Untangling the Impact of Social Context on Non-suicidal Self-injury

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Abstract

Although accumulating research is clarifying the role of negative affect in non-suicidal self-injury (NSSI), few studies have considered the social context of NSSI. Participants with recent and repeated NSSI (*N* = 60) completed daily diaries for 14 days assessing perceived support, interpersonal conflict, stress, negative affect, and NSSI thoughts, urges, and acts. Descriptive analyses revealed that, in most cases, others in the participant's social network (friends, therapists/doctors, family members, romantic partners) were aware of the participant's history of NSSI. Interpersonal functions of NSSI were less frequently and strongly endorsed than intrapersonal functions. Hierarchical linear models (HLM) examined the temporal associations between NSSI and social context in the daily reports, including a) a contemporaneous model, examining whether support or conflict were concurrently associated with NSSI, b) a prospective model, examining whether support or conflict predicted later NSSI, and c) a subsequent model, examining whether NSSI predicted later changes in support or conflict. Perceived support, particularly from romantic partners, was negatively related to concurrent (same-day) NSSI urges, thoughts, and acts. Perceived support was positively associated with NSSI urges on the following day. Interpersonal conflict was positively associated with concurrent (same-day) NSSI urges but unrelated to next-day NSSI. NSSI that was disclosed to or discovered by others was associated with greater perceived support on the following day, but this was not the case for NSSI that was unknown to others. Negative affect partially mediated the concurrent association between support and NSSI. Further, perceived support moderated the concurrent association of negative affect and NSSI urges, such that greater support buffered the effect of negative affect, whereas lower support exacerbated the effect of negative affect. Together, this research provides important insight into the ways that social context can impact NSSI urges and behaviour.

Keywords: Self-injury; self-harm; social support; conflict; daily diary; interpersonal.

Dedication

Once again, to Mr. Gajda and Mme. Boltres, who encouraged me to be curious and brave, and to believe in myself.

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Chapter 1.

Introduction

Non-suicidal self-injury (NSSI), defined as the deliberate, direct destruction of body tissue without suicidal intent and for purposes not socially sanctioned (International Society for the Study of Self-injury, 2007; Klonsky, 2007; Walsh, 2006), carries a risk for negative emotional (Leibenluft, Gardner, & Cowdry, 1987; Schwartz, Cohen, Hoffmann, & Meeks, 1989), interpersonal (Clarke & Whittaker, 1998; Favazza, 1998), and physical consequences (Conterio & Lader, 1998), including an increased risk of suicidal behaviour and accidental death (Asarnow et al., 2011; Guan, Fox, & Prinstein, 2012; Wilkinson et al., 2011). A central question in NSSI research is why individuals engage in this behaviour repeatedly, despite these negative consequences. In pursuing this question, researchers have examined self-reported motives for NSSI (e.g. Brown, Comtois, & Linehan, 2002; Klonsky, 2007; Kumar, Pepe, & Steer, 2004; Laye-Gindhu & Schonert-Reichl, 2005; Rodham, Hawton, & Evans, 2004), the immediate antecedents and consequences of NSSI that may reinforce and maintain this behaviour (e.g., Armey, Crowther, & Miller, 2011; Chapman & Dixon-Gordon, 2007; Haines, Williams, Brain, & Wilson, 1995; Muehlenkamp et al., 2009), and the emotional and psychological correlates of NSSI (see Klonsky & Muehlenkamp, 2007). Together, this body of research suggests that individuals who engage in NSSI experience more frequent and intense negative affect than those who have never engaged in NSSI (Glenn, Blumenthal, Klonsky, & Hajcak, 2011; Klonsky, Oltmanns, & Turkheimer, 2003; Nock, Wedig, Holmberg, & Hooley, 2008; Whitlock, Eckenrode, & Silverman, 2006). Further, intense negative emotions that typically precede NSSI are down-regulated following the behaviour (Armey et al., 2011; Claes, Klonsky, Muehlenkamp, Kuppens, & Vandereycken, 2010a; Muehlenkamp et al., 2009), producing immediate relief from aversive emotional states. In light of this converging evidence, current theoretical models frame NSSI as a maladaptive, emotion regulatory behaviour that can provide

quick relief from negative emotional states (Briere & Gil, 1998; Chapman, Gratz, & Brown, 2006; Klonsky, 2007; Nock, 2009; Suyemoto, 1998; Walsh, 2006).

Although understanding the role of emotion regulation in NSSI represents a major step forward in understanding NSSI, research has not adequately addressed the role of the social context in this behaviour. Over the past several decades, research has predominantly focused on clarifying psychological and emotional vulnerabilities that are associated with increased likelihood of engaging in NSSI, with less attention devoted to social or interpersonal vulnerabilities for NSSI (Nock, 2008). Whereas early theories of self-injury posited that this behaviour served communicative functions (Carroll, Schaffer, Spensley, & Abramowitz, 1980; Friedman, Glasser, Laufer, Laufer, & Wohl, 1972; Podovall, 1969), in addition to emotion regulatory functions, there was some concern that such models may promote a pejorative idea that NSSI is manipulative or should not be taken seriously (e.g., Linehan, 1993). Recent research focusing on the social determinants of NSSI has promise in providing a fuller understanding of the factors influencing, maintaining, or protecting against NSSI. For example, researchers have begun to examine how social context is associated with the initiation, reinforcement, and maintenance of NSSI (Nock & Prinstein, 2004, 2005; Heath, Ross, Toste, Charlebois, & Nedecheva, 2009; Heilbron & Prinstein, 2008). Others have examined how experiences of closeness or alienation within social relationships may impact NSSI (Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008). Interpersonal models of NSSI have been proposed to complement existing psychological models (Nock, 2008; Prinstein, Guerry, Browne, & Rancourt, 2009). Limitations in the methods used to examine social influences on NSSI, however, have made it difficult to draw firm conclusions regarding the interpersonal contingencies that may influence NSSI. For example, the vast majority of this research has relied on individuals' aggregated, retrospective data (Nock, 2008) and has used a single time-point to investigate this association. Thus, at present little is known about how changes in social contexts dynamically influence NSSI, and vice versa. The purpose of this research is to clarify how interpersonal contexts impact NSSI using a prospective, daily diary approach.

1.1. Understanding NSSI in an Interpersonal Context

Although most individuals who engage in NSSI do so when they are alone (Glenn & Klonsky, 2009; Nock, Prinstein, & Sterba, 2009), NSSI may nonetheless have an impact on, and be influenced by, an individual's social context. For example, many individuals who engage in NSSI report that others know about their engagement in this behaviour (Heath et al., 2009; Whitlock et al., 2006), that interpersonal stressors serve as "triggers" for the behaviour (Herpertz, 1995), and that changes in the social environment are sometimes a desired consequence of the behaviour (Brown et al., 2002; Klonsky, 2007; Nock & Prinstein, 2004, 2005). These findings suggest that, despite the privacy or secrecy that sometimes surrounds NSSI, social context is important for understanding NSSI. Below, I briefly review three areas of research linking social context to NSSI: a) interpersonal functions of NSSI, b) interpersonal antecedents of NSSI, and c) interpersonal consequences of NSSI.

1.1.1. Interpersonal Functions of NSSI

NSSI is enacted to serve a variety of functions, including regulation of internal (cognitive and emotional) and external (interpersonal) states (Klonsky, 2007). Most studies examining functions of NSSI converge in suggesting that the most commonly and strongly endorsed function of NSSI is to relieve aversive emotional states (Chapman et al., 2006; Klonsky, 2007). Although social functions of NSSI are less frequently endorsed than internal functions, many individuals also report engaging in NSSI to influence social contexts (17% and 65%; Brown et al., 2002; Heath et al., 2009; Klonsky, 2007; Nock & Prinstein, 2004, 2005). According to Nock's (2008) anthropological model, NSSI can serve as a signal of distress that can elicit caretaking from others when less intense signals, such as language, have been ineffective. Interpersonal functions of NSSI include influencing others, establishing interpersonal boundaries, communicating distress, generating intimacy, or competing with other self-injurers (Klonsky, 2007; Walsh, 2006). Some youth report that NSSI is enacted in the presence of their peers (Glenn & Klonsky, 2009) or is frequently discussed with their friends (Heath et al., 2009), supporting the possible interpersonal utility of NSSI to communicate distress, strengthen peer affiliations, or assert autonomy. Interpersonal functions of NSSI are negatively

associated with the suppression of emotional expression (Turner, Chapman, & Layden, 2012), suggesting that individuals who engage in NSSI for interpersonal reasons may be more willing or more likely to openly demonstrate their emotions, compared to those who engage in NSSI exclusively in the service of intrapersonal functions.

It is important to note that some individuals may be reluctant to directly endorse interpersonal functions of NSSI, as these functions may be perceived as manipulative, needy or as cries for help (Linehan, 1993, pp. 16-18). Thus, self-report studies may underestimate the potentially reinforcing influence of social contingencies on NSSI. Supporting this possibility, research suggests that, whereas adolescents tend not to endorse interpersonal functions as motivating their own NSSI, they rate interpersonal functions as being the most common motivator for others' NSSI (Heath et al., 2009). Additionally, NSSI may be influenced by interpersonal contingencies even when this is not the intended outcome of the behaviour (Heilbron & Prinstein, 2008; Nock, 2008). Indeed, contingencies outside of an individual's awareness can exert powerful influence over his or her behaviour (Nisbett & Wilson, 1977; Farmer & Chapman, 2007). For example, research on stereotypic self-harm among individuals with developmental disabilities reveals that self-injury is maintained predominantly through social reinforcement (Oliver, Hall, & Murphy, 2005). Similarly, if NSSI in typically developing populations is followed by desirable changes in the interpersonal environment, these changes may increase the likelihood that NSSI will be repeated.

Interpersonal functions of NSSI are positively associated with indicators of clinical severity, including more frequent (Hulbert & Thomas, 2010) and severe NSSI (Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007), as well as more severe symptoms of depression (Nock & Prinstein, 2005) and anxiety (Glenn & Klonsky, 2009). Individuals who endorsed interpersonal functions of NSSI were more likely to report a history of suicide attempts compared to self-injurers who did not endorse these functions (Glenn & Klonsky, 2009). Further, engaging in NSSI with the motive to influence other people was associated with problematic interpersonal styles, including domineering/controlling and intrusive/needy interpersonal styles, while engaging in NSSI to communicate distress was positively associated with a vindictive interpersonal style (Turner et al., 2012). Interpersonal functions of NSSI are also associated with greater loneliness (Nock &

Prinstein, 2005) and peer victimization (Hilt et al., 2008). The cross-sectional nature of this research makes it difficult, however, to know whether impaired social functioning was present before NSSI and functioned as a proximal or distal trigger for NSSI, or whether it represents a consequence of NSSI.

1.1.2. Interpersonal Antecedents and Consequences of NSSI

Individuals who engage in NSSI experience a number of susceptibilities that may leave them vulnerable to relying on NSSI to communicate distress or assert interpersonal boundaries. For example, individuals who engage in NSSI report higher rates of peer victimization (Hilt et al., 2008), more interpersonal problems (Kerr & Muehlenkamp, 2010), lower quality of relationships with same-sex peers (Claes, Houben, Vandereycken, Bijttebier, & Muehlenkamp, 2010b), less social support from close friends (Heath et al., 2009), and worse social problem solving abilities (Kehrer & Linehan, 1996; Nock & Mendes, 2008) compared to individuals who do not engage in NSSI. Adolescents who engage in NSSI report more criticism from their parents (Hoff & Muehlenkamp, 2009), worse quality of attachment with their caregivers (Gratz, Conrad, & Roemer, 2002; Zoroglu et al., 2003), significantly lower perceived quality of relationships with parents (Hilt et al., 2008; Claes et al., 2010b), and rate themselves as less socially skilled (Claes et al., 2010b) compared to adolescents who do not engage in NSSI. Among adolescents who attempted suicide by overdose, those who also engage in NSSI reported significantly more loneliness than those without NSSI (Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boergers, 2001). Among military personnel, those who engage in NSSI are perceived by their peers are having more intense emotions and greater sensitivity to rejection than non-self-harming peers (Klonsky et al., 2003). Taken together, these findings suggest that individuals who engage in NSSI may struggle to meet their interpersonal needs, which could lead to greater reliance on behavioural signals of distress. It remains unclear, however, whether interpersonal vulnerabilities such as poor social support or loneliness increase the risk for NSSI specifically, or whether they increase the risk for psychopathology more generally (e.g., depression, anxiety) which may in turn increase the likelihood of engaging in NSSI (Prinstein et al., 2009). Additionally, it is unclear whether these interpersonal vulnerabilities represent antecedents or consequences of NSSI. A more detailed examination of the changes in

the interpersonal environment that typically precede and follow NSSI could shed light on these questions.

In addition to highlighting the more severe interpersonal difficulties in those who engage in NSSI, recent research has also supported the role of interpersonal events as *proximal* antecedents for NSSI. For example, women with BPD listed interpersonal difficulties, including conflict, loss, and abandonment/rejection, as being important precipitants for self-injury (Shaw Welch & Linehan, 2002). Qualitative research suggests that nearly all individuals who engage in NSSI identified rejection, separation or failure as important precipitants for NSSI (Herpertz, 1995); only 6% of self-injurers identified exclusively internal, mood related precipitants for NSSI. Ecological momentary assessment paradigms have revealed that adolescents were significantly more likely to act on NSSI urges when they were feeling socially-focused emotions such as rejection or anger toward others than when they experienced other emotional states (Nock et al., 2009). Further, many NSSI thoughts (51%) first occur when adolescents are with others (peers, family or strangers), although being alone when the thought of NSSI first occurred significantly predicts subsequent engagement in NSSI (Nock et al., 2009). Finally, longitudinal research revealed that adolescent psychiatric patients were more likely to engage in NSSI when anticipating an interpersonal loss in the form of a staff member leaving the treatment program compared to during other periods (Rosen, Walsh, & Rode, 1990).

Although few studies have directly examined the interpersonal consequences of NSSI, emerging evidence suggests that NSSI may be associated with positive as well as negative changes in the social environment. In one longitudinal study, adolescents who engaged in NSSI reported increasing closeness with their fathers over a one-year follow-up, whereas adolescents who engaged in other risky behaviours did not (Hilt et al., 2008). It is important to note, however, that it was not possible to determine whether this change in closeness was due to the NSSI or due to other group-based differences. On the other hand, studies examining people's reactions to self-injury generally find that many people, including mental health professionals, find NSSI to be confusing, unappealing, frightening or disgusting (Deiter & Pearlman, 1998; Favazza, 1998; Francis, 1987; Walsh & Rosen, 1988; Zila & Kiselica, 2001). Many self-injuring

individuals report that they worry about possible negative reactions if someone discovered their NSSI, such as rejection, stigmatization or punishment (Turner, Chapman, & Gratz, 2014). Thus, preliminary evidence suggests that NSSI may be inadvertently reinforced or punished by the social environment.

Taken together, research strongly supports the interplay between NSSI and social environments. As Nock (2008) notes, this is not to say that all instances of NSSI serve a social function, or that all individuals who engage in NSSI deliberately use NSSI to influence their social environments. It is important to acknowledge that most individuals engage in NSSI when they are alone (Nock et al., 2008), and many individuals (14% to 30%) report that no one knows that they engage in this behaviour (Heath et al., 2009; Whitlock et al., 2006), making direct reinforcement by social contexts unlikely. Rather, interpersonal models of NSSI suggest that at least some instances of NSSI may serve to modify interpersonal environments when an individual perceives that other strategies would be ineffective, lacks the skills necessary to use other strategies, or is too emotionally aroused to consider or execute more skilled communication strategies. Further, it is possible that reinforcing social contingencies operate outside the individual's awareness. Engagement in NSSI following a threat to one's sense of belonging or social connectedness may occur via either deliberate decision (e.g., weighing of the pros and cons of doing so) or via automatic or implicit processing (e.g., activation of an internal model that suggests that NSSI will lead to increased support; see, for example, Bowlby, 1989; Shaver, Collins, & Clark, 1996). Even in situations that NSSI is not disclosed or discovered by others, interpersonal stressors are often important triggers for NSSI.

