, attachment, and the basic need for relatedness suggest that self-determination theory may assist in interpreting the underlying mechanisms of these observed associations. Extending this research to investigate the relationship between satisfaction of the needs for autonomy, competence, and relatedness and NSSI lends cohesiveness and structure to findings by understanding associations through the well-established framework. Furthermore, new theoretical and clinical insights into the nature and treatment of NSSI may be informed by self-determination theory.

Current Limitations

The reviewed research highlights significant overlaps between the SDT and NSSI literatures. Specifically, SDT has provided insight into suicidal ideation, depression, and emotion regulation, all constructs which are closely intertwined with NSSI behaviour. Moreover, well-documented NSSI risk factors such as increased parental control, low self-competencies, and low support are conceptually related to SDT's basic needs for autonomy, competence, and

relatedness. Despite these commonalities, an explicit application of self-determination theory to the study of NSSI has yet to be undertaken.

While emotion regulation based theories such as Linehan's (1993) biosocial model, Chapman and colleagues' (2006) experiential avoidance model, and Nock's (2009) conceptual model have guided prolific and impactful NSSI research, they may not place enough emphasis on fluctuations in the social context which may contribute to the cyclical nature of NSSI episodes that is characterized by many starts and stops. The field of NSSI would benefit from a well-established theoretical framework to explain observed associations between a multitude of related risk factors and NSSI and to offer future research and therapeutic directions.

Although some attempts have been made to prospectively examine developmental pathways to NSSI (e.g., Yates et al., 2008), there remains a great need for research paradigms that employ longitudinal designs in order to prospectively study the onset, maintenance, and cessation of NSSI (Guerry & Prinstein, 2009; Hankin & Abela, 2011; Jacobson & Gould, 2007; Nock, 2009). Furthermore, researchers acknowledge that NSSI etiology is multidimensional, likely arising from the interaction of many factors, however, these complex interactions are rarely examined in the literature. To address this limitation, future research should examine the ways that different risk factors work together to influence NSSI (Nock, 2012). The current review suggests that self-determination theory may act as a complementary perspective that could address these limitations within the NSSI literature and ultimately extend our knowledge and conceptualization of NSSI.

Principal Aims of the Research Program

Thus, the overall objective of the proposed program of research is to apply a self-determination theory lens in order to further our understanding of NSSI. Specifically, the first

objective is to examine the relationship between basic psychological needs, emotion dysregulation, and NSSI in young adults. Study 1, will examine whether young adults who report ever having engaged in NSSI significantly differ from those with no history of NSSI on reported levels of satisfaction of the three needs (autonomy, competence, and relatedness) and on reported levels of the six emotion dysregulation factors (non-acceptance, goal, impulse, awareness, strategies, and clarity). In addition, Study 1 will test the explanatory power of SDT by examining whether the basic need satisfaction of autonomy, competence, and relatedness add to the prediction of NSSI history over and above the well-established influence of difficulties in emotion regulation. Although NSSI is prevalent in young adults, the developmental period of adolescence corresponds to a time of increased risk for NSSI. Thus, the second study will extend this research to young adolescents with a particular interest in adding to the sparse longitudinal research in the NSSI literature. The second objective is to apply a self-determination theory perspective to further our understanding of factors associated with NSSI onset, maintenance, and cessation in adolescents. Study 2 will examine group differences in need satisfaction as a function of NSSI status and how changes in the reported satisfaction of autonomy, competence, and relatedness over time may correspond to changes in NSSI onset and cessation. Another limitation within the NSSI literature is the lack of research examining the complex ways in which variables interact to contribute to NSSI. Thus, the next step in this line of inquiry is to empirically examine a model of NSSI based on SDT's tenets. Study 3 will build upon Studies 1 and 2 by examining how perceived parental autonomy support influences NSSI engagement directly and indirectly through difficulties in emotion regulation. In sum, the proposed program of research will address current limitations and gaps in the literature by applying and testing a

well-founded theoretical framework to further our understanding of the associations between autonomy, competence, and relatedness and NSSI.

CHAPTER 2

MANUSCRIPT 1

Basic Psychological Need Satisfaction, Emotion Dysregulation, and NSSI Engagement in Young Adults: An Application of Self-Determination Theory

A. Ann Emery, Nancy L. Heath, and Devin Mills

Department of Educational and Counselling Psychology

McGill University

Montreal, QC

Abstract

Non-suicidal self-injury (NSSI) is a public health concern that affects young adults at alarming rates (Serras, Saules, Cranford, & Eisenberg, 2010). Although many autonomy, competence, and relatedness associated variables have been examined as NSSI correlates (e.g., Breen, Lewis, & Sutherland, 2013; Cawood & Huprich, 2011; Hallab & Covic, 2010), self-determination theory (SDT; Deci & Ryan, 1985, 2008; Ryan & Deci, 2000b) has never been applied as a lens to further our understanding of NSSI. The present study examines the role of satisfaction of self-determination theory's three basic needs in young adults' NSSI engagement. Furthermore, it assesses the contribution of basic psychological needs to NSSI engagement over and above the well-documented risk factor of difficulties with emotion regulation. University students who reported ever having engaged in NSSI (34 female, 6 male; *M*age = 20.10, *SD* = 1.66) reported significantly lower levels of the satisfaction of the needs for autonomy ($\eta^2 = .07$), competence ($\eta^2 = .16$), and relatedness ($\eta^2 = .07$) as well as more difficulties with all aspects of emotion regulation (non-acceptance of emotional responses $\eta^2 = .27$, difficulty engaging in goal directed behavior $\eta^2 = .18$, impulse control $\eta^2 = .23$, lack of emotional awareness $\eta^2 = .08$, limited access to regulation strategies $\eta^2 = .36$, lack of emotional clarity $\eta^2 = .24$) compared to students with no history of NSSI (42 female, 4 male; *M*age = 19.79, SD = 1.37). Results of a logistic regression analysis revealed that need satisfaction added to the prediction of NSSI history group after controlling for the effects of emotion regulation. Only the predictors of satisfaction of competence and limited access to emotion regulation strategies accounted for significant variance in NSSI in the final model.

Basic Psychological Need Satisfaction, Emotion Dysregulation, and NSSI Engagement in Young Adults: An Application of Self-Determination Theory

Non-suicidal self-injury can be understood as the deliberate and self-inflicted destruction of body tissue without suicidal intent and for purposes that are not culturally sanctioned (American Psychiatric Association, 2013). Although NSSI age of onset peaks during the periods of early (14 to 15 years of age) and late adolescence (17-18 years of age) (Lewis & Heath, 2015; Rodham & Hawton, 2009; Ross & Heath, 2002; Whitlock, Eckenrode, & Silverman, 2006), around 23% of individuals begin self-injury in young adulthood (18-22 years of age) (Whitlock et al., 2011). NSSI has been dubbed "common" in college populations (Whitlock et al., 2011). Although lifetime prevalence rates within this population vary widely from 15 to 38% (Gollust, Eisenberg, & Golberstein, 2008; Gratz, 2001; Gratz, Conrad, & Roemer, 2002; Polk & Liss, 2007; Whitlock et al., 2006; Whitlock et al., 2011), results from a recent meta-analysis found that after controlling for methodological differences across studies, 13.4% of young adults report ever having engaged in NSSI (Swannell, Martin, Page, Hasking, & St John, 2014). Thus NSSI constitutes a relevant public health concern among young adults, and as such, has received increasing interest in research and clinical arenas.

Although many functions and risk factors have been associated with NSSI engagement, emotion regulation is one of the most documented functions of NSSI and difficulties with emotion regulation is one of the most empirically supported precursors to NSSI initiation (Andover & Morris, 2014; Klonsky, 2007a; Perez, Venta, Garnaat, & Sharp, 2012). NSSI is considered an overdetermined behavior in that it may serve multiple functions simultaneously (Klonsky & Olino, 2008; Lloyd-Richardson, 2008; Prinstein, 2008). However, the majority of individuals who self-injure report that their NSSI primarily serves a function of intrapersonal

negative reinforcement wherein overwhelming emotions are avoided and regulated through self-harm (Klonsky, 2007a). The understanding of NSSI as a tool to escape, manage, or regulate emotions is a common theme among many theoretical perspectives of NSSI (See Andover & Morris, 2014 for a review). For example, the experiential avoidance model (Chapman, Gratz, & Brown, 2006) of NSSI posits that when an emotionally evocative event occurs, this external stimuli triggers an emotionally aversive internal response. The individual engages in NSSI to eliminate or reduce emotional arousal and thus, the behavior is negatively reinforced. Emotion regulation has been examined within the NSSI literature as a function of the behavior but also as a state risk factor in which individuals who have greater difficulty regulating their emotions are seen as at greater risk for NSSI engagement. Emotion regulation has been conceptualized by Gratz and Roemer (2004) as:

> Involving the (a) awareness and understanding of emotions, (b) acceptance of emotions, (c), ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions, and (d) ability to use situationally appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands. (pp. 42-43)

Emotion dysregulation occurs when all or some of these abilities are impaired in an individual. To tap into this multi-faceted construct, Gratz and Roemer (2004) developed the Difficulties with Emotion Regulation Scale (DERS). The six subscales of the DERS include non-acceptance of emotional responses (non-acceptance), difficulties engaging in goal directed behavior (goal), impulse control difficulties (impulse), lack of emotional awareness (awareness), limited access to emotion regulation strategies (strategies), and lack of emotional clarity (clarity). The six-factor structure of the DERS has been confirmed in community samples of adults and adolescents,

however, most studies report the DERS as a total score (Andover & Morris, 2014; Gratz & Roemer, 2008; Perez et al., 2012).

In a sample of male undergraduate students, overall difficulties with emotion regulation as measured by the DERS significantly predicted NSSI engagement (Gratz & Chapman, 2007). Overall difficulties with emotion regulation as measured by the DERS was also found to mediate the impact of alienation in parent and peer relationships on NSSI in a university sample (Yurkowski et al., 2015). By parsing out the six factors of the DERS, conclusions as to what factors of emotion regulation to target in interventions may be drawn. The results of a MANOVA conducted with an undergraduate sample, revealed that individuals with a history of NSSI reported significantly more difficulties in all emotion regulation factors on the DERS except for awareness when compared to their non-self-injuring peers (Heath, Toste, Nedecheva, & Charlebois, 2008). In line with Chapman and colleagues' (2006) suggestion that having *limited access to emotion regulation strategies* increases one's risk for NSSI engagement, in a sample of female undergraduate students, Gratz and Roemer (2008) found that this subscale on the DERS as well as *lack of emotional clarity*, accounted for greater variance in NSSI above and beyond the other DERS subscales. Similarly, in a sample of adolescent inpatients, Perez et al. (2012) found that only *limited access to emotion regulation strategies* accounted for variance in NSSI when other aspects of emotion dysregulation, sex, and psychopathology were controlled for. Thus, NSSI may be used as a strategy to address perceived deficits in emotion regulation skills (Andover & Morris, 2014) and specifically targeting the thoughts and feelings that one has no way to regulate their overwhelming emotions may be important in clinical interventions.

Whereas emotion dysregulation constitutes a significant intrapersonal proximal risk factor for NSSI, other more distal environmental factors have been investigated as correlates of

NSSI and may be viewed as stimulus events that elicit emotional arousal. Broadly, one such distal factor is the social context in which an individual dwells. The qualities of this context are likely to affect the individual's functioning, for example, does the context allow the individual to act volitionally, provide opportunities for success, and does it offer encouraging support from others? The present paper applies self-determination theory (SDT; Deci & Ryan, 1985, 2008; Ryan & Deci, 2000b) to guide our understanding of NSSI environmental correlates. SDT has furthered our understanding of who is at risk for suicidal ideation, a phenomenon closely linked to NSSI, and many NSSI risk and protective factors are conceptually associated with the three basic needs proposed by SDT. Thus, it seems likely that SDT may serve as a complementary framework to existent emotion regulation models.

Self-Determination Theory

Self-determination theory (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000b) is an organismic approach built on the assumption that people are actively involved in their own development with evolved tendencies towards growth and mastery. Basic psychological needs theory (BPNT), a mini theory within the formal self-determination theory, outlines three universal, innate needs that serve as the avenue through which the social context influences development throughout the lifespan: autonomy, competence, and relatedness. BPNT posits that all three needs are essential; when they are fulfilled via the social context, an individual is in the position to maintain optimal functioning and achieve positive personal growth. However, when any one need is thwarted, an individual's overall well-being and psychological health are at risk (Ryan & Deci, 2000a). Empirical research has consistently supported this tenet (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Howell, Chenot, Hill, & Howell, 2011; Milyavskaya & Koestner, 2011; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sheldon, Ryan, &

Reis, 1996) and BPNT has provided a useful framework for understanding both adaptive and maladaptive behaviours (e.g., Adie, Duda, & Ntoumanis, 2012; Bartholomew et al., 2011; Meyer, Enström, Harstveit, Bowles, & Beevers, 2007).

SDT and Suicidal Ideation

Although self-determination theory has never been directly applied to NSSI, it has recently shed light on suicidal ideation. Although by definition, the act of NSSI excludes any suicidal intent, there has been consistent support in the literature showing that individuals who engage in NSSI are at higher risk for suicidal ideation and suicide attempts (Brausch & Gutierrez, 2010; Hamza, Stewart, & Willoughby, 2012; Victor, Styer, & Washburn, 2015; Zetterqvist, Lundh, & Svedin, 2013). J. S. Bureau, Mageau, Vallerand, Rousseau, and Otis (2012) divided a sample of high school and college students into a high self-determination group and a low self-determination group according to responses on the Global Motivation Scale (Guay, Mageau, & Vallerand, 2003). Using structural equation modeling, J. S. Bureau and colleagues concluded that self-determination moderated the direct and indirect effects of negative life events on suicidal ideation. Specifically, although negative life events were significantly correlated with hopelessness and suicidal ideation for both high and low self-determination groups, all coefficients were smaller for the high self-determination group than for the low self-determination group, indicating that the negative life events had a lower effect on suicidal ideation for those who were highly self-determined.

This was the first study to apply SDT to suicidality, giving important insight as to protective factors to target in young adults. Because NSSI and suicidality often co-occur (Brown, Comtois, & Linehan, 2002; Hawton et al., 2012; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Paul, Tsypes, Eidlitz, Ernhout, & Whitlock, 2015; Sher & Stanley, 2009) and

because characteristics of NSSI such as frequency and number of methods are associated with suicide (Klonsky & Olino, 2008; Paul et al., 2015; Whitlock & Knox, 2007; Whitlock, Muehlenkamp, & Eckenrode, 2008; Whitlock et al., 2013), it makes sense that SDT could shed some light on NSSI.

Other indicators that SDT may be a useful theoretical framework under which to consider NSSI, come from the NSSI literature itself; although SDT's three intrinsic needs have not been directly tapped into to understand NSSI, many correlates of NSSI investigated in young adult populations are conceptually related to SDT's basic needs of autonomy, competence, and relatedness.

Autonomy, Competence, and Relatedness Variables and NSSI in Young Adults

Many NSSI correlates are conceptually related to self-determination theory's basic psychological needs of autonomy, competence, and relatedness. Parental criticism, rigid family values, parental control, and informational justice have been associated with NSSI (J.-F. Bureau et al., 2010; Buser, Buser, & Kearney, 2012; Gratz, 2006; Gratz & Chapman, 2007; Halstead, Pavkov, Hecker, & Seliner, 2014; Hamza & Willoughby, 2013; Martin, Bureau, Cloutier, & Lafontaine, 2011; Yates, Tracy, & Luthar, 2008). These variables do not assess participant's general autonomy support, that is, their daily feelings that their environment is conditional to acting out of volition and according to values. Instead, they are similar to autonomy support within the early caregiving environment, which Koestner, Ryan, Bernieri, and Holt (1984) operationalize as: (a) providing rationale and explanation for behavioural requests; (b) recognizing the feelings and perspective of the child; (c) offering choices and encouraging initiative; and, (d) minimizing the use of controlling techniques. A limitation within this research is that all but one study (i.e.,Yates et al., 2008) relied on young adults' retrospective

memories of their childhood environments. The present study will address this limitation by asking participants about their current levels of satisfaction of autonomy in general.

Although low satisfaction of the need for competence has not been explored as a risk factor for NSSI, the conceptually related variables of self-esteem, negative self-appraisals, self-derogation, a sense of inadequacy about the self, feelings of worthlessness and ineffectiveness are correlates of NSSI in young adults (Adams, Rodham, & Gavin, 2005; Breen et al., 2013; Cawood & Huprich, 2011; Hamza & Willoughby, 2013; Ross, Heath, & Toste, 2009; Rotolone & Martin, 2012). In both qualitative and quantitative research, young adults who self-injure in university as well as those recruited through online communities, consistently report lower self-esteem and more feelings of inadequacy compared to their non-injuring peers. Furthermore, the written language of these young adults contains themes of self-derogation and worthlessness. It makes sense that these individuals would also report low levels of fulfillment of the need for competence, however, this SDT construct has not yet been directly examined as a correlate in the NSSI literature.

Researchers and theoreticians suggest that engagement in NSSI may have a social function such that the act of NSSI may serve to strengthen affiliations and a sense of group belonging (Breen et al., 2013; Heath, Ross, Toste, Charlebois, & Nedecheva, 2009; Hilt & Hamm, 2014; Klonsky, 2007b; Muehlenkamp, Hoff, Licht, Azure, & Hasenzahl, 2008; Nock, 2008, 2009). This social function likely results from a lack of satisfaction of the need for relatedness where individuals engage in NSSI to feel connection and support from others. Indeed, aspects of relatedness such as social support in general, support from parents and friends, connectedness to parents, loneliness, and attachment have been explored in terms of their relation to the development and maintenance of NSSI in young adults, suggesting an influential

relationship between relatedness and NSSI (Adler & Adler, 2005; J.-F. Bureau et al., 2010; Gratz et al., 2002; Hallab & Covic, 2010; Hamza & Willoughby, 2013; Muehlenkamp, Brausch, Quigley, & Whitlock, 2013; Taliaferro & Muehlenkamp, 2015; van der Kolk, Perry, & Herman, 1991).

Despite the wealth of research demonstrating a link between autonomy, competence, and relatedness associated variables and NSSI in young adults, self-determination theory has yet to be directly applied to explore and explain the underlying mechanisms of these associations. Considering the applicability of SDT across a wide range of development and domains, and the utility of a self-determination theory approach to understand who is at risk for suicidal ideation, it is likely that SDT could be a strong complementary tool to emotion regulation models that may serve to further our understanding of NSSI while taking into account the influence of the social environment.

Research Objectives

Thus, the overall goal of the present study is to apply self-determination theory's basic psychological needs mini theory to understand and explain NSSI among a sample of young adults. Specifically, the first objective is to examine whether individuals who report having engaged in NSSI significantly differ from those with no history of NSSI on reported levels of satisfaction of the three needs (autonomy, competence, and relatedness) and on reported levels of the six emotion dysregulation factors (non-acceptance, goal, impulse, awareness, strategies, and clarity). Based on self-determination theory and previous NSSI research with need related variables, it was predicted that individuals with a history of NSSI would report lower satisfaction of the three needs compared to individuals with no history of NSSI. Based on Gratz and Roemer's (2004) conceptualization of emotion dysregulation and previous research linking

emotion dysregulation to NSSI, it was hypothesized that all six aspects of emotion dysregulation would significantly differ between groups indicating that those with a history in NSSI would report increased difficulties with emotion regulation compared to individuals without a history of NSSI.

The second objective is to examine whether the basic need satisfaction of autonomy, competence, and relatedness add to the prediction of NSSI engagement over and above the well-established influence of difficulties in emotion regulation. Based on previous research in a similar sample (Gratz & Roemer, 2008), it is predicted that *limited access to emotion regulation strategies and lack of emotional clarity* will account for greater variance in NSSI above and beyond other aspects of emotion regulation measured by the DERS. Furthermore, it is expected that the three basic needs of autonomy, competence, and relatedness will add to the prediction of NSSI engagement when the effects of emotion dysregulation are accounted for.

Method

Participants

Participants were drawn from a large pre-existing dataset examining coping strategies among young adults from a large urban area Canadian university. The overall sample consisted of 1436 participants (73.6% female, 26.3% male, and .1% who did not report gender). Participants ranged in age from 17 – 42 years (*M*age = 20.01 years, *SD* = 2.30). Participants reported their place of birth as Canada (68%), United States (14%), East Asia (4%), Europe (3%), and Other (11%). Additional demographic information (i.e., ethnicity) was not collected. Exclusions based on age were of necessity as the current study focused on young adults; thus, only participants who reported ages ranging from 18 to 25 were included in the present study. A total of 32 participants were excluded based on this criterion, reducing the sample to 1404

participants. From the remaining sample, 114 participants (8.12%) responded positively to a screening questionnaire that they had physically hurt themselves on purpose without suicidal intent at least once in their lives. Participants were invited to complete a follow-up survey. Of the 114 participants who indicated NSSI engagement, 40 (34 female, 6 male; *M*age = 20.10 years, SD = 1.66) completed the measure of interest in a follow-up survey and were included in the NSSI group. Participants in the NSSI group reported birthplace as follows: Canada (69%), United States (10%), East Asia (6%), Europe (2%), Other (13%).

Of the 40 participants, 30% reported engaging in NSSI within the last year, 27% within the last two years, 19% within the last three to four years, and 24% reported having engaged in the behavior more than four years ago. With regard to frequency, 12% reported having engaged in NSSI once, 20% reported two to four times, 29% reported five to ten times, 27% reported eleven to fifty times, 10% reported fifty-one to one-hundred times, and 2% reported having engaged in the behavior more than one-hundred times.

Comparison participants were recruited in a similar manner as NSSI participants. The criterion for classifying a participant in the control group was based on responses to a screening questionnaire regarding NSSI and completion of a follow-up measure. Thus, a control group of 46 participants (42 female, 4 male; *M*age = 19.79, SD = 1.37) who had no history of NSSI and who completed the measure of interest in a follow-up survey, was created from the overall sample. The NSSI group and control group did not significantly differ on gender, age, and country of birth.

Measures

NSSI screening questionnaire. The How I Deal with Stress Questionnaire (HIDS; Heath & Ross, 2007; Appendix A) is a 29-item self-report questionnaire developed to screen for self-

injury. Each statement on the HIDS taps the frequency of use of both adaptive and maladaptive coping strategies on a four-point Likert scale ranging from 0 (*Never*) to 3 (*Frequently)*. NSSI is embedded within these statements as a coping strategy *("physically hurt myself on purpose"*). The HIDS also has a follow-up section in which participants are asked to provide additional information on NSSI and to indicate whether they had harmed themselves *without suicidal intent* to ensure reports of self-harm meet NSSI definition criteria. The HIDS has been used successfully in community settings to accurately screen for and identify youth who engage in NSSI (Cloutier & Humphreys, 2009). For the present study, participants were included in the NSSI group if they indicated a 1 or above on the Likert scale for the NSSI item and completed the follow up section indicating that their self-injury was without suicidal intent.

Need fulfillment. The Basic Psychological Needs Scale - General Version (BPNS; Appendix B) is adapted from the Basic Psychological Needs Satisfaction Scale – Work Version (Ilardi, Leone, Kasser, & Ryan, 1993). The BPNS consists of 21 items that assess need satisfaction on three subscales: autonomy (7 items), competence (6 items), and relatedness (8 items). Participants are asked how true each statement is for them on a 7-point Likert Scale ranging from 1 (*not at all true*) to 7 (*very true*). Scores range from 7- 49 (autonomy), 7- 42 (competence), 7-56 (relatedness), and 21- 149 (total score), with higher scores reflecting greater satisfaction. An autonomy subscale item example is "I feel like I am free to decide for myself how to live my life," a competence subscale reverse-scored item example is "Often, I do not feel very competent," and a relatedness subscale item example is "People in my life care about me." Gagné (2003) reported construct validity with the three need subscales being positively related to maternal and paternal autonomy support. Wei, Shaffer, Young, and Zakalik (2005) reported coefficient alphas of .68, .75, and .85, for the autonomy, competence, and relatedness subscale

scores respectively. For the present study, reliability for each need subscale was as follows: autonomy $\alpha = .65$, competence $\alpha = .79$, and relatedness $\alpha = .83$. Due to poor internal consistency, item 20 "There is not much opportunity for me to decide how to do things" was removed from the autonomy subscale.

Emotion dysregulation. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004; Appendix C) is a 36-item self-report measure that assesses six components of emotion dysregulation based on Gratz and Roemer's (2004) model. The subscales are non-acceptance of emotional responses (non-acceptance; e.g., I pay attention to how I feel), difficulties engaging in goal directed behavior (goal; e.g., When I'm upset I have difficulty focusing on other things), impulse control difficulties (impulse; e.g., I experience my emotions as overwhelming and out of control), lack of emotional awareness (awareness; e.g., I pay attention to how I feel), limited access to emotion regulation strategies (strategies; e.g., When I'm upset, I believe there is nothing I can do to feel better), and lack of emotional clarity (clarity; e.g., I am clear about my feelings). Items are scored on a 5-point Likert scale ranging from 1(*almost never*) to 5(*almost always*). Subscale scores can range from 6-35, and the total score can range from 42-210. Higher scores indicate greater emotion dysregulation. The measure has been shown to have good internal consistency in clinical and community samples of adolescents and young adults (Gratz & Roemer, 2004; Perez et al., 2012) and has demonstrated construct and predictive validity, and test-retest reliability across 4-8 weeks ($p<.01$; Gratz & Roemer, 2004). In the present study, each subscale had internal consistency that ranged from good to excellent (non-acceptance $\alpha = .93$, goal $\alpha = .90$, impulse $\alpha = .89$, awareness $\alpha = .85$, strategies $\alpha = .90$, clarity $\alpha = .84$).

Procedure

Data collection took place in undergraduate classes at a large urban university in Canada. Instructors from various courses and programs were contacted via email to explain the general purpose of the study and to request permission to present the study to their students during class time. During class visits, a research assistant introduced the study as an investigation of student stress and coping, using a scripted introduction (Appendix D). A second research assistant distributed packages containing a consent form (Appendix E), a form to fill in their contact information if they agreed for further follow-up, and the HIDS. Students who were willing to participate were given fifteen minutes to complete the package in class. Once completed, a research assistant collected the packages and provided participants with a debriefing sheet that gave contact information of the research team and mental health resources.

Participants who gave consent for follow-up were emailed a battery of questionnaires, including the BPNS, that they could complete and email back at their convenience. Upon receipt of the completed follow-up questionnaires, the participants received another email providing the necessary debriefing information and received $25 as well as a link to access resources should they require additional support. The data was then coded and entered into a database and no identifiable information was available through database access alone.

Results

Table 1 presents the means and standard deviations of the study variables by group. Table 2 presents the correlations of the study variables for the control group. Table 3 presents the correlations of the study variables for the NSSI group.

Group Differences on Need Satisfaction and Emotion Dysregulation

Prior to conducting analyses, all variables were examined through SPSS 22 for the accuracy of data entry, detect missing values, and fit between their distributions and assumptions of multivariate analyses. Questionnaires were considered to be invalid and participants were not included in analyses if more than 5% of their data was missing. If 5% or less of the data was missing, missing values were estimated using the regression method in SPSS 22. To examine whether participants who have engaged in NSSI and participants with no history of NSSI differ on reported levels of need satisfaction (autonomy, competence, and relatedness) and reported levels of emotion dysregulation (non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control, lack of emotional awareness, limited access to regulation strategies, and lack of emotional clarity), two multivariate analyses of variance (MANOVAs) were conducted, one with satisfaction of the three needs as dependent variables, and one with the six emotion dysregulation subscales as dependent variables. Results of the first MANOVA revealed overall significant differences between groups on need satisfaction F (3, 82) = 5.34, p = <.01; Wilk's Λ =.84, partial η^2 =.16. In support of our hypotheses, tests of between-subjects effects revealed that the NSSI group and control group significantly differed on their reported levels of satisfaction for all three needs. Specifically, participants in the NSSI group reported: significantly lower levels of autonomy satisfaction compared to participants in the control group, F (1, 84) = 6.51, p <.05, partial η^2 = .07; significantly lower levels of competence satisfaction compared to participants in the control group, F (1, 84) = 16.29, p <.001, partial η^2 = .16; and significantly lower levels of relatedness satisfaction compared to participants in the control group, F (1, 84) = 6.56, p <.05, partial η^2 = .07. Overall power to detect the effects was excellent ranging from .713 to .979. Results of the second MANOVA revealed overall

significant differences between groups on emotion dysregulation F (6, 79) = 9.37, p = <.001; Wilk's Λ =.58, partial η^2 =.42. In support of our hypotheses, tests of between-subjects effects revealed that the NSSI group and control group significantly differed on all six emotion dysregulation subscales. Specifically, participants in the NSSI group reported: significantly higher levels of non-acceptance of emotional responses compared to the control group, F (1, 84) = 31.40, p <.001, partial η^2 = .27; significantly higher levels of difficulty engaging in goal-directed behavior compared to the control group F (1, 84) = 17.82, p <.001, partial η^2 = .18; significantly higher levels of difficulties with impulse control compared to the control group F (1, 84) = 24.85, p <.001, partial η^2 = .23; significantly higher levels of lack of emotional awareness compared to the control group F (1, 84) = 6.94, p <.05, partial η^2 = .08; significantly higher levels of limited access to regulation strategies F (1, 84) = 46.17, p <.001, partial η^2 = .36; and significantly higher levels of lack of emotional clarity compared to the control group F (1, 84) = 26.59, p <.001, partial η^2 = .24. Overall power to detect the effects was excellent ranging from .740 to 1.00.

Need Satisfaction and Emotion Dysregulation as Predictors of NSSI Group Membership

To examine whether the satisfaction of autonomy, competence, and relatedness adds to the prediction of NSSI group membership after accounting for the effects of emotion dysregulation, a logistic regression analysis was conducted on NSSI group membership as outcome. Multicollinearity was assessed for, given the correlations between the subscales and was found to be not an issue.

The six emotion dysregulation predictors (non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control, lack of emotional awareness, limited access to regulation strategies, and lack of emotional clarity) were entered in Step 1 of

the regression. The three need satisfaction predictors (autonomy, competence, and relatedness) were entered in Step 2 of the regression. A test of the first block model against a constant-only model was statistically significant, $\chi^2(6, N = 86) = 43.46, p < .001$ indicating that the emotion dysregulation predictors as a set reliably distinguished between those who have engaged in NSSI and those who have not. The model successfully predicted 80.4% of the individuals who had not engaged in NSSI and 72.5% of individuals who had engaged in NSSI, for an overall success rate of 76.7%. Table 4 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the six emotion dysregulation predictors. In partial support of our hypothesis, according to the Wald criterion, only limited access to regulation strategies reliably predicted NSSI group membership, $\chi^2(1, N = 86) = 4.22, p < .05$. Addition of the need satisfaction variables in Step 2 significantly improved the model $\chi^2(3, N = 86) = 8.05, p < .05$. Classification was improved with 84.8% of individuals who had no NSSI history successfully predicted, and 82.5% of those with a history of NSSI successfully predicted, for an overall success rate of 83.7%. Table 5 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the nine predictors. According to the Wald criterion, limited access to regulation strategies remained a significant predictor of NSSI group membership, $\chi^2(1, N = 86) = 4.40, p < .05$. Furthermore, in partial support of our hypothesis, the satisfaction of the need for competence $\chi^2(1, N = 86) = 6.20, p < .05$ significantly added to the prediction of NSSI group membership such that decreases in satisfaction of the need for competence significantly increased the odds of being classified in the NSSI group.

Discussion

Using self-determination theory's basic psychological needs mini theory (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000b) as a theoretical framework, the current study examined the

associations between need satisfaction (autonomy, competence, relatedness), emotion dysregulation (non-acceptance, goal, impulse, awareness, strategies, clarity) and NSSI engagement among a community sample of young adults. Specifically, the research objectives were to (a) examine whether individuals who report having engaged in NSSI significantly differ from those with no history of NSSI on reported levels of satisfaction of the three needs and on reported levels of the six emotion dysregulation factors, and (b) examine whether the basic need satisfaction of autonomy, competence, and relatedness add to the prediction of NSSI engagement over and above the well-established influence of difficulties in emotion regulation.

