

Characterizing Interpersonal Difficulties Among Young Adults Who Engage in Nonsuicidal Self-Injury Using a Daily Diary

Brianna J. Turner,

Simon Fraser University, Harvard University

Matthew A. Wakefield,

Simon Fraser University

Kim L. Gratz, and

University of Mississippi Medical Center

Alexander L. Chapman

Simon Fraser University

Abstract

Compared to people who have never engaged in nonsuicidal self-injury (NSSI), people with a history of NSSI report multiple interpersonal problems. Theories propose that these interpersonal difficulties play a role in prompting and maintaining NSSI. The cross-sectional nature of most studies in this area limits our understanding of how day-to-day interpersonal experiences relate to the global interpersonal impairments observed among individuals with NSSI, and vice versa. This study compared young adults with ($n = 60$) and without ($n = 56$) recent, repeated NSSI on baseline and daily measures of interpersonal functioning during a 14-day daily diary study. Groups differed in baseline social anxiety, excessive reassurance seeking, and use of support seeking relative to other coping strategies, but did not differ in self-perceived interpersonal competence. In terms of day-to-day functioning, participants with (vs. without) NSSI had significantly less contact with their families and friends, perceived less support following interactions with friends, and were less likely to seek support to cope, regardless of level of negative affect. With the exception of contact with family members, these group differences in daily interpersonal functioning were accounted for by baseline levels of social anxiety and use of support seeking. Contrary to expectations, participants with NSSI had *more* frequent contact with their romantic partners, did not differ in perceptions of support in romantic relationships, and did not report more intense negative affect following negative interpersonal interactions. This study provides a novel test of recent interpersonal theories of NSSI using daily reports.

Keywords

nonsuicidal self-injury; self-harm; social support; experience sampling; daily diary

Address correspondence to Brianna J. Turner, Ph.D., Department of Psychology, Simon Fraser University, 8888 University Drive, Burnaby, BC, Canada, V5A 1S6; briannat@sfu.ca.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

Although nonsuicidal self-injury (NSSI) has been recognized for decades as a serious clinical problem due to its associations with psychopathology, suicidality, and functional impairment (Glenn & Klonsky, 2013; Selby, Bender, Gordon, Nock, & Joiner, 2011), recent evidence suggests that NSSI is also associated with impairments in interpersonal functioning. Compared to individuals without a history of NSSI, those with NSSI report pervasive interpersonal problems, including poorer quality relationships with peers and caregivers (Claes, Houben, Vandereycken, Bijttebier, & Muehlenkamp, 2010; Gratz, Conrad, & Roemer, 2002; Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008; Hoff & Muehlenkamp, 2009), greater loneliness (Giletta, Scholte, Engels, Ciairano, & Prinstein, 2012; Glenn & Klonsky, 2013; Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boergers, 2001), higher rates of peer victimization (Giletta et al., 2012; Hilt et al., 2008), lower perceived support (Heath, Ross, Toste, Charlebois, & Nedecheva, 2009; Muehlenkamp, Brausch, Quigley, & Whitlock, 2013), and worse social problem-solving abilities (Nock & Mendes, 2008). Recent interpersonal theories of NSSI propose that interpersonal experiences may contribute to the development and maintenance of NSSI as both antecedents (e.g., rejection, conflict) and consequences (e.g., support) of this behavior (Nock, 2008, 2009; Prinstein, Guerry, Browne, & Rancourt, 2009; Yates, 2004). To date, however, the predominantly cross-sectional nature of existing studies has limited our understanding of potential deficiencies in the day-to-day interpersonal functioning of people who engage in NSSI. Examining how the daily interpersonal experiences of individuals with NSSI differ from those without NSSI may help to refine interpersonal models of NSSI.

Evidence that NSSI sometimes functions to meet interpersonal needs (see Klonsky, 2007, for a review) underscores the important role of interpersonal precipitants and consequences in NSSI. Identified interpersonal functions of NSSI include communicating distress, eliciting social support, escaping from undesired interpersonal situations or demands, asserting autonomy or demonstrating strength, and seeking belonging or acceptance within a group (Klonsky, 2007). Nock's (2008) anthropological model organizes these functions into three core domains: (a) eliciting caretaking or soothing from others, (b) warding off potential aggressors or unwanted demands by providing a signal of strength, and (c) increasing affiliation with desired groups. These interpersonal functions of NSSI highlight both the interpersonal situations that may precede or prompt NSSI behavior (e.g., interpersonal demands, conflict) and the interpersonal consequences (e.g., support, soothing) that are likely to reinforce this behavior. Given that NSSI is a relatively high-cost method of meeting interpersonal needs (Nock, 2008), the presence of such interpersonal functions may signal the existence of particular interpersonal skills deficits. For instance, individuals who use NSSI to elicit soothing from others may struggle to get this need met in other ways, perhaps due to deficits in their social skills repertoire, problems in the responsiveness of their interpersonal environment, or both (Nock, 2008). Although previous studies have found that interpersonal functions of NSSI are endorsed less often and less strongly than intrapersonal functions (Klonsky, 2007), recent findings suggest that interpersonal reinforcement may nonetheless be important for understanding and predicting daily episodes of NSSI (Turner, Cobb, Gratz, & Chapman, 2016). Thus, previous work examining the interpersonal functions of NSSI provides clues about the specific interpersonal tasks that may be most difficult for individuals with NSSI and most relevant to NSSI behavior.