1.1.3. Social Support as a Moderator of Negative Affect and NSSI

Interest in the reciprocal and interactive associations between social support, stress, and physical and mental wellbeing emerged during the 1970s and 1980s, and has continued to develop since then (Barrera, 1986; Cohen & Wills, 1985; Cohen, 1992; Hostinar, Sullivan, & Gunnar, 2014; Sarason & Duck, 2001). Initial failures to find the expected associations between support and wellbeing, however, led some researchers to question whether there may be distinct aspects of social support that function

differently in buffering against stress. In particular, Barrerra (1986) distinguished between enacted support (i.e., supportive behaviours that are objectively rated by outside observers), perceived support (i.e., an individual's cognitive appraisal of the presence, adequacy, and desirability of support received), and structural support (i.e., the number of individuals in a person's support network). Supporting these distinctions, research demonstrates that enacted support is weakly correlated or uncorrelated with perceived support (Dunkel-Schetter & Bennett, 1990; Lakey & Cassady, 1990; Sarason, Shearin, Pierce, & Sarason, 1987). Further, whereas enacted support is unassociated or in some cases negatively associated with wellbeing (Barrerra, 1986; Bolger, Foster, Vinokur, & Ng, 1996; Dunkel-Schetter & Bennett, 1990), early studies consistently suggested that perceived support is associated with better coping ability, adjustment to stress, and mental wellbeing (Antonucci & Israel, 1986; Sandler & Barrera, 1984; Schwarzer & Leppin, 1991; Wethington & Kessler, 1986). Given that NSSI is conceptualized as a maladaptive effort to cope with distress, this literature suggests that perceived support may buffer against the impact of stress or negative affect on NSSI.

Specifying the expected association between perceived support and NSSI is complicated given the intricacy of the recent literature, however. First, there is conflicting evidence regarding the expected *direction* of the association. Whereas perceived support is typically positively associated with wellbeing and negatively associated with negative affect when it is assessed by aggregated, global reports or over longer follow-up intervals (Cohen, 2004), several recent studies have demonstrated deleterious effects of support in daily diary studies. For example, diary studies have found that support is associated with *increased* negative affect the following day (Bolger, Zuckerman, & Kessler, 2000), particularly for young adults (Scholz, Kliegel, Luszczynska, & Knoll, 2012). Researchers suggest that this unexpected relationship may occur because daily support comes at a cost to the recipient's sense of competence (Bolger & Amarel, 2007), or because of a confounding association between daily support and stress (i.e., perceived support may be highest at times of high stress, resulting in greater negative affect despite the support; Matire et al., 2002). Second, the effects of perceived support may vary by *source* of support. Whereas parental support tends to be particularly important in childhood and early adolescence, support from peers and romantic partners becomes increasingly important during late adolescence and early

adulthood (Evans et al., 2013; Graham & Barnow, 2013). Third, research indicates that social experiences can have additive effects on wellbeing. For example, accounting for exposure to interpersonal conflict can add incrementally to support in predicting adjustment to stressful events (Coyne & Delongis, 1986; Lackner et al., 1993; Pierce et al., 1992). In fact, some research suggests that conflict is even more strongly associated with wellbeing than is perceived support (Abbey & Andrews, 1985; Rook, 1984). Fourth and finally, research highlights the importance of considering direct as well as indirect and moderated effects in understanding the relationship between social experiences and wellbeing. In particular, a growing body of work suggests that perceived support buffers the association between stressful experiences and a variety of adverse outcomes (Arnberg, Hultman, Michel, & Lundin, 2012; Cohen & Wills, 1985; Evans, Steel, DiLillo, 2013; Graham & Barnow, 2013; Hostinar et al., 2014). Thus, untangling the association between social context and NSSI requires careful unpacking of the possible direct, indirect and moderated effects while considering the influence of source of support and the joint impact of conflict and perceived support.

To my knowledge, few studies have directly examined the longitudinal associations between perceived support, interpersonal conflict, and NSSI behaviour. Although previous cross-sectional work has examined the social context of NSSI in adolescents (Claes et al., 2010b; Muehlenkamp. Hoff, Licht, Azure, & Hasenzahl, 2008; Prinstein et al., 2009), and additional gap in the literature concerns the social context of NSSI in young adults. This developmental distinction may be particularly important given the shifting focus from parent relationships to peer and romantic relationships during late adolescence and early adulthood (Kirchler, Palmonari, Pombeni, 1993; Tarrant, MacKenzie, & Hewitt, 2006). For instance, whereas lack of parent support accounts for the largest proportion of variance in distress during adolescence (Helsen, Vollebergh, Meeus, 2000), perceived support from friends and romantic partners becomes increasingly important in adulthood (Evans et al., 2013; Graham & Barnow, 2013). The present study therefore aimed to describe the social context of NSSI behaviour as reported by a sample of young adults with a recent and repeated engagement in this behaviour.

1.2. Limitations in the Research

Understanding the interpersonal context of NSSI has thus far been limited by reliance on cross-sectional, retrospective data, although longitudinal studies are emerging (e.g., Giletta, Burk, Scholte, Engels, & Prinstein 2013; Hilt et al., 2008; Prinstein et al., 2009). Because of this reliance on cross-sectional data, it is currently unclear how social context influences vulnerability or resilience to NSSI, and how these factors interact in real time to increase or decrease the likelihood of NSSI behaviour. For example, although social isolation, loneliness and poor relationship quality are associated with NSSI (Claes et al., 2010b; Gratz et al., 2002; Heath et al., 2009; Hilt et al., 2008; Kerr & Muehlenkamp, 2010; Zoroglu et al., 2003), it is unclear if these represent an antecedent or a consequence of NSSI. While cross-sectional studies highlight areas of social impairment experienced by self-injuring individuals, a much more fine-grained level of observation is necessary to illuminate the nature and mechanisms by which social contexts interact with NSSI.

1.2.1. Daily Diary Methods and NSSI

Understanding interactions between contexts and behaviours requires longitudinal research using a variety of time frames (i.e., hours, days, months, and years). Of the longitudinal methods available, intensive longitudinal methods such as daily diaries and ecological momentary assessment (EMA) allow psychologists to investigate psychological, behavioural, and interpersonal phenomena as they unfold in real-time, in naturalistic contexts (Wilhelm, Perrez, & Pawlik, 2012). Intensive longitudinal methods confer several advantages when it comes to probing context-behaviour relationships. First, intensive longitudinal methods allow the researcher to collect multiple data points from the same individual as he or she interacts with his or her environment; thus, these methods allow researchers to closely investigate temporal associations in a much more naturalistic setting than would be possible in laboratory studies. Second, intensive longitudinal methods can improve measurement accuracy for information that is difficult to recall retrospectively or to aggregate over time (Croyle, 2007). For example, rather than providing a global estimate of perceived support, intensive longitudinal methods allow the researcher to examine daily fluctuations in

support. Third, because associations are not directly probed but rather are derived from later data analysis, these methods have the potential to overcome reporting biases that can hinder research on social determinants of NSSI. For example, rather than asking participants if NSSI influences their relationships, intensive longitudinal methods ask individuals to rate the quality of their relationships separately from their reports of NSSI behaviour. Fourth, intensive longitudinal methods offer the opportunity to observe variability within and between people. For these reasons, intensive longitudinal methods are especially well suited for the investigation of the social context of NSSI.

Despite these advantages, only six studies have applied intensive longitudinal methods to the study of NSSI (Anestis et al., 2012; Armey et al., 2011; Bresin, Carter, & Gordon, 2013; Muehlenkamp et al., 2009; Nock et al., 2009; Victor & Klonsky, 2014). Two of these studies present data for the same sample (Anestis et al., 2012 and Muehlenkamp et al., 2009), which was recruited primarily for engagement in disordered eating rather than NSSI. Most intensive longitudinal studies of NSSI have focused on the affective context of NSSI, revealing increased negative emotion immediately preceding acts of NSSI in women with bulimia nervosa (Muehlenkamp et al., 2009), and in self-injuring college students (Armey et al., 2011), as well as greater overall daily negative affect in self-injuring adults, compared to a sample without NSSI (Victor & Klonsky, 2014). To my knowledge, studies have not yet considered how daily social context impacts urges for and engagement in NSSI. The purpose of the present study, therefore, was to extend research by applying a daily diary method to explore the associations between perceived support, interpersonal conflict and NSSI in a sample of young adults.

Chapter 2.

Aims of this study

2.1. Aim 1: To describe the self-reported social context of NSSI.

Given that few studies have examined the social context of NSSI, Aim 1 of this study was to describe retrospective and daily reports of a variety of social features of NSSI, including disclosures, functions, and perceived interpersonal precipitants and consequences of NSSI. Although this aim was largely descriptive in nature, I had several hypotheses about the expected pattern of results. Consistent with previous research suggesting that approximately 65% of self-injurers report that someone knows about their NSSI (Heath et al., 2009; Whitlock et al., 2006), I expected that the majority of participants (≥ 60%) would report that someone knows about their history of NSSI (Hypothesis 1a). Conversely, I expected that daily acts of NSSI observed during the diary period would be less frequently disclosed (< 50% of acts), because disclosing very recent NSSI may be more likely to result in negative consequences (e.g., rejection, punishment; see Zila & Kiselica, 2001) compared to disclosing historical NSSI (Hypothesis 1b). Consistent with previous research, I expected that NSSI would be most frequently disclosed to friends or romantic partners (Hypothesis 1c; see Heath et al., 2009), rather than other members of the social network such as parents or professionals (teachers, physicians, counsellors). I expected that interpersonal functions of NSSI would be less frequently and less strongly endorsed than intrapersonal (e.g., emotion regulation) functions of NSSI (Hypothesis 1d; see Klonsky, 2007; Turner et al., 2012). Given that interpersonal stressors are often reported to be important precipitants of NSSI (Herpertz, 1995; Nock et al., 2009), I expected that NSSI thoughts that were precipitated by interpersonal stressors would be more likely to co-occur with NSSI behaviour, compared to NSSI thoughts that were precipitated exclusively by

intrapersonal stressors (Hypothesis 1e). Finally, I expected that self-injuring participants would perceive NSSI as having a negative effect on the quality and closeness of their relationships (Hypothesis 1f; Clarke & Whittaker, 1998; Favazza, 1998).

2.2. Aim 2: To examine the temporal association between social context and NSSI.

A second gap in the literature concerns whether and how changes in the social environment precede, follow or co-occur with NSSI. The second aim of this study, therefore, was to examine the temporal associations between perceived support and interpersonal conflict with NSSI (i.e., NSSI urges, thoughts, and actions). I examined three temporal relationships in this set of analyses. First, I examined the contemporaneous (same-day) associations between perceived support, interpersonal conflict and NSSI urges, thoughts or acts. Consistent with evidence that perceived support is robustly associated with greater emotional wellbeing and use of adaptive coping strategies (Cohen, 2004), and with greater same-day positive affect (Bolger et al., 2000), I expected that perceived support would be negatively associated with concurrent (same-day) NSSI urges, thoughts, and acts (Hypothesis 2a). In particular, given that this sample consisted of young adults who may place greater emphasis on peer and romantic relationships, I expected that perceived support from romantic partners and peers, but not from parents, would be significantly, negatively associated with NSSI outcomes (Hypothesis 2b). Further, and consistent with research suggesting that conflict can serve as a proximal trigger for NSSI (Herpertz, 1995; Shaw Welch & Linehan, 2006), I expected that interpersonal conflict would be positively associated with same-day NSSI urges, thoughts, and acts (Hypothesis 2c). I expected that perceived support and conflict would each explain unique variance in NSSI thoughts, urges or actions when considered simultaneously in a single model (Hypothesis 2d), as these constructs were expected to represent independent aspects of social context. Finally, given that stress often moderates the effect of perceived support (Cohen & Wills, 1985), I examined the association between support, conflict and NSSI at various levels of daily stress (high, moderate and low). Stress was categorized into three levels to allow for curvilinear associations between NSSI and support or conflict. Consistent with previous

research (Cohen & Wills, 1985), I expected that the associations between NSSI and perceived support or interpersonal conflict would be strongest on high-stress days, compared to low- or moderate-stress days (Hypothesis 2e).

A second set of analyses focused on the prospective associations between social context (support and conflict) and NSSI. These analyses examined the association between the social variables on one day, and NSSI outcomes on the following day, controlling for the autocorrelations in the outcome of interest. Prospective analyses involved an analogous set of models as those presented above for the contemporaneous (same-day) hypotheses. That is, I examined the simple effects of overall perceived support, of each source of support, and of conflict, the joint effect of conflict and perceived support, and the effect of support or conflict at the three levels of stress (low, moderate, and high) on each NSSI outcome (urges, thoughts, and acts). Given research suggesting that perceived support, particularly from romantic partners, can be "costly" in that it is associated with positive affect on the same day but greater distress the following day (Bolger et al., 2000), I expected that perceived support would be positively associated with NSSI outcomes the following day (Hypothesis 2f), and that this would be particularly the case for perceived support from romantic partners (Hypothesis 2g). Given conflict's detrimental effects on wellbeing and coping, I expected that conflict would be positively associated subsequent NSSI urges, thoughts or actions (Hypothesis 2h). I again expected that conflict and support would each uniquely contribute to the prediction of subsequent NSSI when considered simultaneously in the same model (Hypothesis 2i). Finally, given that perceived support is thought to be detrimental primarily at high and low levels of stress (i.e., when it may be particularly likely to undermine sense of competence or to be conflated with stress effects; see Bolger et al., 2000; Bolger & Amarel, 2007; Matire et al., 2002), I expected that support would have the strongest, positive association with NSSI outcomes on high- and low-stress days, compared to moderate-stress days (Hypothesis 2j). Prospective analyses related to the variability of the effects of conflict over different levels of stress were again treated as exploratory.

A third set of analyses examined changes in the social environment *following* NSSI behaviour. For these analyses, I was particularly interested in whether NSSI acts

that had been disclosed to or discovered by others would be associated with changes in perceived support or conflict the next day. Given equivocal evidence that NSSI can be followed by negative reactions (Favazza, 1998; Walsh & Rosen, 1988; Zila & Kiselica, 2001) or by increased support and caring (Hilt et al., 2008; Nock, 2008), I did not have a priori hypotheses for these analyses and treated them as exploratory.

2.3. Aim 3: To examine the mediating and/or moderating influence of perceived support in the relationship between negative affect and NSSI

A third and final gap in the existing literature concerns how social context interacts with other proximal correlates of NSSI, particularly negative affect. Given the robust evidence that negative affect often precedes and predicts NSSI behaviour (Armey et al., 2011; Muehlenkamp et al., 2009), the third aim of this study was to examine whether perceived support mediates and/or moderates the association between negative affect and NSSI. I expected that support would mediate this association because lower negative affect may result in more positive evaluations of social support, which in turn should reduce NSSI urges (Hypothesis 3a). Alternatively, I examined whether perceived support moderated the association between negative affect and NSSI such that perceiving greater support buffered the effect of negative affect on NSSI (resulting in a weaker relationship between negative affect and NSSI at higher levels of perceived support; Hypothesis 3b).

Chapter 3. Methods

3.1. Participants

This research occurred in the context of a larger project funded by a CIHR Operating Grant to Dr. Alexander Chapman and Dr. Kim Gratz. Young adults (aged 18 to 35) who endorsed recent and repeated NSSI (>10 total NSSI acts; at least one episode of NSSI within the past 12 months; urges for or thoughts about NSSI within the past two weeks; *N* = 60) were eligible to participate. Participants were recruited using advertisements on community websites (i.e., craigslist.org), and posters distributed at Simon Fraser University and Vancouver-area community mental health clinics. Eligibility criteria included fluency in English and regular access to the Internet. Because NSSI rarely occurs in the absence of co-occurring diagnoses (e.g., Nock et al., 2006; Selby, Bender, Gordon, Nock, & Joiner, 2012), exclusion criteria only included diagnoses that could interfere with completion of the diary protocol, including a current primary psychotic disorder or current alcohol or substance dependence (see Table 3.1).

Table 3.1. Inclusion and exclusion criteria

Inclusion Criteria	18-35 years of age
	Regular access to internet-compatible device
	At least 10 lifetime acts of NSSI; At least one episode of NSSI in the past year
	Thoughts of or urges for NSSI within the past two weeks
Exclusion Criteria	Current psychotic disorder (schizophrenia, schizophreniform, or delusional disorder)
	Current alcohol or substance dependence

Participants were young (M_{Age} = 23.25, *SD* = 4.25, range = 18 to 35), predominantly female (85.0% female, *n* = 51), and highly educated (22.1% had completed a post-secondary degree and a further 52.5% had completed some post-secondary education). Most participants had never been married and were not living with a romantic partner at the time of the study (80.0%). The sample was relatively diverse with respect to ethnicity and sexual orientation (53.3% Caucasian, 58.3% heterosexual; see Table 3.2). Participants met criteria for an average of 3.10 lifetime Axis-I disorders (*SD* = 2.10, range = 0 to 8), 1.27 current Axis-I disorders (*SD* = 1.38, range = 0 to 7), and .77 personality disorders (*SD* = 1.11, range = 0 to 4; see Table 3.3 for further diagnostic information). The mean Global Assessment of Functioning score for this sample was 64.71 (*SD* = 9.72, range = 40 to 90), indicating that, on average, participants were experiencing mild to moderate psychiatric symptoms that resulted in some difficulty in their social, occupational or school functioning.