In support of our hypotheses, groups significantly differed on all variables of interest. That is, participants who had engaged in NSSI reported significantly lower satisfaction of autonomy, competence, and relatedness, and had significantly higher levels of non-acceptance of emotions, difficulties engaging in goal directed behavior when upset, difficulties with impulse control, difficulties being aware of their emotions, limited emotion regulation strategies, and difficulties with emotion clarity compared to participants with no NSSI history. The finding that individuals with a history of NSSI engagement report greater emotion regulation difficulties is a link that has been well-established in the literature in both clinical and community samples (e.g., Gratz & Chapman, 2007; Gratz & Roemer, 2008; Heath et al., 2008; Perez et al., 2012). Heath and colleagues (2008) reported similar findings in their undergraduate sample, however, the subscale of awareness did not significantly differ between those with and without a history of NSSI. In the present sample, groups did significantly differ in awareness, however, significance was at a .05 level, and an examination of group means suggests that although the difference in awareness is significant, it is not as large as other emotional regulation factors.

Whereas a myriad of autonomy, competence, and relatedness associated variables have been examined with respect to NSSI, the present study is the first to apply a self-determination theory framework in which to understand and directly measure these variables in the context of basic psychological needs. The finding that those who engage in NSSI report significantly lower levels of satisfaction for autonomy, competence, and relatedness compared to individuals with no NSSI history gives preliminary support for the application of SDT to further our understanding of NSSI. However, in order to further assess the usefulness of SDT in explaining variability in NSSI engagement, it would be important to determine if basic need satisfaction adds to the prediction of NSSI engagement over and above the influence of a well-supported risk factor such as emotion dysregulation. Thus, it was also hypothesized that the satisfaction of autonomy, competence, and relatedness would further contribute to the prediction of NSSI engagement after controlling for the six factors of emotion regulation.

Results partially supported this hypothesis with competence adding to the prediction of NSSI engagement over and above the dimensions of emotion regulation such that a decrease in reported satisfaction of the need for competence significantly increased young adults' odds of being classified in the NSSI group even when emotion regulation difficulties were accounted for. The finding that satisfaction of the need for competence adds to the prediction of NSSI engagement once the influence of emotion dysregulation has been taken into account is in accordance with previous research showing that young adults who engage in NSSI have lower self-esteem and more feelings of worthlessness compared to young adults who do not engage in NSSI (Heath et al., 2009; Rotolone & Martin, 2012) and that the written language of individuals sharing in online communities revolves around themes of self-derogation (Breen et al., 2013). It is likely that when faced with environments and experiences that do not allow for the satisfaction

of competence, negative feelings towards the self may occur, and difficulties regulating these feelings lead to the engagement in NSSI. Within the experiential avoidance model of NSSI (Chapman et al., 2006), the thwarting of the satisfaction of the need for competence could be visualized as the stimulus event that begins the path towards NSSI engagement.

Although autonomy associated variables such as parental criticism, parental control, rigid family values, and informational justice have been previously examined as risk factors within the young adult NSSI literature (J.-F. Bureau et al., 2010; Buser et al., 2012; Gratz, 2006; Gratz & Chapman, 2007; Halstead et al., 2014; Hamza & Willoughby, 2013; Martin et al., 2011), these variables are most closely related to parental autonomy support within the early caregiving relationship. The present study examined autonomy support in general, asking participants to what extent they felt that their present environment allowed for opportunities to act volitionally and in accordance with personal values. The findings suggest that although the degree to which an individual's need for autonomy is supported may distinguish between those who engage and do not engage in NSSI, it may not be a useful predictor of NSSI engagement when the influence of difficulties in emotion regulation and satisfaction of competence are taken into account.

Similarly, contrary to expectations, satisfaction of the need for relatedness was not a significant predictor of NSSI engagement. While intrapersonal functions are most often endorsed by individuals who engage in NSSI (Klonsky, 2007a), self-injurers also endorse interpersonal reasons for the behavior (Nock, 2008; Nock & Prinstein, 2004). Furthermore, young adults who engage in NSSI often report feelings of loneliness, and a lack of social support and connectedness to peers and family (Adler & Adler, 2005; J.-F. Bureau et al., 2010; Gratz et al., 2002; Hallab & Covic, 2010; Hamza & Willoughby, 2013; Muehlenkamp et al., 2013; Taliaferro & Muehlenkamp, 2015; van der Kolk et al., 1991; Whitlock, Prussien, & Pietrusza,

2015). Thus, it would seem likely that reported satisfaction of the need for relatedness would predict NSSI group membership. Similar to the satisfaction of autonomy, it could be that although the need for relatedness successfully discriminated between those who do and do not engage in NSSI, its explanatory power was not strong enough to predict NSSI engagement when entered along with emotion regulation variables and satisfaction of the need for competence. It could also be possible that this need may not be as salient a predictor of NSSI engagement because of an experienced sense of community among those who self-injure. The act of NSSI may serve to strengthen affiliations and a sense of group belonging (Heath et al., 2009; Nock, 2009). Indeed, recent research into NSSI e-communities suggests that the Internet is a place where individuals who engage in NSSI connect with others and give and elicit support (Lewis, Heath, Michal, & Duggan, 2012; Lewis & Michal, 2014). Another plausible explanation for this non-significant result is that emotion regulation may have acted as a mediator on the effect of the need for relatedness and NSSI. However, this possibility was not statistically examined.

With regards to emotion regulation, our hypothesis was partially supported; while *lack of emotional clarity* was not a significant predictor of NSSI group membership, *limited access to emotion regulation strategies* retained significance even after the addition of the three needs variables. The importance of the emotion regulation dimension of *limited access to emotion regulation strategies* has been shown in previous research (Perez et al., 2012) and has been included in etiological models of NSSI (e.g., Chapman et al., 2006). Although in a similar sample, Gratz and Roemer (2008) found that a *lack of emotional clarity*, in addition to *limited emotion regulation strategies,* accounted for greater variance in NSSI above and beyond the other DERS subscales, clarity was not a significant predictor in the present sample. As with the role of satisfaction of the need for relatedness, whereas other aspects of emotion regulation were

successful in distinguishing between those who do and do not engage in NSSI, only *limited access to regulation strategies* was a predictor of the behavior in this sample. *Limited access to emotion regulation strategies* has also been implicated in the cessation of NSSI. Whitlock et al. (2015) found that young adults who had a past history of frequent NSSI (>6 incidents) but who reported no longer engaging in the behavior reported more effective emotion regulation strategies as measured by the DERS strategies subscale compared to young adults who reported currently engaging in the behavior. Furthermore, in qualitative analyses of past and current self-injurer's comments, an increase in emotion regulation skills was identified as the primary driver of NSSI cessation. Although the present study does not examine NSSI cessation, the finding that limited access to emotion regulation skills predicts NSSI engagement lends further support for the importance of this variable to NSSI and the idea that individuals who engage in NSSI feel as though they do not have adaptive means to successfully regulate their internal states.

Limitations and Future Directions

There are several limitations to the present study. First, although the present study drew from a large dataset on stress and coping, the lifetime prevalence rate of NSSI was lower than what has previously been reported in young adult community samples (e.g., Serras et al., 2010; Whitlock et al., 2011; Whitlock et al., 2015). NSSI prevalence rates have been found to range widely within the literature and to vary depending on NSSI definition and how an NSSI screening question is presented, with higher prevalence reported when a checklist of NSSI behaviours is presented compared to one Likert scale question (Swannell et al., 2014). Indeed, the lifetime prevalence rate of 8.12% found in our university sample when asking participants to indicate on a Likert scale from 0 (*Never*) to 3 (*Frequently*) if they had ever engaged in NSSI, is lower than in Whitlock and colleagues' (2015) recent university sample which employed a

checklist of NSSI behaviours and found a lifetime prevalence rate of 14.0%. Although it is likely that this lower prevalence rate is due to methodology, it may be possible that the present sample represents an atypical group of university students and that the findings may not be generalizable to other young adults. Second, although the majority of the participants within the NSSI group indicated NSSI engagement within the last year or two years, participants who indicated NSSI engagement more than two years ago were also included in the group. Recent research has shown differences between individuals who currently engage in NSSI and those who have a history of the behavior but who do not report current engagement (Rotolone & Martin, 2012; Taliaferro & Muehlenkamp, 2015; Whitlock et al., 2015). By placing all individuals with a history of NSSI in the NSSI group, potential between-group differences may have been overlooked. A larger sample size would be important in order to have adequate power to determine differences between multiple categories of self-injurer status. Third, less than 50% of the participants who originally completed the screening questionnaire agreed to follow up, making selection bias a possible limitation. Further, males were underrepresented within the present sample.

Although low levels of need satisfaction have been measured and associated with maladaptive outcomes and psychological distress (Costa, Soenens, Gugliandolo, Cuzzocrea, & Larcan, 2015; Przybylski, Deci, Rigby, & Ryan, 2014; Véronneau, Koestner, & Abela, 2005) the SDT literature has begun moving beyond this approach to include measures of need frustration to predict maladaptive outcomes (Vansteenkiste & Ryan, 2013). Although need thwarting was not directly measured in the present study, it could be argued that reverse items on the BPNS tap into need thwarting. For example the question "I feel forced to follow decisions made for me" on the PNTS is not very different from the BPNS' "in my daily life I frequently have to do what I have

been told." The relation between these reverse items and the construct of need thwarting has yet to be investigated. However, as the present study examines non-suicidal self-injury, measuring need satisfaction without also including a direct measure of need frustration such as the PNTS, is a limitation.

Although the present study examined associations between need satisfaction, emotion dysregulation, and NSSI, the cross-sectional nature of the research impedes any conclusions for directionality or causality. It seems likely that SDT may be a complementary framework to emotion regulation models in that it helps to explain external stimulus that precedes overwhelming emotions. This direction may intuitively make sense and be supported by theory, however, the present findings included individuals who had not engaged in NSSI for more than two years, perhaps indicating that NSSI engagement may have a lasting impact on later need fulfillment. Longitudinal prospective research is needed to evaluate the theoretically proposed timelines and to examine the direction of these relationships.

Conclusion

This study presents a contribution to the current NSSI literature as it is the first to apply a self-determination theory perspective to further our understanding of who is at risk for the behavior. Despite limitations, the current findings suggest that self-determination theory may be complementary to emotion regulation theories such as the experiential avoidance model of NSSI. Satisfaction of the need for competence may be a particularly salient factor in understanding NSSI history.

Working within an SDT framework provides direction for clinical interventions and prevention programs. For example, the social context plays a crucial role in supporting an individual's potential versus stimulating their vulnerabilities (Ryan & Deci, 2000a), thus, it

would be important to target the environments that young adults find themselves in to maximize the opportunities to behave autonomously, to experience competence, and to feel supported. Similarly, young adults faulty perceptions of their environments should be addressed and reframed in order to help them to view contexts as more supportive.

Furthermore, SDT provides a well-established theoretical framework with which to organize and understand previous findings on NSSI risk and protective factors in young adults. SDT may provide further meaning to help researchers and clinicians understand documented links between NSSI and: (a) the autonomy related constructs of parental criticism, rigid family values, parental control, and informational justice; (b) the competence related constructs of self-esteem, negative self-appraisals, self-derogation, a sense of inadequacy about the self, feelings of worthlessness and ineffectiveness; and (c), the relatedness related constructs of social support in general, support from parents and friends, connectedness to parents, loneliness, and attachment.

In sum, although further replication and future investigation is needed, it appears that need satisfaction may contribute to our understanding of NSSI even after the well-established factor of emotion dysregulation is accounted for.

References

Adams, J., Rodham, K., & Gavin, J. (2005). Investigating the "self" in deliberate self-harm. *Qualitative Health Research, 15*(10), 1293-1309. doi: 10.1177/1049732305281761

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise, 13*(1), 51-59. doi:10.1016/j.psychsport.2011.07.008

Adler, P. A., & Adler, P. (2005). Self-injurers as loners: The social organization of solitary deviance. *Deviant Behavior, 26*(4), 345-378. doi: 10.1080/016396290931696

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Andover, M. S., & Morris, B. W. (2014). Expanding and clarifying the role of emotion regulation in nonsuicidal self-injury. *Canadian Journal of Psychiatry, 59*(11), 569-575. Retrieved from: http://www.scopus.com/inward/record.url?eid=2-s2.0-84911926203&partnerID=40&md5=be8da5cc1d505e59abde0953deacf69d

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, *37*(11), 1459-1473. doi:10.1177/0146167211413125

Brausch, A., & Gutierrez, P. (2010). Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of Youth and Adolescence, 39*(3), 233-242. doi: 10.1007/s10964-009-9482-0

Breen, A. V., Lewis, S. P., & Sutherland, O. (2013). Brief report: Non-suicidal self-injury in the context of self and identity development. *Journal of Adult Development, 20*, 57-62. doi:10.1007/s10804-013-9156-8

Brown, M. Z., Comtois, K. A., & Linehan, M. M. (2002). Reasons for suicide attempts and nonsuicidal self-injury in women with borderline personality disorder. *Journal of Abnormal Psychology, 111*, 198-202. doi:10.1037/0021-843X.111.1.198

Bureau, J.-F., Martin, J., Freynet, N., Poirier, A., Lafontaine, M.-F., & Cloutier, P. (2010). Perceived dimensions of parenting and non-suicidal self-injury in young adults. *Journal of Youth and Adolescence, 39*(5), 484-494. doi:10.1007/s10964-009-9470-4

Bureau, J. S., Mageau, G. A., Vallerand, R. J., Rousseau, F. L., & Otis, J. (2012). Self-determination: A buffer against suicide ideation. *Suicide and Life-Threatening Behavior, 42*(4), 377-393. doi:10.1111/j.1943-278X.2012.00097.x

Buser, T. J., Buser, J. K., & Kearney, A. (2012). Justice in the family: The moderating role of social self-efficacy in the relationship between nonsuicidal self-injury and interactional justice from parents. *The Family Journal, 20*(2), 147-156. doi:10.1177/1066480712441575

Cawood, C. D., & Huprich, S. K. (2011). Late adolescent nonsuicidal self-injury: The roles of coping style, self-esteem, and personality pathology. *Journal of Personality Disorders, 25*(6), 765-781. doi:10.1521/pedi.2011.25.6.765

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy, 44*(3), 371-394. doi:10.1016/j.brat.2005.03.005

Costa, S., Soenens, B., Gugliandolo, M., Cuzzocrea, F., & Larcan, R. (2015). The mediating role of experiences of need satisfaction in associations between parental psychological control and internalizing problems: A study among Italian college students. *Journal of Child and Family Studies, 24*(4), 1106-1116. doi:10.1007/s10826-014-9919-2

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*(2), 109-134. doi:10.1016/0092-6566(85)90023-6

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie canadienne, 49*(3), 182-185. doi:10.1037/a0012801

Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and Emotion, 27*(3), 199-223. doi:10.1023/A:1025007614869

Gollust, S. E., Eisenberg, D., & Golberstein, E. (2008). Prevalence and correlates of self-injury among university students. *Journal of American College Health, 56*(5), 491-498. doi:10.3200/JACH.56.5.491-498

Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment, 23*(4), 253-263. doi:10.1023/A:1012779403943

Gratz, K. L. (2006). Risk factors for deliberate self-harm among female college students: The role and interaction of childhood maltreatment, emotional inexpressivity, and affect intensity/reactivity. *American Journal of Orthopsychiatry, 76*(2), 238-250. doi:10.1037/0002-9432.76.2.238

Gratz, K. L., & Chapman, A. L. (2007). The role of emotional responding and childhood maltreatment in the development and maintenance of deliberate self-harm among male undergraduates. *Psychology of Men & Masculinity, 8*, 1-14. doi:10.1037/1524-9220.8.1.1

Gratz, K. L., Conrad, S. D., & Roemer, L. (2002). Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry, 72*, 128-140. doi:10.1037/0002-9432.72.1.128

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26*, 41-54. doi:10.1023/B:JOBA.0000007455.08539.94

Gratz, K. L., & Roemer, L. (2008). The relationship between emotion dysregulation and deliberate self‐harm among female undergraduate students at an urban commuter university. *Cognitive Behaviour Therapy, 37*, 14-25. doi:10.1080/16506070701819524

Guay, F., Mageau, G. A., & Vallerand, R. J. (2003). On the hierarchical structure of self-determined motivation: A test of top-down, bottom-up, reciprocal, and horizontal effects. *Personality and Social Psychology Bulletin, 29*(8), 992-1004. doi:10.1177/0146167203253297

Hallab, L., & Covic, T. (2010). Deliberate self-harm: The interplay between attachment and stress. *Behaviour Change, 27*(2), 93-103. doi:10.1375/bech.27.2.93

Halstead, R. O., Pavkov, T. W., Hecker, L. L., & Seliner, M. M. (2014). Family dynamics and self-injury behaviors: A correlation analysis. *Journal of Marital and Family Therapy, 40*(2), 246-259. doi:10.1111/j.1752-0606.2012.00336.x

Hamza, C. A., Stewart, S. L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review, 32*(6), 482-495. doi:10.1016/j.cpr.2012.05.003

Hamza, C. A., & Willoughby, T. (2013). Nonsuicidal self-injury and suicidal behavior: A latent class analysis among young adults. *PLoS ONE, 8*(3), e59955. doi:10.1371/journal.pone.0059955

Hawton, K., Bergen, H., Kapur, N., Cooper, J., Steeg, S., Ness, J., & Waters, K. (2012). Repetition of self-harm and suicide following self-harm in children and adolescents: Findings from the Multicentre Study of Self-Harm in England. *Journal of Child Psychology and Psychiatry, 53*(12), 1212-1219. doi:10.1111/j.1469-7610.2012.02559.x

Heath, N. L., & Ross, S. (2007). *How I Deal with Stress*. Unpublished instrument. McGill University, Montreal, Quebec, Canada.

Heath, N. L., Ross, S., Toste, J. R., Charlebois, A., & Nedecheva, T. (2009). Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 41*(3), 180-186. doi:10.1037/a0015732

Heath, N. L., Toste, J. R., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling, 30*(2), 137-156. Retrieved from http://amhca.metapress.com/app/home/main.asp?referrer=default

Hilt, L., & Hamm, E. (2014). Peer influences on non-suicidal self-injury and disordered eating. In L. Claes & J. J. Muehlenkamp (Eds.), *Non-suicidal self-injury in eating disorders* (pp. 255-272). Berlin: Springer.

Howell, R., Chenot, D., Hill, G., & Howell, C. (2011). Momentary happiness: The role of psychological need satisfaction. *Journal of Happiness Studies, 12*, 1-15. doi:10.1007/s10902-009-9166-1

Ilardi, B. C., Leone, D., Kasser, T., & Ryan, R. M. (1993). Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *Journal of Applied Social Psychology, 23*(21), 1789-1805. doi:10.1111/j.1559-1816.1993.tb01066.x

Kline, T. J. B. (2005). *Psychological testing: A practical approach to design and evaluation*. Thousand Oaks, CA: Sage Publications, Inc.

Klonsky, E. D. (2007a). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review, 27*(2), 226-239. doi:10.1016/j.cpr.2006.08.002

Klonsky, E. D. (2007b). Non-suicidal self-injury: An introduction. *Journal of Clinical Psychology, 63*(11), 1039-1043. doi:10.1002/jclp.20411

Klonsky, E. D., & Olino, T. M. (2008). Identifying clinically distinct subgroups of self-injurers among young adults: A latent class analysis. *Journal of Consulting and Clinical Psychology, 76*, 22-27. doi:10.1037/0022-006X.76.1.22

Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's behavior: The differential effects of controlling vs. informational styles on intrinsic motivation and creativity. *Journal of Personality, 52*(3), 233-248. doi:10.1111/j.1467-6494.1984.tb00879.x

Lewis, S. P., & Heath, N. L. (2015). Nonsuicidal self-injury among youth. *The Journal of Pediatrics, 166*(3), 526-530. doi:10.1016/j.jpeds.2014.11.062

Lewis, S. P., Heath, N. L., Michal, N. J., & Duggan, J. M. (2012). Non-suicidal self-injury, youth, and the Internet: What mental health professionals need to know. *Child and Adolescent Psychiatry and Mental Health, 6*(13), 1-9. doi:10.1186/1753-2000-6-13

Lewis, S. P., & Michal, N. J. (2014). Start, stop, and continue: Preliminary insight into the appeal of self-injury e-communities. *Journal of Health Psychology*. Advance online publication. doi:10.1177/1359105314527140

Lloyd-Richardson, E. E. (2008). Adolescent nonsuicidal self-injury: Who is doing it and why? *Journal of Developmental & Behavioral Pediatrics, 29*(3), 216-218. doi:10.1097/DBP.0b013e318173a5c1

Martin, J., Bureau, J.-F., Cloutier, P., & Lafontaine, M.-F. (2011). A comparison of invalidating family environment characteristics between university students engaging in self-injurious thoughts & actions and non-self-injuring university students. *Journal of Youth and Adolescence, 40*(11), 1477-1488. doi:10.1007/s10964-011-9643-9

Meyer, B., Enström, M. K., Harstveit, M., Bowles, D. P., & Beevers, C. G. (2007). Happiness and despair on the catwalk: Need satisfaction, well-being, and personality adjustment among fashion models. *The Journal of Positive Psychology, 2*, 2-17. doi:10.1080/17439760601076635

Milyavskaya, M., & Koestner, R. (2011). Psychological needs, motivation, and well-being: A test of self-determination theory across multiple domains. *Personality and Individual Differences, 50*(3), 387-391. doi:10.1016/j.paid.2010.10.029

Muehlenkamp, J., Brausch, A., Quigley, K., & Whitlock, J. (2013). Interpersonal features and functions of nonsuicidal self-injury. *Suicide and Life-Threatening Behavior, 43*, 67-80. doi:10.1111/j.1943-278X.2012.00128.x

Muehlenkamp, J., Hoff, E., Licht, J.-G., Azure, J., & Hasenzahl, S. (2008). Rates of non-suicidal self-injury: A cross-sectional analysis of exposure. *Current Psychology, 27*(4), 234-241. doi:10.1007/s12144-008-9036-8

Nixon, M. K., & Heath, N. L. (2009). Assessment of nonsuicidal self-injury in youth. In M. K. Nixon, & N. L. Heath (Eds.), *Self-injury in youth: The essential guide to assessment and intervention* (pp. 143-170). New York, NY: Routledge/Taylor & Francis Group.

Nock, M. K. (2008). Actions speak louder than words: An elaborated theoretical model of the social functions of self-injury and other harmful behaviors. *Applied and Preventive Psychology, 12*(4), 159-168. doi:10.1016/j.appsy.2008.05.002

Nock, M. K. (2009). Why do people hurt themselves?: New insights into the nature and functions of self-injury. *Current Directions in Psychological Science, 18*(2), 78-83. doi:10.1111/j.1467-8721.2009.01613.x

Nock, M. K., Joiner, T. E., Jr., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research, 144*, 65-72. doi:10.1016/j.psychres.2006.05.010

Nock, M. K., & Prinstein, M. J. (2004). A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology, 72*(5), 885-890. doi:10.1037/0022-006X.72.5.885

Paul, E., Tsypes, A., Eidlitz, L., Ernhout, C., & Whitlock, J. (2015). Frequency and functions of non-suicidal self-injury: Associations with suicidal thoughts and behaviors. *Psychiatry Research, 225*(3), 276-282. doi:10.1016/j.psychres.2014.12.026

Perez, J., Venta, A., Garnaat, S., & Sharp, C. (2012). The Difficulties in Emotion Regulation Scale: Factor structure and association with nonsuicidal self-Injury in adolescent

inpatients. *Journal of Psychopathology and Behavioral Assessment, 34*(3), 393-404. doi:10.1007/s10862-012-9292-7

Polk, E., & Liss, M. (2007). Psychological characteristics of self-injurious behavior. *Personality and Individual Differences, 43*(3), 567-577. doi:10.1016/j.paid.2007.01.003

Prinstein, M. J. (2008). Introduction to the special section on suicide and nonsuicidal self-injury: A review of unique challenges and important directions for self-injury science. *Journal of Consulting and Clinical Psychology, 76*, 1-8. doi:10.1037/0022-006X.76.1.1

Przybylski, A. K., Deci, E. L., Rigby, C. S., & Ryan, R. M. (2014). Competence-impeding electronic games and players' aggressive feelings, thoughts, and behaviors. *Journal of Personality and Social Psychology, 106*(3), 441-457. doi:10.1037/a0034820

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*(4), 419-435. doi:10.1177/0146167200266002

Rodham, K., & Hawton, K. (2009). Epidemiology and phenomenology of nonsuicidal self-injury. In M. K. Nock (Ed.), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 37-62). Washington, DC: American Psychological Association.

Ross, S., & Heath, N. (2002). A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence, 31*, 67-77. doi:10.1023/A:1014089117419

Ross, S., Heath, N. L., & Toste, J. R. (2009). Non-suicidal self-injury and eating pathology in high school students. *American Journal of Orthopsychiatry, 79*, 83-92. doi:10.1037/a0014826

Rotolone, C., & Martin, G. (2012). Giving up self-injury: A comparison of everyday social and personal resources in past versus current self-injurers. *Archives of Suicide Research, 16*(2), 147-158. doi:10.1080/13811118.2012.667333

Ryan, R. M., & Deci, E. L. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78. doi:10.1037/0003-066X.55.1.68

Serras, A., Saules, K. K., Cranford, J. A., & Eisenberg, D. (2010). Self-injury, substance use, and associated risk factors in a multi-campus probability sample of college students. *Psychology of Addictive Behaviors, 24*, 119-128. doi:10.1037/a0017210

Sheldon, K. M., Ryan, R., & Reis, H. T. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin, 22*(12), 1270-1279. doi:10.1177/01461672962212007

Sher, L., & Stanley, B. (2009). Biological models of nonsuicidal self-injury. In M. K. Nock (Ed.), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 99-116). Washington, DC: American Psychological Association.

Swannell, S. V., Martin, G. E., Page, A., Hasking, P., & St John, N. J. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide and Life-Threatening Behavior, 44*(3), 273-303. doi:10.1111/sltb.12070

Taliaferro, L. A., & Muehlenkamp, J. J. (2015). Factors associated with current versus lifetime self-injury among high school and college students. *Suicide and Life-Threatening Behavior, 45*, 84-97. doi:10.1111/sltb.12117

van der Kolk, B. A., Perry, J. C., & Herman, J. L. (1991). Childhood origins of self-destructive behavior. *American Journal of Psychiatry, 148*(12), 1665-1671. doi:10.1176/ajp.148.12.1665

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263-280. doi:10.1037/a0032359

Véronneau, M. H., Koestner, R. F., & Abela, J. R. Z. (2005). Intrinsic need satisfaction and well–being in children and adolescents: An application of the self–determination theory. *Journal of Social and Clinical Psychology, 24*(2), 280-292. doi:10.1521/jscp.24.2.280.62277

Victor, S., Styer, D., & Washburn, J. (2015). Characteristics of nonsuicidal self-injury associated with suicidal ideation: Evidence from a clinical sample of youth. *Child and Adolescent Psychiatry and Mental Health, 9*(20), 1-8. doi:10.1186/s13034-015-0053-8

Wei, M., Shaffer, P. A., Young, S. K., & Zakalik, R. A. (2005). Adult attachment, shame, depression, and loneliness: The mediation role of basic psychological needs satisfaction. *Journal of Counseling Psychology, 52*(4), 591-601. doi:10.1037/0022-0167.52.4.591

Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics, 117*(6), 1939-1948. doi:10.1542/peds.2005-2543

Whitlock, J., & Knox, K. L. (2007). The relationship between self-injurious behavior and suicide in a young adult population. *Archives of Pediatrics & Adolescent Medicine, 161*(7), 634-640. doi:10.1001/archpedi.161.7.634

Whitlock, J., Muehlenkamp, J., & Eckenrode, J. (2008). Variation in nonsuicidal self-injury: Identification and features of latent classes in a college population of emerging adults. *Journal of Clinical Child & Adolescent Psychology, 37*(4), 725-735. doi:10.1080/15374410802359734

Whitlock, J., Muehlenkamp, J., Eckenrode, J., Purington, A., Baral Abrams, G., Barreira, P., & Kress, V. (2013). Nonsuicidal self-injury as a gateway to suicide in young adults. *Journal of Adolescent Health, 52*(4), 486-492. doi:10.1016/j.jadohealth.2012.09.010

Whitlock, J., Muehlenkamp, J., Purington, A., Eckenrode, J., Barreira, P., Baral Abrams, G., . . . Knox, K. (2011). Nonsuicidal self-injury in a college population: General trends and sex differences. *Journal of American College Health, 59*(8), 691-698. doi:10.1080/07448481.2010.529626

Whitlock, J., Prussien, K., & Pietrusza, C. (2015). Predictors of self-injury cessation and subsequent psychological growth: Results of a probability sample survey of students in eight universities and colleges. *Child and Adolescent Psychiatry and Mental Health, 9*, 1-12. doi:10.1186/s13034-015-0048-5

Yates, T. M., Tracy, A. J., & Luthar, S. S. (2008). Nonsuicidal self-injury among "privileged" youths: Longitudinal and cross-sectional approaches to developmental process. *Journal of Consulting and Clinical Psychology, 76*, 52-62. doi:10.1037/0022-006X.76.1.52

Yurkowski, K., Martin, J., Levesque, C., Bureau, J.-F., Lafontaine, M.-F., & Cloutier, P. (2015). Emotion dysregulation mediates the influence of relationship difficulties on non-suicidal self-injury behavior in young adults. *Psychiatry Research*. Advance online publication. doi:10.1016/j.psychres.2015.05.006

Zetterqvist, M., Lundh, L.-G., & Svedin, C. (2013). A comparison of adolescents engaging in self-injurious behaviors with and without suicidal intent: Self-reported experiences of adverse life events and trauma symptoms. *Journal of Youth and Adolescence, 42*(8), 1257-1272. doi:10.1007/s10964-012-9872-6

Table 1

Means and Standard Deviations of DERS and CINSS Subscales for Control and NSSI Groups

Variable	Control (n = 46)	NSSI (n = 40)
	M(SD)	*M*(SD)
Non-acceptance	10.89(3.78)	16.78(5.86)
Goal	13.74(4.43)	17.80(4.47)
Impulse	9.85(3.58)	14.60(5.21)
Awareness	12.89(4.80)	15.58(4.61)
Strategies	15.02(4.56)	23.35(6.72)
Clarity	10.65(2.55)	14.05(3.54)
Autonomy	30.85(5.14)	28.00(5.18)
Competence	31.65(5.77)	26.50(6.06)
Relatedness	45.04(7.73)	40.78(7.68)

Table 2

Correlations Between Study Variables for Control Group

Variable	1	2	3	4	5	6	7	8	9
1. Non-acceptance	--								
2. Goal	.295*	--							
3. Impulse	.507**	.171	--						
4. Awareness	.444**	.220	.440**	--					
5. Strategies	.577**	.623**	.493**	.402**	--				
6. Clarity	.543**	.354*	.363*	.673**	.583**	--			
7. Autonomy	-.474**	-.313*	-.308*	-.546**	-.583**	-.498**	--		
8. Competence	-.370*	-.427**	-.098	-.555**	-.562**	-.542**	.697**	--	
9. Relatedness	-.221	-.361*	-.287	-.346*	-.607**	-.354*	.733**	.675**	--

*p< .05, **p < .01

Table 3
Correlations Between Study Variables for NSSI Group

Variable	1	2	3	4	5	6	7	8	9
1. Non-acceptance	--								
2. Goal	.354*	--							
3. Impulse	.361*	.419**	--						
4. Awareness	.132	.038	.228	--					
5. Strategies	.375*	.588**	.747**	.182	--				
6. Clarity	.410**	.359*	.234	.420**	.306*	--			
7. Autonomy	-.240	-.179	-.350*	-.167	-.381*	-.035	--		
8. Competence	-.170	-.130	-.085	-.183	-.120	-.169	.668**	--	
9. Relatedness	.030	-.171	-.041	-.289	-.141	-.238	.476**	.527**	--

*p< .05, **p < .01

Table 4

Logistic Regression Analysis of NSSI Group Membership as a Function of Emotion Dysregulation and Need Satisfaction Variables

Variables	*B*	Wald Chi Square	Exp(*B*)[a]	95% CI[b]	
				Lower	Upper
Step 1					
Non-acceptance	.08	.98	1.08	.92	1.27
Goal	-.01	.02	.99	.85	1.15
Impulse	.03	.10	1.03	.86	1.23
Awareness	-.06	.62	.94	.81	1.10
Strategies	.18	4.22*	1.19	1.01	1.41
Clarity	.23	2.67	1.26	.96	1.65
Step 2					
Autonomy	.23	4.10	1.25	1.00	1.56
Competence	-.25	6.20*	.78	.64	.95
Relatedness	.03	.16	1.03	.90	1.17

Strategies retained significance in Step 2. Change in -2 Log Liklihood = 67.290, $p < .05$

[a] Exp(*B*) = Odds ratio for each predictor

[b] Confidence interval is created around Exp(*B*), statistically significant if 1 is not in the interval.