Several researchers have articulated interpersonal theories of NSSI (Nock, 2008, 2009; Prinstein et al., 2009; Yates, 2004). According to the social signaling hypothesis (Nock, 2008), NSSI is enacted when less intense and less costly behaviors, such as verbal communications of distress, have not been effective in achieving communicative goals due to poor signal quality or clarity or insufficiently responsive environments. Alternatively, the cognitive vulnerability–stress model (Guerry & Prinstein, 2010) suggests that people who engage in NSSI tend to make more negative attributions when they encounter interpersonal stressors, resulting in more affective arousal and greater reliance on maladaptive behaviors to cope with the resultant distress. Finally, Yates' (2004) developmental model suggests that traumatic experiences in childhood, especially maltreatment, lead to impairments in motivational, emotional, and relational skills, which, in turn, contribute to the use of NSSI (vs. more adaptive strategies) to meet emotional and interpersonal needs.

Past studies using cross-sectional self-report methods have supported aspects of these interpersonal theories of NSSI. Consistent with all three theories, individuals with (vs. without) NSSI rate themselves as less competent at meeting interpersonal goals (Baetens, Claes, Muehlenkamp, Grietens, & Onghena, 2012) and less likely to seek social support to cope with distress (Andover, Pepper, & Gibb, 2007). Consistent with the developmental and social signaling models, the relationship between childhood maltreatment and NSSI has been found to be mediated by cognitive processes such as self-criticism (Glassman, Weierich, Hooley, Deliberto, & Nock, 2007), which, in turn, may increase interpersonal reactivity (Guerry & Prinstein, 2010). Finally, consistent with the cognitive vulnerability–stress model, a negative attributional style has been found to strengthen the association between negative life events (including interpersonal stressors) and NSSI in a prospective study of adolescents (Guerry & Prinstein, 2010). Together, past research in this area suggests that individuals with (vs. without) NSSI may have deficits in the ability to: (a) initiate or maintain relationships with desired groups or individuals, (b) communicate personal and emotional information to others, (c) experience or interpret interactions with others as supportive, (d) regulate distress following unpleasant interpersonal interactions, and (e) effectively seek support or reassurance from others during times of stress.

Although cross-sectional studies of interpersonal functioning in NSSI provide a broad snapshot of some of the interpersonal problems experienced by individuals with NSSI, research using intensive micro-longitudinal methods (e.g., daily diaries, ecological momentary assessment) is needed to clarify the precise nature of these interpersonal problems as they occur in daily life and in naturalistic settings. To our knowledge, very few studies have utilized such methods to examine the relationship between interpersonal experiences and NSSI. Using a micro-longitudinal study of self-injurious thoughts and behaviors among adolescents, Nock, Prinstein, and Sterba (2009) found that NSSI thoughts commonly began when adolescents were socializing; however, being alone (vs. with others) was a significant predictor of whether adolescents acted on these thoughts. Moreover, although interpersonal functions of NSSI were endorsed less frequently than intrapersonal functions of this behavior, both interpersonally oriented emotions (e.g., feeling rejected by and angry toward others) and intrapersonally oriented emotions (e.g., anger toward self, self-hatred) increased the odds of acting on NSSI thoughts (Nock et al., 2009). Similarly, although Snir and colleagues (2015) found that adults with borderline and avoidant

personality disorders rarely endorsed interpersonal functions of NSSI as motivating this behavior in daily life, interpersonal precipitants (e.g., feelings of rejection and isolation) significantly predicted NSSI urges and acts. Although these studies provide important information on the relation of various interpersonal experiences to daily NSSI thoughts and behaviors, neither included a comparison group of individuals without NSSI. Thus, additional research is needed to clarify the daily interpersonal experiences (and potential interpersonal deficits) characteristic of individuals with (vs. without) NSSI. Combining micro-longitudinal and self-report methods can take an important next step in testing the relationship between daily interpersonal experiences and global interpersonal impairments suggested by recent interpersonal theories of NSSI (Nock, 2008; Prinstein et al., 2009; Yates, 2004). Examining day-to-day patterns of interpersonal experiences may help clarify whether the interpersonal problems relevant to NSSI are related to the *quantity* or *quality* of interpersonal behaviors. For example, individuals with (vs. without) NSSI may report poorer quality relationships because they have less frequent contact with others, perceive their daily interactions with others as less supportive, experience greater negative affect in response to interpersonal stressors, or are less effective at seeking support during times of stress. The present study used a micro-longitudinal framework to test these possibilities, taking a first step toward characterizing the day-to-day interpersonal experiences of young adults with recent repeated NSSI.