Table 3.2. Participant demographic characteristics.

Age M (*SD*)	23.25 (*4.25*)
% Female	85.0
% White	50.9
% Full time or part-time student	39.0
% Employed full or part-time	45.7
% Completed Bachelor's level degree	22.1
% Heterosexual	58.3
% Single, never married	80.0

Table 3.3. Diagnostic characteristics of the sample.

	% Meeting Diagnosis within the past month	% Meeting Diagnosis ever during lifetime
Major Depressive Disorder	13.3	66.7
Bipolar Disorder	3.4	8.3
Dysthymic Disorder	8.3	8.3
Alcohol Abuse	3.3	11.6
Alcohol Dependence	--	33.3
Substance Abuse	1.7	5.0
Substance Dependence	--	21.7
Panic Disorder	13.3	18.3
Agoraphobia without Panic Disorder	1.7	6.7
Social Phobia	20.0	25.0
Specific Phobia	16.7	25.0
Obsessive Compulsive Disorder	10.0	13.3
Posttraumatic Stress Disorder	13.3	16.7
Generalized Anxiety Disorder	15.5	16.7
Paranoid PD	--	5.0
Schizotypal PD	--	0
Schizoid PD	--	0
Avoidant PD	--	26.7
Dependent PD	--	3.3
Obsessive Compulsive PD	--	8.3
Histrionic PD	--	0
Borderline PD	--	26.7
Narcissistic PD	--	0
Antisocial PD	--	6.7

3.2. Power.

Current techniques for estimating power for hierarchical linear models (HLM) are limited in that they require an assumption of random assignment to conditions (e.g., Raudenbush et al., 2011) or require that the researcher provide estimates of population-based covariance matrices based on previous research (Bolger, Stadler, & Laurenceau, 2011; Snijders & Bosker, 1993, 2011), which was not possible given the paucity of research on NSSI and social context. To inform sample size requirements, I examined

the sample size and observation schedules for previously published intensive longitudinal studies of NSSI. This information is summarized in Table 3.4. Based on this review, I elected to use a fourteen-day study period and aimed to recruit 60 self-injuring participants.

Table 3.4. Sample size and number of observations in previously published intensive longitudinal studies.

Study	N	Days	Scheduled observations per day	Event contingent responses	Max. possible observations	Actual observations
Anestis et al., 2012; Muehlenkamp et al., 2012	131	14	6	Yes	> 11004	Not reported
Armey et al., 2011	36	7	6	Yes	> 1512	569
Bresin et al., 2013	67	14	1	No	938	613
Nock et al., 2009	30	14	2	Yes	> 840	1227
Victor & Klonsky, 2014	18	14	1	No	252	Not reported
Present Study	60	14	1	No	840	735

3.3. Procedures

3.3.1. Screening.

Interested participants emailed the research team and completed an online survey to confirm they met the study eligibility criteria (e.g., age between 18 and 35, NSSI within the past year). Eligible participants were scheduled for an assessment interview to confirm inclusion/exclusion criteria.

3.3.2. Diagnostic Interviews.

Graduate and undergraduate research assistants trained by myself and Dr. Alexander Chapman assessed eligible participants using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1996) and the Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV; Zanarini, Frankenburg, Chauncey, & Gunderson, 1987). These semi-structured interviews have demonstrated good interrater and test-retest reliability in previous clinical studies

(Lobbestael, Leurgans, & Arntz, 2011; Martin, Pollock, Bukstein, & Lynch, 1999; Zanarini et al., 1987; Zanarini et al., 2000; Zanarini & Frankenburg, 2001). Study assessors coded a subset of randomly selected audio-recorded interviews roughly twice per month to reduce rater drift and monitor reliability. Coding discrepancies were discussed and ongoing training was provided during monthly or biweekly reliability meetings. In a preliminary sample of 14 interviews (6% of the overall sample), interrater reliability between the assessors and this author was good (average kappa > .60). Study participants also completed a self-report measure of NSSI (the Deliberate Self-harm Inventory, described below) during the interview session to confirm their eligibility for the study. The assessment session took approximately 3 to 4 hours in total, and participants were paid $30.

3.3.3. Daily Diary Procedures.

The daily diaries were scheduled to begin one to four days following a second laboratory session in which participants completed online questionnaires and an implicit association task examining the association of NSSI and emotional relief. This laboratory session was part of the larger study from which these participants were drawn, but was not relevant to this investigation. All participants completed the laboratory session.

Participants who consented to participate in the diary portion of the study completed brief, online questionnaires each evening for a period of 14 days. A 14-day assessment period was chosen as an ideal balance between collecting sufficient data to capture variability in NSSI thoughts, urges, and behaviours with the need to reduce participant burden and to promote compliance with diary procedures. Although previous intensive longitudinal studies of NSSI have included multiple assessments per day (Anestis et al., 2012; Armey et al., 2011; Muehlenkamp et al., 2009; Nock et al., 2009), previous work shows that NSSI thoughts are typically reported roughly five times per week, while acts of NSSI occurred 1.6 times per week, on average (Nock et al., 2009). Thus, a single daily report (i.e., a daily diary design) was chosen that it was likely to adequately capture the outcome of interest (NSSI urges, thoughts, and acts) while reducing participant burden. Research also supports the use of daily diaries to study social processes, including perceived support and interpersonal conflict (e.g., Flook,

2011; Lavee & Ben-Ari, 2007; Novak & Webster, 2011). By requiring fewer reports per day, daily diary methods reduce missing data and maximize participant compliance.

At the same time, several phenomena of interest (e.g., perceived support, NSSI urges) were expected to fluctuate throughout the day, and having participants aggregate these fluctuations into a single, retrospective daily report may introduce bias into the data. I therefore used modified Day Reconstruction Method (DRM; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004) within the daily reports to capture this variability. Briefly, the DRM offers a compromise between daily diary and EMA approaches by prompting respondents to divide the day into different "episodes", which are then rated during one report at the end of the day. In this way, the DRM facilitates a detailed description of the previous day. The classic DRM divides the day into episodes based on different activities that participants engaged in. This method remains relatively time intensive, with each report taking an average of 45 to 75 minutes to complete (Kahneman et al., 2004). For the current study, I modified the DRM so that participants instead reported on three predefined periods each day: morning (defined as the period between first waking up and noon), afternoon (defined as noon to 6 p.m.), and evening (defined as 6 p.m. until the time of the diary entry). Participants also reported what time they awoke and completed the diary, so that the relative duration of these periods could be assessed. For each of these three periods, participants rated their experiences of support, conflict, affect, stress, and NSSI urges. They then provided a single daily report of whether they had thought of or engaged in NSSI at any point during the day.

Each evening at 5 p.m., the study coordinator emailed participants a link and password that allowed them to access the questionnaires. The email encouraged participants to complete the diaries as close to bedtime as possible to maximize the inclusiveness of their report about that day. To ensure acts of NSSI were not missed, participants were given an opportunity to report on events that took place between the submission of yesterday's diary and the beginning of the current day. Questions were branched so that participants only responded to relevant items (e.g., if no thoughts of NSSI were reported for a particular day, the participant was not required to answer follow-up questions regarding NSSI thoughts; if they had no contact with their parents, they were not required to rate the quality of support they received from their parents).

Diary questionnaires were administered using Remark Web Survey 5, an online data collection software package that includes a number of features that are particularly useful for daily diary research, including direct data exportation to IBM PASW, question branching, time/date stamping, and data storage on a secure online server.

Several strategies were employed to encourage participant retention. First, participants could elect to receive daily reminders through any of the following means of communication: email, text message, or telephone call. Second, participants who did not complete the previous evening's diary were emailed the next morning and given until 11 a.m. to complete the diary entry without penalty; otherwise, the entry was considered missing. Finally, the compensation strategy was designed to encourage compliance: participants were compensated $45 if they completed at least five of the seven days for either of the two weeks, whereas they received $60 if they completed seven of the seven days for either week, with a maximum possible compensation of $120.

3.4. Measures

3.4.1. Baseline Measures

NSSI History.

History of NSSI was assessed during the online screening using the question "*Have you ever **deliberately** hurt yourself physically, such as by cutting, scratching or burning yourself, but **without** intending to kill yourself?"* NSSI was then confirmed in the diagnostic interview session using the Deliberate Self-Harm Inventory (DSHI; Gratz, 2001), a 17-item, self-report questionnaire that assesses the frequency, duration, method, and medical severity of seventeen methods of NSSI. The DSHI has acceptable internal consistency in undergraduates (Gratz, 2001), and in this study (α = .87).

NSSI Functions.

To assess functions of NSSI, participants completed the 39-item Inventory of Statements About Self-injury (ISAS; Klonsky & Glenn, 2009). The ISAS assesses five intrapersonal functions of NSSI (affect regulation, anti-dissociation, anti-suicide, marking

distress, and self-punishment) and eight interpersonal functions of NSSI (interpersonal boundaries, self-care, sensation seeking, peer bonding, interpersonal influence, toughness, revenge, and autonomy). Scores on the higher-order functions (interpersonal and intrapersonal functions) are derived by taking the mean of the composite subscales. The two higher-order ISAS scales demonstrate acceptable internal consistency (undergraduate students: αs = .80 to .88; Klonsky & Glenn, 2009; current study: interpersonal functions α = .83; intrapersonal functions α = .87). Although the lower-order intrapersonal subscales demonstrated acceptable internal consistency in the current sample (αs = .73 to .92), several of the interpersonal subscales demonstrated moderate to poor internal consistency (self-care α = .56, peer-bonding α = .56, sensation-seeking α = .12). Descriptive and inferential analyses of these subscales should be interpreted with caution.

Disclosures of NSSI.

Participants' disclosures of NSSI were assessed using a structured series of questions developed by Nock et al. (2009). Participants were asked whether anyone knew about their NSSI (response options: "*Yes, I told someone"*, "*Yes, someone found out"*, "*Yes, someone was with me when I did it"*, "*No, no one knows")*, and the relationship of the people who knew about their NSSI (response options: family, friend(s), other peer/acquaintance(s), stranger(s), romantic partner, supervisor/boss/teacher, therapist/counsellor/doctor, or not applicable/no one knows).

Social Desirability.

The Marlowe-Crowne Social Desirability Scale (MCSDS; Reynolds, 1982) is a 33-item self-report measure that assesses socially desirable response patterns. Items are rated as "*True"* or "*False"*. The total score has adequate internal consistency and convergent validity in undergraduate samples (Reynolds, 1982). In this study, the MCSDS had acceptable reliability (α = .78).

3.4.2. Daily Diary Measures Assessed Once per Day

Thoughts About and Engagement in NSSI.

Thoughts about and engagement in NSSI were assessed using a standard series of questions adapted from a previous intensive longitudinal study of NSSI (Nock et al., 2009). NSSI thoughts were assessed with the single dichotomously-rated (yes/no) item "*Did you think of doing the following today (even if it was only a passing thought)... Injuring yourself without intending to die (non-suicidal self-injury)?*" NSSI acts were assessed with the single dichotomously rated (yes/no) item "*Did you engage in non-suicidal self-injury today?*".

Social Context and Functions of Daily NSSI.

To assess contexts of daily NSSI, participants who reported NSSI thoughts were asked a structured series of follow-up questions, including what happened right before the thoughts began and whom they were with when the thoughts occurred. Participants who engaged in NSSI were asked to report whether anyone knew about the NSSI, and if so, who knew (using same response options as the disclosure questions above). Participants also selected one of four possible functions that the NSSI had served ("*to communicate"*, "*to get rid of thoughts and feelings"*, "*to feel something"*, "*to escape a task or other people"*; Nock et al., 2009). Finally, participants who engaged in NSSI were asked to rate the effect that NSSI had on their relationships ("*very positive"*, "*slightly positive"*, "*neutral or no effect"*, "*slightly negative"* or "*very negative"*).

3.4.3. Daily Diary Measures Assessed Three Times per Day

NSSI Urges.

Participants rated their urges to engage in NSSI during each period (morning, afternoon, and evening) using the 5-item Alexian Brothers Urges to Self-Injure Scale (ABUSI; Washburn, Juzwin, Styer, & Aldridge, 2010), which yields a total score ranging from 0 (no urge to engage in NSSI) to 29 (extremely high urges to engage in NSSI). Items include an assessment of the frequency of NSSI thoughts (0 = "*never, 0 times*" to 5 = "*nearly all of the time, more than 6 times*"), strength of NSSI urges (0 = "*none at all*" to 6 = "*strong urge and would have self-injured if able to*"), amount of time spent thinking

about NSSI (0 = "*none*" to 6 = "*more than six hours*"), difficulty in resisting urges (0 = "*not at all difficult*" to 6 = "*was not able to resist*"), and overall assessment of urges (0 = "*never thought about it and never had the urge to self-injure*" to 6 = "*thought about self-injury nearly all of the time and had the urge to do it nearly all of the time*"). The ABUSI demonstrated excellent internal consistency (αs = .92 to .96), convergent validity, and predictive validity for frequency of NSSI, probability of readmission to a psychiatric inpatient unit, and quality of life in self-injuring inpatients (Washburn et al., 2010). In this study, the ABUSI demonstrated excellent internal consistency (αs > .90).

Social Support.

The Goldsmith Social Support Scale (GSSS; Goldsmith, McDermott, & Alexander, 2000) is a 12-item measure on which participants rate the quality of the social support they receive using 12 adjective pairs. The GSSS assesses three different domains of support (helpfulness in solving problems or *problem-focused support*, supportiveness in providing reassurance or *relational support*, and sensitivity to the help seeker's emotional needs or *emotional support*). To capture participants' daily experiences of support, participants were asked whether they had had contact with any of the following potential sources of support in each period (morning, afternoon, and evening): romantic partners, parents, and peers. Participants then completed the GSSS for each source of support they had contact with, resulting in a maximum of nine reports on social support per day. These nine scores were then averaged across sources of support (providing an overall rating of how helpful, supportive, and sensitive their social supports had been that day) and domains of support (providing an overall rating of how supportive their partners, parents, and peers had been that day), to create six higher-order scales. An additional, global daily perceived support score was created by averaging across domains of support for all participants who reported receiving support from at least one source at some point during the day. Previous research supports the factor structure, reliability (α = .89 to .92), and convergent validity of the GSSS in undergraduate students (Goldsmith et al., 2000). In the current study, ratings of domains of support (αs = .88 to .96) and sources of support (αs = .96 to .99) showed acceptable internal consistency.

Interpersonal Conflict.

The Test of Negative Social Exchange (TENSE; Ruehlman & Karoly, 1991) is a 17-item checklist that assesses four types of unpleasant interactions: Hostile/Impatient interactions (e.g., someone losing his/her temper, yelling at, or becoming angry with the participant), Insensitive interactions (e.g., someone taking the participant for granted, ignoring the participants wishes or needs, or taking the participant's feelings lightly), Interfering interactions (e.g., distracting the participant when he/she was doing something important or invading his/her privacy), and Ridiculing interactions (e.g., making fun of, laughing at or gossiping about the participant). Participants responded to dichotomous items (0 = "*no*", 1 = "*yes*") rating whether or not they experienced each type of interaction during the morning, afternoon, and evening. A total daily conflict score was created by taking the average of the three time periods, with scores ranged from 0 to 17. Given the significant positive skew expected in these data (e.g., most participants would report few instances of conflict, resulting in a preponderance of low scores), I elected to rescore the daily TENSE scores as dichomotous variables (0 = "*conflict absent*", 1 = "*conflict present*"). The TENSE has demonstrated acceptable internal consistency (αs = .70 to .83), test-retest reliability over 2 days (r = .65 to .80), and convergence with measures of loneliness and social support (Ruehlman & Karoly, 1991). Research supports the feasibility and internal consistency of the TENSE in daily diary research (αs = .78 to .82; Mohr et al., 2001). In this study, most scales demonstrated adequate internal consistency (αs = .79 to .90), with the exception of the ridiculing subscale (α = .64).

Perceived Stress Scale.

Appraisals of stress were assessed with the Perceived Stress Scale (PSS; Cohen, Kamarck, Mermelstein, 1983). The ten items of the PSS are rated on a 0 ("*never*") to 4 ("*very often*") Likert scale. The PSS has demonstrated good internal consistency, criterion validity, and predictive validity in previous research with undergraduate students and adults attempting to quit smoking (Cohen et al., 1983), and was independent from measures of depression. In this study, the PSS demonstrated adequate internal consistency (α = .79).

Daily Affect.