*$p < .05$

Bridging Manuscripts

Self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) makes predictions for optimal functioning and well-being for all individuals across the lifespan while emphasizing the role of the social context. Considering its well-supported theoretical tenets and the overlap between the SDT and NSSI literatures, it seems likely that SDT would be a strong compliment to existing emotion regulation based models of NSSI and would extend our knowledge on this prevalent public health phenomenon. Thus, the purpose of this program of research was to apply self-determination theory in order to broaden and extend our understanding of NSSI. The first step in establishing this program of research (Manuscript 1) was to examine the role of satisfaction of self-determination theory's three basic needs in the prediction of NSSI history over and above the well-established risk factor of emotion dysregulation. Study 1, as addressed above, showed that perceived satisfaction of autonomy, competence, and relatedness reliably distinguished between young adults with and without a history of NSSI. Furthermore, findings showed that satisfaction of the need for competence predicted NSSI history over and above emotion dysregulation factors, thus, lending support for the inclusion of a self-determination theory framework in the NSSI domain. Although NSSI is prevalent in young adults, the developmental period of adolescence represents a time of heightened risk for the onset, maintenance, and cessation of NSSI (Heath et al., 2009; Plener et al., 2015; Rodham & Hawton, 2009). Furthermore, although cross-sectional research is important to further our understanding of NSSI, there is a great need in the field for longitudinal designs where the onset, maintenance, and cessation of NSSI can be examined (Jacobson & Gould, 2007; Nock, 2012). Therefore, after establishing the value of applying SDT to examine NSSI in a cross-sectional sample of community young adults, the next step in this line of inquiry

is to apply SDT to further our understanding of NSSI in a longitudinal sample of community young adolescents. Specifically, Manuscript 2 explores group differences in need satisfaction as a function of NSSI status and explores how changes in satisfaction of autonomy, competence, and relatedness over a 12-month period may correspond to changes in NSSI onset and cessation.

CHAPTER 3

MANUSCRIPT 2

The Role of Basic Need Satisfaction in the Onset, Maintenance, and Cessation of NSSI: An Application of Self-Determination Theory

A. Ann Emery, Nancy L. Heath, and Devin Mills

Department of Educational and Counselling Psychology

McGill University

Montreal, QC

Abstract

The present study applied self-determination theory (SDT; Deci & Ryan, 1985, 2000; Ryan & Deci, 2000b) to examine the onset, maintenance, and cessation of NSSI in adolescents. Adolescents' reported satisfaction of the needs for autonomy, competence, and relatedness and their NSSI status was assessed at two time points over a 12-month period. Participants were classified into the NSSI Maintain (n = 30, 93% female), NSSI Start (n = 44, 80% female), NSSI Stop (n = 21, 62% female), or Control (no-NSSI history of NSSI, n = 98, 80% female) groups based on NSSI status over the study period. Results of a 4 (NSSI Maintain, NSSI Start, NSSI Stop, Control) x 2 (Time 1 and Time 2) repeated measures multiple analysis of variance (MANOVA) revealed a main effect of time, Wilks' $\lambda = .95$, $F(3, 187) = 3.31$, $p = .02$, $\eta p^2 = .05$, univariate follow up revealed this was due to decreases in the satisfaction of the need for competence over time in all adolescents, regardless of group status. Results also revealed a main effect of group membership, Wilks' $\lambda = .78$, $F(9, 455) = 5.50$, $p = .000$, $\eta p^2 = .08$,. Univariate follow up revealed that adolescents who maintained NSSI behaviour over the course of the study reported significantly lower levels of the satisfaction of autonomy, competence, and relatedness compared to adolescents reporting no history of NSSI engagement, and adolescents who began NSSI over the course of the study reported significantly lower levels of satisfaction of the needs for autonomy and competence compared to those reporting no history of NSSI engagement. Participants in the NSSI Stop group reported higher need satisfaction than participants in the Maintain and Start groups and lower satisfaction than participants who did not have a history of NSSI, however, these differences were not statistically significant. Contrary to hypotheses, there was no significant group x time interaction. This research is the first to apply a self-determination theory perspective to the study of NSSI in adolescents, finding that need

satisfaction varies as a function of NSSI status. These initial findings give preliminary support for the application of self-determination theory as a framework in which to further our understanding of NSSI onset, maintenance, and cessation.

The Role of Basic Need Satisfaction in the Onset, Maintenance, and Cessation of NSSI: An Application of Self-Determination Theory

Non-suicidal self-injury (NSSI), defined as the deliberate destruction of body tissue without the intent to die and for purposes not socially sanctioned (American Psychiatric Association, 2013), is a growing public health concern. Adolescence is a time of particular risk for NSSI and corresponds to the developmental period in which age of onset peaks (Lewis & Heath, 2015; Rodham & Hawton, 2009; Ross & Heath, 2002; Whitlock, Eckenrode, & Silverman, 2006). Lifetime prevalence rates in adolescent community samples range from 13% to 39% (e.g., Hankin & Abela, 2011; Heath, Toste, Nedecheva, & Charlebois, 2008; Klonsky & Muehlenkamp, 2007; Lloyd-Richardson, 2008; Plener, Libal, Keller, Fegert, & Muehlenkamp, 2009; Yates, Tracy, & Luthar, 2008). Past year prevalence rates in adolescent community samples range from 7% to 12% (e.g., Andrews, Martin, Hasking, & Page, 2013; Duggan, Heath, & Hu, 2015; Hankin & Abela, 2011; Tatnell, Kelada, Hasking, & Martin, 2014). Results from a recent meta-analysis found that after controlling for methodological differences across studies, 17.2 % of adolescents report ever having engaged in NSSI (Swannell, Martin, Page, Hasking, & St John, 2014). Investigating the factors that influence the onset, maintenance, and cessation of NSSI would be imperative in informing prevention and intervention strategies.

While cross-sectional designs have compared past versus current self-injurers to examine differences that may account for cessation (e.g., Brown, Williams, & Collins, 2007; Rotolone & Martin, 2012; Taliaferro & Muehlenkamp, 2015; Whitlock, Prussien, & Pietrusza, 2015), longitudinal designs are essential if one truly wants to understand the incidence and changes of NSSI over time. Prospective designs offer insight into the direction and causation of a relationship, and provide the opportunity to investigate onset, maintenance, and cessation within

individuals. Little is known about the longitudinal course of NSSI among adolescents (Jacobson & Gould, 2007), however some recent research has provided insight into which factors may be particularly salient to NSSI onset, maintenance, and cessation in this population.

Longitudinal Research investigating NSSI Onset, Maintenance, and Cessation

A recent review of longitudinal investigations of NSSI and deliberate self-harm emphasized the nascent state of our understanding of NSSI development and cessation (Plener, Schumacher, Munz, & Groschwitz, 2015). Across longitudinal studies, the methodology, predictors measured, and length between follow-ups vary widely as do the findings across samples (Plener et al., 2015). Some consistently measured variables associated with NSSI onset, maintenance, and cessation are depressive symptoms, self-esteem, support, and emotion dysregulation. For example, Duggan et al. (2015) found that adolescents who stopped engaging in NSSI over a year period reported significantly lower levels of depressive symptoms and emotion dysregulation compared to adolescents who continued to engage in NSSI over the year. Baseline aspects of emotion regulation were also found to distinguish between cessation and maintenance of NSSI in a community sample of Australian adolescents (Andrews et al., 2013). In their longitudinal study, Andrews et al. (2013) compared adolescents who reported engaging in NSSI at two time points over a 12-month period with those who reported discontinuing the behaviour at follow up. Results of paired t-tests indicated that aspects of NSSI severity such as frequency, potential lethality, and number of methods significantly increased over time for adolescents who continued NSSI engagement. Furthermore, results of a logistic regression revealed lower cognitive reappraisal and higher emotional suppression increased the odds of maintaining NSSI engagement over the course of the study. However, adolescents who began

engaging in NSSI over the course of the study were excluded from analyses, thus, conclusions could not be made with regards to NSSI onset.

In order to examine NSSI onset in adolescents, Hankin and Abela (2011) applied Nock's (2009) conceptual model of NSSI that hypothesizes that both distal and proximal risk factors influence stressors that may contribute to NSSI. Hankin and Abela (2011) examined prospective models to predict NSSI onset in community adolescents over a two and a half year period. Results of a multivariate logistic regression indicated a negative cognitive style at baseline, depressive symptoms at follow up, and lack of social support was found to predict new onset of NSSI (Hankin & Abela, 2011).

Indeed, social support from both family and peers seem to be particularly salient factors associated with NSSI onset and cessation. In a large community sample of Chinese adolescents, You and Leung (2012) found that perceived family invalidation at Time 1 was associated with the occurrence of NSSI at Time 2 two years later. Unfortunately, NSSI was only assessed at Time 2 when adolescents were asked to indicate whether or not they had engaged in the behaviour in the past two years. Thus, conclusions regarding onset, maintenance, and cessation could not be drawn. Tatnell et al. (2014) also investigated family and peer support at two time points over a 12-month interval and assessed NSSI status at both times. Drawing from Nock's (2009) model as well as Linehan's (1993) biosocial model that posits emotion regulation deficits stemming from an invalidating family environment as being central to the development of NSSI, Tatnell et al. (2014) examined whether interpersonal distal factors (attachment and social support from friends, family, and significant others) and intrapersonal proximal factors (emotion regulation, self-efficacy, and self-esteem) could differentiate between adolescents who start, stop, and maintain NSSI behaviours over the one year period. Results from two doubly

multivariate analyses revealed that NSSI onset was associated with a decrease in self-esteem, family support, support from friends, support from significant others, and an increase in emotional suppression over time. NSSI maintenance was associated with a decrease in self-esteem over time, and NSSI cessation was associated with an increase in self-efficacy and in family support over time. Tatnell and colleagues' findings show that fluctuations in both intrapersonal proximal and interpersonal distal factors have an effect on the onset, maintenance, and cessation of NSSI.

Further examining the influence of proximal and distal factors on NSSI, Garisch and Wilson (2015), surveyed New Zealand youth twice over a five-month period. Results of cross-lag panel analyses revealed that distal factors such as bullying became non-significant predictors over time whereas proximal factors such as depressive symptoms and self-esteem remained important. It could be that while distal factors associated with the environment may contribute to the onset of NSSI, engagement in NSSI itself increases depressive symptoms and lowers self-esteem so much so that even when environmental factors improve, NSSI continues. Further research is needed to determine if this is the case. Overall, initial longitudinal research suggests that as adolescents' support, self-esteem, self-efficacy, depressive symptoms, and emotion regulation change, so too may their NSSI status.

Longitudinal investigation into NSSI onset, maintenance, and cessation has for the most part been guided by emotion regulation models such as Linehan's (1993) biosocial model and by Nock's (2009) model of proximal and distal factors. The present study presents self-determination theory (SDT; Deci & Ryan, 1985, 2000; Ryan & Deci, 2000b) as a complementary perspective to the Linehan and Nock models and suggests that SDT can further

our understanding of NSSI onset, maintenance, and cessation factors and can offer a well-established framework in which to explain the underlying mechanisms of observed associations.

Self-determination theory provides a broad theory of motivation, personality, and development that applies to all humans; an aspect that is relevant considering the high prevalence rates of NSSI in nonclinical samples. Furthermore, fluctuations in SDT's basic needs have been associated with fluctuations in adaptive and maladaptive outcomes such as well-being, quality of life, burn out, and binge eating (Amorose, Anderson-Butcher, & Cooper, 2009; Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014; Gillison, Standage, & Skevington, 2008; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Finally, many of the factors identified in the NSSI literature as associated with the onset, maintenance, and cessation of NSSI are conceptually related to SDT's basic needs of autonomy (e.g., family invalidation), competence (e.g., self-efficacy, self-esteem), and relatedness (e.g., support), suggesting that SDT may be a particularly useful lens under which to examine NSSI.

Self-Determination Theory

Self-determination theory (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000b) is an organismic approach built on the assumption that people are actively involved in their own development with evolved tendencies towards growth and mastery. Basic psychological needs theory (BPNT), a mini theory within the formal self-determination theory, outlines three universal, innate needs that serve as the avenue through which the social context influences development throughout the lifespan: autonomy, competence, and relatedness. The need for autonomy is understood as our need for feeling that we are acting out of our own volition and in accordance with our personal values as opposed to feeling as though our behaviour stems from coercion or pressure (Grolnick & Raferty-Helmer, 2013). The need for competence reflects our

inherent desire to feel effective when interacting with our environment (Deci & Ryan, 2000). It follows that when our need for competence is fulfilled, feelings of self-efficacy and self-esteem may be at the center of more general feelings of well-being. The need for relatedness is our need for deep and meaningful connections with close others, as well as a need for broader connections to society in general. This need is satisfied when we experience social support and feel close to others (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000a). BPNT posits that all three needs are essential; when they are fulfilled via the social context, an individual is in the position to maintain optimal functioning and achieve positive personal growth. However, when any one need is thwarted, an individual's overall well-being and psychological health are at risk (Ryan & Deci, 2000a).

Although SDT has never been directly applied to the study of NSSI, the three basic needs as well as parental autonomy support have been shown to be associated with depressive symptoms (which are closely related to NSSI e.g., Claes, Luyckx, Baetens, Van De Ven, & Witteman, 2015; Duggan et al., 2015; Hankin & Abela, 2011; You & Leung, 2012) in children and adolescents (Emery, Toste, & Heath, 2015; Van der Giessen, Branje, & Meeus, 2014; Véronneau, Koestner, & Abela, 2005). Similarly, self-determination was recently supported as a protective factor against suicidal ideation (Bureau, Mageau, Vallerand, Rousseau, & Otis, 2012), another phenomenon closely related to NSSI (M. Z. Brown, Comtois, & Linehan, 2002; Hawton et al., 2012; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Paul, Tsypes, Eidlitz, Ernhout, & Whitlock, 2015; Sher & Stanley, 2009). Considering these overlaps between the SDT and NSSI literatures, it seems likely that SDT may be a useful paradigm in which to conceptualize NSSI. SDT's emphasis on the distal social context may hold explanatory power for the cyclical starts and stops that typify NSSI behaviour (Walsh, 2006).

The Present Study

Thus, the overall objective of the present study was to apply a self-determination theory perspective to further our understanding of factors associated with NSSI onset, maintenance, and cessation in adolescents. Specifically we wanted to examine group differences in reported need satisfaction as a function of NSSI status and to examine how changes in satisfaction of autonomy, competence, and relatedness over time may correspond to changes in NSSI onset and cessation. Based on self-determination theory and empirical research within the SDT and NSSI literatures, it was hypothesized that: (a) reports of satisfaction of the needs for autonomy, competence, and relatedness would significantly differ based on NSSI status such that adolescents who engage in NSSI would report lower need satisfaction compared to adolescents with no NSSI history; and, (b) reports of satisfaction of the needs for autonomy, competence, and relatedness would vary as a function of NSSI status over time such that adolescents who begin NSSI will report a decrease in need satisfaction and adolescents who stop NSSI will report an increase in need satisfaction.

Method

Participants

An a priori power analysis using the G*power version 3.1.9.2 computer program (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that a total sample of 112 participants would be needed to have .95 power for detecting a large sized effect when employing the traditional .05 criterion for statistical significance. The current study represents a subset of data collected over two years as part of a larger three-year longitudinal investigation on stress and coping strategies in young adolescents. Participants were recruited from 15 high schools in and around Montreal, Quebec. The overall sample at Time 1 of the present study when participants were in grade 8

consisted of 730 participants (55.9% female) with a mean age of 13.43 years (SD = 0.50). Participants reported their birthplace as Canada (96%), followed by the United States (1%), and other countries (3%). Of the overall sample at Time 1, 139 participants (19.0%) indicated having engaged in NSSI at least once in their lifetime and 65 participants (8.9%) indicated currently engaging in the behaviour. Of the 65 participants who reported currently engaging in NSSI, 27% reported having engaged in NSSI once, 25% reported two to four times, 21% reported five to ten times, 19% reported eleven to fifty times, and 8% reported fifty-one to one-hundred times. From the participants at T1 who reported currently engaging in NSSI, 36% reported engaging in the behavior within the last three months.

Of the 730 participants who participated at T1, 686 (94.0%) participated at T2 when students were in 9th grade. Participants at T2 (56.9% female) had a mean age of 14.50 years (SD = 0.51) and reported their birthplace as Canada (97%), followed by the United States (1%), and other countries (2%). Attrition was due to invalid questionnaires (n = 2), withdrawal (n = 14), absenteeism (n = 3), and moving to a different school (n = 25). Of the overall sample at Time 2, 130 participants (19.0%) indicated having engaged in NSSI at least once in their lifetime and 82 participants (12.0%) indicated currently engaging in the behaviour. Of the 82 participants who reported currently engaging in NSSI, 14% reported having engaged in NSSI once, 24% reported two to four times, 24% reported five to ten times, 17% reported eleven to fifty times, 15% reported fifty-one to one-hundred times, and 6% reported engaging in NSSI more than one-hundred times. From the participants at T2 who reported currently engaging in NSSI, 49% reported engaging in the behavior within the last three months.

Measures

All measures were administered at Time 1 and again 12 months later at Time 2.

NSSI screening questionnaire. The How I Deal with Stress Questionnaire (HIDS; Heath & Ross, 2007) is a 29-item self-report questionnaire developed to screen for self-injury. Each statement on the HIDS taps the frequency of use of both adaptive and maladaptive coping strategies on a four-point Likert scale ranging from 0 (*Never*) to 3 (*Frequently)*. NSSI is embedded within these statements as a coping strategy *("physically hurt myself on purpose"*). The HIDS also has a follow-up section in which participants are asked to provide additional information on NSSI and to indicate whether they had harmed themselves *without suicidal intent* to ensure reports of self-harm meet NSSI definition criteria. NSSI status was further confirmed through individual interviews conducted by a trained doctoral student. The HIDS has been used successfully in community settings to accurately screen for and identify youth who engage in NSSI (Cloutier & Humphreys, 2009; Ross & Heath, 2002). The HIDS questionnaire section examining the use of adaptive and maladaptive coping strategies for stress was found to have good internal consistency at both time points (31 items, T1 α =.77 and T2 α =.75). This is consistent with past research using the HIDS (i.e., α =.78; Heath, Ross, Toste, Charlebois, & Nedecheva, 2009).

Need fulfillment. Children's Intrinsic Need Satisfaction Scale (CINSS; Koestner & Véronneau, 2001; Véronneau, Koestner, & Abela, 2005; Appendix F). This 18-item questionnaire was adapted for use with child and adolescent populations from the Intrinsic Need Satisfaction Scale (Deci, et al., 2001a) and assesses children and adolescents' autonomy, competence, and relatedness across three contexts (i.e., at home, at school, and with peers). Participants respond to each question on a five-point Likert-scale, selecting whether each statement is "not at all true" (1), "slightly true" (2), "moderately true" (3), "mostly true" (4), or "completely true" (5). The scale consists of three 6-item subscales that represent the intrinsic

needs proposed by SDT: autonomy, competence, and relatedness. The autonomy subscale measures the extent to which the participant feels as if they act with volition (e.g., "I feel free to express myself at home"), while the competence subscale considers the extent to which the participant feels that they can master tasks and activities (e.g., "I feel I do things well at school"), finally, the relatedness scale taps into the extent that the participant feels they are socially connected with important others (e.g., "my teachers like me and care about me").

Total scores on the CINSS range from 18 to 90, and subscale scores range from 6 to 30 with higher scores indicating higher levels of need satisfaction. When administered in previous research, there was evidence to suggest acceptable reliability within subscales (Milyavskaya et al., 2009). For the present study, reliability for each need subscale at T1 was as follows: autonomy $\alpha = .75$, competence $\alpha = .83$, and relatedness $\alpha = .70$. Reliability for each need subscale at T2 was as follows: autonomy $\alpha = .76$, competence $\alpha = .84$, and relatedness $\alpha = .73$.

Procedure

Following ethics board approval for the longitudinal project, presentations were made in grade 7 classes in the 15 schools who had agreed to take part in the research project. Students were invited to participate in the three-year project examining stress and coping upon the transition to high school. Risks and benefits of participation were described as well as the potential time commitment, confidentiality, goals and objectives, and methodology. Students learned that those who completed the Standard Assessment Battery (SAB; see description below) would be entered to win one of four $50 gift cards to Famous Players and that those selected for individual follow-up interviews would receive a ten-dollar gift certificate to Subway, Tim Hortons, Chapters, or iTunes. While students were encouraged to participate, they were informed that they have the option to withdraw from the study at any time. It was also emphasized that

their participation would have no bearing on any class grades or evaluation. Students had the opportunity to ask questions and express any concerns at that time and were provided with an informed consent form (see Appendix G) detailing the project for their parents. Students received a small chocolate bar for returning signed forms and were entered in a draw for one of two gift cards to a local shopping mall valued at $100 and $200, regardless of whether or not their parents had agreed to their participation.

Students completed questionnaires at three time points that corresponded to their grade 7th, 8th, and 9th years. The present study includes the two time points when participants were in grades 8 and 9. At each time point, the data collection procedure was identical. Students whose parents had given consent were invited to the cafeteria of their school for the completion of the SAB. Participants were seated spaced out throughout the cafeteria with black cardboard dividers for privacy. Prior to completing questionnaires, participants were asked to provide assent (Appendix H). The potential risks and benefits of participation were explained as well as the terms under which confidentiality would be broken. Participants who did not give assent went back to their regular classrooms. The SAB consisted of the HIDS and CINSS among other measures (which were part of the larger study). The SAB sessions took approximately 60 minutes to complete and occurred during school hours. The SAB session provided information regarding NSSI group classification. A follow-up interview was completed with participants who completed the screening to further confirm NSSI status. The interviews were conducted by doctoral students in school psychology who were trained by a clinician due to the sensitive nature of sections of the interview (i.e., items tapping NSSI severity and suicidality). Confidentiality was broken only in the event that the participant indicated to the interviewer that they were at harm to themselves or to others. Once confidentiality was broken, the participant

was informed and transitioned to a pre-determined school mental health professional (i.e., school psychologist, school counsellor) that was aware of the nature of the project.

Results

Prior to conducting analyses, all variables were examined through SPSS 22 for the accuracy of data entry, detect missing values, and fit between their distributions and assumptions of multivariate analyses. Questionnaires were considered to be invalid and participants were not included in group classification if more than 5% of their data on the CINSS at either T1 or T2 was missing. If 5% or less of the data was missing, missing values were estimated using the regression method in SPSS 22.

NSSI Group Classification

To address our study objectives, four groups were created based on NSSI status at two time points over a 12-month period. Of the 730 participants who participated at Time 1, 686 (94.0%) completed the assessments at Time 2 (12 months later) when students were in grade 9. At Time 1, 65 students reported currently engaging in NSSI. Of these 65 participants, 30 reported engaging in NSSI (93% female) at T2 and were classified in the NSSI Maintain group. An additional 21 participants (62% female) reported stopping the behavior at T2 and were classified in the NSSI Stop group. Fourteen participants were removed from analysis due to invalid data or ambiguous responses that did not allow for clear group classification. Furthermore, 44 participants (80% female) reported engaging in NSSI at T2 but not at T1 and were classified in the NSSI Start group. A comparison group of adolescents (n = 98, 80% female) who reported no NSSI history was created from the same pool of participants and matched on gender through random number generation. Table 1 presents the means and standard

deviations of the variables by classification group for T1. Table 2 presents the means and standard deviations of the variables by classification group for T2.

The Relationship Between Need Satisfaction and NSSI

To investigate group differences in need satisfaction over time, a 4 (NSSI Maintain, NSSI Start, NSSI Stop, Control) x 2 (Time 1 and Time 2) repeated measures multiple analysis of variance (MANOVA) was conducted. The dependent variables were the three subscales of the CINSS representing the satisfaction of the three basic needs (i.e., autonomy, competence, and relatedness) with the group as the independent variable. Results from the repeated measures MANOVA showed that the main effect for time was significant, Wilks' $\lambda = .95$, $F\ (3, 187) = 3.31$, $p = .02$, $\eta p^2 = .05$, observed power = .75. A closer examination of univariate effects indicated that competence significantly decreased over time, regardless of group membership. No difference was observed in the satisfaction of autonomy or relatedness over time. See Table 3 for a summary of univariate effects.

Supporting our hypothesis, the main effect for group was also significant, Wilks' $\lambda = .78$, $F\ (9, 455) = 5.50$, $p = .000$, $\eta p^2 = .08$, observed power = .99. A closer examination of the between-subjects effects indicated that significant group differences existed on all three need subscales (i.e., autonomy, competence, and relatedness). See Table 3 for a summary of between group effects. A Sidak post hoc analysis was conducted to investigate which groups differed on reports of autonomy, competence, and relatedness. Sidak analysis was chosen to compare all possible pairs of means because it has slightly more power when compared to Bonferonni (Sidak, 1967). Participants in the NSSI Maintain group reported significantly lower levels of the needs for autonomy, competence, and relatedness compared to participants in the Control group. Participants in the NSSI Start group reported significantly lower levels of the satisfaction of the

needs for autonomy and competence compared to the Control group. Participants in the NSSI Stop group did not significantly differ on their levels of need satisfaction compared to the other groups. Participants in the NSSI Maintain group did not significantly differ from participants in the NSSI Start group on their levels of reported need satisfaction.

Contrary to our hypothesis, no interaction effect was found between group and time, indicating that the differences in need satisfaction observed over time did not differ significantly as a function of group, Wilks' $\lambda = .97$, $F\ (9, 455) = .59$, $p = .ns$, $\eta p^2 = .01$, observed power = .24. See Figures 1, 2, and 3 for plots of groups' need satisfaction over time. This finding needs to be interpreted with caution in light of the very low observed power (see Table 3).

Discussion

The present study applied self-determination theory's basic psychological needs mini theory (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000b) as a theoretical framework to examine NSSI onset, maintenance, and cessation in adolescents. Adolescents' perceived need satisfaction (autonomy, competence, and relatedness) and NSSI engagement was assessed at two time points over a 12-month period. Specifically, the research objectives were to (a) examine group differences in need satisfaction as a function of NSSI status and (b), to examine how changes in satisfaction of autonomy, competence, and relatedness over time may correspond to changes in NSSI onset and cessation.

In support of our hypothesis, there was a significant main effect of NSSI group membership such that reported satisfaction of basic needs differed as a result of NSSI status. Adolescents who reported NSSI engagement at both time points (NSSI Maintain) reported significantly lower levels of satisfaction of the needs for autonomy, competence, and relatedness compared to adolescents who reported no history of NSSI engagement. Similarly, adolescents

who reported NSSI onset during the course of the study (NSSI Start) reported significantly lower levels of the satisfaction of the needs for autonomy and competence compared to adolescents who reported no history of NSSI engagement. This finding is in line with self-determination theory's tenet that when basic needs are not fulfilled via the social context, ill-being and maladaptive functioning result (Ryan & Deci, 2000a). Furthermore, although the present study represents the first investigation of the association between the satisfaction of SDT's basic needs and NSSI, the present findings support previous research finding associations between lower satisfaction of needs with increases in depressive symptoms (Emery et al., 2015; Véronneau et al., 2005), which are related to NSSI engagement (Claes et al., 2015; Duggan et al., 2015; Hankin & Abela, 2011; You & Leung, 2012).

Contrary to our hypothesis, adolescents who reported stopping NSSI behaviour over the course of the study (NSSI Stop) did not significantly differ on need satisfaction compared to adolescents with no history of NSSI. Although contrary to our initial hypothesis, it would make sense according to SDT that adolescents who stop NSSI behaviour may experience higher levels of need satisfaction compared to those who currently engage in the behaviour, making their levels more akin to controls. Indeed, cross-sectional research points to numerous well-being indices that differentiate those who have ceased self-injury from those who currently injure (Rotolone & Martin, 2012; Taliaferro & Muehlenkamp, 2015; Whitlock et al., 2015). However, our findings also showed that the NSSI Stop group did not significantly differ in their reports of need satisfaction compared to the other NSSI groups (Start and Maintain). Examination of the plotted means of each need in Figures 1, 2, and 3, show the Control group consistently reported the greatest satisfaction of each need, followed by the NSSI Stop group, the NSSI Start group, and the NSSI Maintain group who reported the lowest amount of need satisfaction. Thus, the

NSSI Stop group did consistently report lower need satisfaction in relation to the Control group, and higher need satisfaction in relation to the NSSI Start and Maintain groups, however, not significantly so. This makes sense under an SDT perspective where needs are satisfied via the current social context. Participants in the NSSI Stop group should be experiencing improvements in their environment such that their needs are being satisfied more than participants beginning or maintaining NSSI who would be experiencing deteriorating social contexts, but still less than participants who never engaged in the behaviour. After this transitioning period, one would expect significant differences in reported need satisfaction between the NSSI Stop and NSSI Start and Maintain groups, making the NSSI Stop participants more akin to controls, as the observed plots would suggest. Adding a third time point to the research design would be essential to capture this transition.

Results revealed a significant overall effect of Time on need satisfaction such that satisfaction of the need for competence decreased over time for all adolescents regardless of NSSI status. Time 1 and Time 2 of the present study mapped onto grades 8 and 9 for adolescent participants. It is likely that in these early high school years, adolescents continue to feel the reverberations from school transitioning. Going from elementary to high school, workload and difficulty often increase while teacher support decreases. Highlighting this, Alspaugh (1998) found that there was significant achievement loss in the transition from elementary to high school. It logically follows that Seidman, Allen, Aber, Mitchell, and Feinman (1994) found that transitioning to high school corresponded to decreases in self-esteem. It would make sense that as the present sample of young adolescents move up in grades and experience increased academic challenges, levels of competence decrease.

Finally, contrary to our hypothesis, the group x time interaction was not significant, indicating that levels of need satisfaction did not change significantly over time as a function of NSSI status. SDT does put forth causality orientations theory in order to explain more stable individual differences in how individuals orient to particular environments and thus continue to experience need satisfaction versus thwarting (Deci & Ryan, 1985). However, according to SDT, fulfillment of needs should also fluctuate depending upon environmental factors (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000b). Furthermore, these fluctuations in satisfaction should have direct results on well-being and ill-being as well as on adaptive and maladaptive behaviours. While an individual may engage in NSSI over many years, engagement is often cyclical in nature with episodes being separated by weeks, months, or sometimes years (Walsh, 2006). Working from an SDT perspective, it is likely that changes in need satisfaction may underlie these cyclical NSSI patterns. Thus, we anticipated that NSSI cessation would correspond to increases in need satisfaction over the period of the study whereas NSSI onset would correspond to decreases. An examination of the profile plots of satisfaction of each need over time in Figures 1, 2, and 3 do indicate a general trend in this direction. Although a priori power analyses indicated that our total sample size was adequate to give excellent power for detecting a large sized effect when employing.05 criterion for statistical significance, observed power for the interaction was very low (see Table 3), thus this non-significant result needs to be interpreted with caution. The addition of a third time point in the study design would be essential in increasing power in order to observe the interaction effect. As noted above, it is likely that NSSI Start and NSSI Stop participants are in transitional periods where their social contexts are beginning to deteriorate or to improve. Therefore, while a general trend may be apparent after one 12-month period, an additional time point would capture participants 12-

months after this transition when environmental changes and corresponding changes in need satisfaction are fully felt.