AIMS AND HYPOTHESES

The purpose of this study was to examine differences in baseline measures of interpersonal competence and functioning, as well as daily interpersonal experiences, between young adults with recent, repeated NSSI and those without NSSI using a 14-day daily diary design. In terms of baseline interpersonal differences, we hypothesized that young adults with (vs. without) NSSI would rate themselves as less interpersonally competent, more socially anxious, more likely to engage in excessive reassurance seeking, and less likely to seek support, relative to other coping strategies, in response to stress (Hypothesis 1). In terms of daily interpersonal experiences, we hypothesized that participants with (vs. without) NSSI would: report less frequent interpersonal contact across potential sources of support (i.e., family members, peers, and romantic partners; Hypothesis 2a), perceive less support during and following interactions with others (Hypothesis 2b), experience more intense negative affect in the period and day following negative interpersonal interactions (Hypothesis 2c), and use less support seeking, relative to other coping strategies, particularly when they experienced high levels of negative affect (Hypothesis 2d).

Methods

PARTICIPANTS

Participants were recruited using Internet advertisements and posters distributed on a Canadian university campus and near community mental health clinics. Participants were eligible for this study if they (a) were young adults (aged 18–35), (b) had regular access to the Internet to complete online surveys, and (c) reported either no history of NSSI (non-NSSI group) or a history of recent (i.e., past-year), recurrent (i.e., 10 lifetime episodes)

NSSI and urges for or thoughts about NSSI in the 2 weeks prior to study enrolment (NSSI group). To maximize external validity, exclusion criteria were limited to psychiatric diagnoses that could interfere with study performance, including manic, hypomanic, or depressive mood episodes within the past 2 weeks, substance dependence within the past month, and/or any primary psychotic disorder within the past month.

The final sample ($N = 116$) had a mean age of 23.50 ($SD = 4.66$). The majority of participants were female (77.6%), had completed some or all of a postsecondary degree (77.2%), and were not married or cohabitating at the time of the study (81.9%). Participants identified as White (44%), East Asian (34%), South Asian (7%), Native Canadian (2%) and Black/African Canadian (1%). Please see Table 1 for further information on the demographic, clinical, and diagnostic features of the sample. Participants with NSSI reported a median of 206 lifetime episodes of NSSI (range = 15 to 3009), and used a median of 6 NSSI methods (range = 1 to 12), with the majority reporting a history of more severe forms of NSSI, including cutting (85%) and burning (38%).

PROCEDURES

After completing an online survey to screen for initial eligibility criteria (i.e., age between 18 and 35, 0 or 10 lifetime episodes of NSSI), 354 people were eligible for the study, and 206 participants attended in-person diagnostic interviews to confirm inclusion and exclusion criteria. The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First et al., 1996), Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV; Zanarini, Frankenburg, Chauncey, & Gunderson, 1987), and Deliberate Self-Harm Inventory (DSHI; Gratz, 2001) were used to assess DSM-IV-TR psychiatric diagnoses (American Psychiatric Association, 2000) and NSSI history. Interviews were conducted by bachelor's- or master's-level clinical assessors trained to reliability with study investigators. Interrater reliability in this sample was good (average diagnostic agreement = 85%, with a median $\kappa = .76$ among valid kappas). Following the diagnostic assessment, 163 participants met inclusion criteria for the larger study, 148 attended the subsequent laboratory session (detailed in Gratz, Chapman, Dixon-Gordon, & Tull, 2016), and 125 were eligible for and consented to the daily diary procedures (additional inclusion criteria for the diary procedures involved having regular access to an Internet-capable device and, for participants with NSSI histories, thoughts of or urges for NSSI in the past 2 weeks). Four participants withdrew after consenting to the diary study, and five were excluded due to inconsistent reporting of NSSI history across measures. The remaining 116 participants were included in the final sample. Diary participants were provided with a link and password for an online survey containing the baseline measures of interpersonal functioning, which they completed at home, and began the daily diaries within 4 days of the laboratory session.