Emotional experiences were assessed using a short-version of the Multidimensional Mood Questionnaire (MDMQ; Steyer, Schwenkmezger, Notz, & Eid, 1997; Wilhelm & Schoebi, 2007). The MDMQ consists of six bipolar items assessing three aspects of mood: valence (assessed with the item pairs "*content-discontent*" and "*well-unwell*"), calmness (assessed with the item pairs "*relaxed-tense*" and "*agitated-calm*"), and energetic arousal (assessed with the item pairs "*tired-awake*" and "*full of energy-without energy*"). Participants rated their emotions for each period (morning, afternoon, and evening), and these reports were then averaged to create an overall Valence, Calmness and Arousal score for each day. Daily diary research with adults supports the internal consistency (αs = .90 to .92 between individuals, αs = .70 to .77 within individuals), three-factor structure, and sensitivity to change of the MDMQ (Wilhelm & Schoebi, 2007). In this study, the MDMQ scales demonstrated acceptable internal consistency (αs = .82 to .86).

3.5. Data Analytic Plan

3.5.1. Aim 1: Describing the Social Context of NSSI.

To address Aim 1 (i.e., describing the social context of NSSI, participants' self-reported disclosure, functions, antecedents, and consequences of NSSI), I used simple descriptive statistics such as proportions and mean scores to assess the rates of endorsement of different aspects of NSSI. Where applicable, inferential tests were conducted using one-sample *t*-tests, Pearson Product Moment correlations, one-way comparisons of correlation coefficients (Meng, Rosenthal, & Rubin (1992), and gamma comparisons for ordinal data.

3.5.2. Aim 2: Describing the Temporal Association of Social Context and NSSI.

Preliminary Considerations.

Daily diary data have a multilevel structure (multiple observations nested within individuals). Prior to inferential analyses of these multilevel data, I used Mahalanobis' D_2 and visual inspection of Q-Q plots and individual slopes to identify extreme outliers to screen for multivariate outliers among the independent (i.e., perceived support, conflict, negative affect, stress) and continuously distributed dependent variable (i.e., NSSI urges). If less than 10% of the data constituted extreme univariate outliers (>2x the interquartile range from the upper quartile), I planned to replace the outliers with the last valid value. If >10% outliers were identified, or if non-normal distribution properties were not attributable to such outliers, I planned to use logarithmic (base 10) transformations (Tabachnick & Fidell, 2000).

To inferentially test my hypotheses, I used hierarchical linear models (HLM) and HLM 7.01 software (Bryk, Raudenbush, & Congdon, 2010) to examine temporal associations between NSSI and social context. A key advantage of this technique is that participants with missing data at Level 1 still contribute to parameter estimates at Level 2, minimizing bias in the parameter estimates and maximizing power. I used random effects models to allow between-person variability in both the intercepts and the slopes. Although three-level models were possible for NSSI urges (e.g., with periods nested within days nested within individuals), I did not have a priori hypotheses regarding day-level associations between social contextual variables and NSSI urges. Therefore, for simplicity, I used two-level models, with days nested within individuals, for all three outcomes of interest, and created daily average scores for variables that had been assessed more than once per day (i.e., perceived support, conflict, negative affect, stress, and NSSI urges). For all of the multilevel analyses, I present coefficient estimates with robust standard errors.

The primary dependent variables in this study differed in their distributions, necessitating different analytic approaches. NSSI urges were assessed using several Likert-type items, creating a continuous, normally distributed total score. Standard HLM can be used to analyze this type of continuously distributed outcome. NSSI thoughts

and acts, however, were assessed dichotomously (present/absent), and therefore require the use of Hierarchical Generalized Linear Models (HGLM). These HGLM analyses applied a Bernoulli distribution and a logit link function to derive multilevel logistic regressions, wherein the resulting coefficients can be interpreted as the log odds of the outcome. I used LaPlace EM estimation in the HGLM analyses, as this approach provides unbiased estimates even when the outcome is rare (Pinheiro & Bates, 1995), and present the results for the population-average model (as opposed to unit-specific model), as these results are less sensitive to misspecification and distributional assumptions, and are more appropriate for detecting the overall effect in total sample.

Centering variables prior to multilevel analyses can facilitate the interpretability of coefficients and reduce collinearity (Bolger & Laurenceau, 2013). The centering technique used depended on the variable's distribution and the interpretability of the resulting coefficient. To facilitate interpretability of the intercepts, time was modeled as 0 at the intercept (i.e., uncentered) with scores representing the number of days from baseline to completion of each diary entry (e.g., 1 = first day, 2 = second day, etc.). Dichotomous Level 1 predictors (e.g., daily conflict scores) were dummy-coded and were not centered to facilitate interpretability of the effects. Continuous Level 1 predictors (e.g., daily perceived support scores) were standardized (z-transformed) across time to facilitate comparability of the coefficients across models. Similarly, dichotomous Level 2 predictors (e.g., presence/absence of BPD) were dummy-coded and uncentered, whereas continuous Level 2 predictors (e.g., participant age) were grand-mean centered.

Covariates.

To identify relevant covariates for subsequent analyses, preliminary multilevel models examined the following potential Level 2 covariates: Female gender, participant age, number of current Axis-I disorders, number of lifetime Axis-I disorders, presence of BPD, and presence of a mood, anxiety or substance abuse disorder within the month before the study. If significant associations with the dependent variables were detected, the covariate was entered in subsequent analyses as a moderator of the intercept.

Primary Analyses.

Using the considerations above as a starting point, I used a series of increasingly complex models to examine the concurrent and prospective associations of perceived support and daily conflict with NSSI urges, thoughts, and actions. To test hypothesis 2a, Model 1 examined the simple association between overall perceived support at $Time_T$ and the NSSI outcome at $Time_T$, controlling for the Level 1 effect of time and any Level 2 covariates, as appropriate. For example:

Level 1 $$NSSIUrges_T = \pi_{0i} + \pi_{1i}(Time_T) + \pi_{2i}(Support_T) + e_{ti}$$

Level 2 $$\pi_{0i} = \beta_{00} + \beta_{01}(Covariate) + r_{0i}$$
$$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$$
$$\pi_{2i} = \beta_{20} + \beta_{21} + r_{2i}$$

To test hypothesis 2b (Models 2 through 4), I examined the association between perceived support and NSSI, using separate models for perceived support from partners, peers, and parents. To test hypothesis 2c (Model 5), I examined the association between conflict at $Time_T$ and NSSI outcomes at $Time_T$. To test hypothesis 2d (Model 6), I included the Level 1 effects of both support and conflict in the same model:

Level 1 $$NSSIUrges_T = \pi_{0i} + \pi_{1i}(Time_T) + \pi_{2i}(Support_T) + \pi_{3i}(Conflict_T) + e_{ti}$$

Level 2 $$\pi_{0i} = \beta_{00} + \beta_{01}(Covariate) + r_{0i}$$
$$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$$
$$\pi_{2i} = \beta_{20} + \beta_{21} + r_{2i}$$
$$\pi_{3i} = \beta_{30} + \beta_{31} + r_{3i}$$

To test hypothesis 2e (Model 7), I examined the association of support and NSSI at various levels of stress. Days were categorized as high-, moderate-, and low-stress by calculating each participant's mean level of perceived stress and the standard deviation of their scores. High-stress days were those that fell one standard deviation above the participant's mean level of stress. Low-stress days were those that fell one standard

deviation below the mean, and moderate-stress days were those that fell within one standard deviation of the mean. The interactive effect of support was calculated by multiplying the perceived support score with the three dummy coded stress variables. Thus, the HLM model included three Level 1 effects of social support (corresponding to low-, moderate-, and high-stress days). Similarly, conflict was examined at three levels of stress (Model 8) by multiplying the dummy coded stress variables with the conflict scores. For example:

Level 1 $\text{NSSIUrges}_{T} = \pi_{0i} + \pi_{1i}(\text{Time}_T) + \pi_{2i}(\text{LowStr*Support}_T) + \pi_{3i}(\text{MidStr*Support}_T) + \pi_{4i}(\text{HighStr*Support}_T) + e_{ti}$

Level 2 $\pi_{0i} = \beta_{00} + \beta_{01}(\text{Covariate}) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$

$\pi_{2i} = \beta_{20} + \beta_{21} + r_{2i}$

$\pi_{3i} = \beta_{30} + \beta_{31} + r_{3i}$

$\pi_{4i} = \beta_{40} + \beta_{41} + r_{4i}$

For prospective models (hypotheses 2f to 2j), I used time-lagged multilevel models predicting outcomes at Time_{T+1} from predictors assessed at prior time points (Time_T). Lagged analyses examined these associations across 13 lags (e.g., from T1 – T2, T2 – T3, T3 – T4, etc.). The time-lagged outcome (NSSI at T +1) was modelled as a function of lagged time (Time_{T+1}), the outcome variable at Time_T (to account for the autocorrelation between NSSI at Time_T and Time_{T+1}), and the predictor at Time_T, with any covariates included at Level 2. For example, to test hypothesis 2f, I used the following equation predicting NSSIUrges_{T+1} from the Support_T with participant age as a Level 2 covariate:

Level 1 $\text{NSSIUrges}_{T+1} = \pi_{0i} + \pi_{1i}(\text{Time}_{T+1}) + \pi_{2i}(\text{NSSI}_T) + \pi_{3i}(\text{Support}_T) + e_{ti}$

Level 2 $\pi_{0i} = \beta_{00} + \beta_{01}(\text{Age}) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$

$\pi_{2i} = \beta_{20} + \beta_{21} + r_{2i}$

$\pi_{3i} = \beta_{30} + \beta_{31} + r_{3i}$

The models for other prospective hypotheses followed the same iterative pattern as the contemporaneous models (Models 2 through 8, examining simple, additive, and stress moderated effects), taking into account the lagged nature of these analyses.

For exploratory analyses regarding the relationship between NSSI acts and subsequent (next-day) perceived support or conflict, NSSI at $Time_T$ was entered as a Level 1 predictor of support or conflict at $Time_{T+1}$, taking into account the effect of time and the autocorrelation between support at $Time_T$ and $Time_{T+1}$. For example:

Level 1 $$Support_{T+1} = \pi_{0i} + \pi_{1i}(Time_{T+1}) + \pi_{2i}(Support_T) + \pi_{3i}(NSSI_T) + e_{ti}$$

Level 2 $$\pi_{0i} = \beta_{00} + \beta_{01}(Age) + r_{0i}$$
$$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$$
$$\pi_{2i} = \beta_{20} + \beta_{21} + r_{2i}$$
$$\pi_{3i} = \beta_{30} + \beta_{31} + r_{3i}$$

3.5.3. Aim 3: Comparing Mediating versus Moderating Roles of Social Support.

Assessing mediation in multilevel data can be accomplished using a system of multilevel equations when each of the variables of interest is assessed at Level 1 (i.e., negative affect, support, and conflict, and NSSI urges were assessed at least once per day; see Krull & Mackinnon, 2001), is modeled as a random effect, and is person-centered (Zhang, Zyphur, & Preacher, 2009). Given that tests of mediation for dichotomous outcomes are less well understood, I limited these analyses to an examination of NSSI urges (assessed continuously), rather than NSSI thoughts or acts.

Similar to the equations used to assess mediation in ordinary regression, I tested hypothesis 3a by constructing three models: the first model assessed whether support or conflict (X_{ij}) was associated with NSSI (Y_{ij}), the second model assessed whether support or conflict (X_{ij}) was still uniquely and significant associated with NSSI (Y_{ij}) when negative affect ($M_{ij;}$; giving β_b) was also in the model, and the third model assessed whether negative affect (M_{ij}) was associated with support or conflict ($X_{ij;}$ giving β_a; see equations below).

Equation 1

Level 1 $NSSI_T = \pi_{0i} + \pi_{1i}(Support_T) + e_{ti}$

Level 2 $\pi_{0i} = \beta_{00} + \beta_{01} + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$

Equation 2

Level 1 $NSSI_T = \pi_{0i} + \pi_{1i}(Support_T) + \pi_{2i}(NegativeAffect_T) + e_{ti}$

Level 2 $\pi_{0i} = \beta_{00} + \beta_{01} + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$

$\pi_{2i} = \beta_{20} + \beta_{21} + r_{2i}$

Equation 3

Level 1 $NegativeAffect_T = \pi_{0i} + \pi_{1i}(Support_T) + e_{ti}$

Level 2 $\pi_{0i} = \beta_{00} + \beta_{01} + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$

As in single-level mediation equations, the meditational effect may be estimated by examining the magnitude and standard errors of $\beta_a\beta_b$ (Krull & MacKinnon, 2001). Bootstrapping procedures are not available for multilevel data, so a Sobel test was used to examine the significance of the indirect effect.

Testing moderation (hypothesis 3b) also proceeded in a manner analogous to ordinary regression analyses. Specifically, after person-centering each of the Level 1 predictors of interest (negative affect and perceived support), I manually computed an interaction term between these variables. I then entered the person-centered predictors and their interaction into a model predicting NSSI urges. Significant interaction effects were clarified using the simple slopes tool provided by Sibley (2008).

Level 1 $NSSI_T = \pi_{0i} + \pi_{1i}(Support_T) + \pi_{2i}(NegativeAffect_T) + \pi_{3i}(Support*Affect_T) + e_{ti}$

Level 2 $\pi_{0i} = \beta_{00} + \beta_{01} + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11} + r_{1i}$

$\pi_{2i} = \beta_{20} + \beta_{21} + r_{2i}$

$\pi_{3i} = \beta_{30} + \beta_{31} + r_{3i}$

Chapter 4. Results

4.1. Preliminary Results.

4.1.1. Diary Compliance.

Participants completed a total of 735 out of a possible 840 diary entries, with an average of 12.10 entries per person (*SD* = 3.39, range = 1 to 15). Diary compliance (number of entries completed) was not significantly related to participant age ($r(60) = .08$, $p = .56$), gender ($t(58) = -.84$, $p = .40$) or presence of an anxiety, substance abuse or mood disorder within the past month (anxiety (*n* = 33): $t(53.64) = 1.57$, $p = .12$; substance abuse (*n* = 4), $t(58) = 1.13$, $p = .26$; mood (*n* = 14), $t(15.97) = 1.52$, $p = .15$). Participants with BPD (*n* = 16) did not differ from those without BPD (*n* = 44) in terms of diary compliance ($t(19.78) = 1.11$, $p = .28$). Out of the 735 observations, 55 of the participants reported NSSI thoughts on 364 days, and 31 of the participants reported NSSI acts on 90 days. NSSI acts included self-cutting (*n* = 13), scratching (*n* = 31), hitting (*n* = 13), and "other" self-injury (*n* = 21, reported examples included sticking self with a needle, self-biting, re-opening wounds until blood was drawn).

4.2. Aim 1: Descriptive Analyses of the Social Context of NSSI

4.2.1. Disclosures of NSSI.

Consistent with hypothesis 1a, only three participants (5.0%) reported that no one knew about their lifetime history of NSSI (>60%: $t(59) = 2.27$, $p = .03$). More often, participants reported that they had told someone about their NSSI (*n* = 32, 53.3%) or that someone had found out about their NSSI (*n* = 19, 31.7%). Three participants

reported having engaged in NSSI in the presence of others (*n* = 3, 5.0%). NSSI was often known about by friends (*n* = 41, 68.3%), therapists or doctors (*n* = 36, 60.0%), family members (*n* = 35, 58.3%), and romantic partners (*n* = 32, 53.3%). Among participants for whom someone knew about their NSSI, an average of 11.04 people knew about participants' NSSI (*SD* = 10.63, range = 1 to 45).

Of the daily NSSI acts, 70% (*n* = 63; 95% CI = 60.95% to 79.05%) were not known to anyone. Consistent with hypothesis 1b, significantly fewer than 50% of daily NSSI acts were disclosed ($t(89) = 2.18$, $p = .03$). The 27 acts of NSSI that were known by others were reported by 10 of the participants. Of the 27 acts that were known, the NSSI had most often been discovered because someone was with the participant when he or she engaged in NSSI (51.9%, *n* = 14) or because the participant told someone (29.6%, *n* = 8). Consistent with hypothesis 1c, the person who knew about the NSSI was most often a romantic partner (92.6%, *n* = 25, McNemar's test $p < .001$), and less frequently a family member (3.7%, *n* = 1), friend (7.4%, *n* = 2) or other peer/acquaintance (3.7%, *n* = 1). In all cases where another person was present when the participant engaged in NSSI, that person was a romantic partner. NSSI thoughts most often occurred when participants were alone (66.8%, *n* = 243), but also occurred in the presence of romantic partners (17.3%, *n* = 63), family (13.5%, *n* = 49), friends (12.9%, *n* = 47), other peers or acquaintances (8.0%, *n* = 29) or supervisors (3.3%, *n* = 12).