Limitations and Future Directions

The low observed power constitutes a limitation of the current study. Future longitudinal research should look to increase sample size and to add time points in order to increase power and examine the full transitions likely taking place. Increased time points would be of value both over a broader time span to capture NSSI onset and cessation and within a smaller time frame to investigate a range of NSSI characteristics. For example, daily diary methods recording need satisfaction and NSSI thoughts and behaviours on a day-to-day basis could explain how need satisfaction may affect fluctuations in NSSI frequency, severity, and number of methods. Next, although low levels of need satisfaction have been measured and associated with maladaptive outcomes and psychological distress (e.g., Costa, Soenens, Gugliandolo, Cuzzocrea, & Larcan, 2015; Przybylski, Deci, Rigby, & Ryan, 2014; Véronneau et al., 2005) the SDT literature has begun moving beyond this approach to include measures of need frustration to predict maladaptive outcomes (Vansteenkiste & Ryan, 2013). Need frustration is different from low need satisfaction in that needs are not simply left unfulfilled, but are actively thwarted within the social context. As the present study examines non-suicidal self-injury, measuring need satisfaction without also including a direct measure of need frustration is a limitation.

Future research could also look to include measures of depressive symptoms. In the present study, participants in the control group were matched on gender, however, considering the documented relationships between lowered need satisfaction and depressive symptoms and NSSI and depressive symptoms, not controlling for levels of depression is a limitation. Further, males

were underrepresented within the present sample. Future research should move beyond convenience sampling to ensure more male participants.

Conclusion

This study extends current thinking on NSSI engagement to include a self-determination theory approach. Despite limitations, the current research suggests that self-determination theory may be a relevant framework under which to conceptualize and understand the onset, maintenance, and cessation of NSSI. Initial findings suggest that levels of satisfaction of autonomy, competence, and relatedness differ as a function of NSSI status. Furthermore, although the group x time interaction was not significant, an examination of the general trends in reported need satisfaction over time by group suggest that changes in need satisfaction over time may be associated with NSSI onset and cessation.

Although there exist some significant overlaps between the SDT and NSSI literatures, this is the first study to explicitly apply SDT to further our understanding of NSSI. SDT is a well-established theoretical framework that has been applied across a variety of disciplines, cultures, and developmental periods. Its broad framework and various mini theories may provide new insights and directions informing future NSSI research paradigms. Conceptualizing NSSI onset, maintenance, and cessation within an SDT framework may also inform prevention and treatment strategies. Specifically, the present research points to the importance of promoting social environments in which adolescents experience need satisfaction.

In sum, although further replication and future investigation is needed, it appears that perceived satisfaction of autonomy, competence, and relatedness is associated with NSSI onset,

maintenance, and cessation in adolescents, and that self-determination theory may be useful in furthering our understanding of NSSI in this population.

References

Alspaugh, J. W. (1998). Achievement loss associated with the transition to middle school and high school. *The Journal of Educational Research, 92*, 20-25. doi:10.1080/00220679809597572

Amarose, A. J., Anderson-Butcher, D., & Cooper, J. (2009). Predicting changes in athletes' well-being from changes in need satisfaction over the course of a competitive season. *Research Quarterly for Exercise and Sport, 80,* 386-392. Retrieved from http://go.galegroup.com/ps/i.do?id= GALE%7CA203659327&v =2.1&u=crepuq_mcgill&it=r&p=EAIM&sw=w

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Andrews, T., Martin, G., Hasking, P., & Page, A. (2013). Predictors of continuation and cessation of nonsuicidal self-injury. *Journal of Adolescent Health, 53*, 40-46. doi:10.1016/j.jadohealth.2013.01.009

Boone, L., Vansteenkiste, M., Soenens, B., Van der Kaap-Deeder, J., & Verstuyf, J. (2014). Self-critical perfectionism and binge eating symptoms: A longitudinal test of the intervening role of psychological need frustration. *Journal of Counseling Psychology, 61*(3), 363-373. doi:10.1037/a0036418

Brown, M. Z., Comtois, K. A., & Linehan, M. M. (2002). Reasons for suicide attempts and nonsuicidal self-injury in women with borderline personality disorder. *Journal of Abnormal Psychology, 111*, 198-202. doi:10.1037/0021-843X.111.1.198

Brown, S. A., Williams, K., & Collins, A. (2007). Past and recent deliberate self-harm: Emotion and coping strategy differences. *Journal of Clinical Psychology, 63*(9), 791-803. doi:10.1002/jclp.20380

Bureau, J. S., Mageau, G. A., Vallerand, R. J., Rousseau, F. L., & Otis, J. (2012). Self-determination: A buffer against suicide ideation. *Suicide and Life-Threatening Behavior, 42*(4), 377-393. doi:10.1111/j.1943-278X.2012.00097.x

Claes, L., Luyckx, K., Baetens, I., Van De Ven, M., & Witteman, C. (2015). Bullying and victimization, depressive mood, and non-suicidal self-injury in adolescents: The moderating role of parental support. *Journal of Child and Family Studies*. Advance online publication. doi:10.1007/s10826-015-0138-2

Cloutier, P. F., Nixon, M. K. (2003). The Ottawa self-injury inventory: A preliminary evaluation. Abstracts to the 12th International Congress European Society for Child and Adolescent Psychiatry. *European Child & Adolescent Psychiatry, 12* (Suppl 1): I/94.

Costa, S., Soenens, B., Gugliandolo, M., Cuzzocrea, F., & Larcan, R. (2015). The mediating role of experiences of need satisfaction in associations between parental psychological control and internalizing problems: A study among Italian college students. *Journal of Child and Family Studies, 24*(4), 1106-1116. doi:10.1007/s10826-014-9919-2

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*(2), 109-134. doi:10.1016/0092-6566(85)90023-6

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie canadienne, 49*(3), 182-185. doi:10.1037/a0012801

Duggan, J., Heath, N., & Hu, T. (2015). Non-suicidal self-injury maintenance and cessation among adolescents: A one-year longitudinal investigation of the role of objectified body consciousness, depression and emotion dysregulation. *Child and Adolescent Psychiatry and Mental Health, 9*(21), 1-12. doi:10.1186/s13034-015-0052-9

Emery, A. A., Toste, J., & Heath, N. (2015). The balance of intrinsic need satisfaction across contexts as a predictor of depressive symptoms in children and adolescents. *Motivation and Emotion*. Advance online publication. doi:10.1007/s11031-015-9491-0

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3.1: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behaviour Research Methods, 39,* 175-191. Retrieved from: http://www.gpower.hhu.de/fileadmin/redaktion/Fakultaeten/Mathematisch-Naturwissenschaftliche_Fakultaet/Psychologie/AAP/gpower/GPower3-BRM-Paper.pdf

Garisch, J., & Wilson, M. (2015). Prevalence, correlates, and prospective predictors of non-suicidal self-injury among New Zealand adolescents: Cross-sectional and longitudinal survey data. *Child and Adolescent Psychiatry and Mental Health, 9*(28), 1-11. doi:10.1186/s13034-015-0055-6

Gillison, F., Standage, M., & Skevington, S. (2008). Changes in quality of life and psychological need satisfaction following the transition to secondary school. *British Journal of Educational Psychology, 78*, 149-162. doi:10.1348/000709907X209863

Hankin, B. L., & Abela, J. R. Z. (2011). Nonsuicidal self-injury in adolescence: Prospective rates and risk factors in a 2 ½ year longitudinal study. *Psychiatry Research, 186*, 65-70. doi:10.1016/j.psychres.2010.07.056

Hawton, K., Bergen, H., Kapur, N., Cooper, J., Steeg, S., Ness, J., & Waters, K. (2012). Repetition of self-harm and suicide following self-harm in children and adolescents: Findings from the Multicentre Study of Self-Harm in England. *Journal of Child Psychology and Psychiatry, 53*(12), 1212-1219. doi:10.1111/j.1469-7610.2012.02559.x

Heath, N. L., & Ross, S. (2007). *How I Deal with Stress*. Unpublished instrument. McGill University, Montreal, Quebec, Canada.

Heath, N. L., Ross, S., Toste, J. R., Charlebois, A., & Nedecheva, T. (2009). Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 41*, 180-186. doi:10.1037/a0015732

Heath, N. L., Toste, J. R., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling, 30*(2), 137-156. Retrieved from http://amhca.metapress.com/app/home/main.asp?referrer=default

Jacobson, C. M., & Gould, M. (2007). The epidemiology and phenomenology of non-suicidal self-injurious behavior among adolescents: A critical review of the literature. *Archives of Suicide Research, 11*, 129-147. doi:10.1080/13811110701247602

Klonsky, E. D., & Muehlenkamp, J. J. (2007). Self-injury: A research review for the practitioner. *Journal of Clinical Psychology, 63*(11), 1045-1056. doi:10.1002/jclp.20412

Lewis, S. P., & Heath, N. L. (2015). Nonsuicidal self-injury among youth. *The Journal of Pediatrics, 166*(3), 526-530. doi:10.1016/j.jpeds.2014.11.062

Linehan, M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guilford Press.

Lloyd-Richardson, E. E. (2008). Adolescent nonsuicidal self-injury: Who is doing it and why? *Journal of Developmental & Behavioral Pediatrics, 29*(3), 216-218. doi:10.1097/DBP.0b013e318173a5c1

Nixon, M. K., & Heath, N. L. (2009). Assessment of nonsuicidal self-injury in youth. In M. K. Nixon, & N. L. Heath (Eds.), *Self-injury in youth: The essential guide to assessment and intervention* (pp. 143-170). New York, NY: Routledge/Taylor & Francis Group.

Nock, M. K. (2009). Why do people hurt themselves?: New insights into the nature and functions of self-Injury. *Current Directions in Psychological Science, 18*(2), 78-83. doi:10.1111/j.1467-8721.2009.01613.x

Nock, M. K., Joiner, T. E., Jr., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research, 144*, 65-72. doi:10.1016/j.psychres.2006.05.010

Paul, E., Tsypes, A., Eidlitz, L., Ernhout, C., & Whitlock, J. (2015). Frequency and functions of non-suicidal self-injury: Associations with suicidal thoughts and behaviors. *Psychiatry Research, 225*, 276-282. doi:10.1016/j.psychres.2014.12.026

Plener, P., Libal, G., Keller, F., Fegert, J. M., & Muehlenkamp, J. J. (2009). An international comparison of adolescent non-suicidal self-injury (NSSI) and suicide attempts: Germany and the USA. *Psychological Medicine, 39*(9), 1549-1558. doi:10.1017/S0033291708005114

Plener, P., Schumacher, T., Munz, L., & Groschwitz, R. (2015). The longitudinal course of non-suicidal self-injury and deliberate self-harm: A systematic review of the literature. *Borderline Personality Disorder and Emotion Dysregulation, 2*, 1-11. doi:10.1186/s40479-014-0024-3

Przybylski, A. K., Deci, E. L., Rigby, C. S., & Ryan, R. M. (2014). Competence-impeding electronic games and players' aggressive feelings, thoughts, and behaviors. *Journal of Personality and Social Psychology, 106*(3), 441-457. doi:10.1037/a0034820

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*(4), 419-435. doi:10.1177/0146167200266002

Rodham, K., & Hawton, K. (2009). Epidemiology and phenomenology of nonsuicidal self-injury In M. K. Nock (Ed.), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 37-62). Washington, DC: American Psychological Association.

Ross, S., & Heath, N. (2002). A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence, 31*, 67-77. doi:10.1023/A:1014089117419

Rotolone, C., & Martin, G. (2012). Giving up self-injury: A comparison of everyday social and personal resources in past versus current self-injurers. *Archives of Suicide Research, 16*, 147-158. doi:10.1080/13811118.2012.667333

Ryan, R. M., & Deci, E. L. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78. doi:10.1037/0003-066X.55.1.68

Seidman, E., Allen, L., Aber, J. L., Mitchell, C., & Feinman, J. (1994). The impact of school transitions in early adolescence on the self-system and perceived social context of poor urban youth. *Child Development, 65*(2), 507-522. doi:10.1111/j.1467-8624.1994.tb00766.x

Sher, L., & Stanley, B. (2009). Biological models of nonsuicidal self-injury. In M. K. Nock (Ed.), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 99-116). Washington, DC: American Psychological Association.

Sidak, Z. (1967). Rectangular confidence intervals for the means of multivariate normal distributions. *Journal of the American Statistical Association, 62*(318), 626-633. Retrieved from: http://www.jstor.org/stable/2283989

Swannell, S. V., Martin, G. E., Page, A., Hasking, P., & St John, N. J. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide and Life-Threatening Behavior, 44*(3), 273-303. doi:10.1111/sltb.12070

Taliaferro, L. A., & Muehlenkamp, J. J. (2015). Factors associated with current versus lifetime self-injury among high school and college students. *Suicide and Life-Threatening Behavior, 45*, 84-97. doi:10.1111/sltb.12117

Tatnell, R., Kelada, L., Hasking, P., & Martin, G. (2014). Longitudinal analysis of adolescent NSSI: The role of intrapersonal and interpersonal factors. *Journal of Abnormal Child Psychology, 42*(6), 885-896. doi:10.1007/s10802-013-9837-6

Van der Giessen, D., Branje, S., & Meeus, W. (2014). Perceived autonomy support from parents and best friends: Longitudinal associations with adolescents' depressive symptoms. *Social Development, 23*(3), 537-555. doi:10.1111/sode.12061

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263-280. doi:10.1037/a0032359

Véronneau, M. H., Koestner, R. F., & Abela, J. R. Z. (2005). Intrinsic need satisfaction and well–being in children and adolescents: An application of the self–determination theory. *Journal of Social and Clinical Psychology, 24*(2), 280-292. doi:10.1521/jscp.24.2.280.62277

Walsh, B. W. (2006). *Treating self-injury: A practical guide*. New York, NY: Guilford Press.

Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics, 117*(6), 1939-1948. doi:10.1542/peds.2005-2543

Whitlock, J., Prussien, K., & Pietrusza, C. (2015). Predictors of self-injury cessation and subsequent psychological growth: Results of a probability sample survey of students in eight universities and colleges. *Child and Adolescent Psychiatry and Mental Health, 9*(19). doi:10.1186/s13034-015-0048-5

Yates, T. M., Tracy, A. J., & Luthar, S. S. (2008). Nonsuicidal self-injury among "privileged" youths: Longitudinal and cross-sectional approaches to developmental process. *Journal of Consulting and Clinical Psychology, 76*, 52-62. doi:10.1037/0022-006X.76.1.52

You, J., & Leung, F. (2012). The role of depressive symptoms, family invalidation and behavioral impulsivity in the occurrence and repetition of non-suicidal self-injury in

Chinese adolescents: A 2-year follow-up study. *Journal of Adolescence, 35*(2), 389-395. doi:10.1016/j.adolescence.2011.07.020

Table 1

Means and Standard Deviations for CINSS subscales by Classification Group during Time 1

	Time 1			
	NSSI Maintain (n =30)	NSSI Stop (n = 21)	NSSI Start (n = 44)	Control (n = 98)
	M (SD)	*M* (SD)	*M* (SD)	*M* (SD)
CINSS subscales				
Autonomy	20.43 (4.91)	22.29 (4.41)	21.86 (4.44)	23.43 (3.70)
Competence	21.20 (5.14)	22.76 (3.48)	21.73 (4.33)	24.53 (3.69)
Relatedness	22.26 (4.36)	23.83 (2.63)	23.70 (3.85)	24.65 (3.46)

Table 2

Means and Standard Deviations for CINSS subscales by Classification Group during Time 2

	Time 2			
	NSSI Maintain (n =30)	NSSI Stop (n = 21)	NSSI Start (n = 44)	Control (n = 98)
	M (SD)	*M* (SD)	*M* (SD)	*M* (SD)
CINSS subscales				
Autonomy	20.17 (4.17)	22.45 (3.41)	20.65 (4.37)	23.61 (4.24)
Competence	19.83 (4.84)	21.67 (3.10)	20.55 (4.79)	23.94 (3.91)
Relatedness	21.93 (3.49)	23.33 (3.14)	22.74 (3.79)	24.26 (3.79)

Table 3

Between Subjects and Univariate Effects of Group and Time on Need Satisfaction Subscales Across Time

Dependent Variables	*df*	*F*	ηp^2	Observed Power	*p*
Group Membership					
Autonomy	3	8.57	.12	.99	.000***
Competence	3	13.08	.17	1.00	.000***
Relatedness	3	4.74	.07	.90	.003**
Time					
Autonomy	1	.53	.00	.11	.47
Competence	1	8.34	.04	.82	.004**
Relatedness	1	3.18	.02	.43	.08
Group x Time					
Autonomy	3	.99	.02	.27	.40
Competence	3	.36	.01	.12	.79
Relatedness	3	.28	.00	.10	.84

**$p < .01$, ***$p < .001$

Figure 1. Line Chart Representing Group Trends in the CINSS Autonomy Subscale Over Time

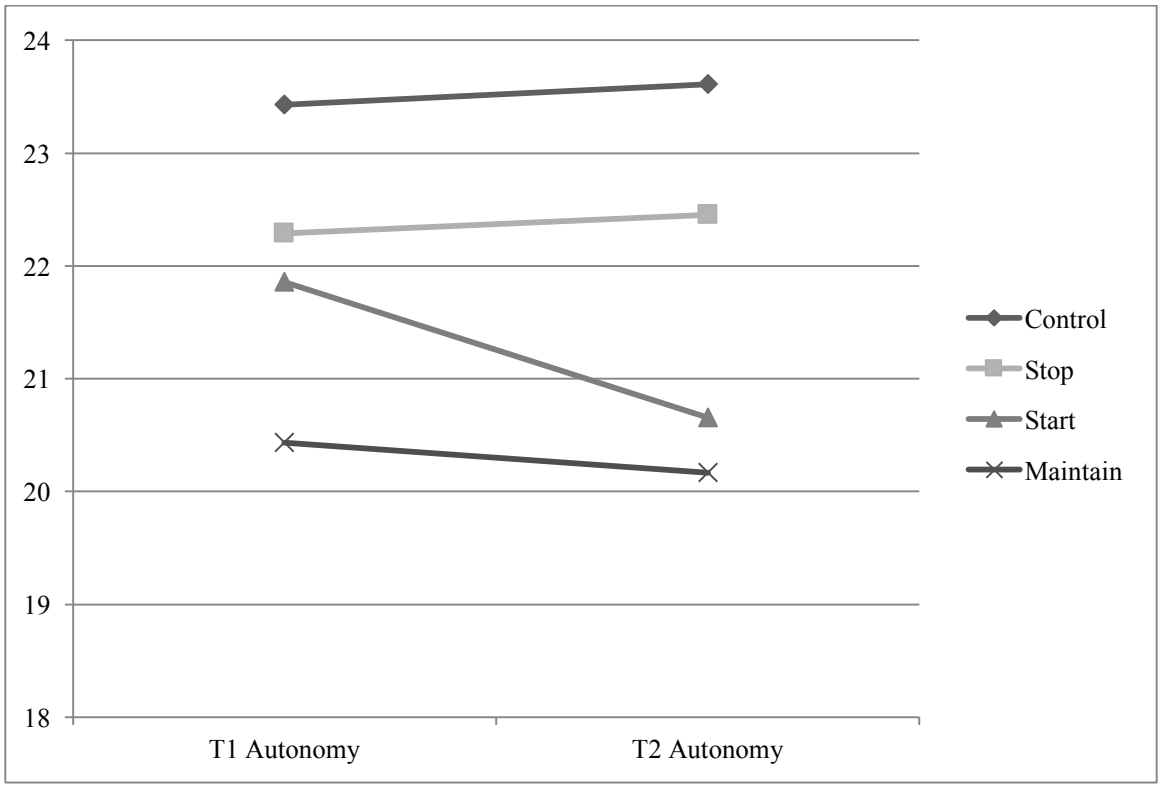


Figure 2. Line Chart Representing Group Trends in the CINSS Competence Subscale Over Time

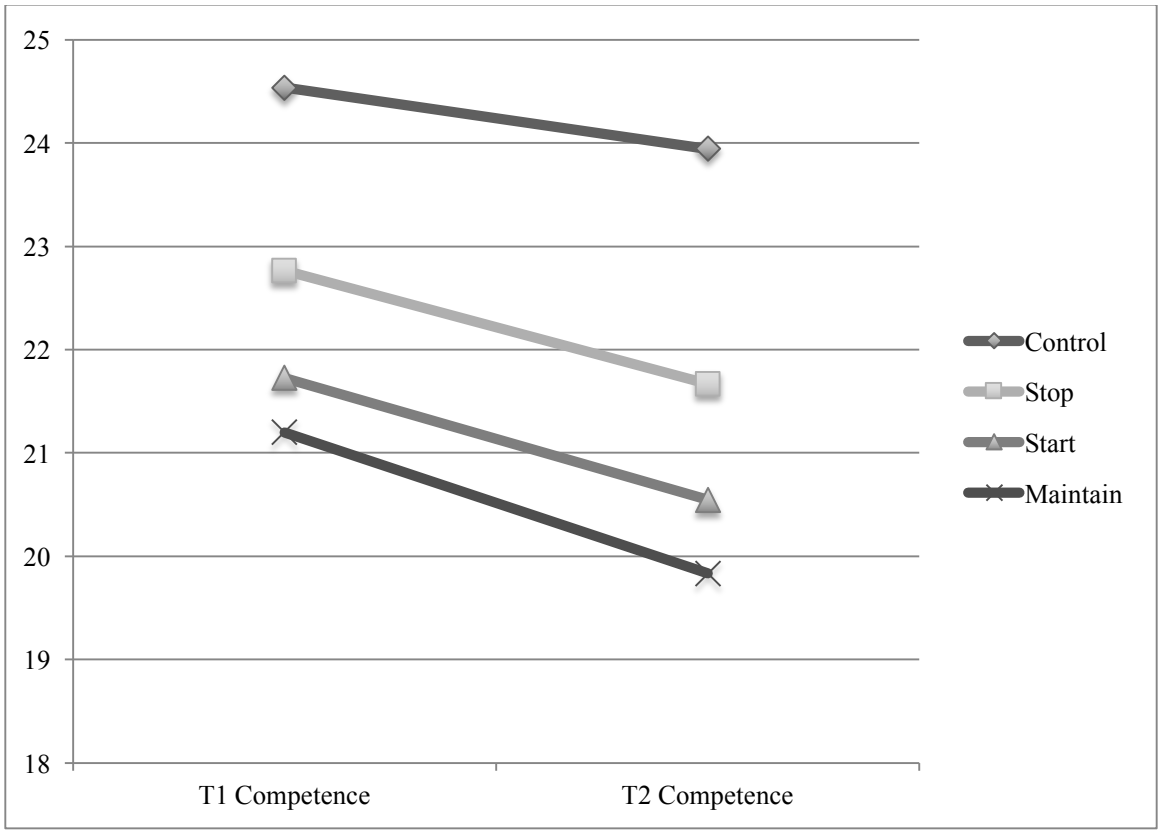
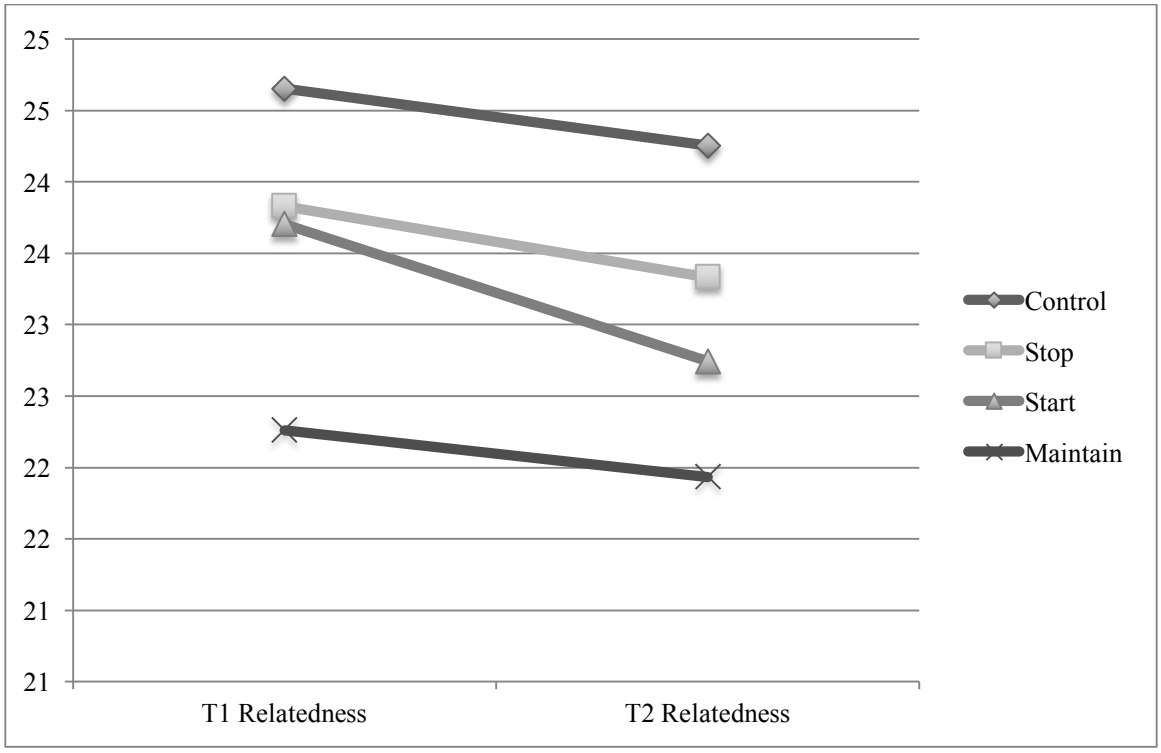


Figure 3. Line Chart Representing Group Trends in the CINSS Relatedness Subscale Over Time



Bridging Manuscripts

The overall goal of the program of research is to apply self-determination theory in order to broaden and extend our understanding of NSSI. As previously noted, the findings reported in Manuscript 1 supported the usefulness of examining NSSI through an SDT lens, showing that reported need satisfaction was associated with NSSI history above and beyond the well-established role of emotion dysregulation. Next, Manuscript 2 provided support for the application of SDT to further our understanding of NSSI status in a longitudinal sample of young adolescents. Although, there was not a significant change in the satisfaction of the needs for autonomy, competence, and relatedness as a function of group status over time, this was likely due to low power, as an examination of group means suggests a general trend in the hypothesized directions. With the results from both Manuscripts 1 and 2 suggesting that SDT is a relevant and valuable theoretical framework under which to extend our current knowledge of NSSI, the next step in this line of inquiry is to empirically examine a model of NSSI based on SDT's tenets. Specifically, Study 3 will build upon Studies 1 and 2 by examining how perceived parental autonomy support influences NSSI directly and indirectly through difficulties in emotion regulation.

CHAPTER 4

MANUSCRIPT 3

Parental Autonomy Support Affects NSSI Directly and Indirectly Through Difficulties in Emotion Regulation: An Application of Self-Determination Theory

A. Ann Emery[a], Nancy L. Heath,[a] and Maria Rogers[b]

[a]Department of Educational and Counselling Psychology, McGill University, Montreal, QC

[b]School of Psychology (Clinical), University of Ottawa, Ottawa, ON

Abstract

The present study applies self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000b) to examine a model whereby perceived parental autonomy support directly and indirectly affects NSSI through difficulties in emotion regulation. Of the 639 young adolescent participants (53% female; M_{age} =13.38 years, SD = 0.51), 116 (18.2%) indicated a lifetime history of NSSI. Results of a mediation analysis with bootstrapping procedure (Hayes, 2013) revealed significant direct effects of parental autonomy support on NSSI history (p = .0027) and emotion regulation on NSSI history (p = <.001), and a significant direct effect of parental autonomy on emotion regulation (p = <.001). Emotion regulation mediated the relationship between parental autonomy support and NSSI with a significant indirect negative effect (95% CI = -.4806--.2137). These findings support previous research showing associations between parental relationship difficulties, difficulties in emotion regulation, and NSSI, and suggest that self-determination theory may be a particularly useful framework in which to conceptualize these associations especially within community young adolescent samples.

Emotion Regulation Mediates the Relationship Between Parental Autonomy Support and NSSI: An Application of Self-Determination Theory

Extensive empirical research points to a strong link between emotion regulation and non-suicidal self-injury (NSSI). NSSI, which is defined as the deliberate destruction of body tissue without the intent to die and for purposes not socially sanctioned (American Psychiatric Association, 2013) has been found to be especially prevalent in young adolescents who report difficulties regulating their emotions (Andover & Morris, 2014; Voon, Hasking, & Martin, 2014; Yurkowski et al., 2015). Moreover, the most commonly cited function of NSSI is intrapersonal, whereby NSSI serves to regulate overwhelming negative emotions (Klonsky, 2007). Reflecting this important relationship, many theories of NSSI etiology include emotion regulation as a central component to the onset and maintenance of NSSI behaviour (see Andover & Morris, 2014 for review). For example, the widely accepted biosocial model from Linehan (1993) proposes that NSSI develops within the context of an invalidating family environment where parents are intolerant to the expression of emotion and do not support children in the regulation of their emotions. Therefore, not only does Linehan identify emotion regulation difficulties as central to NSSI behaviour, but she also stipulates the early caregiving environment as the source of these deficits in emotion regulation.

It follows that this early caregiving environment has received attention within the NSSI literature as a particularly salient risk factor. This system has been studied through various variables including rigid values, parental criticism, parental alienation, parental support, perceived family invalidation, parental control, and informational justice (e.g., J.-F. Bureau et al., 2010; Buser, Buser, & Kearney, 2012; Chapman, Gratz, & Brown, 2006; Gratz & Chapman, 2007; Halstead, Pavkov, Hecker, & Seliner, 2014; Hamza & Willoughby, 2013; Martin, Bureau,

Cloutier, & Lafontaine, 2011; Saldias, Power, Gillanders, Campbell, & Blake, 2013; Wedig & Nock, 2007; Yates, Tracy, & Luthar, 2008; You & Leung, 2012). In general, results point to the importance of both the early caregiving relationship and the ongoing parent-adolescent relationship in the development and maintenance of NSSI.

Thus, there are clear links between parent-child relationship difficulties and NSSI as well as emotion regulation difficulties and NSSI, however, very few studies have explicitly investigated Linehan's (1993) proposed pathway in which parent-child relationship difficulties contribute to the development of NSSI indirectly through difficulties in emotion regulation.

Associations Between Parental Relation Difficulties, Emotion Regulation Difficulties, and NSSI

Applying an extension of the biosocial model that suggests that emotion dysregulation fosters and maintains NSSI within a negative and unsupportive social context (Crowell, Beauchaine, & Linehan, 2009), Adrian, Zeman, Erdley, Lisa, and Sim (2011) tested a model where difficulties in emotion regulation mediated the effects of negative family and peer characteristics on NSSI behaviours. In a small sample of female adolescent inpatients, Adrian et al. (2011) found a significant direct effect whereby difficulties in emotion regulation predicted NSSI frequency and number of methods, and marginally significant direct effects of family relational problems on NSSI behaviours ($p = .08$) as well as peer relational problems on difficulties in emotion regulation ($p = .06$). Supporting theory, a significant indirect effect was found whereby parental and peer relational difficulties predicted NSSI behaviours through difficulties in emotion regulation. Adrian and colleague's (2011) work was the first to lend empirical support to the theoretically proposed pathways of Linehan (1993) and Crowell et al. (2009).

Building on this research in a large undergraduate sample, Yurkowski et al. applied Linehan's (1993) biosocial theory to test a model where emotion regulation difficulties mediated the association between parent and peer relationship difficulties and NSSI engagement. In their sample of 1153 students, 79 participants (6.9%) reported engaging in NSSI within the last six months. Parent and peer trust, communication, and alienation were assessed via the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987) and emotion regulation difficulties were assessed through the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). NSSI engagement was assessed via an item on the Ottawa Self-Injury Questionnaire (Cloutier & Nixon, 2003) where participants were asked to indicate whether they had purposefully injured themselves without the intent to die within the last six months. Results of structural equation modeling indicated significant direct effects of parental alienation and communication on difficulties in emotion regulation, peer alienation and trust on difficulties in emotion regulation, and difficulties in emotion regulation on NSSI engagement. In line with theory and with Adrian and colleague's (2011) findings, emotion dysregulation mediated the relationship between parent alienation and NSSI engagement. The indirect effect of parental communication on NSSI through emotion regulation was marginally significant ($p = .058$). Emotion dysregulation also mediated the relationship between peer alienation and NSSI engagement while the indirect effect of peer trust on NSSI through emotion regulation was marginally significant ($p = .065$).

To test the cumulative effects of parent and peer relationship difficulties on NSSI engagement, two hierarchical logistic regressions were conducted. In the first regression, parental trust, communication, and alienation were entered in Step 1 and peer trust, communication, and alienation were entered in Step 2 of the model. In the second regression,

these steps were reversed so that the peer variables were entered in Step 1 and the parent variables were entered in Step 2. Results of the first logistic regression showed that the parental variables accounted for a significant amount of variance in NSSI engagement, with parental alienation emerging as the sole predictor increasing the odds of engaging in NSSI. The addition of the peer variables in Step 2 did not account for any additional variance. In the second logistic regression, the peer variables accounted for a significant amount of variance in NSSI engagement, with peer alienation emerging as the sole predictor increasing the odds of engaging in NSSI. However, when the parental variables were added in Step 2, the influence of peer alienation became insignificant. Step 2 significantly contributed to the model such that greater parental alienation increased the odds of NSSI engagement. These results suggest that although the quality of peer relationships may have an impact on NSSI, parent relationships have the greater impact.

Together, these two studies lend support to emotion regulation models of NSSI and the biosocial model (Crowell et al., 2009; Linehan, 1993) in particular, showing that difficulties in parent and peer relationships affect NSSI partially (Adrian et al., 2011) and completely (Yurkowski et al., 2015) through difficulties in emotion regulation.

While there are many strengths of conceptualizing NSSI etiology and maintenance through Linehan's (1993) model, it is originally a model of Borderline Personality Disorder (BPD) to be applied in clinical populations. Although NSSI is a symptom of BPD, most individuals who engage in the behaviour do not have a corresponding diagnosis of BPD and studies of NSSI within community samples suggest that the behaviour is widely prevalent among adolescents and young adults outside of clinical settings (Garisch & Wilson, 2015; Gollust, Eisenberg, & Golberstein, 2008; Gratz, 2001; Gratz, Conrad, & Roemer, 2002; Polk & Liss,

2007; Swannell, Martin, Page, Hasking, & St John, 2014; Whitlock, Eckenrode, & Silverman, 2006; Whitlock et al., 2011). Considering this, it may be useful to explore and conceptualize the associations between relational difficulties, emotion regulation, and NSSI through a broader theoretical framework that makes predictions about humans in general and places emphasis on the distal environment. The present paper suggests that self-determination theory (Deci & Ryan, 1985, 2000, 2008; Ryan & Deci, 2000a, 2000b) offers a complementary perspective to the biosocial model and can further our understanding of NSSI.

Self-Determination Theory

Self-determination theory is a theory of motivation, personality, and development that posits three basic psychological needs of autonomy, competence, and relatedness as being fulfilled via the social context and as essential for optimal growth and functioning for all humans throughout the lifespan (Ryan & Deci, 2013). The need for autonomy is satisfied when one's actions are undertaken with a sense of volition and in accordance with internal values instead of through coercion or pressure (Grolnick & Raftery-Helmer, 2013). Although all three needs have been investigated in terms of their associations with both adaptive and maladaptive behaviours, autonomy has received the most empirical attention (Ryan & Deci, 2013). Indeed, it is argued that when an individual's need for autonomy is being supported, their needs for competence and relatedness are being fulfilled as well (e.g., as when positive encouragement is being given) and when an individual feels that their autonomy is supported, they are more likely to act in ways that yield fulfillment of the needs for competence and relatedness (Ryan & Deci, 2013). While autonomy support can come from numerous sources, the primary and most important sources are parents within the early caregiving environment (Ryan & Deci, 2000a).

Parental Autonomy Support

When parents support a child's need for autonomy, they are encouraging a child's capacity to be self-initiating. This has been operationalized in terms of four factors: (a) providing rationale and explanation for behavioural requests; (b) recognizing the feelings and perspective of the child; (c) offering choices and encouraging initiative; and (d), minimizing the use of controlling techniques (Koestner, Ryan, Bernieri, & Holt, 1984). Based on this definition, autonomy is not synonymous with independence or breaking free from parental bonds; on the contrary, parental structure and involvement is seen as complementary to autonomy support (Joussemet, Landry, & Koestner, 2008; Joussemet, Mageau, & Koestner, 2014). Self-determination theory posits negative repercussions resulting from parents thwarting their children's need for autonomy and that emotion regulation is central to this pathway.

SDT describes three types of emotion regulation profiles: emotion suppression (when one is not aware, clear, or actively denies their emotions), emotion dysregulation (when one experiences their emotions as out of control), and emotion integration (when one is able to be aware and differentiate their emotions and to use adaptive strategies to express and control them) (Ryan, Deci, Grolnick, & LaGuardia, 2006). According to SDT, a lack of parental autonomy support leads children to either: (a) internalize requests and self-regulate but in an inflexible and pressured way (emotion suppression), leading to internalizing problems; or, (b) reject parental requests and fail to self-regulate (emotion dysregulation), leading to externalizing problems (Ryan et al., 2006). Indeed, this theoretical avenue has received some empirical support.

Associations Between Parental Autonomy Support, Emotion Regulation, and Adaptive and Maladaptive Outcomes

To investigate SDT's proposed links between parenting practices that support versus thwart autonomy, emotion regulation profiles, and adaptive and maladaptive outcomes, Roth, Assor, Niemiec, Ryan, and Deci (2009) asked ninth graders and their teachers to complete measures of parental practices, emotion regulation, and academic engagement. Results of structural equation modeling supported SDT's tenets, finding that parenting practices that undermine autonomy predicted emotion suppression and dysregulation and corresponding grade-focused academic performance and academic disengagement in adolescents. Conversely, adolescents with autonomy supportive parents showed emotion integration and interest-focused academic engagement.

Building on these findings, Brenning, Soenens, Van Petegem, and Vansteenkiste (2015) asked young adolescents to report on their perceived maternal autonomy support, emotion regulation, depressive symptoms, and self-esteem at two time points over a twelve-month period. Results of cross-lagged analyses revealed that maternal autonomy support was predictive of decreases in depressive symptoms, increases in self-esteem, and decreases in emotion suppression over time. Interestingly, autonomy support was not predictive of decreases in emotion dysregulation, but initial levels of emotion dysregulation predicted decreases in perceived maternal support over time, indicating that the direction of the relationship may not be as hypothesized. Testing for the mediating role of emotion regulation, results showed that the indirect path from autonomy support to self-esteem through emotion integration was not significant and that the indirect path from autonomy support to depressive symptoms through emotion suppression was marginally significant ($p = .06$). The authors argue that although

findings pointed in the direction of a mediation model, the indirect effects may not have reached significance because of the conservative nature of the testing where the effects of within time associations and initial levels of the variables were controlled for. Together, these studies lend initial support for SDT's proposed associations between parental autonomy support, emotion regulation, and adaptive and maladaptive outcomes.

The Present Study

Despite the similarities and overlaps between the NSSI and SDT literatures, an SDT perspective has never been applied to further our understanding of NSSI. Although aspects of parental control, which have been shown to be negatively associated with SDT's parental autonomy support and three basic needs (Ahmad, Vansteenkiste, & Soenens, 2013; Costa, Soenens, Gugliandolo, Cuzzocrea, & Larcan, 2015), have been investigated as an NSSI risk factor, parental autonomy support as conceptualized by SDT has not been explored. Understanding whether parental autonomy support also plays a role in NSSI would be worthwhile considering the possibilities for targeted therapeutic parenting interventions. Giving choices, showing empathy, and offering a rationale for requests are autonomy supportive parenting techniques that can be learned and improved on by parents and research has shown that parenting interventions that increase parental autonomy support lead to decreases in children's internalizing and externalizing behaviours (Joussement et al., 2014). Furthermore, applying a structural framework that makes predictions for all humans across the lifespan such as SDT to the study of NSSI offers a rich portfolio in which to inform future research within the NSSI field. Thus, the present study adds the literature by examining the associations between the parent-child relationship, emotion regulation, and NSSI engagement in a young adolescent sample and through a self-determination theory lens. Specifically, the primary objective of the present study

is to examine how parental autonomy support influences NSSI directly and indirectly through emotion regulation.

Based on self-determination theory and empirical research within the SDT and NSSI literatures, it is hypothesized that: (a) parent autonomy support and difficulties in emotion regulation will directly predict NSSI history; (b) parental autonomy support will directly predict difficulties in emotion regulation; and (c), difficulties in emotion regulation will partially mediate associations between parental autonomy support and NSSI. We expect that high levels of parental autonomy support will be negatively associated with difficulties in emotion regulation and with NSSI history.

Method

Participants

The current study represents a subset of data collected as part of a larger three-year longitudinal investigation of stress and coping strategies in young adolescents. Participants were recruited from 15 high schools in and around Montreal, Quebec. The overall sample of the present study consisted of 730 participants in grade 8 (55.9% female) with a mean age of 13.43 years (SD = 0.50). Participants reported their birthplace as Canada (96%), followed by the United States (1%), and other countries (3%). Of the overall sample, 139 participants (19.0%) indicated having engaged in NSSI at least once in their lifetime. Ninety-one participants were excluded from analyses due to invalid questionnaires, giving a final sample of 639 participants (53% female) with a mean age of 13.38 years (SD = 0.51). Participants who indicated having ever hurt themselves on purpose without the intent to die (n = 116, 66% female) were classified in the NSSI lifetime group. Participants without a history of NSSI (n = 523, 50% female) were classified in the No NSSI group.

Measures

NSSI screening questionnaire. The How I Deal with Stress Questionnaire (HIDS; Heath & Ross, 2007) is a 29-item self-report questionnaire developed to screen for self-injury. Each statement on the HIDS taps the frequency of use of both adaptive and maladaptive coping strategies on a four-point Likert scale ranging from 0 (*Never*) to 3 (*Frequently)*. NSSI is embedded within these statements as a coping strategy *("physically hurt myself on purpose"*). The HIDS also has a follow-up section in which participants are asked to provide additional information on NSSI and to indicate whether they had harmed themselves *without suicidal intent* to ensure reports of self-harm meet NSSI definition criteria. Responses were collapsed to create a dichotomous NSSI engagement variable (Never NSSI vs. all other frequencies combined) for the purposes of the analysis. Results of individual follow-up interviews were used to confirm NSSI status (see procedure). The HIDS also has a follow-up section in which participants are asked to provide additional information on NSSI. In this section, information is collected regarding whether or not participants engaged in NSSI within the last year, frequency, methods, and age of onset of NSSI behaviours. The HIDS has been used successfully in community settings to accurately screen for and identify youth who engage in NSSI (Cloutier & Humphreys, 2009; Ross & Heath, 2002). The HIDS questionnaire section examining the use of adaptive and maladaptive coping strategies for stress was found to have good internal consistency in the present sample (31 items, α =.77). This is consistent with past research using the HIDS (i.e., α =.78 Heath, Ross, Toste, Charlebois, & Nedecheva, 2009).

Parental autonomy support. Parental autonomy support was assessed via an adapted version of the *Perceptions of Parents Scale* (POPS; Grolnick, Ryan, & Deci, 1991; Appendix I). The POPS consists of 22 questions (11 each for mother and father) that assess the extent children

believe that parents are involved in their lives and support their choices and actions. Subscales include Mother Autonomy Support (6 items), Mother Involvement (5 items), Father Autonomy Support (6 items), and Father Involvement (5 items). For the present study, questions were worded so that participants could indicate agreement on a 5-poin Likert scale from 1 (Strongly Disagree or Never) to 5 (Strongly Agree or Always) for each parent. Parental Autonomy Support was calculated by summing the Mother and Father Autonomy Support subscales for each participant. Possible scores ranged from 12 to 60 with higher scores indicating higher levels of perceived parental autonomy support. Autonomy Support subscale item examples include "this parent gets upset if I don't do what I'm supposed to right away" and "this parent thinks it's OK if I make mistakes." Internal consistency for the parental autonomy support scale in this study was $\alpha = .78$.

Emotion dysregulation. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report measure that assesses six components of emotion dysregulation based on Gratz and Roemer's (2004) conceptualization. The subscales are non-acceptance of emotional responses (non-acceptance; e.g., I pay attention to how I feel), difficulties engaging in goal directed behavior (goal; e.g., When I'm upset I have difficulty focusing on other things), impulse control difficulties (impulse; e.g., I experience my emotions as overwhelming and out of control), lack of emotional awareness (awareness; e.g., I pay attention to how I feel), limited access to emotion regulation strategies (strategies; e.g., When I'm upset, I believe there is nothing I can do to feel better), and lack of emotional clarity (clarity; e.g., I am clear about my feelings). Items are scored on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). Subscale scores can range from 6-35, and the total score can range from 42-210. Higher scores indicate greater emotion dysregulation. The measure has

been shown to have good internal consistency in clinical and community samples of adolescents and young adults (Gratz & Roemer, 2004; Perez, Venta, Garnaat, & Sharp, 2012) and has demonstrated construct and predictive validity, and test-retest reliability across 4-8 weeks (p<.01) (Gratz & Roemer, 2004). In the present study, the DERS total score had good internal consistency α = .83.

Procedure

Following ethics board approval, presentations were made in class in the 15 schools who had agreed to take part in the research project. Students were invited to participate in the three-year project examining stress and coping with the transition to high school. Risks and benefits of participation were described as well as the potential time commitment, confidentiality, goals and objectives, and methodology. Students learned that those who completed the Standard Assessment Battery (SAB; see description below) would be entered to win one of four $50 gift cards to Famous Players and that those selected for individual follow-up interviews would receive a ten-dollar gift certificate to Subway, Tim Hortons, Chapters, or iTunes. While students were encouraged to participate, they were informed that they have the option to withdraw from the study at any time. It was also emphasized that their participation would have no bearing on any class grades or evaluation. Students had the opportunity to ask questions and express any concerns at that time and were provided with an informed consent form detailing the project for their parents. Students received a small chocolate bar for returning signed forms and were entered in a draw for one of two gift cards to a local shopping mall valued at $100 and $200, regardless of whether or not their parents had agreed to their participation.

Students completed questionnaires at three time points that corresponded to their grade 7th, 8th, and 9th years. The present study includes one time point when participants were in grade 8.

At each time point, the data collection procedure was identical. Students whose parents had given consent were invited to the cafeteria of their school for the completion of the SAB. Participants were seated spaced out throughout the cafeteria with black cardboard dividers for privacy. Prior to completing questionnaires, participants were asked to provide assent. The potential risks and benefits of participation were explained as well as the terms under which confidentiality would be broken. Participants who did not give assent went back to their regular classrooms. The SAB consisted of the HIDS, POPS, and DERS, among other measures (which were part of the larger study). The SAB sessions took approximately 60 minutes to complete and occurred during school hours. The SAB session provided information regarding NSSI group classification. A follow-up interview was completed with participants who completed the screening and met criteria for the NSSI group. The interviews were conducted by doctoral students in school psychology who were trained by a clinician due to the sensitive nature of sections of the interview (i.e., items tapping NSSI severity and suicidality). Confidentiality was broken only in the event that the participant indicated to the interviewer that they were at harm to themselves or to others. Once confidentiality was broken, the participant was informed and transitioned to a pre-determined school mental health professional (i.e., school psychologist, school counsellor) that was aware of the nature of the project.

Results

Prior to conducting analyses, all variables were examined through SPSS for the accuracy of data entry, detect missing values, and fit between their distributions. Mediation was tested using the SPSS macro, PROCESS (Hayes, 2013). Specifically, a series of linear regression models were fitted and the size and significance of the indirect effects were estimated by a bootstrap procedure. Bootstrapping is a resampling procedure that generates an empirical

approximation of the sampling distribution from the available data and constructs p-values and confidence intervals (CI) from this distribution (see Hayes, 2012, 2013). Bootstrapping was chosen as it makes no assumptions about the shape of the distribution, is not based on large-sample theory, and thus decreases the chances of both Type I and Type II error (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004). The present analysis used 5000 bootstrapped samples. The indirect effect is considered statistically significantly different from zero if the 95% bias-corrected bootstrap CI does not contain zero. If the effect is positive, the CI will be above zero, and if it is negative, below zero (Hayes, 2013).

Emotion Regulation as a Mediator of the Relationship Between Parental Autonomy Support and NSSI

To examine how parental autonomy support influences NSSI directly and indirectly through emotion regulation, a mediation analysis with bootstrapping procedure (Hayes, 2013) was conducted. Supporting our hypotheses, results revealed significant direct effects of parental autonomy support on NSSI engagement (path c'_1) with an effect of -.5765, (SE = .1924, p = .0027) and emotion regulation on NSSI engagement (path b) B = .0311, SE = .0051, p = <.001. Further supporting our hypothesis, parental autonomy had a direct effect on emotion regulation (path a) B = -10.6786, SE = 1.3593, p = <.001. Finally, as expected, emotion regulation partially mediated the relationship between parental autonomy support and NSSI history with a significant indirect negative effect of -.3321(SE = .0686, 95% CI = -.4806--.2137). The total effect of parental autonomy support on NSSI history (path c) was statistically significant B = -.8400, SE = .1826, p = <.001. Correlations, means and standard deviations of the study variables are presented in Table 1. See Table 2 for path coefficients of the mediation model outlined in Figure 1.

Discussion

The current study applied self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000b) to examine the associations between the parent-child relationship, emotion regulation, and NSSI engagement in a young adolescent sample. The primary objective was to examine how parental autonomy support influences NSSI directly and indirectly through emotion regulation. Findings from a mediation model with bootstrapping procedure supported the hypotheses that: (a) parent autonomy support and difficulties in emotion regulation would directly predict NSSI history; (b) parental autonomy support would directly predict difficulties in emotion regulation; and (c), difficulties in emotion regulation would partially mediate associations between parental autonomy support and NSSI.

Parental Autonomy Support and NSSI

This study is the first to examine parental autonomy support from an SDT perspective as a predictor of NSSI engagement. Although self-determination theory has never been applied to understand NSSI behaviour, studies conducted under the SDT umbrella have found associations between the three basic needs, parental autonomy support, and child and adolescent depressive symptoms, which are closely related to NSSI (Emery, Toste, & Heath, 2015; Van der Giessen, Branje, & Meeus, 2014; Véronneau, Koestner, & Abela, 2005). Self-determination was also found to be a protective factor against suicidal ideation, another construct strongly associated with NSSI (J. S. Bureau, Mageau, Vallerand, Rousseau, & Otis, 2012). Considering these links, it makes sense that parental autonomy support would also be predictive of NSSI. Furthermore, drawing from the NSSI literature, a host of parental relation variables have been associated with NSSI engagement (e.g., J.-F. Bureau et al., 2010; Buser et al., 2012; Chapman et al., 2006; Gratz & Chapman, 2007; Halstead et al., 2014; Hamza & Willoughby, 2013; Martin et al., 2011;

Saldias et al., 2013; Wedig & Nock, 2007; Yates et al., 2008; You & Leung, 2012). Thus, the finding of a direct effect of parental autonomy support on NSSI history lends further support to this large body of literature documenting the effects of invalidating family characteristics and adds new insight by documenting a parenting variable that has been shown to be amenable to change (Joussement et al., 2014).

Difficulties in Emotion Regulation and NSSI

Our finding that difficulties in emotion regulation predict NSSI history in this sample of early adolescents adds to the literature documenting these effects. Although NSSI is considered an overdetermined behavior in that it may serve multiple functions simultaneously (Lloyd-Richardson, 2008; Prinstein, 2008), the majority of individuals who self-injure report that their NSSI primarily serves a function of intrapersonal negative reinforcement wherein overwhelming emotions are avoided and regulated through self-harm (Klonsky, 2007). This understanding of NSSI as a tool to escape, manage, or regulate emotions is a common theme among many theoretical perspectives of NSSI (See Andover & Morris, 2014 for a review). Furthermore, our findings echo previous studies that show that young adolescents with a history of NSSI have deficits in their abilities to self-regulate (Andover & Morris, 2014; Duggan, Heath, & Hu, 2015; Perez et al., 2012).

Parental Autonomy Support's Influence on Difficulties in Emotion Regulation

As predicted by SDT, the present study found a direct negative effect of parental autonomy support on difficulties in emotion regulation. A central component of parental autonomy support is the provision of empathy and recognizing the feelings and perspective of the child (Koestner et al., 1984). SDT posits that parenting that does not support autonomy, forces children to ignore their negative feelings and is associated with suppression and

dysregulation of emotions (Deci et al., 2006; Roth et al., 2009). This tenet of SDT is strikingly similar to Linehan's (1993) biosocial model that proposes that negating and ignoring children's emotions contribute to difficulties in emotion regulation. Our findings support these tenets and previous research showing that lower levels of parental autonomy support predicted higher levels of emotion dysregulation (Brenning et al., 2015; Roth et al., 2009).

Difficulties in Emotion Regulation Mediate the Relationship Between Parental Autonomy Support and NSSI

Supporting our hypothesis, difficulties in emotion regulation were found to partially mediate the relationship between parental autonomy support and NSSI. This mediation model was built from and provides support for self-determination theory's tenet that when parents thwart their children's autonomy, maladaptive outcomes result due to disturbances in emotion regulation (Deci et al., 2006). The present study extends previous tests of this model in early adolescents (Brenning et al., 2015; Roth et al., 2009) to include NSSI engagement. Furthermore, the present study builds on literature within the NSSI domain that applies Linehan's (1993) biosocial model to understand the indirect path of family relation difficulties on NSSI through difficulties in emotion regulation (Crowell et al., 2009; Yurkowski et al., 2015). Specifically, these findings extend Yurkowski and colleagues' work to include a young adolescent sample. This sample is of particular interest to NSSI researchers and clinicians as it corresponds to the developmental period wherein most individuals will begin NSSI behaviours (Lewis & Heath, 2015; Plener, Schumacher, Munz, & Groschwitz, 2015; Rodham & Hawton, 2009; Ross & Heath, 2002; Whitlock et al., 2006). Clinical implications from this finding point to the importance of working with parents to help them to adapt their parenting style to include more autonomy supportive techniques such as offering choices, providing a rationale when demands

are made, and empathizing with their adolescent. In doing so, the adolescent may strengthen their emotion regulation capabilities and, in turn, lower their risk of NSSI engagement.

Limitations and Future Directions

The present study is not without limitations. First, although the DERS subscales indirectly tap into the three emotion regulation profiles proposed by SDT, a measure such as the emotion regulation inventory (Roth et al., 2009) could be useful to directly assess emotion integration, suppression, and dysregulation. Moreover, a combination of multiple methods should be applied in future research to reduce the reliance on self-report data. In particular, observational methods may be particularly interesting as a method of measuring parental autonomy support. The SDT literature has begun moving beyond measuring low satisfaction of needs to include measures of need frustration to predict maladaptive outcomes (Vansteenkiste & Ryan, 2013). Need frustration is different from low need satisfaction in that needs are not simply left unfulfilled, but are actively thwarted within the social context. Presently, a measure of parental autonomy thwarting has yet to be developed. Through observations of parent-child interactions, it may be possible to differentiate between low parental autonomy support and active thwarting of autonomy.

Second, without a longitudinal design, direction and causality cannot be inferred. Although our model is informed by theory that hypothesizes a path from parental autonomy support to emotion regulation to adaptive and maladaptive outcomes, recent findings suggest that this path may not be so direct. Specifically, Brenning et al. (2015) found that initial levels of emotion dysregulation predicted decreases in maternal autonomy support. Similarly, in a longitudinal study of community adolescents and their parents, Baetens et al. (2015) found that NSSI had an effect on parenting behaviours where NSSI at Time 1 predicted controlling

parenting at Time 2. It could be argued that living with a child who experiences difficulties regulating their emotions and who engages in NSSI may be stressful and taxing, and overtime, may diminish a parents' patience to employ autonomy supportive strategies. Prospective longitudinal research is needed to further explore the directions of these relationships. Finally, males were underrepresented within the present sample. Future research should move beyond convenience sampling to ensure more male participants.

Conclusion

This study extends current thinking of NSSI engagement to include a self-determination theory approach. Despite limitations, the current findings suggest that self-determination theory may be complementary to other emotion regulation theories such as Linehan's (1993) biosocial model in explaining NSSI behaviour. Specifically, our findings support an SDT model whereby parental autonomy support influences NSSI directly and indirectly through emotion regulation.

SDT is a well-established theoretical framework that has been applied across a variety of disciplines, cultures, and developmental periods. Its broad framework and various mini theories may provide new insights and directions informing future NSSI research paradigms. Furthermore, conceptualizing NSSI within an SDT framework may inform prevention and treatment strategies. It is clear that increasing emotion regulation strategies should be central to NSSI prevention and treatment, however, the present research, as well as previous findings (i.e., Brenning et al., 2015), suggest that only targeting this skill may yield incomplete therapeutic results. Increasing parental autonomy support may be an essential part of NSSI prevention and treatment programs. Recently, Joussemet et al. (2014) found that a parenting program increased autonomy supportive parenting and well-being in children. This type of program targeting

healthy coping in general as opposed to NSSI specifically, along with instruction in emotion regulation strategies, may be particularly effective in preventing and treating NSSI.

In sum, although further replication and future investigation is needed, it appears that parental autonomy support affects NSSI directly and indirectly through difficulties in emotion regulation and that self-determination theory may be a particularly useful framework in which to conceptualize this process.

References

Adrian, M., Zeman, J., Erdley, C., Lisa, L., & Sim, L. (2011). Emotional dysregulation and interpersonal difficulties as risk factors for nonsuicidal self-injury in adolescent girls. *Journal of Abnormal Child Psychology, 39*(3), 389-400. doi:10.1007/s10802-010-9465-3

Ahmad, I., Vansteenkiste, M., & Soenens, B. (2013). The relations of Arab Jordanian adolescents' perceived maternal parenting to teacher-rated adjustment and problems: The intervening role of perceived need satisfaction. *Developmental Psychology, 49*, 177-183. doi:10.1037/a0027837

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Andover, M. S., & Morris, B. W. (2014). Expanding and clarifying the role of emotion regulation in nonsuicidal self-injury. *Canadian Journal of Psychiatry, 59*(11), 569-575. Retrieved from: http://www.scopus.com/inward/record.url?eid=2-s2.0-84911926203&partnerID=40&md5=be8da5cc1d505e59abde0953deacf69d

Armsden, G., C., & Greenberg, M. T. (1987). The inventory of parent and peer attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence, 16*(5), 427-454. doi:10.1007/BF02202939

Baetens, I., Claes, L., Onghena, P., Grietens, H., Van Leeuwen, K., Pieters, C., . . . Griffith, J. (2015). The effects of nonsuicidal self-injury on parenting behaviors: A longitudinal analyses of the perspective of the parent. *Child and Adolescent Psychiatry and Mental Health, 9*(24). doi:10.1186/s13034-015-0059-2

Brenning, K., Soenens, B., Van Petegem, S., & Vansteenkiste, M. (2015). Perceived maternal autonomy support and early adolescent emotion regulation: A longitudinal study. *Social Development*. Advance online publication. doi:10.1111/sode.12107

Bureau, J.-F., Martin, J., Freynet, N., Poirier, A., Lafontaine, M.-F., & Cloutier, P. (2010). Perceived dimensions of parenting and non-suicidal self-injury in young adults. *Journal of Youth and Adolescence, 39*(5), 484-494. doi:10.1007/s10964-009-9470-4

Bureau, J. S., Mageau, G. A., Vallerand, R. J., Rousseau, F. L., & Otis, J. (2012). Self-determination: A buffer against suicide ideation. *Suicide and Life-Threatening Behavior, 42*(4), 377-393. doi:10.1111/j.1943-278X.2012.00097.x

Buser, T. J., Buser, J. K., & Kearney, A. (2012). Justice in the family: The moderating role of social self-efficacy in the relationship between nonsuicidal self-injury and interactional justice from parents. *The Family Journal, 20*(2), 147-156. doi:10.1177/1066480712441575

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy, 44*(3), 371-394. doi:10.1016/j.brat.2005.03.005

Cloutier, P. F., Nixon, M. K. (2003). The Ottawa self-injury inventory: A preliminary evaluation. Abstracts to the 12th International Congress European Society for Child and Adolescent Psychiatry. *European Child & Adolescent Psychiatry, 12* (Suppl 1): I/94.

Costa, S., Soenens, B., Gugliandolo, M., Cuzzocrea, F., & Larcan, R. (2015). The mediating role of experiences of need satisfaction in associations between parental psychological control and internalizing problems: A study among Italian college students. *Journal of Child and Family Studies, 24*(4), 1106-1116. doi:10.1007/s10826-014-9919-2

Crowell, S. E., Beauchaine, T. P., & Linehan, M. M. (2009). A biosocial developmental model of borderline personality: Elaborating and extending Linehan's theory. *Psychological Bulletin, 135*(3), 495-510. doi:10.1037/a0015616

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*(2), 109-134. doi:10.1016/0092-6566(85)90023-6

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie canadienne, 49*(3), 182-185. doi:10.1037/a0012801

Duggan, J., Heath, N., & Hu, T. (2015). Non-suicidal self-injury maintenance and cessation among adolescents: A one-year longitudinal investigation of the role of objectified body consciousness, depression and emotion dysregulation. *Child and Adolescent Psychiatry and Mental Health, 9*(21), 1-12. doi:10.1186/s13034-015-0052-9

Emery, A. A., Toste, J., & Heath, N. (2015). The balance of intrinsic need satisfaction across contexts as a predictor of depressive symptoms in children and adolescents. *Motivation and Emotion*. Advance online publication. doi:10.1007/s11031-015-9491-0

Garisch, J., & Wilson, M. (2015). Prevalence, correlates, and prospective predictors of non-suicidal self-injury among New Zealand adolescents: cross-sectional and longitudinal survey data. *Child and Adolescent Psychiatry and Mental Health, 9*(28), 1-11. doi:10.1186/s13034-015-0055-6

Gollust, S. E., Eisenberg, D., & Golberstein, E. (2008). Prevalence and correlates of self-injury among university students. *Journal of American College Health, 56*(5), 491-498. doi:10.3200/JACH.56.5.491-498

Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment, 23*(4), 253-263. doi:10.1023/A:1012779403943

Gratz, K. L., & Chapman, A. L. (2007). The role of emotional responding and childhood maltreatment in the development and maintenance of deliberate self-harm among male undergraduates. *Psychology of Men & Masculinity, 8*, 1-14. doi:10.1037/1524-9220.8.1.1

Gratz, K. L., Conrad, S. D., & Roemer, L. (2002). Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry, 72*, 128-140. doi:10.1037/0002-9432.72.1.128

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26*, 41-54. doi:10.1023/B:JOBA.0000007455.08539.94

Gratz, K. L., & Roemer, L. (2008). The relationship between emotion dysregulation and deliberate self‐harm among female undergraduate students at an urban commuter university. *Cognitive Behaviour Therapy, 37*, 14-25. doi:10.1080/16506070701819524

Grolnick, W. S., & Raftery-Helmer, J. N. (2013). The importance of autonomy for development and well-being. In B. W. Sokol, F. M. E. Grouzet, & U. Muller (Eds.), *Self-regulation and autonomy: Social and developmental dimensions of human conduct* (pp. 141-164). New York, NY: Cambridge Press.

Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology, 83*(4), 508-517. doi:10.1037/0022-0663.83.4.508

Halstead, R. O., Pavkov, T. W., Hecker, L. L., & Seliner, M. M. (2014). Family dynamics and self-injury behaviors: A correlation analysis. *Journal of Marital and Family Therapy, 40*(2), 246-259. doi:10.1111/j.1752-0606.2012.00336.x

Hamza, C. A., & Willoughby, T. (2013). Nonsuicidal self-injury and suicidal behavior: A latent class analysis among young adults. *PLoS ONE, 8*(3), e59955. doi:10.1371/journal.pone.0059955

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from: http://www.afhayes.com/ public/process2012.pdf

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis : A regression-based approach*. New York, NY: Guilford Press.

Heath, N. L., & Ross, S. (2007). *How I Deal with Stress*. Unpublished instrument. McGill University, Montreal, Quebec, Canada.

Heath, N. L., Ross, S., Toste, J. R., Charlebois, A., & Nedecheva, T. (2009). Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 41*(3), 180-186. doi:10.1037/a0015732

Heath, N. L., Toste, J. R., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling, 30*(2), 137-156. Retrieved from: http://amhca.metapress.com/app/home/main.asp?referrer=default

Joussemet, M., Landry, R., & Koestner, R. (2008). A self-determination theory perspective on parenting. *Canadian Psychology, 49*(3), 194-200. doi:10.1037/a0012754

Joussemet, M., Mageau, G., & Koestner, R. (2014). Promoting optimal parenting and children's mental health: A preliminary evaluation of the How-to Parenting Program. *Journal of Child and Family Studies, 23*(6), 949-964. doi:10.1007/s10826-013-9751-0

Klonsky, E. D. (2007). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review, 27*(2), 226-239. doi:10.1016/j.cpr.2006.08.002

Klonsky, E. D., & Olino, T. M. (2008). Identifying clinically distinct subgroups of self-injurers among young adults: A latent class analysis. *Journal of Consulting and Clinical Psychology, 76*, 22-27. doi:10.1037/0022-006X.76.1.22

Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's behavior: The differential effects of controlling vs. informational styles on intrinsic motivation and creativity. *Journal of Personality, 52*(3), 233-248. doi:10.1111/j.1467-6494.1984.tb00879.x

Lewis, S. P., & Heath, N. L. (2015). Nonsuicidal self-injury among youth. *The Journal of Pediatrics, 166*(3), 526-530. doi:10.1016/j.jpeds.2014.11.062

Linehan, M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guilford Press.

Lloyd-Richardson, E. E. (2008). Adolescent nonsuicidal self-injury: Who is doing it and why? *Journal of Developmental & Behavioral Pediatrics, 29*(3), 216-218. doi:10.1097/DBP.0b013e318173a5c1

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99-128. doi:10.1207/s15327906mbr3901_4

Martin, J., Bureau, J.-F., Cloutier, P., & Lafontaine, M.-F. (2011). A comparison of invalidating family environment characteristics between university students engaging in self-injurious thoughts & actions and non-self-injuring university students. *Journal of Youth and Adolescence, 40*(11), 1477-1488. doi:10.1007/s10964-011-9643-9

Nixon, M. K., & Heath, N. L. (2009). Assessment of nonsuicidal self-injury in youth. In M. K. Nixon, & N. L. Heath (Eds.), *Self-injury in youth: The essential guide to assessment and intervention* (pp. 143-170). New York, NY: Routledge/Taylor & Francis Group.

Perez, J., Venta, A., Garnaat, S., & Sharp, C. (2012). The Difficulties in Emotion Regulation Scale: Factor structure and association with nonsuicidal self-Injury in adolescent inpatients. *Journal of Psychopathology and Behavioral Assessment, 34*(3), 393-404. doi:10.1007/s10862-012-9292-7

Plener, P., Schumacher, T., Munz, L., & Groschwitz, R. (2015). The longitudinal course of non-suicidal self-injury and deliberate self-harm: A systematic review of the literature. *Borderline Personality Disorder and Emotion Dysregulation, 2*, 1-11. doi:10.1186/s40479-014-0024-3

Polk, E., & Liss, M. (2007). Psychological characteristics of self-injurious behavior. *Personality and Individual Differences, 43*(3), 567-577. doi:10.1016/j.paid.2007.01.003

Preacher, K., & Hayes, A. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*(4), 717-731. doi:10.3758/BF03206553

Prinstein, M. J. (2008). Introduction to the special section on suicide and nonsuicidal self-injury: A review of unique challenges and important directions for self-injury science. *Journal of Consulting and Clinical Psychology, 76*, 1-8. doi:10.1037/0022-006X.76.1.1

Rodham, K., & Hawton, K. (2009). Epidemiology and phenomenology of nonsuicidal self-injury In M. K. Nock (Ed.), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 37-62). Washington, DC: American Psychological Association.

Ross, S., & Heath, N. (2002). A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence, 31*, 67-77. doi:10.1023/A:1014089117419

Roth, G., Assor, A., Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2009). The emotional and academic consequences of parental conditional regard: Comparing conditional positive regard, conditional negative regard, and autonomy support as parenting practices. *Developmental Psychology, 45*(4), 1119-1142. doi:10.1037/a0015272

Ryan, R. M., & Deci, E. L. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78. doi:10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2013). The importance of autonomy for development and well-being. In B. W. Sokol, F. M. E. Grouzet, & U. Muller (Eds.), *Self-regulation and autonomy: Social and developmental dimensions of human conduct* (pp. 19-46). New York, NY: Cambridge Press.

Ryan, R. M., Deci, E. L., Grolnick, W. S., & La Guardia, J. G. (2006). The significance of autonomy and autonomy support in psychological development and psychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and methods* (2nd ed., pp. 295–849). New York: Wiley.

Saldias, A., Power, K., Gillanders, D. T., Campbell, C. W., & Blake, R. A. (2013). The mediatory role of maladaptive schema modes between parental care and non-suicidal self-injury. *Cognitive Behaviour Therapy*. Advance online publication. doi:10.1080/16506073.2013.781671

Swannell, S. V., Martin, G. E., Page, A., Hasking, P., & St John, N. J. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide and Life-Threatening Behavior, 44*(3), 273-303. doi:10.1111/sltb.12070

van der Giessen, D., Branje, S., & Meeus, W. (2014). Perceived autonomy support from parents and best friends: Longitudinal associations with adolescents' depressive symptoms. *Social Development, 23*(3), 537-555. doi:10.1111/sode.12061

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263-280. doi:10.1037/a0032359

Véronneau, M. H., Koestner, R. F., & Abela, J. R. Z. (2005). Intrinsic need satisfaction and well–being in children and adolescents: An application of the self–determination theory. *Journal of Social and Clinical Psychology, 24*(2), 280-292. doi:10.1521/jscp.24.2.280.62277

Voon, D., Hasking, P., & Martin, G. (2014). The roles of emotion regulation and ruminative thoughts in non-suicidal self-injury. *British Journal of Clinical Psychology, 53*, 95-113. doi:10.1111/bjc.12030

Wedig, M. M., & Nock, M. K. (2007). Parental expressed emotion and adolescent self-injury. *Journal of the American Academy of Child & Adolescent Psychiatry*, *46*(9), 1171-1178. doi:10.1097/chi.0b013e3180ca9aaf

Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics, 117*(6), 1939-1948. doi:10.1542/peds.2005-2543

Whitlock, J., Muehlenkamp, J., Purington, A., Eckenrode, J., Barreira, P., Baral Abrams, G., . . . Knox, K. (2011). Nonsuicidal self-injury in a college population: General trends and sex differences. *Journal of American College Health, 59*(8), 691-698. doi:10.1080/07448481.2010.529626

Yates, T. M., Tracy, A. J., & Luthar, S. S. (2008). Nonsuicidal self-injury among "privileged" youths: Longitudinal and cross-sectional approaches to developmental process. *Journal of Consulting and Clinical Psychology, 76*, 52-62. doi:10.1037/0022-006X.76.1.52

You, J., & Leung, F. (2012). The role of depressive symptoms, family invalidation and behavioral impulsivity in the occurrence and repetition of non-suicidal self-injury in Chinese adolescents: A 2-year follow-up study. *Journal of Adolescence*, *35*, 389-395. doi:10.1016/j.adolescence.2011. 07.020

Yurkowski, K., Martin, J., Levesque, C., Bureau, J.-F., Lafontaine, M.-F., & Cloutier, P. (2015). Emotion dysregulation mediates the influence of relationship difficulties on non-suicidal self-injury behavior in young adults. *Psychiatry Research*. Advance online publication. doi:10.1016/j.psychres.2015.05.006

Table 1

Correlations, Means, and Standard Deviations of Study Variables

	1	2	3
1. POPS - Parental Autonomy Support	-		
2. DERS – Total	-.297**	-	
3. NSSI Engagement	-.186**	-.294**	-
Mean (SD)	42.15 (7.05)	71.48 (21.11)	.18 (.39)

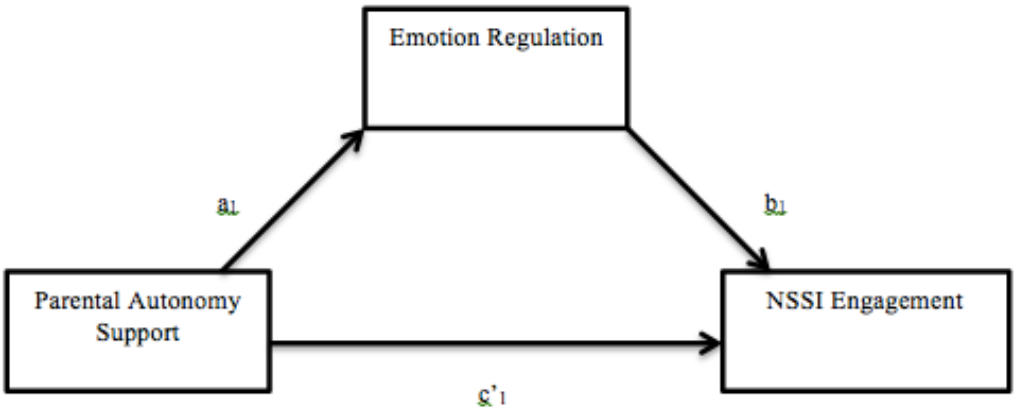
Note: **correlations significant (p = .01)

Table 2

Path Coefficients for Mediation Model Represented in Figure 1

	B	SE	*p*
Path a_1	-10.68	1.36	<.001
Path b_1	.031	.005	<.001
Path c_1' (Direct Effect)	-.576	.192	.003
Indirect Effect	-.332	.069	CI = -.954 - -.199
Path c_1 (Total Effect)	-.840	.183	<.001

Figure 1. Conceptual and Statistical Model



CHAPTER 5

Conclusion

Summary of Findings and Original Contributions to Knowledge

With high prevalence rates in adolescents and young adults, non-suicidal self-injury is a public health concern. There is a need for research outlining factors associated with NSSI onset, maintenance, and cessation in order to better understand the behaviour and to create empirically informed prevention and treatment programs. While emotion-regulation based models of NSSI etiology and maintenance have been essential in guiding research in this domain and in informing treatment, they may not place enough emphasis on the distal social context. Self-determination theory (SDT; Deci & Ryan, 1985, 2000; Ryan & Deci, 2000b) is a theory of motivation, personality, and development that stresses the importance of the social context for well-being and optimal functioning throughout the lifespan. While there are significant overlaps between the NSSI and SDT fields, SDT has never been explicitly applied to further our understanding of NSSI. As a model that considers an individual's perception of their environment, SDT may shed new light on NSSI contributing environmental factors. The current program of research took an SDT lens to investigate and explain NSSI in adolescents and young adults.

The first manuscript introduced SDT's three basic needs as potential indicators of NSSI in a community sample of young adults. Level of satisfaction of the three basic needs successfully distinguished between young adults with a history of NSSI engagement and those with no such history, with those who have engaged in NSSI reporting significantly lower levels of satisfaction of the needs for autonomy, competence, and relatedness. Additionally, lowered satisfaction of the need for competence significantly increased the odds of having a history of

engaging in NSSI even after the effects of difficulties in emotion regulation were accounted for. These results suggest that the satisfaction of self-determination theory's basic need for competence may have an impact on NSSI engagement history in young adults above and beyond the well-established role of emotion dysregulation. The results from the first manuscript lend support to SDT's basic tenets and suggest that it may be a useful theory to extend our understanding of NSSI. This study is a substantial contribution to the NSSI literature as it is the first to test a self-determination theory approach, with findings suggesting that SDT may be complementary to emotion regulation models. Under this perspective, distal environmental influences on the fulfillment of the need for competence, which is associated with feelings of self-esteem and self-efficacy, may be particularly influential in predicting NSSI history in young adults.

Although some individuals develop NSSI during young adulthood, the majority experience onset of NSSI in early to mid adolescence (Heath et al., 2009; Plener et al., 2015; Rodham & Hawton, 2009). Furthermore, as the typical length of NSSI is from 2-4 years (Whitlock & Selekman, 2014), for many, adolescence represents the developmental period that corresponds to NSSI initiation and cessation. Thus, following the establishment of the relevancy of SDT in a sample of young adults, the next step in this line of inquiry was to apply a self-determination theory perspective to further our understanding of NSSI onset, maintenance, and cessation in adolescents. Manuscript 2 sought to examine group differences in need satisfaction as a function of NSSI status and to examine how changes in the satisfaction of autonomy, competence, and relatedness over a 12-month period may correspond to changes in NSSI onset and cessation. Results indicated that adolescents significantly differed on their reports of need satisfaction based on NSSI status. That is, adolescents who reported engaging in NSSI at both

time points of the study reported significantly lower levels of satisfaction of the needs for autonomy, competence, and relatedness compared to adolescents who had no NSSI history. Similarly, adolescents who reported NSSI onset over the course of the study reported lower satisfaction of the needs for autonomy and competence compared to adolescents with no NSSI history. Although there was no significant effect of need satisfaction on NSSI status over time, this was likely due to low power, as an examination of the plotted means by group suggest a general trend in the hypothesized directions, indicating that it is possible that as need satisfaction changes, so too does NSSI behaviour. This study is the first to apply an SDT perspective to further our understanding of NSSI in young adolescents, and offers further support for the usefulness of this paradigm. Furthermore, this study represents an important contribution in that it adds to the much needed literature on NSSI onset, maintenance, and cessation using a longitudinal design (Jacobson & Gould, 2007; Nock, 2012).

Manuscript 3 builds on the findings of manuscripts 1 and 2 that suggest that SDT may be a useful addition to the field of NSSI by directly testing a model constructed from self-determination theory tenets. Specifically, the objective of the study was to examine how parental autonomy support influences NSSI in young adolescents directly and indirectly through difficulties in emotion regulation. Results indicated direct effects of parental autonomy support and difficulties in emotion regulation on NSSI engagement, a direct effect of perceived parental autonomy support on difficulties in emotion regulation, and that difficulties in emotion regulation partially mediated the associations between parental autonomy support and NSSI history. These findings lend support to self-determination theory's proposition that when parents thwart their children's autonomy, maladaptive outcomes result due to disturbances in emotion regulation (Deci et al., 2006).

The collective findings of this program of research offer an original contribution to the literature by synthesizing NSSI and SDT fields and thereby providing a well-established theoretical framework in which to understand and conceptualize NSSI. Although SDT has previously been applied to constructs closely related to NSSI such as suicidal ideation, depression, and difficulties in emotion regulation (Brenning et al., 2015; J. S. Bureau et al., 2012; Emery et al., 2015; van der Giessen, 2014; Véronneau et al., 2005), and many empirically supported risk factors associated with NSSI are conceptually related to self-determination theory's needs for autonomy, competence, and relatedness, the present program of research represents the first to explicitly view NSSI through an SDT lens.

Together, the study findings suggest that SDT may be a useful theory to further our understanding of NSSI in adolescents and young adults. Findings from these studies emphasize the need to take into account more distal environmental factors such as need satisfaction, along with proximal intrapersonal factors such as emotion dysregulation, when considering NSSI. Indeed, Nock's (2009) conceptual model of NSSI highlights the importance of both intrapersonal proximal and interpersonal distal factors in NSSI etiology. SDT offers a well-established theoretical framework to explain the underlying mechanisms of the associations found between these factors and NSSI behaviour. Findings from the studies offer insight into the importance of acknowledging adolescents' and young adults' perceived needs to feel as though they are acting out of their own volition, are competent, and feel close to others, as well as the ultimate importance of parenting behaviours that support autonomy. Similar to previous results (Emery et al., 2015), it appears that some needs may be more salient predictors of maladaptive outcomes at different developmental periods. Competence seemed to have the largest effect on NSSI history in young adults whereas all three needs were more sensitive in adolescents. As adolescence

represents a particularly important developmental period where risk is heightened for NSSI onset (Plener et al., 2015; Nock & Prinstein, 2005), it may also be a critical period in which to target SDT informed prevention and intervention efforts. Along with potential avenues for therapeutic strategies, taking on an SDT perspective can inform future research in the field of NSSI.

Directions for Future Research

The present program of research lends initial support for the application of SDT to further our understanding of NSSI by examining SDT's tenets in adolescents and young adults and by incorporating both cross-sectional and longitudinal designs. Future research should look to extend this work especially with prospective longitudinal designs that may give important insight into NSSI onset, maintenance, and cessation, and how this may coincide with fluctuations in need fulfillment. Research should incorporate more than two time points in order to capture the potential many starts and stops of cyclical NSSI behaviour. Increased time points would be of value both over a broader time span to capture NSSI onset and cessation and within a smaller time frame to investigate NSSI characteristics. For example, diary methods recording need satisfaction and NSSI thoughts and behaviours on a month-to-month basis over a period of several years could explain how need satisfaction may affect fluctuations in NSSI behaviour over the short and long terms. Additionally, other measures of NSSI severity could be included such as frequency, body location, and number of methods. It is likely that as need satisfaction drops, NSSI severity increases. When conducting these longitudinal studies, it would be important to investigate large samples in order to have enough power to compare across multiple profiles of NSSI.

Measures of more proximal intrapersonal factors such as difficulties in emotion regulation should be included in these designs as it is clear that they are an essential piece of the

NSSI puzzle. One potential factor stems from SDT's causality orientations mini theory that explains more stable individual differences in how individuals orient to particular environments and thus continue to experience need satisfaction versus thwarting (Deci & Ryan, 1985). Considering the present findings showing that needs relate to NSSI, it is likely that causality orientation may be a powerful proximal intrapersonal factor that contributes to NSSI.

Measures of need thwarting such as the Psychological Need Thwarting Scale (Bartholomew et al., 2011) would also be a good addition to future research applying SDT to NSSI as would an SDT based measure of emotion regulation such as Roth and colleague's (2009) Emotion Regulation Inventory. Adding measures of autonomy support completed by multiple informants would substantiate the present findings, as would the use of observational methods to view parent-child interactions in real time and assess the degree of autonomy support versus thwarting. Finally, future research would benefit from using structural equation modeling when examining SDT's proposed tenets. With this analysis directionality may be inferred and the influence of multiple aspects of a variable can be parsed out. For example, considering that emotion regulation strategies seemed to hold particular relevance for NSSI engagement in Study 1 of the present program of research, it would be of interest to see if this aspect of difficulties in emotion regulation again held the most explanatory power as a mediator between parental autonomy support and NSSI engagement. Structural equation modeling would allow for this examination of multiple levels of mediators.

Clinical Implications

The present findings give clinicians working with adolescents and young adults who are engaging in NSSI, a well-established theoretical framework from which to conceptualize the behaviour and to base their therapeutic approach. Findings suggest that clinicians should assess

their client's level of need satisfaction and target client's perceptions of the social context to advance therapeutic change. Findings from the present program of research suggest that adolescents and young adults with NSSI differ in their perceptions of their need satisfaction; this would be a potentially fruitful area for exploration in the therapeutic context. The client and clinician can work together to reframe aspects of the environment that the client may view as thwarting their needs and to increase opportunities for need fulfillment. Furthermore, the present findings suggest that the parent-child relationship is of particular importance when considering NSSI. Coming alongside parents and teaching them autonomy supportive techniques may be an essential addition to other identified client focused dialectical behavioural therapy approaches when treating young adolescents.

Implications for School Psychologists

In a school environment, the best approach for managing cases of NSSI is not to focus on the behaviour itself, but instead to implement school-wide programs that teach healthy adaptive coping strategies (Toste & Heath, 2010). The current research suggests that psychoeducation in the importance of satisfaction of the needs for autonomy, competence, and relatedness would be an important component of such programs. School psychologists could encourage students to think about their values and beliefs and to identify times when they have acted in accordance with these. Students could be encouraged to identify things that they are good at and to participate in activities that are challenging but achievable. Students could be encouraged to identify their support systems; who they get support from and who they give support to. They can outline the many ways they are connected to other people, communities, and society at large. Furthermore, school psychologists could ask students what environments they feel that their needs are the most supported in and to increase their exposure to these environments during

times in which they feel overwhelmed and stressed. The present findings also suggest that psychoeducation in emotion and emotion regulation may be helpful to decrease incidents of NSSI. Although mindfulness and acceptance interventions for children and youth are still in their infancy (Hayes & Greco, 2008), these approaches offer students instruction in identifying emotions, noticing how they feel in the body, and letting them run their course in a non-judgmental way. Research has been promising for mindfulness-based school interventions, showing improvements in students' cognitive and emotional control, empathy, optimism, and decreases in depression (Saltzman & Goldin, 2008; Schonert-Reichl et al., 2015).

The role of the teacher is central to academic and social success (Hughes, Im, & Wehrly, 2014; Spilt, Hughes, Wu, & Kwok, 2012) and research in the field of SDT consistently shows the student benefits of having an autonomy supportive teacher (e.g., Jungert & Koestner, 2013; Vansteenkiste et al., 2012). Classrooms should also be places where students experience need fulfillment, and it is likely that increased satisfaction of needs within this context would correspond to decreases in NSSI. School psychologists should work with teachers to help them to cultivate autonomy supportive teaching methods. In this way, school psychologists may indirectly promote healthy schools and potentially decrease the occurrence of NSSI.

Concluding Comments

The current program of research represents an original contribution to the literature as it applies self-determination theory to further our understanding and conceptualization of NSSI. In summary, findings from the current program of research reveal significant associations between the satisfaction of the needs for autonomy, competence, and relatedness, as well as parental autonomy support, and NSSI in adolescents and young adults, indicating that SDT may be a

useful tool with which to advance future research and therapeutic prevention and intervention efforts.

Bibliography

Adams, J., Rodham, K., & Gavin, J. (2005). Investigating the "self" in deliberate self-harm. *Qualitative Health Research, 15*(10), 1293-1309. doi:10.1177/1049732305281761

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well- and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise, 13*, 51-59. doi:10.1016/j.psychsport.2011.07.008

Adler, P. A., & Adler, P. (2005). Self-injurers as loners: The social organization of solitary deviance. *Deviant Behavior, 26*(4), 345-378. doi:10.1080/016396290931696

Adrian, M., Zeman, J., Erdley, C., Lisa, L., & Sim, L. (2011). Emotional dysregulation and interpersonal difficulties as risk factors for nonsuicidal self-injury in adolescent girls. *Journal of Abnormal Child Psychology, 39*(3), 389-400. doi:10.1007/s10802-010-9465-3

Ahmad, I., Vansteenkiste, M., & Soenens, B. (2013). The relations of Arab Jordanian adolescents' perceived maternal parenting to teacher-rated adjustment and problems: The intervening role of perceived need satisfaction. *Developmental Psychology, 49*, 177-183. doi:10.1037/a0027837

Alspaugh, J. W. (1998). Achievement loss associated with the transition to middle school and high school. *The Journal of Educational Research, 92*, 20-25. doi:10.1080/00220679809597572

Amarose, A. J., Anderson-Butcher, D., & Cooper, J. (2009). Predicting changes in athletes' well-being from changes in need satisfaction over the course of a competitive season. *Research Quarterly for Exercise and Sport, 80,* 386-392. Retrieved from:

http://go.galegroup.com/ps/i.do?id= GALE%7CA203659327&v
=2.1&u=crepuq_mcgill&it=r&p=EAIM&sw=w

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed. text revision). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Anderson, N. L., & Crowther, J. H. (2012). Using the experiential avoidance model of non-suicidal self-injury: Understanding who stops and who continues. *Archives of Suicide Research, 16*, 124-134. doi:10.1080/13811118.2012.667329

Andover, M. S., & Morris, B. W. (2014). Expanding and clarifying the role of emotion regulation in nonsuicidal self-injury. *Canadian Journal of Psychiatry, 59*(11), 569-575. Retrieved from: http://www.scopus.com/inward/record.url?eid=2-s2.0-84911926203&partnerID=40&md5=be8da5cc1d505e59abde0953deacf69d

Andrews, T., Martin, G., Hasking, P., & Page, A. (2013). Predictors of continuation and cessation of nonsuicidal self-injury. *Journal of Adolescent Health, 53*, 40-46. doi:10.1016/j.jadohealth.2013.01.009

Armsden, G., C., & Greenberg, M., T. (1987). The inventory of parent and peer attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence, 16*(5), 427-454. doi:10.1007/BF02202939

Baard, P. P., Deci, E. L., & Ryan, R. M. (2004). Intrinsic need satisfaction: A motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology, 34*(10), 2045-2068. Retrieved from:

http://www.selfdeterminationtheory.org/publications/browse-by-topic/137-paul-baards-publications

Baetens, I., Claes, L., Martin, G., Onghena, P., Grietens, H., Van Leeuwen, K., . . . Griffith, J. W. (2014). Is nonsuicidal self-injury associated with parenting and family factors? *The Journal of Early Adolescence, 34*(3), 387-405. doi:10.1177/0272431613494006

Baetens, I., Claes, L., Muehlenkamp, J., Grietens, H., & Onghena, P. (2012). Differences in psychological symptoms and self-competencies in non-suicidal self-injurious Flemish adolescents. *Journal of Adolescence*, *35*, 753-759. doi:10.1016/j.adolescence.2011.11.001

Baetens, I., Claes, L., Onghena, P., Grietens, H., Van Leeuwen, K., Pieters, C., . . . Griffith, J. (2015). The effects of nonsuicidal self-injury on parenting behaviors: A longitudinal analyses of the perspective of the parent. *Child and Adolescent Psychiatry and Mental Health, 9*(24), 1-6. doi:10.1186/s13034-015-0059-2

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, *37*(11), 1459-1473. doi:10.1177/0146167211413125

Boone, L., Vansteenkiste, M., Soenens, B., Van der Kaap-Deeder, J., & Verstuyf, J. (2014). Self-critical perfectionism and binge eating symptoms: A longitudinal test of the intervening role of psychological need frustration. *Journal of Counseling Psychology, 61*(3), 363-373. doi:10.1037/a0036418

Brausch, A., & Gutierrez, P. (2010). Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of Youth and Adolescence, 39*(3), 233-242. doi:10.1007/s10964-009-9482-0

Breen, A. V., Lewis, S. P., & Sutherland, O. (2013). Brief report: Non-suicidal self-injury in the context of self and identity development. *Journal of Adult Development, 20*, 57-62. doi:10.1007/s10804-013-9156-8

Brenning, K., Soenens, B., Van Petegem, S., & Vansteenkiste, M. (2015). Perceived maternal autonomy support and early adolescent emotion regulation: A longitudinal study. *Social Development*. Advance online publication. doi:10.1111/sode.12107

Briere, J., & Gil, E. (1998). Self-mutilation in clinical and general population samples: Prevalence, correlates, and functions. *American Journal of Orthopsychiatry, 68*(4), 609-620. doi:10.1037/h0080369

Brown, M. Z., Comtois, K. A., & Linehan, M. M. (2002). Reasons for suicide attempts and nonsuicidal self-injury in women with borderline personality disorder. *Journal of Abnormal Psychology, 111*, 198-202. doi:10.1037/0021-843X.111.1.198

Brown, S. A., Williams, K., & Collins, A. (2007). Past and recent deliberate self-harm: Emotion and coping strategy differences. *Journal of Clinical Psychology, 63*(9), 791-803. doi:10.1002/jclp.20380

Bureau, J.-F., Martin, J., Freynet, N., Poirier, A., Lafontaine, M.-F., & Cloutier, P. (2010). Perceived dimensions of parenting and non-suicidal self-injury in young adults. *Journal of Youth and Adolescence, 39*(5), 484-494. doi:10.1007/s10964-009-9470-4

Bureau, J. S., Mageau, G. A., Vallerand, R. J., Rousseau, F. L., & Otis, J. (2012). Self-determination: A buffer against suicide ideation. *Suicide and Life-Threatening Behavior, 42*(4), 377-393. doi:10.1111/j.1943-278X.2012.00097.x

Buser, T. J., Buser, J. K., & Kearney, A. (2012). Justice in the family: The moderating role of social self-efficacy in the relationship between nonsuicidal self-injury and interactional justice from parents. *The Family Journal, 20*(2), 147-156. doi:10.1177/1066480712441575

Cawood, C. D., & Huprich, S. K. (2011). Late adolescent nonsuicidal self-injury: The roles of coping style, self-esteem, and personality pathology. *Journal of Personality Disorders, 25*(6), 765-781. doi:10.1521/pedi.2011.25.6.765

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy, 44*(3), 371-394. doi:10.1016/j.brat.2005.03.005

Claes, L., Houben, A., Vandereycken, W., Bijttebier, P., & Muehlenkamp, J. (2010). Brief report: The association between non-suicidal self-injury, self-concept and acquaintance with self-injurious peers in a sample of adolescents. *Journal of Adolescence*, *33*(5), 775-778. doi:10.1016/ j.adolescence.2009.10.012

Claes, L., Luyckx, K., Baetens, I., Van De Ven, M., & Witteman, C. (2015). Bullying and victimization, depressive mood, and non-suicidal self-injury in adolescents: The moderating role of parental support. *Journal of Child and Family Studies*. Advanced online publication. doi:10.1007/s10826-015-0138-2

Claes, L., Vandereycken, W., & Vertommen, H. (2007). Self-injury in female versus male psychiatric patients: A comparison of characteristics, psychopathology and aggression regulation. *Personality and Individual Differences, 42*(4), 611-621. doi:10.1016/j.paid.2006.07.021

Cloutier, P. F., Nixon, M. K. (2003). The Ottawa self-injury inventory: A preliminary evaluation. Abstracts to the 12th International Congress European Society for Child and Adolescent Psychiatry. *European Child & Adolescent Psychiatry, 12* (Suppl 1): I/94.