4.2.2. Self-reported functions of NSSI.

As shown in Table 4.1, in the baseline assessment of NSSI functions, all participants endorsed intrapersonal functions of NSSI, whereas 87.7% endorsed interpersonal functions. The proportion of participants endorsing each type of function did not differ ($t(59) = .70$, $p = .49$); however, consistent with hypothesis 1d, intrapersonal functions of NSSI were more strongly endorsed than were interpersonal functions ($t(56) = -15.71$, $p < .001$). The most frequently and strongly endorsed intrapersonal function was affect regulation. The most frequently and strongly endorsed interpersonal function was self-care, followed by asserting interpersonal boundaries and demonstrating toughness.

Previous work suggests that interpersonal functions of NSSI may be stigmatized, and therefore less frequently endorsed than intrapersonal functions (Heath et al., 2009). I examined the correlations of intrapersonal and interpersonal functions of NSSI with socially desirable response patterns. Socially desirable responding was negatively associated with interpersonal functions of NSSI, although the correlation was small and non-significant (r = -.17, p = .21). Socially desirable responding was not associated with intrapersonal functions (r = .09, p = .49). Of the subscales, only Affect Regulation was significantly positively associated with social desirability (r = .35, p = .01), whereas three interpersonal subscales were significantly, negatively associated with social desirability (Sensation Seeking: r = -.27, p = .04; Peer Bonding: r = -.30, p = .02; Revenge: r = -.33, p = .01).

Table 4.1. Self-reported functions of NSSI.

	Min.	Max.	Mean	SD	% scoring > 0
Intrapersonal Functions	0.4	4.1	0.8	0.7	100.0
Interpersonal Functions	0	5.6	3.0	1.3	87.7
Affect regulation	1.0	6.0	4.9	1.4	100.0
Anti-dissociation	0	6.0	2.5	2.0	75.4
Anti-suicide	0	6.0	2.1	2.3	56.1
Marking distress	0	6.0	1.7	1.6	68.4
Self-punishment	0	6.0	3.9	2.1	93.0
Interpersonal boundaries	0	6.0	1.1	1.4	49.1
Self-care	0	6.0	1.5	1.5	63.2
Sensation-seeking	0	3.0	0.6	0.8	47.4
Peer-bonding	0	2.0	0.1	0.3	7.0
Interpersonal influence	0	5.0	0.7	1.2	35.1
Toughness	0	6.0	1.1	1.4	49.1
Revenge	0	6.0	0.6	1.2	26.3
Autonomy	0	5.0	0.8	1.3	36.8

In terms of functions of NSSI observed in the daily diaries, participants reported that NSSI most often served to get rid of thoughts and feelings (64.7%, n = 44), with fewer acts of NSSI serving to escape a task or other people (17.6%, n = 12), to feel something (13.2%, n = 9) or to communicate (4.4%, n = 3), consistent with hypothesis 1d. The three instances of NSSI that served to communicate with others were enacted

in the presence of a romantic partner. Due to the small number of NSSI acts that were reported to serve interpersonal functions, inferential examination of the associations with social desirability was not completed.

4.2.3. Self-reported precipitants of NSSI.

Intrapersonal (e.g., health problems, new demands, financial problems; 44.8%, *n* = 163) and interpersonal stressors (e.g., conflict or arguments, being alone or isolated; 39.8%, *n* = 145) were reported to precede NSSI thoughts with similar frequency (see Table 4.2), and roughly one in five NSSI thoughts were preceded by stressors of both types (21.4%, *n* = 78). Consistent with hypothesis 1e, NSSI acts were significantly more likely to occur on days when NSSI thoughts had been preceded by interpersonal stressors, compared to when they had been preceded exclusively by intrapersonal stressors ($\chi 2(1) = 4.54$, $p = .03$).

Table 4.2. Precipitants of NSSI thoughts.

	Total NSSI Thoughts (%)	NSSI Thought + NSSI Act (%)	NSSI Thought ≠ NSSI Act (%)
Conflict or argument	23.3	30.8	20.8
Tried to spend time with someone but couldn't	9.3	6.6	10.2
Someone was disappointed with you	15.6	20.9	13.9
Someone was angry with, criticized or put you down	14.2	17.6	13.1
Someone let you down or broke a promise	13.4	15.4	12.8
Someone rejected you	11.0	8.8	11.7
You lost someone (even temporarily)	4.7	5.5	4.4
You were more isolated or alone than you wanted	27.7	19.8	30.3
You had financial problems	11.8	9.9	12.4
You lost a job	0.3	0.0	0.4
You had health problems or physical discomfort	12.3	7.7	13.9
You had a new demand	15.3	14.3	15.7
You talked with someone about upsetting memories	15.6	14.3	16.1

4.2.4. Self-reported consequences of NSSI.

Inconsistent with hypothesis 1f, most participants reported that NSSI acts that occurred during the diary period had a neutral or no effect on their relationships (see Table 4.3), and a slightly positive or neutral effect on their emotions. This was true regardless of whether the act of NSSI was disclosed/discovered by others, or unknown to others (γs = -.16 to .07, *p*s > .50).

Table 4.3. Self-reported consequences of NSSI.

Relationship consequences…	All NSSI Acts (%)	Disclosed/ Discovered NSSI (%)	Unknown NSSI (%)
Much closer/more contact	2.5	3.8	1.9
Somewhat closer/somewhat more contact	2.5	7.7	0.0
No effect or neutral effect	86.1	76.9	90.6
Somewhat more distant or strained, somewhat less contact	6.3	7.7	4.7
Much more distant or strained, much less contact	2.5	3.8	1.6
Emotional consequences….			
I felt much better	7.4	3.8	9.1
I felt somewhat better	39.5	38.5	40.0
No effect or neutral effect	37.0	46.2	32.7
I felt somewhat worse	14.8	7.7	18.2
I felt much worse	1.2	3.8	0.0

4.3. Aim 2: Temporal Models of Social Context and NSSI

4.3.1. Preliminary Analyses.

Data Inspection.

Table 4.4 presents descriptive statistics for the main (non-dichotomous) daily diary variables prior to standardization.

Table 4.4. Descriptive statistics for primary study variables.

	N	Min	Max	Mean	SD	Skew	Kurtosis
NSSI Urges	732	.00	28.00	3.55	4.64	1.56	2.48
Problem-focused support	691	1.00	7.00	4.78	1.23	-.12	-.18
Relational Support	691	1.00	7.00	4.80	1.24	-.07	-.31
Emotional Support	691	1.00	7.00	4.74	1.18	.04	-.30
Parent Support	369	1.00	7.00	4.57	1.36	.08	-.38
Peer Support	487	1.42	7.00	4.74	1.15	.12	-.07
Partner Support	410	1.00	7.00	5.08	1.46	-.44	-.38
Overall Support	691	1.00	7.00	4.75	1.15	-.04	-.11
Hostile Interactions	732	.00	6.00	.56	1.03	2.57	7.33
Insensitive Interactions	731	.00	4.00	.55	.92	1.99	3.50
Interfering Interactions	731	.00	3.67	.23	.51	3.01	10.60
Ridiculing Interactions	731	.00	2.33	.06	.21	5.30	37.71
Overall Conflict	732	.00	16.00	1.39	2.18	2.40	7.21
Mood arousal	732	.00	12.00	5.00	2.46	.17	-.08
Mood valence	732	.00	12.00	6.21	2.34	.24	-.02
Mood calmness	732	.00	12.00	5.87	2.35	.13	-.18
Perceived Stress	732	.00	38.67	17.32	7.03	.04	-.03

Visual inspection of the Q-Q plots and the individual slopes for NSSI urges identified three univariate outliers. These values were replaced with the next valid value, which resulted in a more acceptable distribution (skew = 1.44, kurtosis = 1.69). Further, given that conflict-related variables were positively skewed and highly leptokurtic due to a preponderance of zeroes, these variables were rescored as dichotomous (0 = absent, 1 = present). Multivariate inspection of the IVs did not reveal any significant outliers (Mahalanobis' D_2s > 1.88, *p*s > .003).

Missing Data.

I used Little's Missing Completely at Random (MCAR) test (1988) to examine patterns of missing data among the complete set of independent and dependent variables. Results supported the assumption that the data were missing at random ($\chi^2(170) = 170.77$, $p = .48$). Simulation studies have demonstrated that under conditions where data is missing at random (MAR) or missing completely at random (MCAR),

statistical techniques based on maximum likelihood estimation such as HLM produce unbiased parameter estimates (Black, Harel, & Matthews, 2011).

One area deserving close attention was the analysis of missing data for sources of social support, given that participants were only required to rate support if they had had contact with that source of support. Analyses revealed that 17.14% of the diary entries reported support from all three sources of support. Common patterns of missingness were parent and peer reports provided, but partner report missing (16.24%), peer and partner reports provided, but parent report missing (14.71%), and peer report provided, but parent and partner reports missing (14.19%). Little's MCAR test revealed non-random patterns of missingness among these variables ($\chi^2(9) = 50.68$, $p < .001$); therefore, the association between NSSI DVs and each source of support was analyzed separately, and generalization of these findings was limited to the sample under inspection (e.g., self-injuring participants who have contact with a partner).

Correlations among independent variables.

The three domains of support (problem-focused, emotional, and relational) were strongly correlated (average ICC = .85, *SD* = .20). Similarly, the four domains of conflict (hostile, insensitive, interfering, ridiculing) were strongly correlated (average ICC = .64, *SD* = .20). Given these strong associations, analyses were conducted using total scores for perceived support and conflict to prevent problems with multicollinearity in the hierarchical models.

Decomposition of Variance at Level 1 and Level 2.

To investigate the relative contribution of between-person versus within-person variance in the continuously distributed study variables, the unconditional means models were used to decompose the variance (Singer, 1998) and Intraclass Correlations Coefficients (ICCs) were calculated. ICCs reflect a ratio of the variance that occurs between individuals, relative to the total variance. ICCs close to .50 (as is the case for most of the variables in this study, see Table 4.5) indicate that within-person processes account for roughly half of the total variance. Variance components associated with the intercept (r_0) were significantly different from zero, which supports the use of hierarchical models to account for within- and between-person variance.

Table 4.5. Intraclass correlation coefficients for continuously distributed study variables.

	ICC
NSSI Urges	0.41
Parent Support	0.60
Peer Support	0.39
Partner Support	0.51
Total Support	0.52
Mood arousal	0.44
Mood valence	0.42
Mood calmness	0.44
Perceived Stress	0.56

Identification of Covariates.

I examined whether gender, age, presence of a current anxiety, mood or substance use disorder, presence of BPD, number of current Axis-I disorders or number of lifetime Axis-I disorders were associated with any of the outcomes of interest. Female gender (γ = .42, p = .03) and presence of BPD (γ = .52, p = .01) were significantly associated with NSSI urges. When these covariates were entered simultaneously, only BPD remained significantly associated with the dependent variable (γ = .48, p = .02), thus BPD was retained as a covariate. Female gender (OR = 3.06, 95% CI = 1.37 to 6.85; p = .004) was associated with a greater likelihood of reporting NSSI thoughts and was retained as a covariate. Finally, presence of a current substance use disorder was associated with a significantly lower likelihood of engaging in NSSI (OR = .27, 95% CI = .14 to .52; p < .001), and was used as a covariate in analyses predicting NSSI acts.

In terms of social outcomes, the presence of a current mood disorder (γ = -.70, p < .001) was significantly related to perceived daily support, and was used as a covariate in lagged analyses predicting next-day support. Female gender was associated with greater likelihood of reporting interpersonal conflict (OR = 2.73, 95% CI = 1.60 to 4.64; p < .001), and was used as a covariate in lagged analyses predicting next-day conflict.

4.3.2. Primary Analyses of the Association between NSSI and Social Context

Contemporaneous Models for NSSI Urges, Thoughts, and Acts.

Consistent with hypothesis 2a, overall perceived support was negatively associated with all three NSSI outcomes, including same-day NSSI urges (Model 1, Table 4.6; $p < .001$), likelihood of NSSI thoughts (Model 1, Table 4.7; $p < .001$) and likelihood of NSSI acts (Model 1, Table 4.8; $p = .006$). Consistent with hypothesis 2b, among participants in romantic relationships, perceived support from romantic partners was negatively related to NSSI urges (Model 2, Table 4.6; $p < .001$), thoughts (Model 2, Table 4.7; $p < .001$), and acts (Model 2, Table 4.8; $p < .001$). Also consistent hypothesis 2b, perceived support from peers was negatively related to NSSI urges (Model 3, Table 4.6; $p = .01$) and there was a non-significant trend for peer support to be related to lower likelihood of engaging in NSSI (Model 3, Table 4.8; $p = .06$). Inconsistent with this hypothesis, however, peer support was not related to likelihood of NSSI thoughts (Model 3, Table 4.7; $p = .22$). Partially consistent with hypothesis 2b, perceived support from parents was not related to likelihood of NSSI thoughts (Model 4, Table 4.7; $p = .26$) or acts (Model 4, Table 4.8; $p = .99$). Parent support was negatively related to NSSI urges (Model 4, Table 4.6; $p = .02$).

With respect to contemporaneous relationships between NSSI and conflict, consistent with hypothesis 2c, conflict was positively associated with all three outcomes, including same-day NSSI urges (Model 5, Table 4.6; $p < .001$), thoughts (Model 5, Table 4.7; $p = .001$), and acts (Model 5, Table 4.8; $p = .03$). Consistent with hypothesis 2d, analyses supported an additive effect for NSSI thoughts, with perceived support (Model 6, Table 4.7; $p < .001$) and conflict (Model 6, Table 4.7; $p < .04$) each uniquely contributing to the model. Inconsistent with hypothesis 2d, however, when perceived support and conflict were entered in the same model predicting NSSI acts, neither predictor was significantly associated with the outcome (Model 6, Table 4.8; ps $> .10$). There was a non-significant trend for an additive effect of support and conflict in accounting for NSSI urges (Model 6, Table 4.6; perceived support $p < .001$, conflict $p = .056$).

Perceived support was negatively related to NSSI urges and NSSI thoughts at all three levels of stress (Model 7, Tables 4.6 and 4.7; *p*s < .01). Consistent with hypothesis 2e, however, the magnitude of the association between support and NSSI urges was significantly greater on high-stress days, compared to moderate-stress days ($\chi^2(1) = 5.35$, $p = .02$). For NSSI thoughts, however, the magnitudes of the associations did not differ by level of stress, inconsistent with hypothesis 2e. Perceived support was associated with a lower likelihood of NSSI acts at low (Model 7, Table 4.8; $p < .001$) and high stress (Model 7, Table 4.8; $p = .01$). There was a non-significant trend for a stronger relationship between support and NSSI acts on high-stress compared to moderate-stress days ($\chi^2(1) = 3.55$, $p = .056$). Unexpectedly, the magnitude of the association between support and NSSI acts was greater on low-stress compared to moderate-stress days ($\chi^2(1) = 15.16$, $p < .001$).

Conflict was positively related to likelihood of thinking about and engaging in NSSI at all three levels of stress (Model 8, Tables 4.7 and 4.8; *p*s < .01), but was positively associated with NSSI urges only at low (Model 8, Table 4.6; $p < .001$) and moderate stress (Model 8, Table 4.6; $p < .001$). Across NSSI outcomes, the magnitude of the association between conflict and NSSI was significantly greater on low-stress days compared to high-stress days (NSSI urges: $\chi^2(1) = 3.97$, $p = .04$; NSSI thoughts: $\chi^2(1) = 7.38$, $p = .007$; NSSI acts: $\chi^2(1) = 7.10$, $p = .007$). For NSSI thoughts and acts, the association between conflict and NSSI was also stronger on low-stress compared to moderate-stress days (NSSI thoughts: $\chi^2(1) = 6.04$, $p = .01$; NSSI acts: $\chi^2(1) = 11.34$, $p = .001$).

Table 4.6. Contemporaneous models of NSSI urges at $Time_T$.