Costa, S., Soenens, B., Gugliandolo, M., Cuzzocrea, F., & Larcan, R. (2015). The mediating role of experiences of need satisfaction in associations between parental psychological control and internalizing problems: A study among Italian college students. *Journal of Child and Family Studies, 24*(4), 1106-1116. doi:10.1007/s10826-014-9919-2

Crowell, S. E., Beauchaine, T. P., & Linehan, M. M. (2009). A biosocial developmental model of borderline personality: Elaborating and extending Linehan's theory. *Psychological Bulletin, 135*(3), 495-510. doi:10.1037/a0015616

Crowell, S. E., Beauchaine, T. P., McCauley, E., Smith, C. J., Vasilev, C. A., & Stevens, A. L. (2008). Parent-child interactions, peripheral serotonin, and self-inflicted injury in adolescents. *Journal of Consulting and Clinical Psychology*, *76*, 15-21. doi:10.1037/0022-006X.76.1.15

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*(2), 109-134. doi:10.1016/0092-6566(85)90023-6

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie canadienne, 49*(3), 182-185. doi:10.1037/a0012801

Duggan, J., Heath, N., & Hu, T. (2015). Non-suicidal self-injury maintenance and cessation among adolescents: A one-year longitudinal investigation of the role of objectified body consciousness, depression and emotion dysregulation. *Child and Adolescent Psychiatry and Mental Health, 9*(21), 1-12. doi:10.1186/s13034-015-0052-9

Duggan, J. M., Heath, N. L., Toste, J. R., & Ross, S. (2011). School counsellors' understanding of non-suicidal self-injury: Experiences and international variability. *Canadian Journal of Counselling and Psychotherapy/Revue canadienne de counseling et de psychothérapie, 45*(4), 327-348. Retrieved from: http://www.cjc-rcc.ucalgary.ca/cjc/index.php/rcc/article/view/918/1416

Emery, A. A., Toste, J., & Heath, N. (2015). The balance of intrinsic need satisfaction across contexts as a predictor of depressive symptoms in children and adolescents. *Motivation and Emotion*. Advance online publication. doi:10.1007/s11031-015-9491-0

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3.1: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behaviour Research Methods, 39,* 175-191. Retrieved from: http://www.gpower.hhu.de/fileadmin/redaktion/Fakultaeten/Mathematisch-Naturwissenschaftliche_Fakultaet/Psychologie/AAP/gpower/GPower3-BRM-Paper.pdf

Fichman, L., Koestner, R., & Zuroff, D. C. (1996). Dependency, self-criticism, and perceptions of inferiority at summer camp: I'm even worse than you think. *Journal of Youth and Adolescence*, *25*, 113-126. doi:10.1007/BF01537383

Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research 14*, 449– 468. doi:10.1007/BF01172967

Garisch, J., & Wilson, M. (2015). Prevalence, correlates, and prospective predictors of non-suicidal self-injury among New Zealand adolescents: Cross-sectional and longitudinal survey data. *Child and Adolescent Psychiatry and Mental Health, 9*(28), 1-11. doi:10.1186/s13034-015-0055-6

Gillison, F., Standage, M., & Skevington, S. (2008). Changes in quality of life and psychological need satisfaction following the transition to secondary school. *British Journal of Educational Psychology, 78*, 149-162. doi:10.1348/000709907X209863

Glassman, L. H., Weierich, M. R., Hooley, J. M., Deliberto, T. L., & Nock, M. K. (2007). Childhood maltreatment, non-suicidal self-injury, and the mediating role of self-criticism. *Behaviour Research and Therapy, 45*(10)*,* 2483- 2490. doi:10.1016/j.brat.2007.04.002

Glenn, C. R., & Klonsky, E. D. (2013). Nonsuicidal self-injury disorder: An empirical investigation in adolescent psychiatric patients. *Journal of Clinical Child & Adolescent Psychology, 42*(4), 496-507. doi:10.1080/15374416.2013.794699

Gollust, S. E., Eisenberg, D., & Golberstein, E. (2008). Prevalence and correlates of self-injury among university students. *Journal of American College Health, 56*(5), 491-498. doi:10.3200/JACH.56.5.491-498

Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment, 23*(4), 253-263. doi:10.1023/A:1012779403943

Gratz, K. L. (2006). Risk factors for deliberate self-harm among female college students: The role and interaction of childhood maltreatment, emotional inexpressivity, and affect intensity/reactivity. *American Journal of Orthopsychiatry, 76*(2), 238-250. doi:10.1037/0002-9432.76.2.238

Gratz, K. L., Breetz, A., & Tull, M. T. (2010). The moderating role of borderline personality in the relationships between deliberate self-harm and emotion-related factors. *Personality and Mental Health, 4*(2), 96-107. doi:10.1002/pmh.102

Gratz, K. L., & Chapman, A. L. (2007). The role of emotional responding and childhood maltreatment in the development and maintenance of deliberate self-harm among male undergraduates. *Psychology of Men & Masculinity, 8*, 1-14. doi:10.1037/1524-9220.8.1.1

Gratz, K. L., Conrad, S. D., & Roemer, L. (2002). Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry, 72*, 128-140. doi:10.1037/0002-9432.72.1.128

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26*, 41-54. doi:10.1023/B:JOBA.0000007455.08539.94

Gratz, K. L., & Roemer, L. (2008). The relationship between emotion dysregulation and deliberate self‐harm among female undergraduate students at an urban commuter university. *Cognitive Behaviour Therapy, 37*, 14-25. doi:10.1080/16506070701819524

Grolnick, W. S., & Raftery-Helmer, J. N. (2013). The importance of autonomy for development and well-being. In B. W. Sokol, F. M. E. Grouzet, & U. Muller (Eds.), *Self-regulation and autonomy: Social and developmental dimensions of human conduct* (pp. 141-164). New York, NY: Cambridge Press.

Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology, 83*(4), 508-517. doi:10.1037/0022-0663.83.4.508

Gross, J. J., & Barrett, L. F. (2011). Emotion generation and emotion regulation: One or two depends on your point of view. *Emotion Review, 3,* 8-16. doi:10.1177/1754073910380974

Gross, J. J., & Jazaieri, H. (2014). Emotion, emotion regulation, and psychopathology: An affective science perspective. *Clinical Psychological Science, 2*(4), 387-401. doi:10.1177/2167702614536164

Guay, F., Mageau, G. A., & Vallerand, R. J. (2003). On the hierarchical structure of self-determined motivation: A test of top-down, bottom-up, reciprocal, and horizontal effects. *Personality and Social Psychology Bulletin, 29*(8), 992-1004. doi:10.1177/0146167203253297

Guertin, T., Lloyd-Richardson, E., Spirito, A., Donaldson, D., & Boergers, J. (2001). Self-mutilative behavior in adolescents who attempt suicide by overdose. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*(9)*,* 1062–1069. doi:10.1097/00004583-200109000-00015

Gunnell, K. E., Crocker, P. R. E., Wilson, P. M., Mack, D. E., & Zumbo, B. D. (2013). Psychological need satisfaction and thwarting: A test of basic psychological needs theory in physical activity contexts. *Psychology of Sport and Exercise*, *14*, 599-607. doi:10.1016/j.psychsport.2013.03.007

Hallab, L., & Covic, T. (2010). Deliberate self-harm: The interplay between attachment and stress. *Behaviour Change, 27*, 93-103. doi:10.1375/bech.27.2.93

Halstead, R. O., Pavkov, T. W., Hecker, L. L., & Seliner, M. M. (2014). Family dynamics and self-injury behaviors: A correlation analysis. *Journal of Marital and Family Therapy, 40*(2), 246-259. doi:10.1111/j.1752-0606.2012.00336.x

Halvari, A. E. M., Halvari, H., Bjørnebekk, G., & Deci, E. L. (2013). Oral health and dental well-being: Testing a self-determination theory model. *Journal of Applied Social Psychology*, *43*, 275-292. doi:10.1111/j.1559-1816.2012.00996.x

Hamza, C. A., Stewart, S. L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review, 32*(6), 482-495. doi:10.1016/j.cpr.2012.05.003

Hamza, C. A., & Willoughby, T. (2013). Nonsuicidal self-injury and suicidal behavior: A latent class analysis among young adults. *PLoS ONE, 8*(3), e59955. doi:10.1371/journal.pone.0059955

Hankin, B. L., & Abela, J. R. Z. (2011). Nonsuicidal self-injury in adolescence: Prospective rates and risk factors in a 2 ½ year longitudinal study. *Psychiatry Research, 186*, 65-70. doi:10.1016/j.psychres.2010.07.056

Hawton, K., Bergen, H., Kapur, N., Cooper, J., Steeg, S., Ness, J., & Waters, K. (2012). Repetition of self-harm and suicide following self-harm in children and adolescents: Findings from the Multicentre Study of Self-Harm in England. *Journal of Child Psychology and Psychiatry, 53*(12), 1212-1219. doi:10.1111/j.1469-7610.2012.02559.x

Hawton, K., Rodham, E., Evans, R., & Weatherall, R. (2002). Deliberate self-harm in adolescents: Self-report survey in schools in England. *British Medical Journal, 325*(7374), 1207–1211. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC135492/

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from: http://www.afhayes.com/ public/process2012.pdf

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis : A regression-based approach*. New York, NY: Guilford Press.

Hayes, S. C., & Greco, L. A. (2008). Acceptance and mindfulness for youth: It's time. In L. A. Greco & S. C. Hayes (Eds.), *Acceptance and mindfulness treatments for children and adolescents: A practitioner's guide* (pp. 3-13). Oakland, CA: New Harbinger.

Heath, N. L., & Ross, S. (2007). *How I Deal with Stress*. Unpublished instrument. McGill University, Montreal, Quebec, Canada.

Heath, N. L., Ross, S., Toste, J. R., Charlebois, A., & Nedecheva, T. (2009). Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 41*(3), 180-186. doi:10.1037/a0015732

Heath, N. L., Schaub, K., Holly, S., & Nixon, M. K. (2009). Self-injury today: Review of population and clinical studies in adolescents. In N. L. Heath & M. K. Nixon (Eds.), *Self-injury in youth: The essential guide to assessment and intervention* (pp. 9-28). New York, NY: Routledge Press

Heath, N. L., Toste, J. R., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling, 30*(2), 137-156. Retrieved from http://amhca.metapress.com/app/home/main.asp?referrer=default

Heppner, W. L., Kernis, M. H., Nezlek, J. B., Foster, J., Lakey, C. E., & Goldman, B. M. (2008). Within-person relationships among daily self-esteem, need satisfaction, and authenticity. *Psychological Science, 19*(11), 1140-1145. doi:10.1111/j.1467-9280.2008.02215.x

Herpertz, S., Sass, H., & Favazza, A. (1997). Impulsivity in self-mutilative behavior: Psychometric and biological findings. *Journal of Psychiatric Research*, *31*, 451-465. doi:10.1016/S0022-3956(97)00004-6

Hilt, L., & Hamm, E. (2014). Peer influences on non-suicidal self-injury and disordered eating. In L. Claes & J. J. Muehlenkamp (Eds.), *Non-suicidal self-injury in eating disorders* (pp. 255-272). Berlin: Springer.

Hilt, L. M., Nock, M. K., Lloyd-Richardson, E. E., & Prinstein, M. J. (2008). Longitudinal study of nonsuicidal self-injury among young adolescents: Rates, correlates, and preliminary test of an interpersonal model. *The Journal of Early Adolescence*, *28*, 455-469. doi:10.1177/ 0272431608316604

Hodgsen, S. (2004). Cutting through the silence: A sociological construction of self-injury. *Sociological Inquiry*, *74*, 162-179. doi:10.1111/j.1475-682X.2004.00085.x

Hoff, E. R., & Muehlenkamp, J. J. (2009). Nonsuicidal self-injury in college students: The role of perfectionism and rumination. *Suicide and Life-Threatening Behavior*, *39*, 576-587. doi:10.1521/suli.2009.39.6.576

Howell, R., Chenot, D., Hill, G., & Howell, C. (2011). Momentary happiness: The role of psychological need satisfaction. *Journal of Happiness Studies, 12*, 1-15. doi:10.1007/s10902-009-9166-1

Hughes, J. N., Im, M. H., & Wehrly, S. E. (2014). Effect of peer nominations of teacher–student support at individual and classroom levels on social and academic outcomes. *Journal of School Psychology, 52*(3), 309-322. doi:10.1016/j.jsp.2013.12.004

Ilardi, B. C., Leone, D., Kasser, T., & Ryan, R. M. (1993). Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *Journal of Applied Social Psychology, 23*(21), 1789-1805. doi:10.1111/j.1559-1816.1993.tb01066.x

Jacobson, C. M., & Gould, M. (2007). The epidemiology and phenomenology of non-suicidal self-injurious behavior among adolescents: A critical review of the literature. *Archives of Suicide Research, 11*, 129-147. doi:10.1080/13811110701247602

Jacobson, C. M., Muehlenkamp, J.J., Miller, A.L., & Turner, J.B. (2008). Psychiatric impairment among adolescents engaging in different types of deliberate self-harm. *Journal of Clinical Child and Adolescent Psychology, 37,* 363-375. doi:10.1080/15374410801955771

Jenkins, A. L., & Schmitz, M. F. (2012). The roles of affect dysregulation and positive affect in non-suicidal self-injury. *Archives of Suicide Research, 16*(3), 212-225. doi:10.1080/13811118.2012.695270

Joussemet, M., Landry, R., & Koestner, R. (2008). A self-determination theory perspective on parenting. *Canadian Psychology, 49*(3), 194-200. doi:10.1037/a0012754

Joussemet, M., Mageau, G., & Koestner, R. (2014). Promoting optimal parenting and children's mental health: A preliminary evaluation of the How-to Parenting Program. *Journal of Child and Family Studies, 23*(6), 949-964. doi:10.1007/s10826-013-9751-0

Jungert, T., & Koestner, R. (2013). Science adjustment, parental and teacher autonomy support and the cognitive orientation of science students. *Educational Psychology, 35*(3), 361-376. doi:10.1080/01443410.2013.828826

Kaminski, J. W., Puddy, R. W., Hall, D. M., Cashman, S. Y., Crosby, A. E., & Ortega, L. A. (2010). The relative influence of different domains of social connectedness on self-directed violence in adolescence. *Journal of Youth and Adolescence*, *39*, 460-473. doi:10.1007/s10964-009-9472-2

Kline, T. J. B. (2005). *Psychological testing: A practical approach to design and evaluation*. Thousand Oaks, CA: Sage Publications, Inc.

Klonsky, E. D. (2007a). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review, 27*(2), 226-239. doi:10.1016/j.cpr.2006.08.002

Klonsky, E. D. (2007b). Non-suicidal self-injury: An introduction. *Journal of Clinical Psychology, 63*(11), 1039-1043. doi:10.1002/jclp.20411

Klonsky, E. D., Muehlenkamp, J., Lewis, S. P., & Walsh, B. (2011). *Nonsuicidal self-injury*. Cambridge, MA: Hogrefe & Huber.

Klonsky, E. D., & Olino, T. M. (2008). Identifying clinically distinct subgroups of self-injurers among young adults: A latent class analysis. *Journal of Consulting and Clinical Psychology, 76*, 22-27. doi:10.1037/0022-006X.76.1.22

Klonsky, E. D., Oltmanns, T. F., & Turkheimer, E. (2003). Deliberate self-harm in a nonclinical population: Prevalence and psychological correlates. *American Journal of Psychiatry, 160*(8)*,* 1501–1508. doi:10.1176/appi.ajp.160.8.1501

Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's behavior: The differential effects of controlling vs. informational styles on intrinsic motivation and creativity. *Journal of Personality, 52*(3), 233-248. doi:10.1111/j.14676494.1984.tb00879.x

La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*(3), 367-384. doi:10.1037/0022-3514.79.3.367

Laye-Gindhu, A., & Schonert-Reichl, K.A. (2005). Non-suicidal self-harm among community adolescents: Understanding the “whats” and “whys” of self-harm. *Journal of Youth and Adolescence, 34*, 447-457. doi:10.1007/s10964-005-7262-z

Lewis, S. P., & Heath, N. L. (2015). Nonsuicidal self-injury among youth. *The Journal of Pediatrics, 166*(3), 526-530. doi:10.1016/j.jpeds.2014.11.062

Lewis, S. P., Heath, N. L., Michal, N. J., & Duggan, J. M. (2012). Non-suicidal self-injury, youth, and the Internet: What mental health professionals need to know. *Child and Adolescent Psychiatry and Mental Health, 6*(13), 1-9. doi:10.1186/1753-2000-6-13

Lewis, S. P., & Michal, N. J. (2014). Start, stop, and continue: Preliminary insight into the appeal of self-injury e-communities. *Journal of Health Psychology*. Advance online publication. doi:10.1177/1359105314527140

Linehan, M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guilford Press.

Lloyd-Richardson, E. E. (2008). Adolescent nonsuicidal self-injury: Who is doing it and why? *Journal of Developmental & Behavioral Pediatrics, 29*(3), 216-218. doi:10.1097/DBP.0b013e318173a5c1

Lloyd-Richardson, E., Perrine, N., Dierker, L., & Kelley, M. L. (2007). Characteristics and functions of non-suicidal self-injury in a community sample of adolescents. *Psychological Medicine, 37*(8), 1183-1192. doi:10.1017/S003329170700027X

Lofthouse, N. L., Muehlenkamp, J. J, & Adler, R. (2009). Non-suicidal self-injury and co-occurrence. In M.K. Nixon, N.L. Heath (Eds.), *Self-injury in youth: The essential guide to assessment and intervention* (pp. 59-78). New York, NY: Routledge.

Lundh, L. G., Karim, J., & Quilisch, E.V.A. (2007). Deliberate self-harm in 15-year-old adolescents: A pilot study with a modified version of the Deliberate Self‐Harm Inventory. *Scandinavian Journal of Psychology*, *48*, 33-41. doi:10.1111/j.1467-9450.2007.00567.x

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99-128. doi:10.1207/s15327906mbr3901_4

Martin, J., Bureau, J.-F., Cloutier, P., & Lafontaine, M.-F. (2011). A comparison of invalidating family environment characteristics between university students engaging in self-injurious thoughts & actions and non-self-injuring university students. *Journal of Youth and Adolescence, 40*(11), 1477-1488. doi:10.1007/s10964-011-9643-9

Martin, G., Swannell, S., Hazell, P., Harrison, J., & Taylor, A. (2010). Self-injury in Australia: A community survey. *Medical Journal of Australia, 193*, 506–510. Retrieved from: https://www. mja.com.au/journal/2010/193/9/self-injury-australia-community-survey?0=ip_login_no_ cache%3D614c75b042d17ac2ac49b8abfb0f8771

Meyer, B., Enström, M. K., Harstveit, M., Bowles, D. P., & Beevers, C. G. (2007). Happiness and despair on the catwalk: Need satisfaction, well-being, and personality adjustment among fashion models. *The Journal of Positive Psychology, 2*, 2-17. doi:10.1080/17439760601076635

Milyavskaya, M., Gingras, I., Mageau, G. A., Koestner, R., Gagnon, H., Fang, J., & Boiche, J. (2009). Balance across contexts: Importance of balanced need satisfaction across various life domains. *Personality and Social Psychology Bulletin, 35*(8)*,* 1031-1045. doi:10.1177/0146167209337036

Milyavskaya, M., & Koestner, R. (2011). Psychological needs, motivation, and well-being: A test of self-determination theory across multiple domains. *Personality and Individual Differences, 50*(3), 387-391. doi:10.1016/j.paid.2010.10.029

Miskey, H. M., Hill, R. W., & Huelsman, T. J. (2012). Big five traits and perfectionism are risk factors for nonsuicidal cutting. *Psychology and Behavioral Sciences, 1*, 1-7. doi:10.11648/j.pbs. 20120101.11

Muehlenkamp, J., Brausch, A., Quigley, K., & Whitlock, J. (2013). Interpersonal features and functions of nonsuicidal self-injury. *Suicide and Life-Threatening Behavior, 43*, 67-80. doi:10.1111/j.1943-278X.2012.00128.x

Muehlenkamp, J., Claes, L., Havertape, L., & Plener, P. (2012). International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child and Adolescent Psychiatry and Mental Health, 6*(10), 1-9. doi:10.1186/1753-2000-6-10

Muehlenkamp, J. J., & Gutierrez, P. M. (2007). Risk for suicide attempts among adolescents who engage in non-suicidal self-injury. *Archives of Suicide Research*, *11*, 69-82. doi:10.1080/13811110600992902

Muehlenkamp, J., Hoff, E., Licht, J.-G., Azure, J., & Hasenzahl, S. (2008). Rates of non-suicidal self-injury: A cross-sectional analysis of exposure. *Current Psychology, 27*(4), 234-241. doi:10.1007/s12144-008-9036-8

Muehlenkamp, J. J., Williams, K. L., Gutierrez, P. M., & Claes, L. (2009). Rates of non-suicidal self-injury in high school students across five years. *Archives of Suicide Research*, *13*, 317-239. doi:10.1080/13811110903266368

Nixon, M. K., Cloutier, P. F., & Aggarwal, S. (2002). Affect regulation and addictive aspects of repetitive self-injury in hospitalized adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 41*(11), 1333-1341. doi:10.1097/00004583-200211000-00015

Nixon, M. K., & Heath, N. L. (2009). Assessment of nonsuicidal self-injury in youth. In M. K. Nixon, & N. L. Heath (Eds.), *Self-injury in youth: The essential guide to assessment and intervention* (pp. 143-170). New York, NY: Routledge/Taylor & Francis Group.

Nock, M. K. (2008). Actions speak louder than words: An elaborated theoretical model of the social functions of self-injury and other harmful behaviors. *Applied and Preventive Psychology, 12*(4), 159-168. doi:10.1016/j.appsy.2008.05.002

Nock, M. K. (2009). Why do people hurt themselves?: New insights into the nature and functions of self-Injury. *Current Directions in Psychological Science, 18*(2), 78-83. doi:10.1111/j.1467-8721.2009.01613.x

Nock, M. K. (2010). Self-Injury. *Annual Review of Clinical Psychology, 6*, 339-363. doi:10.1146/annurev.clinpsy.121208.131258

Nock, M. K. (2012). Future directions for the study of suicide and self-injury. *Journal of Clinical Child & Adolescent Psychology, 41*(2), 255-259. doi:10.1080/15374416.2012.652001

Nock, M. K., Joiner, T. E., Jr., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research, 144*, 65-72. doi:10.1016/j.psychres.2006.05.010

Nock, M. K., & Prinstein, M. J. (2004). A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology, 72*(5), 885-890. doi:10.1037/0022-006X.72.5.885

Patrick, H., Knee, C. R, Canevello, A., & Lonsbary, C. (2007). The role of need fulfillment in relationship functioning and well-being: A self-determination theory perspective. *Journal of Personality and Social Psychology, 92*, 434-457. doi:10.1037/0022-3514.92.3.434

Paul, E., Tsypes, A., Eidlitz, L., Ernhout, C., & Whitlock, J. (2015). Frequency and functions of non-suicidal self-injury: Associations with suicidal thoughts and behaviors. *Psychiatry Research, 225*(3), 276-282. doi:10.1016/j.psychres.2014.12.026

Pavey, L., Greitemeyer, T., & Sparks, P. (2011). Highlighting relatedness promotes prosocial motives and behavior. *Personality and Social Psychology Bulletin*, *37*, 905–917. doi:10.1177/0146167211405994

Perez, J., Venta, A., Garnaat, S., & Sharp, C. (2012). The Difficulties in Emotion Regulation Scale: Factor structure and association with nonsuicidal self-injury in adolescent inpatients. *Journal of Psychopathology and Behavioral Assessment, 34*(3), 393-404. doi:10.1007/s10862-012-9292-7

Plener, P. L., Libal, G., Keller, F., Fegert, J. M., & Muehlenkamp, J. J. (2009). An international comparison of adolescent non-suicidal self-injury (NSSI) and suicide attempts: Germany and the USA. *Psychological Medicine, 39*(9), 1549-1558. doi:10.1017/S0033291708005114

Plener, P., Schumacher, T., Munz, L., & Groschwitz, R. (2015). The longitudinal course of non-suicidal self-injury and deliberate self-harm: A systematic review of the literature. *Borderline Personality Disorder and Emotion Dysregulation, 2*, 1-11. doi:10.1186/s40479-014-0024-3

Polk, E., & Liss, M. (2007). Psychological characteristics of self-injurious behavior. *Personality and Individual Differences, 43*(3), 567-577. doi:10.1016/j.paid.2007.01.003

Preacher, K., & Hayes, A. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*(4), 717-731. doi:10.3758/BF03206553

Prinstein, M. J. (2008). Introduction to the special section on suicide and nonsuicidal self-injury: A review of unique challenges and important directions for self-injury science. *Journal of Consulting and Clinical Psychology, 76*, 1-8. doi:10.1037/0022-006X.76.1.1

Przybylski, A. K., Deci, E. L., Rigby, C. S., & Ryan, R. M. (2014). Competence-impeding electronic games and players' aggressive feelings, thoughts, and behaviors. *Journal of Personality and Social Psychology, 106*(3), 441-457. doi:10.1037/a0034820

Quested, E., Bosch, J. A., Burns, V. E., Cumming, J., Ntoumanis, N., & Duda, J. L. (2011). Basic psychological need satisfaction, stress-related appraisals, and dancers' cortisol and anxiety responses. *Journal of Sport & Exercise Psychology*, *33*, 828-846. Retrieved from: http://www.selfdeterminationtheory.org/component/ sdt/?view=SearchPublications&task =domainSearch&domain=2

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*(4), 419-435. doi:10.1177/0146167200266002

Rodham, K., & Hawton, K. (2009). Epidemiology and phenomenology of nonsuicidal self-injury. In M. K. Nock (Ed.), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 37-62). Washington, DC: American Psychological Association.

Ross, S., & Heath, N. (2002). A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence, 31*, 67-77. doi:10.1023/A:1014089117419

Ross, S., Heath, N. L., & Toste, J. R. (2009). Non-suicidal self-injury and eating pathology in high school students. *American Journal of Orthopsychiatry, 79*, 83-92. doi:10.1037/a0014826

Roth, G., Assor, A., Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2009). The emotional and academic consequences of parental conditional regard: Comparing conditional positive regard, conditional negative regard, and autonomy support as parenting practices. *Developmental Psychology, 45*(4), 1119-1142. doi:10.1037/a0015272

Rotolone, C., & Martin, G. (2012). Giving up self-injury: A comparison of everyday social and personal resources in past versus current self-injurers. *Archives of Suicide Research, 16*, 147-158. doi:10.1080/13811118.2012.667333

Ryan, R. M., & Deci, E. L. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78. doi:10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2013). The importance of autonomy for development and well-being. In B. W. Sokol, F. M. E. Grouzet, & U. Muller (Eds.), *Self-regulation and autonomy: Social and developmental dimensions of human conduct* (pp. 19-46). New York, NY: Cambridge Press.

Ryan, R. M., Deci, E. L., Grolnick, W. S., & La Guardia, J. G. (2006). The significance of autonomy and autonomy support in psychological development and psychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and methods* (2nd ed., pp. 295–849). New York: Wiley.

Saldias, A., Power, K., Gillanders, D. T., Campbell, C. W., & Blake, R. A. (2013). The mediatory role of maladaptive schema modes between parental care and non-suicidal self-injury. *Cognitive Behaviour Therapy*, *42*(3), 244-257. doi:10.1080/16506073.2013.781671

Saltzman, A., & Goldin, P. (2008). Mindfulness-based stress reduction for school-age children. In L. A. Greco & S. C. Hayes (Eds.), *Acceptance and mindfulness treatments for children and adolescents: A practitioner's guide* (pp. 139-161). Oakland, CA: New Harbinger.

Schonert-Reichl, K. A., Oberle, E., Lawlor, M. S., Abbott, D., Thomson, K., Oberlander, T. F., & Diamond, A. (2015). Enhancing cognitive and social-emotional development through a simple-to-master mindfulness-based school program for elementary school children: A randomized controlled trial. *Developmental Psychology, 51,* 52-66. doi:10.1037/a0038454

Seidman, E., Allen, L., Aber, J. L., Mitchell, C., & Feinman, J. (1994). The impact of school transitions in early adolescence on the self-system and perceived social context of poor urban youth. *Child Development, 65*(2), 507-522. doi:10.1111/j.1467-8624.1994.tb00766.x

Serras, A., Saules, K. K., Cranford, J. A., & Eisenberg, D. (2010). Self-injury, substance use, and associated risk factors in a multi-campus probability sample of college students. *Psychology of Addictive Behaviors, 24*, 119-128. doi:10.1037/a0017210

Sheldon, K. M., Ryan, R., & Reis, H. T. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin, 22*(12), 1270-1279. doi:10.1177/01461672962212007

Sher, L., & Stanley, B. (2009). Biological models of nonsuicidal self-injury. In M. K. Nock (Ed.), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 99-116). Washington, DC: American Psychological Association.

Sidak, Z. (1967). Rectangular confidence intervals for the means of multivariate normal distributions. *Journal of the American Statistical Association, 62*(318), 626-633. Retrieved from: http://www.jstor.org/stable/2283989

Soenens, B., Park, S.-Y., Vansteenkiste, M., & Mouratidis, A. (2012). Perceived parental psychological control and adolescent depressive experiences: A cross-cultural study with Belgian and South-Korean adolescents. *Journal of Adolescence, 35*(2), 261-272. doi:10.1016/j.adolescence.2011.05.001

Soenens, B., Sierens, E., Vansteenkiste, M., Goossens, L., & Dochy, F. (2012). Psychologically controlling teaching: Examining outcomes, antecedents, and mediators. *Journal of Educational Psychology*, *104*, 108-120. doi:10.1037/a0025742

Soenens, B., Vansteenkiste, M., & Sierens, E. (2009). How are parental psychological control and autonomy-support related? A cluster-analytic approach. *Journal of Marriage and Family, 71*, 187-202. doi: 10.1111/j.1741-3737.2008.00589.x

Sornberger, M. J., Heath, N. L., Toste, J. R., & McLouth, R. (2012). Non-suicidal self-injury and gender: Patterns of prevalence, methods, and locations among adolescents. *Suicide and Life-Threatening Behaviour, 42*, 266-279. doi:10.1111/j.1943-278X.2012.00088.x

Spilt, J. L., Hughes, J. N., Wu, J.-Y., & Kwok, O.-M. (2012). Dynamics of teacher–student relationships: Stability and change across elementary school and the influence on children's academic success. *Child Development, 83*(4), 1180-1195. doi:10.1111/j.1467-8624.2012.01761.x

Stevens, L. E., & Fiske, S. T. (1995). Motivation and cognition in social life: A social survival perspective. *Social Cognition, 13,* 189–214. doi:10.1521/soco.1995.13.3.189

Swannell, S. V., Martin, G. E., Page, A., Hasking, P., & St John, N. J. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide and Life-Threatening Behavior, 44*(3), 273-303. doi:10.1111/sltb.12070

Taliaferro, L. A., & Muehlenkamp, J. J. (2015). Factors associated with current versus lifetime self-injury among high school and college students. *Suicide and Life-Threatening Behavior, 45*, 84-97. doi:10.1111/sltb.12117

Tatnell, R., Kelada, L., Hasking, P., & Martin, G. (2014). Longitudinal analysis of adolescent NSSI: The role of intrapersonal and interpersonal factors. *Journal of Abnormal Child Psychology, 42*(6), 885-896. doi:10.1007/s10802-013-9837-6

Thogersen-Ntoumani, C., Ntoumanis, N., & Nikitaras, N. (2010). Unhealthy weight control behaviours in adolescent girls: A process model based on self-determination theory. *Psychology and Health*, *25*, 535–550. doi:10.1080/08870440902783628

Toste, J. R., & Heath, N. L. (2010). School response to non-suicidal self-injury. *Prevention Researcher*, *17*, 14-17. Retrieved from: http://web.ebscohost.com/ehost/detail?sid=e5ad8ef9-d5af-46dc-b9fe-c6074b44bbbb%40sessionmgr11&vid=1&hid=18&bdata=#db =rzh&AN= 201 0565287

Tschan, T., Schmid, M., & In-Albon, T. (2015). Parenting behavior in families of female adolescents with nonsuicidal self-injury in comparison to a clinical and a nonclinical control group. *Child and Adolescent Psychiatry and Mental Health, 9*(17), 1-9. doi: 10.1186/s13034-015-0051-x

Van der Giessen, D., Branje, S., & Meeus, W. (2014). Perceived autonomy support from parents and best friends: Longitudinal associations with adolescents' depressive symptoms. *Social*

Development, 23(3), 537-555. doi:10.1111/sode.12061

van der Kolk, B. A., Perry, J. C., & Herman, J. L. (1991). Childhood origins of self-destructive behavior. *American Journal of Psychiatry, 148*(12), 1665-1671. doi:10.1176/ajp.148.12.1665

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263-280. doi:10.1037/a0032359

Vansteenkiste, M., Sierens, E., Goossens, L., Soenens, B., Dochy, F., Mouratidis, A., . . . Beyers, W. (2012). Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learning and Instruction, 22*(6), 431-439. doi:10.1016/j.learninstruc.2012.04.002

Véronneau, M. H., Koestner, R. F., & Abela, J. R. Z. (2005). Intrinsic need satisfaction and well–being in children and adolescents: An application of the self–determination theory. *Journal of Social and Clinical Psychology, 24*(2), 280-292. doi:10.1521/jscp.24.2.280.62277

Victor, S., Styer, D., & Washburn, J. (2015). Characteristics of nonsuicidal self-injury associated with suicidal ideation: Evidence from a clinical sample of youth. *Child and Adolescent Psychiatry and Mental Health, 9*(20), 1-8. doi:10.1186/s13034-015-0053-8

Voon, D., Hasking, P., & Martin, G. (2014). The roles of emotion regulation and ruminative thoughts in non-suicidal self-injury. *British Journal of Clinical Psychology, 53*, 95-113. doi:10.1111/bjc.12030

Walsh, B. W. (2006). *Treating self-injury: A practical guide*. New York, NY: Guilford Press.

Wedig, M. M., & Nock, M. K. (2007). Parental expressed emotion and adolescent self-injury. *Journal of the American Academy of Child & Adolescent Psychiatry*, *46*(9), 1171-1178. doi:10.1097/chi.0b013e3180ca9aaf

Wei, M., Shaffer, P. A., Young, S. K., & Zakalik, R. A. (2005). Adult attachment, shame, depression, and loneliness: The mediation role of basic psychological needs satisfaction. *Journal of Counseling Psychology, 52*(4), 591-601. doi:10.1037/0022-0167.52.4.591

Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics, 117*(6), 1939-1948. doi:10.1542/peds.2005-2543

Whitlock, J., & Knox, K. L. (2007). The relationship between self-injurious behavior and suicide in a young adult population. *Archives of Pediatrics & Adolescent Medicine, 161*(7), 634-640. doi:10.1001/archpedi.161.7.634

Whitlock, J., Muehlenkamp, J., & Eckenrode, J. (2008). Variation in nonsuicidal self-injury: Identification and features of latent classes in a college population of emerging adults. *Journal of Clinical Child & Adolescent Psychology, 37*(4), 725-735. doi:10.1080/15374410802359734

Whitlock, J., Muehlenkamp, J., Eckenrode, J., Purington, A., Baral Abrams, G., Barreira, P., & Kress, V. (2013). Nonsuicidal self-injury as a gateway to suicide in young adults. *Journal of Adolescent Health, 52*(4), 486-492. doi:10.1016/j.jadohealth.2012.09.010

Whitlock, J., Muehlenkamp, J., Purington, A., Eckenrode, J., Barreira, P., Baral Abrams, G., . . . Knox, K. (2011). Nonsuicidal self-injury in a college population: General trends and sex differences. *Journal of American College Health, 59*(8), 691-698. doi:10.1080/07448481.2010.529626

Whitlock, J., Prussien, K., & Pietrusza, C. (2015). Predictors of self-injury cessation and subsequent psychological growth: Results of a probability sample survey of students in eight universities and colleges. *Child and Adolescent Psychiatry and Mental Health, 9*, 1-12. doi:10.1186/s13034-015-0048-5

Whitlock, J., Purington, A., & Gershkovich, M. (2009). Media, the Internet, and nonsuicidal self-injury. In M. K. Nock (Ed), *Understanding nonsuicidal self-injury: Origins, assessment, and treatment* (pp. 139-155). Washington, DC: American Psychological Association.

Whitlock, J., & Selekman, M. D. (2014). Nonsuicidal self-injury across the lifespan. In M. K. Nock (Ed.), *The Oxford handbook of suicide and self-injury* (pp. 133-155). New York, NY: Oxford University Press.

Wichstrom, L. (2009). Predictors of non-suicidal self-injury versus attempted suicide: Similar or different? *Archives of Suicide Research, 13,*105–122. *doi:*10.1080/13811110902834992

Yates, T. M., Tracy, A. J., & Luthar, S. S. (2008). Nonsuicidal self-injury among "privileged" youths: Longitudinal and cross-sectional approaches to developmental process. *Journal of Consulting and Clinical Psychology, 76*, 52-62. doi:10.1037/0022-006X.76.1.52

You, J., & Leung, F. (2012). The role of depressive symptoms, family invalidation and behavioral impulsivity in the occurrence and repetition of non-suicidal self-injury in Chinese adolescents: A 2-year follow-up study. *Journal of Adolescence*, *35*, 389-395. doi:10.1016/j.adolescence.2011. 07.020

Yurkowski, K., Martin, J., Levesque, C., Bureau, J.-F., Lafontaine, M.-F., & Cloutier, P. (2015). Emotion dysregulation mediates the influence of relationship difficulties on non-suicidal self-injury behavior in young adults. *Psychiatry Research*. Advance online publication. doi:10.1016/j.psychres.2015.05.006

Zetterqvist, M., Lundh, L.-G., & Svedin, C. (2013). A comparison of adolescents engaging in self-injurious behaviors with and without suicidal intent: Self-reported experiences of adverse life events and trauma symptoms. *Journal of Youth and Adolescence, 42*(8), 1257-1272. doi:10.1007/s10964-012-9872-6

Zoroglu, S. S., Tuzun, U., Sar, V., Tutkun, H., Savas, H. A., Ozturk, M., ... Kora, M. E. (2003). Suicide attempt and self-mutilation among Turkish high school students in relation with abuse, neglect and dissociation. *Psychiatry and Clinical Neurosciences*, *57*, 119-126. doi:10.1046/j.14401819.2003.01088.x

Zuroff, D. C., Koestner, R., & Moskowitz, D. S. (2012). Therapist's autonomy support and patient's self-criticism predict motivation during brief treatments for depression. *Journal of Social and Clinical Psychology*, *31*, 903-932. doi:10.1521/jscp.2012.31.9.903

Appendix A:

How I Deal With Stress Questionnaire (HIDS)
Heath & Ross, 2007
Studies 1, 2, and, 3

Please begin by completing the following information:

Age: _____ **Sex:** ❑ Male

❑ Female

Sexual Orientation: ❑ Heterosexual ❑ Gay/Lesbian ❑Bisexual ❑ Questioning

What **languages** do you speak at home? ❑ English ❑ French

❑ Other (please specify): _____

Country of **permanent residence** ❑ Canada ❑ USA

❑ Other (please specify): _____

Country of **birth** ❑ Canada ❑ USA

❑ Other (please specify): _____

Teenagers have to deal with a lot of stress. In a recent survey, youth said they used the following list of strategies to help them deal with problems. We are interested in knowing if you have also used any of these strategies to help you deal with stress.

Please read each item and indicate whether you:

never use this strategy (0)

use this strategy **sometimes** (1)

use this strategy **often** to cope with stress (2)

almost always use this strategy to cope with stress (3)

Coping strategies	***Never***	***Sometimes***	***Often***	***Always***
1. Try not to think about it	**0**	**1**	**2**	**3**
2. Spend time alone	**0**	**1**	**2**	**3**
3. Go out	**0**	**1**	**2**	**3**
4. Talk to someone	**0**	**1**	**2**	**3**
5. Try to solve the problem	**0**	**1**	**2**	**3**
6. Do something to keep myself busy	**0**	**1**	**2**	**3**
7. Say to myself it doesn't matter	**0**	**1**	**2**	**3**
8. Listen to music	**0**	**1**	**2**	**3**
9. Exercise	**0**	**1**	**2**	**3**
10. Play sports	**0**	**1**	**2**	**3**
Coping strategies	***Never***	***Sometimes***	***Often***	***Always***
11. Read	**0**	**1**	**2**	**3**
12. Go shopping	**0**	**1**	**2**	**3**
13. Overeat	**0**	**1**	**2**	**3**
14. Stop eating	**0**	**1**	**2**	**3**
15. Drink alcohol	**0**	**1**	**2**	**3**
16. Hit someone	**0**	**1**	**2**	**3**
17. Get into an argument with someone	**0**	**1**	**2**	**3**
18. Try to control my weight	**0**	**1**	**2**	**3**
19. Do drugs	**0**	**1**	**2**	**3**
20. Smoke	**0**	**1**	**2**	**3**

21. Do risky things	**0**	**1**	**2**	**3**
22. Physically hurt myself on purpose	**0**	**1**	**2**	**3**
23. Cry	**0**	**1**	**2**	**3**
24. Sleep	**0**	**1**	**2**	**3**
25. Pray or engage in religious activities	**0**	**1**	**2**	**3**
26. Meditate	**0**	**1**	**2**	**3**
27. Video gaming	**0**	**1**	**2**	**3**
28. Chat online (e.g., MSN, Facebook)	**0**	**1**	**2**	**3**
29. General web browsing	**0**	**1**	**2**	**3**
30. Watch television	**0**	**1**	**2**	**3**
31. Text	**0**	**1**	**2**	**3**
32. Other: _____	**0**	**1**	**2**	**3**

On a scale of 1 to 10, where 1 is no stress at all and 10 is the most stressed you have ever felt,

how stressed have you been over the past two weeks? (circle one)

1 2 3 4 5 6 7 8 9 10

Do risky things to cope with stress:

What kind of risky activities have you engaged in? (check all that apply)

❑ Drug use ❑ Alcohol use ❑ Promiscuous or unprotected sexual activities

❑ Vandalism ❑ Theft ❑ Gambling

❑ Other dangerous activities, please specify: _____

❑ I have not engaged in any risky or dangerous activities – **skip to next section.**

After you engaged in risky activities, how did you feel? (check all that apply)

❑ Calm ❑ Nervous ❑ Ashamed ❑ Tense

❑ Overwhelmed ❑ Energetic ❑ Angry ❑ Anxious

❑ Confident ❑ Relaxed ❑ Excited ❑ Guilty

❑ Happy ❑ Scared ❑ Sad ❑ Other (specify): _____

How old were you when you first engaged in these risky activities? _____

In the last 3 months, have you engaged in this behaviour?

❑ Not at all ❑ Occasionally ❑ Frequently ❑ A lot

Have you currently stopped engaging in this behaviour?

❑ Yes ❑ No

If yes, when did you stop? _____

Physically hurt self on purpose:

Please circle any way that you have intentionally hurt yourself <u>without suicidal intent</u>:

1. Cut your wrists, arms, or other areas of your body
2. Burned yourself
3. Scratched yourself, to the extent that scarring or bleeding occurred
4. Banged your head against something, to the extent that you caused a bruise to appear
5. Punched yourself, to the extent that you caused a bruise to appear
6. Other (please specify): _____

❑ I have not hurt myself on purpose – **skip to next section.**

After you hurt yourself on purpose <u>without suicidal intent</u>, how did you feel? (check all that apply)

❑ Calm	❑ Nervous	❑ Ashamed	❑ Tense
❑ Overwhelmed	❑ Energetic	❑ Angry	❑ Anxious
❑ Confident	❑ Relaxed	❑ Excited	❑ Guilty
❑ Happy	❑ Scared	❑ Sad	❑ Other (specify): _____

How old were you when you first hurt yourself on purpose? _____

In the last 3 months, have you engaged in this behaviour?

❑ Not at all ❑ Occasionally ❑ Frequently ❑ A lot

Have you currently stopped engaging in this behaviour?

❑ Yes ❑ No

If yes, when did you stop? _____

How many times have you hurt yourself on purpose throughout your life? (circle one)

One time	2 to 4 times	5 to 10 times
11 to 50 times	51 to 100 times	More than 100 times

Video gaming to cope with stress:

❑ I do not play video games to cope with stress – **skip to next section.**

After you play video games, how do you feel? (check all that apply)

❑ Calm	❑ Nervous	❑ Ashamed	❑ Tense
❑ Overwhelmed	❑ Energetic	❑ Angry	❑ Anxious
❑ Confident	❑ Relaxed	❑ Excited	❑ Guilty
❑ Happy	❑ Scared	❑ Sad	❑ Other (specify): _____

What types of video games have you used to deal with stress? (check all that apply)

❑ Home console (e.g., Xbox 360, PS3, Wii)

❑ Mobile (e.g., DS, PSP, iPhone/iPod Touch)

❑ PC/Mac (e..g, World of Warcraft, Crysis)

❑ Other (specify): _____

When playing video games to deal with stress, how do you prefer to play? (check all that apply)

❑ Online, with friends I first met in person	❑ Offline, with friends I first met in person
❑ Online, with friends I first met online	❑ Offline, with friends I first met online

❑ Online, with strangers ❑ Offline, by myself

How many hours per week do you spend:

- playing video games online? _____
- playing video games offline? _____
- playing any video games on an average weekday? _____
- playing any video games on an average weekend day? _____

Other Stressors:

Teenagers may find many other things in their lives stressful.

What other common stressors do you have? (check all that apply)

❑ Conflict with parents/family

❑ Conflict between parents (e.g., divorce, separation)

❑ Academic difficulties

❑ Conflict/difficulty with peers

Bullying about your: (check all that apply)

❑ Ethnicity	❑ Religion	❑ Sexual orientation	❑ Gender
❑ Athletic ability	❑ Social style	❑ Behaviour/mannerisms	
❑ Lack of money/things	❑ Physical appearance	❑ School performance	

Appendix B:

Basic Psychological Needs Scale (BPNS)
Ilardi, Leone, Kasser, & Ryan, 1993

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond:

1	2	3	4	5	6	7
not at all true			Somewhat true			Very true

1.I feel like I am free to decide for myself how to live my life.

2.I really like the people I interact with.

3.Often, I do not feel very competent.

4.I feel pressured in my life.

5.People I know tell me I am good at what I do.

6.I get along with people I come into contact with.

7.I pretty much keep to myself and don't have a lot of social contacts.

8.I generally feel free to express my ideas and opinions.

9.I consider the people I regularly interact with to be my friends.

10. I have been able to learn interesting new skills recently.

11. In my daily life, I frequently have to do what I am told.

12. People in my life care about me.

13. Most days I feel a sense of accomplishment from what I do.

14. People I interact with on a daily basis tend to take my feelings into consideration.

15. In my life I do not get much of a chance to show how capable I am.

16.There are not many people that I am close to.

17. I feel like I can pretty much be myself in my daily situations.

18. The people I interact with regularly do not seem to like me much.

19. I often do not feel very capable.

20. There is not much opportunity for me to decide for myself how to do things in my daily life.

21. People are generally pretty friendly towards me.

Appendix C:

Difficulties in Emotion Regulations Scale (DERS)
Studies 1 and 3
Gratz & Roemer, 2004

This purpose of this questionnaire is to find out what people believe they can do about upsetting emotions or feelings. Please answer the statements by giving as true a picture of your own beliefs as possible. There are no right or wrong answers. Remember, the questionnaire is about what you actually or usually do. ***Indicate how often this statement applies to you by typing an X in the appropriate column.***

	Never	**Sometimes**	**Half of the time**	**Most of the time**	**Always**
1. I am clear about my feelings.					
2. I pay attention to how I feel.					
3. I experience my emotions as overwhelming and out of control.					
4. I have no idea how I am feeling.					
5. I have difficulty making sense of my feelings.					
6. I am attentive to my feelings.					
7. I know exactly how I am feeling.					
8. I care about what I am feeling.					
9. I am confused about how I feel.					
10. When I'm upset, I acknowledge my emotions.					
11. When I'm upset, I become angry with myself for feeling that way.					
12. When I'm upset, I become embarrassed for feeling that way.					
13. When I'm upset, I have difficulty getting work done.					

14. When I'm upset, I become out of control.					
15. When I'm upset, I believe that I will remain that way for a long time.					
16. When I'm upset, I believe that I'll end up feeling very depressed.					
17. When I'm upset, I believe that my feelings are valid and important.					
18. When I'm upset, I have difficulty focusing on other things.					
19. When I'm upset, I feel out of control.					
20. When I'm upset, I can still get things done.					
21. When I'm upset, I feel ashamed with myself for feeling that way.					
22. When I'm upset, I know that I can find a way to eventually feel better.					
23. When I'm upset, I feel like I am weak.					
24. When I'm upset, I feel like I can remain in control of my behaviors.					
25. When I'm upset, I feel guilty for feeling that way.					
26. When I'm upset, I have difficulty concentrating.					
27. When I'm upset, I have difficulty controlling my behavior.					
28. When I'm upset, there's nothing I can do to make myself feel better.					
29. When I'm upset, I become irritated with myself for feeling that way.					
30. When I'm upset, I start to feel very bad about myself.					

31. When I'm upset, I believe that wallowing in it is all I can do.					
32. When I'm upset, I lose control over my behaviors.					
33. When I'm upset, I take time to figure out what I'm really feeling.					
34. When I'm upset, it takes me a long time to feel better.					
35. When I'm upset, my emotions feel overwhelming.					
36. When I'm upset, I have difficulty thinking about anything else.					

Appendix D:

Scripted Introduction for University Classes

(Questionnaires being completed during class time)

Hello. My name is _____ and I'm from the research team of Dr. Nancy Heath in the Faculty of Education. We are conducting a study on adaptive and maladaptive coping strategies employed by young adults and we would very much appreciate your participation. It will help us to better understand how university students cope with stress. Our questionnaire takes about 15 minutes to complete and it is completely confidential. If you have completed this in another class please do not complete it again.

Other lab members can begin to pass out the questionnaires while delivering speech.

Your names and consent forms will be stored separately from your responses and only the primary researchers will have access to this confidential information. Your participation is completely optional and it will have no impact on your grade in this class. You may choose not to answer a question if it makes you uncomfortable and you are also free to withdraw from the study at any time, without penalty or prejudice. If you have questions raise your hand and a research assistant will come to you. You must be at least 18 years old to participate. The research assistants will give every student a copy of the questionnaire. If you choose not to participate, just hold on to it until everyone is done and then hand it in blank.

The first page is a consent form. Please read it carefully and sign it if you agree to participate. Then, please fill out the questionnaire silently and turn it over when you have finished. It is very important that there be no talking and that the questions be filled out individually. Otherwise our results will not be valid.

Thank you very much for your time. We invite you to participate in further studies that our lab is conducting, with the possibility of remuneration. Participants in our future studies will be automatically entered into a draw to win one of three gift certificates (one for $200 and two for $50). If you are interested please provide your contact information on the page following the questionnaire. Your contact information will be stored separately from your questionnaire. When you hand back your papers, you will be given a sheet with our contact information. Please feel free to contact us at the e-mail we've provided if you have any questions about our studies. Thanks again.

Lab members can be waiting to collect the questionnaires and pass out the additional information sheet.

Appendix E:

Consent Form

HOW YOUNG ADULTS DEAL WITH STRESS
CONSENT TO PARTICIPATE IN RESEARCH

This is to state that I agree to participate in the research project investigating stress coping mechanisms conducted by the research team of Dr. Nancy Heath at McGill University. The purpose of this project is to examine the prevalence and type of specific coping strategies used by young adults in times of stress.

All of the information provided is kept completely confidential. The questionnaires will be kept entirely confidential, and consent forms will be stored separately, in a locked cabinet accessible only to the primary researcher. I understand that this will maintain my confidentiality and anonymity in this study. I fully understand that participation in this research is voluntary and will not, in any way, affect my grades or evaluation of my course work. Participation in this study will provide the participant access to resource information as well as help to develop our knowledge about behaviours related to stress and coping for young adults.

The questionnaire I am being asked to complete will take approximately fifteen minutes. While there are no risks involved in participation in this research project, some participants might be sensitive to, or uncomfortable with, some of the questions. Should this issue arise, I am free to withdraw from the study, at any time, without penalty or prejudice. I am also free to not answer any item that makes me uncomfortable.

I understand the purpose of the study and know the risks, benefits, and inconveniences that are involved in this research project. I realize that the data will be used for the above stated research purposes and that I am invited to visit a study outcome website which will be shared with me upon completion of the study. If you have any questions or concerns about your rights as a research subject in this study, please contact the McGill Research Ethics Officer at 514-398-6831.

I have read the above and I understand all of the conditions. I freely consent and voluntarily agree to participate in this study.

Name (please print): _____

Signature: _____ Date: _____

Shareen Holly, M.A.
McGill University, Project Coordinator
Doctoral Candidate
(514) 398-1232
shareen.holly@mcgill.ca

Nancy Heath, Ph.D.
McGill University, Faculty of Education
James McGill Professor
(514) 398-3439
nancy.heath@mcgill.ca

If you have already completed this questionnaire, please do not continue.

Appendix F:

Children's Intrinsic Need Satisfaction Scale (CINSS)
Koestner & Véronneau, 2001

Children's Intrinsic Need Scale

Instructions: We are interested in how you feel about yourself and how you think other people see you. For each statement, choose the number from the scale that best describes your feelings and ideas in the **past week**. Circle the number that corresponds to your answer.

Not at all true	Slightly true	Moderately true	Mostly true	Completely true
1	2	3	4	5

1. I feel I do things well at school.	1 2 3 4 5
2. My teachers like me and care about me.	1 2 3 4 5
3. I feel free to express myself at home.	1 2 3 4 5
4. I feel my teachers think that I am good at things.	1 2 3 4 5
5. I like to spend time with my parents.	1 2 3 4 5
6. I feel free to express myself with my friends.	1 2 3 4 5
7. I feel I do things well at home.	1 2 3 4 5
8. My parents like me and care about me.	1 2 3 4 5
9. I feel I have a choice about when and how to do my school work.	1 2 3 4 5
10. I feel my parents think that I am good at things.	1 2 3 4 5
11. I like to be with my teachers.	1 2 3 4 5
12. I feel I have a choice about which activities to do with my friends.	1 2 3 4 5
13. I feel I do things well when I am with my friends.	1 2 3 4 5
14. My friends like me and care about me.	1 2 3 4 5
15. I feel free to express myself at school.	1 2 3 4 5

16. I feel my friends think that I am good at things.	1 2 3 4 5
17. I like to spend time with my friends.	1 2 3 4 5
18. I feel I have a choice about when and how to do my household chores.	1 2 3 4 5

Appendix G:

Parent Consent Form
Studies 2 and 3

SELF-DETERMINATION THEORY AND NSSI

McGill

RESEARCH PROJECT

Transition to Secondary Schools: How Students Cope

Spring 2011

Dear Parent/Legal Tutor,

Adolescence is characterized by considerable change physically, socially, and emotionally; often, the added pressure of starting secondary school can increase the stress associated with this time period. The stressors during the transition to secondary school typically include interpersonal stress (e.g., difficulties with peers or family members), intrapersonal distress (e.g., anxiety, mood, self-esteem), and generalized school stress (e.g., homework stress, test anxiety). Our research team is interested in examining adaptive and maladaptive strategies that youth use to cope with these stressors through 7th, 8th, and 9th grades. Our research has shown that youth may engage in both adaptive coping (e.g., problem-solving, communication), as well as some worrisome coping mechanisms. Your son/daughter's participation will help us to better understand the various ways in which youth cope with stress during transition to high school.

Project activities: Students who participate in the project will complete a package of questionnaires *once per year* during their first three years of secondary school. These questionnaires will assess interpersonal, intrapersonal, and school stressors, as well as potential protective factors (e.g., self-efficacy, physical activity, involvement in the community). These sessions will take place each school year within the school setting. The sessions will be completed in groups of 20-30 students during the school day, and will take approximately 1.5 hours (two sessions of 45 minutes each). A research assistant will explain the instructions to all students and answer any questions. Students will complete the forms individually and confidentially.

Following each of these sessions, students may be invited to meet with a member of our research team (e.g., graduate student in Educational Psychology) for an individual interview session to clarify their responses.

This interview would take approximately one hour. The time of the interview would be arranged to ensure that critical class activities are not missed. We are interested in interviewing students who engage in a variety of different coping strategies—as such, not all students will complete individual sessions. Students would participate in a *maximum of 2.5 hours* of research activities per year if they are selected for individual interviews.

Audio taping: For the students who complete an individual session, we request permission to audio tape one aspect of the interview related to students' views of how they can be better supported in dealing with school stress. This information will be critical to help school professionals understand the services that adolescents need during this transition period. Please

note that all audiotapes will be coded and kept confidential. The tapes will not be accessible to any school personnel and will only be listened to by researchers at McGill.

Compensation: Students will be compensated in several ways for their time and effort. All students who return the consent form regardless of agreement to participate will be entered in a draw for one of two gift cards to a local shopping mall in the amounts of $200 and $100. An additional draw for one of four $50 gift cards to Famous Players will be held following completion of each of the group sessions (e.g., questionnaires completed once per year). Students who participate in the individual interviews will receive one $10 gift card for each session.

Benefits: Youth are reporting increased levels of stress and difficulties in coping. Transition to high school is a particularly challenging time. Although there are no direct benefits for individual participants, this project has the potential to greatly enhance our understanding of both risk and protective factors for youth experiencing transition. Following completion of the project, in 9th grade, all students who participate will be invited to attend a workshop on effective stress management. Furthermore, information provided by students on how schools can better support them in coping with stress (information collected in the audio taped interview) will be synthesized and shared with school professionals.

Potential risks: While there are no direct risks involved in participation in this research project, some participants might be sensitive to some of the questions. Please be assured that students do not have to answer any question they don't want to, they can take a break or end a session at any time or withdraw from the study at any time.

Note that all information collected will be kept confidential, and all completed questionnaires will be kept in a locked cabinet accessible only to the primary researcher from McGill University. All data will be coded to ensure confidentiality. No identifying information will be used in any written or oral presentation of the results. Students are free to withdraw from the project at any time.

Although all information will be kept confidential, in the event that your son/daughter is perceived to be a risk to him/herself or others, we are required to break confidentiality. In the unlikely event that this occurs we will accompany the student to a designated school mental health professional (counsellor, psychologist, or social worker) who is informed concerning the project goals. This person, together with your son/daughter will contact you. All of this will remain completely confidential between your son/daughter, the mental health professional and yourself, no other personnel at the school will be involved. However, even if you are contacted the full details of your son/daughter's responses must remain confidential although the reason for concern will be shared by the student or the researcher.

Please sign below, indicating whether or not you would like your son/daughter to participate, and return this form to school. Should you have any questions, please feel free to contact me at the coordinates listed below. If you have any questions or concerns about your child's rights or welfare as a participant in this research study, please contact the McGill Research Ethics Officer at (514) 398-6831. Thank you so much.

Sincerely,

Nancy Heath, Ph.D.
James McGill Professor
McGill University, Faculty of Education
nancy.heath@mcgill.ca
(514) 398-3439

Amber Emery
Project Coordinator
(514) 398-1232
amber.emery@mail.mcgill.ca

❑ **YES** ⇢ I consent to my son/daughter's participation in this project.

❑ **YES** ⇢ I consent to audio taping if my son/daughter is selected to complete an individual interview session.

Signature: _____ Date: _____

Name of **parent/legal tutor** (please print): _____

Name of **student** (please print): _____

Student's date of birth (month/day/year): _____ Grade: _____

Parent telephone number(s): _____

❑ **NO** ⇢ I do not consent to my son/daughter's participation in this project.

Appendix H:

Student Assent Form
Studies 2 and 3

McGill

Transition to Secondary Schools: How Students Cope

ASSENT TO PARTICIPATE IN PROJECT – ***STUDENT***

- This project is about the pressure or stress that students face during the transition to secondary school. Our research team is interested in understanding how teenagers cope with this stress through 7th and 8th grades. Your parents have already agreed for you to take part in this project.

- In this project, you will be asked to complete a package of questionnaires *twice per year during their first two years of secondary school*. These questionnaires will ask you about stress, coping strategies, as well as the way you feel about yourself and school. These sessions will take place during the fall and spring of each year. We meet with students in groups of 20 during school time and each session takes about two hours (two sessions of one hour each). You complete the questionnaires individually and confidentially.

- Following each of these sessions, we may ask you to meet with a member of our research team for an individual interview session to talk about some of your answers. This interview would take about one hour. We will be meeting with students who indicate many different kinds of coping strategies, so you may not be asked to complete an individual session. We ask your permission to audio tape one part of this interview.

- If you agree, you would participate at least 4 hours of research activities per year—and up to a maximum of 6 hours of research activities per year if you are selected for individual interview sessions.

- Your teachers will not be told about the answers that you give in these interviews. Your parents will also not be told about my answers, unless it is perceived that you are at serious risk to yourself. In the unlikely event that this occurs, you would need to speak with _____ (the specific school's designated school mental health professional) who would contact your parents with you. No other school personnel will be notified. The full details of your responses will remain confidential and will not be shared with your parents or _____.

- Although there are no direct benefits for individual participants, this project has the potential to improve our understanding of how to help students when they are dealing with stress. Following completion of the project, in preparation for the 9th grade, you will be invited to attend a workshop on effective stress management.

- While there are no direct risks involved in participation in this research project, there may be questions that you find sensitive. If this issue arises, are free to not answer any item that makes you uncomfortable. You are also free to withdraw from the study at anytime.

- You will be compensated in several ways for my time and effort. After each of the group sessions, you will be entered in a draw for one of four $50 gift cards to Famous Players. Also, if you participate in the individual interviews, you will receive one $10 gift card for each session.

- No identifying information about you will be used in any presentation of the results from this project.

- Your classroom work and grades will not be affected by your decision to participate or not to participate.

I have read the above and understand all of the conditions. I voluntarily agree to participate in this project.

❑ YES ❑ NO ⇢ I consent to participation in this project.

❑ YES ❑ NO ⇢ I consent to audio taping if I am selected to complete an individual interview.

Name: (please print):_____

Signature: _____ Date: _____

Student telephone number(s): _____

Appendix I:

Perceptions of Parents Scale (POPS)
(Items in boldface)
Grolnick, Ryan, & Deci, 1991

INSTRUCTIONS: This form is about you and your parents. Use the scale below to answer each question about **YOUR MOTHER** (left side) and **YOUR FATHER** (right side). Think about each sentence and circle the number that corresponds with your answer. Please try to answer all the questions.

MOTHER						FATHER				
Strongly Disagree or Never	**Disagree or Not Often**	**I'm not sure**	**Agree or Usually**	**Strongly Agree or Always**		**Strongly Disagree or Never**	**Disagree or Not Often**	**I'm not sure**	**Agree or Usually**	**Strongly Agree or Always**
1	*2*	*3*	*4*	*5*	If my grades are not good enough, this parent will restrict my free time or take away my usual privileges.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent has enough time to talk to me.**	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent talks to me about the way I should behave.**	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent supports me in the things I do in school.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent tries to tell me how to approach my schoolwork.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent insists I do my schoolwork her / his way.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent asks me about what I do during the school day.**	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent gets upset if I don't do what I'm supposed to right away**.	*1*	*2*	*3*	*4*	*5*

1	*2*	*3*	*4*	*5*	This parent is typically happy to talk to me about my learning.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent thinks I am lazy when it comes to school.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	When I am struggling at school, this parent listens to my opinion or perspective.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent likes me to come to him/her for help with schoolwork.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent allows me to make my own decisions regarding my schoolwork.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	When I get a poor grade, I feel the need to hide it from this parent.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent punishes me if I do poorly in school.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent has the time to talk with me about my problems.**	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent punishes me without talking to me about what was wrong.**	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent tries to make me feel confident in my schoolwork.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	Sometimes I feel like this parent is trying to “take over” my schoolwork.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent seems to be disappointed in my schoolwork a lot.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent likes me to decide for myself what to do.**	*1*	*2*	*3*	*4*	*5*

1	*2*	*3*	*4*	*5*	**This parent thinks it's OK if I make mistakes.**	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent is constantly nagging me about my schoolwork.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent tries to make me feel guilty when I do poorly in school.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	Whenever possible, this parent allows me to make my own choices about my schoolwork and learning.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	I feel a lot of pressure from this parent to achieve at school.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent supports me in my school-related choices.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent never wants to know what I am doing.**	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent gets upset when I don't do well in school.**	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent is often disapproving of my schoolwork.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent is very strict when it comes to my schoolwork.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	This parent is very patient when it comes to my education.	*1*	*2*	*3*	*4*	*5*
1	*2*	*3*	*4*	*5*	**This parent likes to talk to my teachers about how I'm doing in school.**	*1*	*2*	*3*	*4*	*5*