NSSI Urges	γ Estimate	SE	*t* (df)	*p*
Model 1: Overall Support				
Intercept	-.12	.09	-1.29 (58)	.20
$Time_T$	<-.01	.01	-0.15 (59)	.88
$Support_T$	-.26	.05	-5.03 (59)	<.001
Models 2 to 4: Sources of Support				
Intercepts (Models 2 to 4)	-.24 to -.13	.09 to .11	-2.49 to -1.28 (41 to 55)	.02 to .21
$Time(s)_T$ (Models 2 to 4)	<-.01	.01	-.25 to .76 (42 to 56)	.45 to .80
$Partner_T$	-.27	.07	-4.03 (42)	<.001
$Peer_T$	-.14	.06	-2.58 (56)	.01
$Parent_T$	-.16	.06	-2.46 (56)	.02
Model 5: Conflict				
$Intercept_T$	-.30	.09	-3.32 (58)	.002
$Time_T$	<.01	.01	0.53 (59)	.60
$Conflict_T$	.27	.07	4.04 (59)	<.001
Model 6: Additive Effects of Support and Conflict				
Intercept	-.20	.09	-2.19 (58)	.03
$Time_T$	<.01	.01	0.03 (59)	.98
$Support_T$	-.25	.05	-4.69 (59)	<.001
$Conflict_T$	.11	.06	1.95 (59)	.056
Model 7: The Effect of Support by Level of Stress				
Intercept	-.16	.09	-1.73 (58)	.09
$Time_T$	<-.01	.01	-0.18 (59)	.86
Support at Low $Stress_T$	-.25	.07	-3.63 (59)	<.001
Support at Mid $Stress_T$	-.23	.06	-3.57 (59)	<.001
Support at High $Stress_T$	-.46	.10	-4.72 (59)	<.001
Model 8: The Effect of Conflict by Level of Stress				
Intercept	-.15	.08	-1.87 (58)	.07
$Time_T$	<.01	.01	0.83 (59)	.41
Conflict at Low $Stress_T$	.51	.10	4.94 (59)	<.001
Conflict at Mid $Stress_T$	.31	.06	5.12 (59)	<.001
Conflict at High $Stress_T$	.09	.16	0.57 (59)	.57

Table 4.7. Contemporaneous models for NSSI thoughts at $Time_T$.

NSSI Thoughts	γ Estimate	SE	OR	95% CI of OR	*t* (df)	*p*
Model 1: Overall Support						
Intercept	-.75	.41	.47	.21 to 1.09	-1.80 (58)	.08
$Time_T$	-.03	.02	.97	.93 to 1.01	-1.72 (59)	.09
$Support_T$	-.54	.11	.58	.47 to .73	-4.92 (59)	<.001
Model 2 to 4: Sources of Support						
Intercepts	-1.33 to -.35	.41 to .45	.29 to .70	.12 to 1.72	-3.27 to -.79 (55)	.002 to .43
$Time(s)_T$	-.02 to -.04	.02 to .03	.96 to .98	.91 to 1.03	-1.53 to -0.97 (56)	.13 to .40
$Partner_T$	-.59	.16	.56	.40 to .77	-3.68 (42)	<.001
$Peer_T$	-.15	.12	.86	.67 to 1.10	-1.22 (56)	.22
$Parent_T$	-.17	.15	.85	.63 to 1.14	-1.14 (56)	.26
Model 5: Conflict						
$Intercept_T$	-1.12	.39	.33	.15 to .72	-2.84 (58)	.006
$Time_T$	-.02	.02	.98	.94 to 1.02	-1.22 (59)	.23
$Conflict_T$	.65	.19	1.91	1.30 to 2.82	3.35 (59)	.001
Model 6: Additive Effects of Support and Conflict						
Intercept	-1.01	.40	.36	.17 to .80	-2.58 (58)	.01
$Time_T$	-.03	.02	.97	.93 to 1.01	-1.60 (59)	.12
$Support_T$	-.43	.10	.65	.53 to .80	-4.17 (59)	<.001
$Conflict_T$	.41	.19	1.50	1.02 to 2.20	2.12 (59)	.04
Model 7: The Effect of Support by Level of Stress						
Intercept	-.71	.34	.49	.25 to .98	-2.06 (58)	.04
$Time_T$	-.03	.02	.97	.93 to 1.01	-1.72 (59)	.09
Support at Low $Stress_T$	-.49	.18	.62	.43 to .88	-2.74 (59)	.008
Support at Mid $Stress_T$	-.46	.12	.63	.50 to .81	-3.80 (59)	<.001
Support at High $Stress_T$	-.58	.17	.56	.40 to .80	-3.33 (59)	.002
Model 8: The Effect of Conflict by Level of Stress						
Intercept	-.67	.36	.51	.25 to 1.06	-1.84 (58)	.07
$Time_T$	-.02	.02	.98	.94 to 1.01	-1.36 (59)	.18
Conflict at Low $Stress_T$	1.46	.30	4.29	2.34 to 7.86	4.81 (59)	<.001
Conflict at Mid $Stress_T$	.68	.11	1.97	1.57 to 2.46	6.05 (59)	<.001
Conflict at High $Stress_T$	.46	.16	1.59	1.16 to 2.17	2.96 (59)	.004

Table 4.8. Contemporaneous models for NSSI acts at $Time_T$.

NSSI Acts	γ Estimate	SE	OR	95% CI of OR	*t (df)*	*p*
Model 1: Overall Support						
Intercept	-1.52	.16	.22	.16 to .30	-9.47 (59)	<.001
$Time_T$	-.04	.02	.96	.93 to .99	-2.38 (59)	.02
$Support_T$	-.21	.07	.81	.71 to .94	-2.88 (59)	.006
Model 2 to 4: Sources of Support						
Intercepts	-1.78 to -1.42	.19 to .23	.17 to .24	.11 to .38	-8.73 to -6.22 (56)	<.001
$Time(s)_T$	-.04 to -.03	.02 to .03	.96 to .97	.91 to 1.01	-1.69 to -1.57 (56)	.10 to .12
$Partner_T$	-.44	.10	.64	.53 to .78	-4.66 (42)	<.001
$Peer_T$	.22	.11	1.24	.99 to 1.56	1.94 (56)	.06
$Parent_T$	<-.01	.13	.99	.77 to 1.29	-0.01 (56)	.99
Model 5: Conflict						
Intercept	-1.70	.18	.18	.13 to .26	-9.47 (59)	<.001
$Time_T$	-.04	.02	.96	.93 to .99	-2.40 (59)	.02
$Conflict_T$	.29	.13	1.33	1.03 to 1.72	2.22 (59)	.03
Model 6: Additive Effects of Support and Conflict						
Intercept	-1.60	.19	.20	.14 to .30	-8.33 (59)	<.001
$Time_T$	-.04	.02	.96	.93 to .99	-2.51 (59)	.02
$Support_T$	-.10	.08	.90	.78 to 1.05	-1.37 (59)	.18
$Conflict_T$	.18	.13	1.20	.92 to 1.57	1.39 (59)	.17
Model 7: The Effect of Support by Level of Stress						
Intercept	-1.49	.15	.23	.17 to .30	-10.02 (59)	<.001
Support at Low $Stress_T$	-.50	.09	.61	.51 to .72	-5.77 (59)	<.001
Support at Mid $Stress_T$	-.08	.07	.92	.80 to 1.06	-1.13 (59)	.26
Support at High $Stress_T$	-.39	.16	.67	.49 to .92	-2.53 (59)	.01
Model 8: The Effect of Conflict by Level of Stress						
Intercept	-1.54	.15	.22	.16 to 29	-10.36 (59)	<.001
$Time_T$	-.02	.01	.98	.95 to 1.01	-1.67 (59)	.10
Conflict at Low $Stress_T$	1.37	.34	3.94	2.00 to 7.77	4.04 (59)	<.001
Conflict at Mid $Stress_T$	.29	.06	1.34	1.18 to 1.52	4.56 (59)	<.001
Conflict at High $Stress_T$	.41	.14	1.51	1.13 to 2.01	2.85 (59)	.006

Note that covariates were excluded from these analyses due to problems in the fixed portion of the model, possibly due to collinearity or multicollinearity among predictors. Further, Models 2 to 4 and 7 to 9 for NSSI acts are presented with REML estimation, as Laplace estimation did not converge within the parameter space.

Prospective Models for NSSI Urges, Thoughts and Acts.

Perceived support was positively associated with NSSI urges (Model 1, Table 4.9; p = .02) on subsequent days, but inconsistent with hypothesis 2f, was not associated with likelihood of having NSSI thoughts (Model 1, Table 4.10; p = .88) or engaging in NSSI (Model 1, Table 4.11; p = .16) on the following day. Inconsistent with hypothesis 2g, among participants in romantic relationships, perceived support from partners was not associated with subsequent NSSI urges, thoughts, or acts (Model 2, Tables 4.9 to 4.11; ps ≥ .10). Inconsistent with hypothesis 2h, conflict was not associated with NSSI urges, thoughts or acts on the following day (Model 5, Tables 4.9 to 4.11; ps > .10). Inconsistent with hypothesis 2i, additive effects of perceived support and conflict were not supported in explaining subsequent NSSI outcomes (Model 6, Tables 4.9 to 4.11; ps > .10). Finally, with respect to the impact of stress on these relationships, inconsistent with hypothesis 2j, perceived support was not prospectively associated with NSSI urges or thoughts, regardless of level of stress (Model 7, Tables 4.9 and 4.10; ps > .10). Partially consistent with hypothesis 2j, however, greater perceived support on low-stress days was associated with a lower likelihood of engaging in NSSI on the following day (Model 7, Table 4.11; p = .003). Conflict was not associated with any NSSI outcome on the following day, regardless of level of stress (Model 8, Tables 4.9 to 4.11; ps > .10).

Table 4.9. Prospective models for NSSI urges at $Time_{T+1}$.

NSSI Urges	γ Estimate	SE	*t* (df)	*p*
Model 1: Overall Support				
Intercept	-.17	.08	-2.19 (57)	.03
$Time_{T+1}$	.01	.01	1.00 (58)	.32
$NSSI_T$	.32	.06	5.26 (58)	<.001
$Support_T$	.12	.05	2.32 (58)	.02
Models 2 to 4: Sources of Support				
Intercepts	-.06 to -.24	.08 to .11	-.55 to -2.94 (40 to 55)	.005 to .58
$Time(s)_{T+1}$	<-.01 to .01	.01	-0.14 to 0.64 (40 to 56)	.26 to .89
$NSSI(s)_T$	.37 to .41	.06 to .08	4.71 to 6.14 (40 to 56)	<.001
$Partner_T$	.06	.04	1.61 (41)	.12
$Peer_T$	-.02	.06	-0.36 (56)	.72
$Parent_T$	-.01	.06	-0.18 (52)	.86
Model 5: Conflict				
Intercept	-.23	.10	-2.34 (57)	.02
$Time_{T+1}$	<.01	.01	0.94 (58)	.35
$NSSI_T$	.30	.06	4.75 (58)	<.001
$Conflict_T$	.10	.08	1.26 (58)	.21
Model 6: Additive Model				
Intercept	-.23	.10	-2.27 (57)	.03
$Time_{T+1}$	<.01	.01	0.88 (58)	.38
$NSSI_T$	.28	.06	4.74 (58)	<.001
$Support_T$	.02	.05	0.35 (58)	.73
$Conflict_T$	.09	.08	1.10 (58)	.28
Model 7: The Effect of Support by Level of Stress				
Intercept	-.15	.08	-1.91 (57)	.06
$Time_{T+1}$	<.01	<.01	0.89 (58)	.38
$NSSI_T$	.30	.06	5.26 (58)	<.001
Support at Low $Stress_T$	-.11	.08	-1.26 (58)	.21
Support at Mid $Stress_T$	<.01	.05	0.05 (58)	.96
Support at High $Stress_T$	.05	.08	0.65 (58)	.52
Model 8: The Effect of Conflict by Level of Stress				
Intercept	-.15	.08	-1.81 (57)	.08
$Time_{T+1}$	.007	.008	0.88 (58)	.38
$NSSI_T$	.28	.06	4.56 (58)	<.001
Conflict at Low $Stress_T$	.05	.14	0.31 (58)	.76
Conflict at Mid $Stress_T$	.06	.05	1.23 (58)	.22
Conflict at High $Stress_T$	.03	.07	0.40 (58)	.69

Table 4.10. Prospective models for NSSI thoughts at $Time_{T+1}$.

NSSI Thoughts	γ Estimate	SE	OR	95% CI of OR	*t* (df)	*p*
Model 1: Overall Support						
Intercept	-1.17	.38	.31	.15 to .66	-3.11 (57)	.003
$Time_{T+1}$	-.02	.02	.98	.94 to 1.02	-1.06 (58)	.29
$NSSI_T$	.71	.16	2.03	1.47 to 2.81	4.36 (58)	<.001
$Support_T$	.01	.10	1.01	.84 to 1.23	0.15 (58)	.88
Models 2 to 4: Sources of Support						
Intercepts	-1.14 to -1.80	.43 to .50	.17 to .32	.07 to .80	-2.51 to -4.22 (40 to 53)	<.01 to .02
$Time(s)_{T+1}$	<-.01 to .02	.02 to .03	.98 to 1.02	.93 to 1.07	-0.92 to 0.77 (41 to 54)	.36 to .85
$NSSI(s)_T$	.63 to 1.22	.18 to .26	1.19 to 3.38	1.31 to 5.69	3.50 to 4.71 (41 to 54)	<.001
$Partner_T$	.09	.11	1.09	.89 to 1.36	0.82 (41)	.42
$Peer_T$	-.03	.10	.97	.79 to 1.19	-0.03 (56)	.77
$Parent_T$	-.08	.12	.92	.72 to 1.05	-0.19 (54)	.85
Model 5: Conflict						
Intercept	-1.17	.34	.31	.16 to .62	-3.40 (57)	.001
$Time_{T+1}$	-.02	.02	.98	.94 to 1.02	-0.89 (58)	.38
$NSSI_T$	.61	.15	1.85	1.36 to 2.51	3.98 (58)	<.001
$Conflict_T$	<-.01	.15	.99	.74 to 1.33	-0.05 (58)	.96

NSSI Thoughts	γ Estimate	SE	OR	95% CI of OR	*t* (df)	*p*
Model 6: Additive Model						
Intercept	-1.13	.36	.32	.16 to .66	3.16 (57)	.003
Time $_{T+1}$	-.02	.02	.98	.94 to 1.02	-0.94 (58)	.35
$NSSI_T$	.70	.16	2.01	1.46 to 2.78	4.33 (58)	<.001
$Support_T$	.02	.10	1.02	.83 to 1.24	0.17 (58)	.86
$Conflict_T$	-.03	.16	.98	.71 to 1.35	-0.16 (58)	.88
Model 7: The Effect of Support by Level of Stress						
Intercept	-1.20	.35	.30	.15 to .61	-3.44 (57)	.001
Time $_{T+1}$	-.02	.02	.98	.95 to 1.02	-0.80 (58)	.43
$NSSI_T$	.67	.16	1.95	1.42 to 2.68	4.22 (58)	<.001
Support at Low $Stress_T$	.13	.20	1.14	.77 to 1.69	0.66 (58)	.51
Support at Mid $Stress_T$	.05	.11	1.05	.85 to 1.30	0.43 (58)	.67
Support at High $Stress_T$	-.13	.17	.88	.63 to 1.22	-0.78 (58)	.44
Model 8: The Effect of Conflict by Level of Stress						
Intercept	-1.17	.33	.31	.16 to .60	-3.59 (57)	<.001
Time $_{T+1}$	-.01	.02	.99	.95 to 1.03	-0.55 (58)	.58
$NSSI_T$	.67	.16	1.95	1.42 to 2.66	4.26 (58)	<.001
Conflict at Low $Stress_T$	-.42	.28	.65	.38 to 1.14	-1.52 (58)	.13
Conflict at Mid $Stress_T$	.11	.09	1.12	.94 to 1.33	1.29 (58)	.20
Conflict at High $Stress_T$	.05	.13	1.05	.82 to 1.36	0.40 (58)	.69

Model 5 (parent support) predicting prospective NSSI thoughts are presented with REML estimation, as Laplace estimation did not converge within the parameter space.

Table 4.11. Prospective models for NSSI acts at $Time_{T+1}$.

NSSI Acts	γ Estimate	SE	OR	95% CI of OR	*t* (df)	*p*
Model 1: Overall Support						
Intercept	-1.71	.16	.18	.13 to .25	-10.96 (57)	<.001
$Time_{T+1}$	-.03	.02	.97	.94 to .99	-2.15 (58)	.04
$NSSI_T$	.29	.25	1.33	.82 to 2.18	1.18 (58)	.25
$Support_T$	.11	.08	1.12	.96 to 1.32	1.44 (58)	.16
Models 2 to 4: Sources of Support						
Intercepts	-1.88 to -2.19	.19 to .22	.10 to .15	.07 to .23	-9.37 to -10.29 (41 to 55)	<.001
$Time(s)_{T+1}$	<-.01 to -.02	.02 to .03	.97 to .99	.93 to 1.05	-.20 to -1.50 (41 to 56)	.22 to .85
$NSSI(s)_T$	.64 to .94	.30 to .34	1.90 to 2.74	1.04 to 5.06	2.14 to 2.76 (41 to 56)	<.05
$Partner_T$	.18	.11	1.20	.96 to 1.50	1.68 (41)	.10
$Peer_T$	-.10	.08	.91	.78 to 1.08	-1.13 (56)	.26
$Parent_T$	.08	.14	1.09	.82 to 1.45	0.59 (54)	.56
Model 5: Conflict						
Intercept	-1.83	.17	.16	.12 to .23	-10.87 (57)	<.001
$Time_{T+1}$	-.02	.02	.98	.94 to 1.01	-1.51 (58)	.14
$NSSI_T$	.20	.23	1.22	.77 to 1.95	0.86 (58)	.39
$Conflict_T$	.04	.15	1.04	.77 to 1.95	0.26 (58)	.79
Model 6: Additive Model						
Intercept	-2.08	.20	.12	.08 to .18	-10.62 (57)	<.001
$Time_{T+1}$	-.03	.02	.97	.94 to 1.01	-1.55 (58)	.13
$NSSI_T$	.84	.27	2.33	1.35 to 4.01	3.12 (58)	.003
$Support_T$	.14	.10	1.15	.95 to 1.40	1.43 (58)	.16
$Conflict_T$	.26	.19	1.30	.89 to 1.90	1.37 (58)	.18

NSSI Acts	γ Estimate	SE	OR	95% CI of OR	*t* (df)	*p*
Model 7: The Effect of Support by Level of Stress						
Intercept	-1.76	.15	.17	.13 to .23	-12.00 (57)	<.001
Time $_{T+1}$	-.02	.01	.98	.95 to 1.01	-1.64 (58)	.11
$NSSI_T$	.57	.25	1.76	1.08 to 2.89	2.30 (58)	.03
Support at Low $Stress_T$	-.40	.13	.67	.52 to .87	-3.09 (58)	.003
Support at Mid $Stress_T$	.14	.10	1.15	.94 to 1.40	1.40 (58)	.17
Support at High $Stress_T$	.13	.15	1.14	.84 to 1.56	0.85 (58)	.40
Model 8: The Effect of Conflict by Level of Stress						
Intercept	-1.69	.14	.18	.14 to .25	-12.01 (57)	<.001
Time $_{T+1}$	-.03	.02	.97	.94 to 1.00	-1.88 (58)	.07
$NSSI_T$	.44	.25	1.56	.95 to 2.56	1.79 (58)	.08
Conflict at Low $Stress_T$	.27	.23	1.31	.83 to 2.08	1.17 (58)	.25
Conflict at Mid $Stress_T$	.06	.08	1.06	.90 to 1.24	0.71 (58)	.48
Conflict at High $Stress_T$	.01	.13	1.01	.78 to 1.30	0.05 (58)	.96

Models 4 (parent support) and 7 to 9 predicting prospective NSSI acts are presented with REML estimation, as Laplace estimation did not converge within the parameter space. Level 2 covariates had to be excluded from the Model 4 (parent support) due to a problem in the fixed portion of the model, possibly related to collinearity among predictors.

Perceived Support and Conflict Subsequent to NSSI Acts.

Exploratory analyses revealed that, when all acts of NSSI were considered (regardless of whether they had been disclosed or discovered), NSSI acts were associated with greater perceived support on the following day (Table 4.12, p = .006). Analyses were then divided to examine only those acts of NSSI that were disclosed or discovered versus those that were unknown to others. There was a significant increase in perceived support on days following acts of NSSI that were disclosed or discovered (Table 4.12, p = .001), but not following acts that were unknown by others (Table 4.12, p = .14). NSSI acts were not associated with conflict on the following day, regardless of whether NSSI was disclosed or discovered, or unknown to others (Table 4.13, ps ≥ .10).

Table 4.12. Perceived support at $Time_{T+1}$ subsequent to NSSI acts at $Time_T$.

All NSSI Acts	**γ Estimate**	**SE**	***t* (df)**	***p***
Intercept	.05	.06	0.70 (57)	.49
$Time_{T+1}$	<-.01	.01	-0.63 (58)	.53
$Support_T$	.57	.06	9.74 (58)	<.001
$NSSI_T$	.25	.09	2.82 (58)	.006
NSSI = Disclosed/Discovered	**γ Estimate**	**SE**	***t* (df)**	***p***
Intercept	.07	.06	1.21 (57)	.23
$Time_{T+1}$	<-.01	.01	-0.86 (58)	.40
$Support_T$	.56	.06	9.50 (58)	<.001
$NSSI_T$	.48	.14	3.53 (58)	.001
NSSI = Unknown	**γ Estimate**	**SE**	***t* (df)**	***p***
Intercept	.07	.06	1.18 (57)	.24
$Time_{T+1}$	<-.01	.01	-0.76 (58)	.45
$Support_T$	.57	.06	9.53 (58)	<.001
$NSSI_T$	.15	.10	1.50 (58)	.14

Table 4.13. Conflict at $Time_{T+1}$ subsequent to NSSI acts at $Time_T$.

All NSSI Acts	γ Estimate	SE	OR	95% CI of OR	*t* (df)	*p*
Intercept	-1.07	.28	.34	.20 to .61	-3.79 (57)	<.001
$Time_{T+1}$	-.04	.02	.96	.93 to .99	-2.10 (58)	.04
$Conflict_T$	.40	.14	1.50	1.12 to 2.00	2.80 (58)	.007
$NSSI_T$	.25	.16	1.30	.95 to 1.77	1.66 (58)	.10
NSSI = Disclosed/Discovered	**γ Estimate**	**SE**	**OR**	**95% CI of OR**	***t* (df)**	***p***
Intercept	-.96	.29	.38	.21 to .68	-3.32 (57)	.002
$Time_{T+1}$	-.04	.02	.96	.92 to .99	-2.36 (58)	.02
$Conflict_T$	.35	.14	1.42	1.08 to 1.87	2.53 (58)	.01
$NSSI_T$	.12	.32	1.13	.60 to 2.15	0.39 (58)	.70
NSSI = Unknown	**γ Estimate**	**SE**	**OR**	**95% CI of OR**	***t* (df)**	***p***
Intercept	-.97	.30	.38	.21 to .70	-3.20 (57)	.002
$Time_{T+1}$	-.04	.02	.96	.93 to .99	-2.14 (58)	.04
$Conflict_T$	.38	.14	1.46	1.11 to 1.94	2.71 (58)	.01
$NSSI_T$	.10	.19	1.10	.75 to 1.61	0.51 (58)	.61

4.4. Aim 3: Mediation and Moderation Analyses

4.4.1. Mediation Analyses.

Consistent with hypothesis 3a, negative affect partially mediated the contemporaneous association between support and NSSI urges (Table 4.14, Sobel test statistic = -5.04, SE = .02, $p < .001$). There was a main effect of support in predicting NSSI urges even when negative affect was added to the model, indicating that the association between support and negative affect does not entirely account for the association between perceived support and NSSI urges. Overall, these results suggest that perceived support and negative affect incrementally and independently account for variance in same-day NSSI urges.

Table 4.14. Negative affect as a mediator of social context and NSSI urges.

Equation 1: Support Predicts NSSI Urges				
	γ Estimate	**SE**	***t* (df)**	***p***
Intercept	-.01	.09	-0.11 (59)	.91
Support	-.26	.06	-4.33 (59)	<.001
Equation 2: Support and Negative Affect Predict NSSI Urges				
Intercept	-.01	.09	-0.11 (58)	.91
Support	-.14	.06	-2.46 (58)	.02
Negative Affect	.26	.04	6.54 (58)	<.001
Equation 3: Support Predicts Negative Affect				
Intercept	-.02	.01	-1.91 (58)	.06
Support	-.48	.06	-7.46 (58)	<.001

4.4.2. Moderation Analyses.

Consistent with hypothesis 3b, perceived support moderated the contemporaneous association of negative affect and NSSI urges such that the association of negative affect and NSSI urges was stronger at low levels of social support (slope = .32, SE = .05, $t = 6.37$, $p < .001$), compared to at high levels of support (slope = .19, SE = .04, $t = 4.48$, $p < .001$; see Figure 1). Inconsistent with expectations, support did not moderate the association of negative affect and NSSI thoughts or acts.

Table 4.15. Perceived support as a moderator of negative affect and NSSI urges.

	Estimate	**SE**	***t* (df)**	***p***
Intercept	-.12	.10	-1.15 (57)	.25
Time	<.01	.01	.03 (58)	.98
Negative Affect	.26	.04	6.57 (58)	<.001
Support	-.13	.05	-2.52 (58)	.01
Negative Affect * Support	-.07	.03	-2.54 (58)	.01

Table 4.16. Perceived support as a moderator of negative affect and NSSI thoughts.

	γ Estimate	SE	OR	95% CI of OR	*t* (df)	*p*
Intercept	-.93	.37	.40	.19 to .83	-2.52 (57)	.02
Time	-.03	.02	.97	.94 to 1.01	-1.64 (58)	.11
Negative Affect	.49	.08	1.64	1.41 to 1.90	6.55 (58)	<.001
Support	-.30	.12	.74	.58 to .95	-2.45 (58)	.02
Negative Affect * Support	.05	.05	1.05	.95 to 1.17	0.92 (58)	.36

Table 4.17. Perceived support as a moderator of negative affect and NSSI acts.

	γ Estimate	SE	OR	95% CI of OR	*t* (df)	*p*
Intercept	-1.38	.15	.25	.19 to .34	-9.16 (58)	<.001
Time	-.04	.01	.96	.94 to .99	-2.76 (58)	.008
Negative Affect	.23	.07	1.25	1.09 to 1.44	3.26 (58)	.002
Support	-.06	.07	.94	.81 to 1.10	-0.79 (58)	.44
Negative Affect * Support	-.02	.05	.98	.88 to 1.08	-0.50 (58)	.62

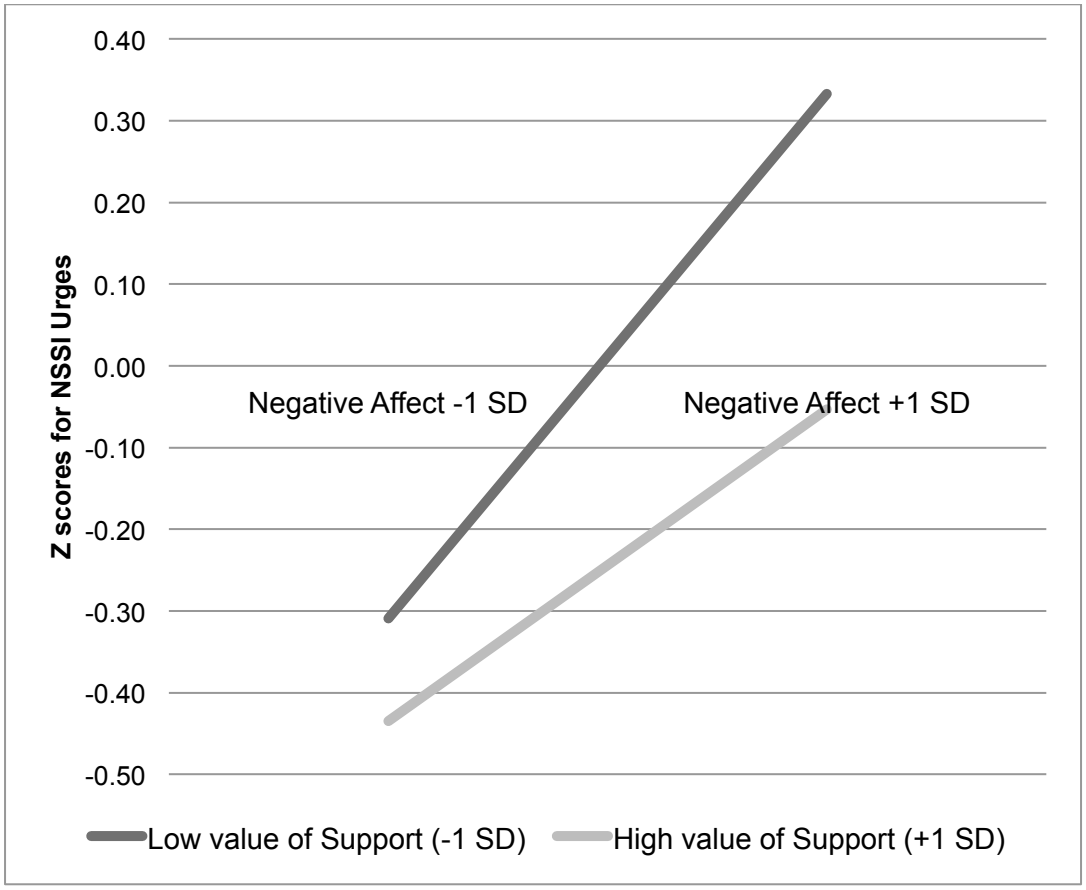

Figure 4.1. The moderating role of support in the association between negative affect and NSSI urges.

This figure displays the strength of the relationship between negative affect and NSSI urges at two levels of social support (low = one standard deviation below the mean for perceived support, high = one standard deviation above the mean), and suggest a stronger relationship between negative affect and NSSI urges at lower levels of perceived support, compared to high levels.

4.5. Summary of Results

The major findings of this study are summarized in Table 4.18.

Table 4.18. Summary of key findings.

	Hypothesis	Supported?
1a	Most participants (>60%) will report someone knows about their history of NSSI.	Yes.
1b	Fewer than 50% of daily acts of NSSI would be disclosed.	Yes.
1c	NSSI will be disclosed to friends or romantic partners more often than to other people.	Yes for daily NSSI.
1d	Interpersonal functions of NSSI will be less frequently and less strongly endorsed than intrapersonal functions.	Yes.
1e	NSSI acts will be more likely when NSSI thoughts are precipitated by interpersonal versus intrapersonal stressors.	Yes.
1f	Daily acts of NSSI will be perceived as having a negative effect on relationship quality and closeness.	No.
2a	Perceived support would be negatively associated with concurrent NSSI urges, thoughts, and acts.	Yes.
2b	Perceived support from romantic partners and peers, but not from parents, would be associated with NSSI.	Partner support was related to all NSSI, and parent support was related to NSSI urges.
2c	Conflict would be positively associated with concurrent NSSI urges, thoughts, and acts.	Yes.
2d	Conflict and perceived support would uniquely contribute to models explaining NSSI urges, thoughts, and acts.	Only for NSSI thoughts. For urges and acts, additive effects were not supported.
2e	Perceived support would have the strongest negative association with NSSI outcomes on high-stress days, versus low- or moderate-stress days.	No. Support was associated with lower NSSI urges and thoughts at all levels of stress, and with NSSI acts at low and high stress.
2f	Perceived support would be positively associated with next-day NSSI outcomes.	No. Perceived support was prospectively related to NSSI urges, not thoughts or acts.
2g	Perceived support from romantic partners, but not from other sources, would be positively related to prospective NSSI.	No.
2h	Conflict would be positively associated with next-day NSSI.	No.
2i	Conflict and perceived support would contribute uniquely in prospective models.	No.
2j	Perceived support would have strong, positive associations with prospective NSSI on high- and low-stress days.	No. Although support on low-stress days was related to a lower likelihood of NSSI acts, other models were not significant.
3a	Negative affect will mediate the association of perceived support and NSSI urges.	Yes, but mediation was partial.
3b	Support will moderate the association between negative affect and NSSI.	Yes for NSSI urges. No for NSSI thoughts and acts.

Chapter 5. Discussion

This study is one of the first to use a daily diary design to examine of the interplay between social context and NSSI, and as such can make several valuable contributions to the literature. First, the results of this study highlight several ways in which the social environment may interact with NSSI. Second, this study highlights areas of convergence and divergence between self-injuring participants' self-reports regarding social antecedents and consequences of NSSI, and the associations between these variables as they unfold in real time in daily life. Third, this study represents a first step toward understanding the reciprocal influences and conditions under which social context can serve as a risk or buffering factor for NSSI among individuals with recent and repeated NSSI.

One important question with respect to the social context of NSSI is when, how and to whom self-injuring individuals disclose their NSSI, and what effect these disclosures have on their relationships. Consistent with previous research in self-injuring adolescents and college students (Heath et al., 2009; Whitlock et al., 2006), nearly all of the young adults in this sample reported that someone knew about their history of NSSI, most often a friend, therapist or doctor, family member or romantic partner. Conversely, acts of NSSI that occurred during the two-week diary period were rarely disclosed to others. However, the circumstances surrounding these disclosures were not investigated in this study. In some cases, the participant may have willingly initiated disclosures, whereas in other cases disclosures may have occurred as a result of pressure from others (for example, by someone who confronted them about their injuries). The discrepancy between frequent disclosures of historical NSSI versus infrequent disclosures of daily NSSI is an important area for future research. It could be, for example, that disclosures of historical NSSI are less risky than disclosures of very recent NSSI in that they are less likely to result in rejection or stigmatization. NSSI may not be disclosed until later to avoid distressing others, and people may acknowledge

their history of NSSI but the keep any ongoing self-injury hidden. Another possibility is that when previous NSSI disclosures elicit negative reactions, people may become less likely to disclose ongoing NSSI to new confidants (e.g., new romantic partners or friends). Unfortunately, this study did not examine the context of NSSI disclosures, and so could not test these hypotheses directly. Future studies should look at how past disclosures influence later willingness to discuss NSSI, and how relationship duration influences NSSI disclosures. More detailed research on the nature, consequences, and course of NSSI disclosures is necessary to clarify these possibilities.

With respect to the perceived effect of NSSI on relationships, although previous research suggests that NSSI may be followed by positive (Hilt et al., 2008) and negative (Turner et al., 2014; Zila & Kiselica, 2011) changes in relationships, participants in this study did not perceive their NSSI as having any effect on their relationships. Daily NSSI acts that were disclosed or discovered by others, however, were followed by increased perceived support on the following day. This increase in support following NSSI is consistent with anthropological models of NSSI suggesting that self-injury can serve to mobilize support and caring behaviour when other signals of distress have been ineffective (Nock, 2008). Interpretations of this finding need to be tentative, given the small number of NSSI acts that were disclosed or discovered (n = 27), and the small number of participants from whom this sample of acts was drawn (n = 10). Further, this study does not inform whether the relationship between NSSI and subsequent perceived support is direct or indirect. Cognitive and affective changes following NSSI that impact perceptions of support even in the absence of changes in enacted support (see, for example, Dunkel-Schetter & Bennett, 1990; Lakey & Cassady, 1990) could indirectly account for this finding, but were not investigated in this study. This study also did not examine the longer-term social consequences of NSSI, and thus was unable to ascertain how NSSI may be associated with changes in perceived support after several days or weeks. Short-term increases in perceived support following NSSI may be followed by attenuation of support over time. Given that missing data can create increasingly severe problems for lagged models when more lags that are introduced, this study only examined a single lag (i.e., from one day to the next). Examining the association between NSSI and support over varying lags and time windows will help

round out our understanding of the dynamic interplay between NSSI and perceived support.

A second question regarding the social context of NSSI is whether NSSI serves interpersonal functions in addition to regulating negative affect (Armey et al., 2011; Muehlenkamp et al., 2009). Consistent with previous research (Klonsky, 2007), participants in this study endorsed intrapersonal functions of NSSI, especially seeking relief from negative emotions and desiring to punish themselves, more frequently and more strongly than interpersonal functions. Many participants, however, also reported that they had used NSSI to influence their social environment, with the most common interpersonal functions being to assert interpersonal boundaries or demonstrate toughness to others, to influence others or assert their autonomy, and to enact revenge. Consistent with suggestions that self-injuring individuals may be reluctant to endorse interpersonal functions of NSSI due to negative perceptions about these functions being manipulative or attention seeking (Klonsky, 2007; Nock, 2008), endorsement of interpersonal functions was inversely related to positive image management. The observation that disclosed or discovered NSSI acts were followed by increases in perceived support may hint at one of the interpersonal functions of NSSI that may not be openly endorsed in standard questionnaires. Specifically, when NSSI is known to others, it may communicate distress, elicit support and temporarily increase closeness (Hilt et al., 2008; Nock, 2008), thus serving to improve relationship quality and to reduce interpersonal demands. As mentioned previously, however, relatively few of these NSSI acts were observed during this study. Further, this study focused on perceived rather than enacted support, and thus it is unclear whether NSSI that is disclosed or discovered is followed by changes in supportive behaviour of others, or whether it is simply associated with a change in perceptions of support. Future research, particularly experimental paradigms in the context of expanded intensive longitudinal work, may help to clarify possible reinforcement contingencies for NSSI. Such research, however, would require a larger sample and a longer observation period than two weeks to capture sufficient variability in NSSI acts that were disclosed versus not, especially because moderating effects (e.g., determining for whom and under what conditions NSSI is followed by increased support) may be an important consideration.

A third important question with respect to the social context of NSSI is when interpersonal events increase or decrease risk for NSSI behaviour. Results of this study supported a robust buffering effect of perceived support, particularly from romantic partners, in reducing NSSI urges, thoughts, and acts on the same day, regardless of level of daily stress. Further, perceived support buffered against the effect of negative affect in increasing NSSI urges. Negative affect also partially mediated the association between perceived support and NSSI urges. That this mediation effect was not complete indicates that negative affect and perceived support each uniquely contribute to the prediction of same-day NSSI urges. It is important to note, however, that examining mediation within contemporaneous models does not allow disentanglement of the temporal direction of these effects. It is possible that low support precedes more negative affect, which in turn results in higher NSSI urges, or that negative affect precedes decreases in support, which in turn increases NSSI urges.

Although findings suggested that perceived support buffers against NSSI urges on the same day, the results of this study also suggest that this buffering effect may come at a cost. Specifically, whereas perceived support was associated with a lower likelihood of engaging in NSSI on subsequent low-stress days, support was also associated with greater NSSI urges on the following day. One possible explanation for this positive association is that support that is highly visible to the recipient may have a negative impact on wellbeing, possibly because visible supports conveys a sense of ineffectiveness or weakness to the recipient, and undermines feelings of competence (Bolger & Amarel, 2007). In contrast, results did not support the hypothesis that the costly effects of perceived support would be particularly pronounced on low and high stress days, inconsistent with past research (Matire et al., 2002). Alternatively, the unexpectedly positive association between perceived support and next-day NSSI urges may be explained by a rebound effect, wherein greater perceived support can help to inhibit urges for maladaptive behaviour in the short term, but these urges re-emerge the following day when the support is no longer as available or apparent. This possibility could not be examined in the single-lagged models in this study, but represents an important question for future research.

With respect to the relationship between conflict and NSSI, results of this study suggest that conflict is associated with stronger NSSI urges, greater likelihood of having NSSI thoughts, and greater likelihood of engaging in NSSI during the same day, but is not prospectively associated with NSSI outcomes. This suggests that conflict may be an important proximal correlate of NSSI. Consistent with this finding, examining the self-reported antecedents of NSSI revealed that NSSI thoughts that were precipitated by interpersonal stressors were significantly more likely to co-occur with NSSI acts, compared to NSSI thoughts that had been preceded by exclusively intrapersonal stressors. Unexpectedly, however, conflict was most strongly associated with same-day NSSI urges and thoughts on low-stress days, compared to high-stress days. It is possible that there is a ceiling effect with respect to stress, such that NSSI urges, thoughts and behaviours are less reactive to conflict when individuals are already highly stressed. The effect of conflict may be thus masked during particularly stressful periods. On less stressful days, however, conflict may become more salient and be more strongly associated with variability in NSSI. An important limitation to these data, however, is that I did not assess the source of interpersonal conflict (i.e., whether the conflict was occurring with a romantic partner, a friend or an acquaintance). It is possible that conflict which occurs in close relationships would produce more negative affect, and thus be more strongly associated with urges for, thoughts about and engagement in NSSI, compared to conflict occurring in less intimate relationships. Future research should assess the relative contributions of conflict as it occurs in different contexts and relationships to untangle the moderating role of stress in the relationship between conflict and same-day NSSI.

A final question is whether and how NSSI may be socially reinforced. Although the results from this study cannot speak directly to reinforcement contingencies, they provide some preliminary evidence that changes in perceived support may reinforce NSSI urges. Specifically, in this study, a) NSSI acts that are disclosed or discovered are followed by an increase in perceived support on the following day; b) perceived support is associated with decreased NSSI urges and likelihood of engaging in NSSI on the same day; and c) perceived support is associated with greater urges for NSSI the following day. Thus, it appears that while perceived support may temporarily decrease urges for and engagement in NSSI, there is a risk that, in some cases, support may

increase following NSSI and thereby reinforce urges for and engagement in this behaviour. This concerning possibility, while extremely tentative given the limitations of this data, is consistent with previous observations and anecdotal reports that NSSI is often perceived as being enacted to influence others (Health et al., 2009; Rosen et al., 1990). It is worth reiterating, however, that reinforcement contingencies usually operate outside of an individual's awareness, and thus these findings should not be construed as supporting a view that NSSI is enacted to deliberately manipulate others. Instead, the findings of this study may highlight additional contingencies that could operate on an individual's likelihood of engaging in NSSI, and that could be therefore be modified to reduce the probability of NSSI.

NSSI is a clinically important behaviour, and therefore it bears considering how this study might inform clinical work with patients who engage in self-injury. First, these findings suggest that recent acts of NSSI may not be willingly or openly disclosed to others. It is therefore important for clinicians who are working with individuals who have a history of this behaviour to be comfortable assessing for NSSI over the course of treatment. Second, there is a discrepancy between this study's finding that participants perceive daily NSSI as having little impact on their relationships, with previous research showing that self-injuring participants often perceive NSSI as having a negative impact on relationships over time (Turner et al., 2014). It is possible that individuals who engage in NSSI discount the possible negative consequences of their behaviour in the immediate aftermath of NSSI. Helping clients to connect recent NSSI behaviour with the possible negative consequences of such behaviour, and to consider these potential consequences in advance of engaging in NSSI, may help to decrease engagement in NSSI. Indeed, these types of problem-solving strategies are often incorporated into established treatments that reduce NSSI, including Dialectical Behaviour Therapy (Linehan, 1993) and Emotion Regulation Group Therapy (Gratz & Tull, 2011). Third, these findings may point to the potential utility of incorporating couples or family-based interventions into treatments targeting NSSI. Given that interpersonal conflict and lack of perceived support seem to function as important precipitants of NSSI, it may be worthwhile to consider how important support network members could be invited to participate in therapy. Psychoeducation regarding NSSI, conflict resolution skills, and support provision skills could then be rehearsed and refined in the therapy session.

Although this study provides a rationale for why such an approach may be beneficial, a systematic and empirical examination is needed before conclusions can be drawn about its merits, particularly relative to other well-established therapeutic approaches.

Although daily diaries provide rich data regarding the nature and association of behaviours in daily life, there were a number of limitations in this study. First, with respect to measurement issues, social context variables were assessed from the participants' perspectives only and therefore may not agree with others' perceptions. Using self-reports to investigate the impact of social context necessarily provides a one-sided account of the story. Perceptions of support are vulnerable to a variety of extraneous influences, including the effects of mood, stress, personality traits, and cognitive self-representations (Procidano & Walker Smith, 1997). Disentangling the associations of NSSI with perceived versus enacted support will provide critical information regarding where interventions would be best targeted. In future studies, it would be helpful to include reports from other informants, including romantic partners, peers, and family members who interact with self-harming individuals on a day-to-day basis. Unfortunately, this was not feasible within the context of this study. A second measurement issue arises due to the nature of the measures selected to assess perceived support and conflict. Whereas the GSSS assesses global perceptions of specific sources of support (e.g., peers, parents), the TENSE assesses specific conflict-related events irrespective of the relationship with whom these events occur. Further, the GSSS provides a continuous rating of perceived support, whereas the TENSE uses a checklist response format. These differences can introduce error related to measurement variance, particularly for the additive models. Thus, we might see unique effects in additive models simply because the measurement structure and response format differed between the instruments. Future research should therefore examine the effects of support and conflict using analogous measures to minimize measurement related error. A final measurement issue relates to differing operational definitions of the dependent variable used in this study. While including multiple measurements of NSSI outcomes (i.e., urges, thoughts and acts) helped to capture different aspects of daily variability in NSSI, this study did not explicitly examine the nature of the relationships among these variables. For example, while we might assume that NSSI behaviours are the product of NSSI thoughts and urges, these causal associations cannot be

determined, particularly when the measurements are aggregated over the day. More frequent ratings of these outcomes may help us to understand their temporal relationships, and would provide valuable information regarding the latency between the emergence of NSSI urges or thoughts, and NSSI behaviour. Such an examination fell outside of the scope of the current study.

In terms of study design and data collection, an important limitation relates to the differing durations of the identified time periods between participants (e.g., a participant who awoke at 8 a.m. would have a longer morning period compared to a participant who awoke at 11 a.m.). Differing assessment periods can introduce error into period-specific coefficients, and therefore I used only two-level models and daily average scores in this study. However, it is possible that these daily averages still contain error related to this method. Further, the use of two-level models and daily averages reduced my ability to detect potentially important fluctuations in affect, support, and NSSI outcomes throughout the day. Future research using a more frequent assessment schedule (i.e., ecological momentary assessment) could illuminate the more fine-grained temporal relationships among these variables. A second design related limitation arose due to the nature of question branching utilized in this study. To reduce participant burden, participants did not rate perceived support if they had not had contact with a particular source of support during the identified time period. Although this is a logical design, it resulted in non-randomly missing data (e.g., participants who were not in romantic relationships were systematically missing all of the scores from the partner reports). To account for this non-randomly missing data, I limited my examination of different sources of support to those who had reported at least some contact with that source during the study. I was not able, however, to compare the relative strength of the associations of perceived support from particular sources (e.g., peers versus romantic partners) due to the non-randomly missing data, which would be an interesting direction for future work.

With respect to limitations arising from the data analytic strategy employed in this study, it is first important to note that contemporaneous and prospective models cannot be used to examine causal associations between variables. Thus, although these models may inform the temporal sequencing of events, they cannot rule out the possibility of extraneous, unobserved variables that could explain the associations.

Thus, the finding that support was related subsequent NSSI urges should not be taken to imply that support caused the increase in urges. Second, the relationships that are detected in daily diary studies are limited by the observation schedule that was selected for the study. A single-entry daily diary design was chosen for this study in the hopes of increasing participant compliance and minimizing missing data. EMA would be better suited to looking at trajectories within days and perhaps could provide a finer-grained exploration of triggers and consequences of NSSI in the hours and minutes preceding the behaviour. Third, although HLM analyses provide flexibility in analyzing daily diary data, these models become increasingly complicated to interpret as more variables are added to the model. Although more complex models (e.g., mediation models for dichotomous outcomes such as NSSI thoughts or acts, or non-normally distributed predictors such as interpersonal conflict; mediation or moderation models for prospective or subsequent models) may provide interesting information regarding the social context of NSSI, I did not believe these models would have been adequately supported by this data due to the number of predictors and missing data that would be involved. Thus, I limited the analyses under consideration to a single time lag in all cases. Further, I limited mediation and moderation analyses to contemporaneous models and to continuously distributed outcomes (i.e., NSSI urges). A final analytic consideration is the potential for Type-I and Type-II errors in this study. Given that this study was one of the first to examine the associations between social context and NSSI in daily life, I adopted a more liberal approach to significance testing and retained the traditional cut-off ($p < .05$) for my inferential tests. Although this approach reduces the probability of Type-II error (i.e., retaining the null when it is false), it correspondingly increases the probability of Type-I error (i.e., rejecting the null when it is true) when a large number of inferential tests are conducted. Type-II errors can be more problematic during the initial phases of research, as replications are less likely to be undertaken for non-significant results than for significant results. It is important to recognize that retaining the traditional cut-off for statistical significance may have increased the number of spurious findings in this research. The best resolution for either type of error is repeated and careful replication.

In terms of sample considerations, it is important to note that this sample included only young adults who had self-injured repeatedly ($\geq$ 10 times) and recently (within the past year). Results therefore may not generalize to those who have less

frequent or recent NSSI. Additionally, the sample was comprised mainly of women. Previous research has documented gender differences with respect to perceived support (Ashton & Fuehrer, 1993; Barbee et al., 1993; Olson & Shultz, 1994). Specifically, young women tend to report greater perceived support than young adult men (Olson & Shultz, 1994), possibly masculine gender roles that emphasize autonomy and independence and may make young men less attentive to or likely to endorse receiving support (Barbee et al., 1993). Thus, it will be critical to include a greater number of male self-injurers in future studies examining the relationships between NSSI and social context. Moreover, although the sample size in this study was comparable with previously published intensive longitudinal studies of NSSI, the number of participants may limit power, particularly for the analyses that relied on a subgroup of participants (e.g., examining NSSI acts that were disclosed or discovered, examining perceived support from romantic partners).

Despite these limitations, this study represents a valuable first step toward understanding the association between NSSI and social context using methods that have not been utilized in previous research, and points to several important directions for future research. First, these findings suggest that an important goal for future research is to examine the interpersonal antecedents and consequences of NSSI disclosures, particularly as they unfold in daily life. Second, although the role of negative affect as a proximal risk factor for NSSI is well established (Armey et al., 2011; Muehlenkamp et al., 2009; Nock et al., 2009), this research underscores the importance of investigating other psychological and interpersonal factors that could attenuate (or exacerbate) the association between negative affect and NSSI. Specifically, future research should examine other potential buffering variables, including reasons to resist NSSI urges (Turner et al., 2014), hopefulness and commitment to stopping NSSI, use of flexible emotion regulation strategies, and mindfulness or cognitive flexibility (i.e., a lack of rumination or self-criticism), that may discourage engagement in NSSI. Finally, this study may hint at novel targets that could be incorporated into clinical interventions for NSSI, thus helping clinicians to more effectively work with clients to reduce NSSI behaviour.

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