During the diary protocol, participants were emailed each evening with a link and password for the online diary questionnaires, which they were encouraged to complete as close to bedtime as possible. Within each diary entry, participants were asked to report on interpersonal events and emotions for each of three periods: morning, afternoon, and evening. Thus, questions regarding participants' contact with and perceived support from others, interpersonal stressors, and emotions were completed three times in each entry. At

the end of the entry, participants were asked to describe the most stressful event of the day and rate how they had coped with this event (see below). Participants who did not complete the previous evening's diary were emailed in the morning and given until 11 A.M. to complete the diary; otherwise, the entry was considered missing. Online questionnaires were administered using Remark Web Survey 5, which allows question branching and time/date stamping of diary entries. Participants were paid \$30 for the diagnostic assessment, \$30 for the laboratory session, and \$45 if they completed at least five of seven diary entries during either of the 2 weeks or \$60 if they completed all seven entries in either week, for a maximum total compensation of \$240.

BASELINE MEASURES OF INTERPERSONAL COMPETENCE AND FUNCTIONING

Descriptive information for baseline study measures is presented in Table 2.

Interpersonal Competence—Two measures were used to assess self-rated skill in performing a variety of interpersonal tasks. The Interpersonal Competence Questionnaire (ICQ; Buhrmester, Furman, Wittenberg, & Reis, 1988) is a 40-item scale measuring self-perceived competency in five domains: initiating relationships, disclosing personal information, providing emotional support, asserting disagreement and needs, and managing conflict. Items are rated on a 5-point scale (1 = “*I m poor at this; I d feel so uncomfortable and unable to handle this situation, I d avoid it if possible*” to 5 = “*I m extremely good at this; I d feel very comfortable and could handle this situation very well*”). All five subscales of the ICQ had acceptable internal consistency in this study (α s = .81 to .89). The ICQ subscales have been shown to correlate with self-report measures of interpersonal functioning, loneliness, and romantic competence (r s = .31 to .71), as well as objective ratings of interpersonal competence (r s = .33 to .75; Buhrmester et al., 1988). The Social Support Behaviors Scale (SS-B; Vaux, Riedel, Stewart, 1987) is a 45-item scale that was modified for this study to assess the likelihood that participants would provide five types of support to a friend or family member: emotional support, practical assistance, financial support, advice/guidance, and social support. Items are rated on a 5-point scale (1 = “*I would never do this*” to 5 = “*I would most certainly do this*”). The SS-B has been found to be significantly correlated with other measures of enacted support (Vaux et al., 1987), as well as positively associated with romantic relationship satisfaction and negatively associated with relationship conflict and depression (Cramer, 2006). All five subscales of the SS-B had acceptable internal consistency in this study (α s = .85 to .92). Correlations between the respective subscales of the ICQ and SS-B ranged from small (r = .03) to medium (r = .50), and the majority were < .30, supporting the independence of the measures.

Social Anxiety—Severity of social anxiety symptoms was assessed with the Social Avoidance and Distress Scale (SADS; Watson & Friend, 1969), which is comprised of 28 *True* (1) or *False* (0) items assessing participants' willingness to seek out or engage in social contact in varied settings, as well as their anticipated discomfort in doing so. The items are summed to create a total score. Example items include “I often feel on edge when I am with a group of people” and “I try to avoid talking to people unless I know them well.” The SADS has been found to correlate significantly with both self-report (r s = .18 to .75; Nichols & Webster, 2015; Watson & Friend, 1969) and clinician-administered (r = .63; Heimberg et

al., 1999) measures of anxiety, and predict willingness to participate in group activities in the laboratory (Watson & Friend, 1969). The SADS had acceptable internal consistency in this study ($\alpha = .94$).

Reassurance Seeking—Reassurance seeking behavior was assessed with four items from the Depressive Interpersonal Relationships Inventory (DIRI; Joiner, Alfano, & Metalsky, 1992), which are rated on a 7-point Likert-type scale (1 = “*no, not at all*” to 7 = “*yes, very much*”). Example items include “in general, do you find yourself often asking people you feel close to how they *truly* feel about you?” and “in general, do the people you feel close to sometimes become irritated with you for seeking reassurance from them about whether they *really* care about you?” The DIRI has been shown to correlate positively with observer-rated reassurance-seeking behaviors and self-reported depression symptoms, and to predict the onset of depression in undergraduates (Joiner & Metalsky, 2001). The DIRI had acceptable internal consistency in this study ($\alpha = .91$).

Support Seeking—Use of support seeking and two other coping strategies (i.e., problem-solving and avoidance) were assessed using the Coping Strategy Indicator (CSI; Amirkhan, 1990). Participants rate the extent to which they would use each of 33 possible coping strategies to deal with distress on a 3-point Likert-type scale (1 = “*not at all*”, 3 = “*a lot*”). Examples of support seeking items include “go to someone (friend or professional) in order to help you feel better” and “accept sympathy and understanding from someone.” Because we were interested in participants’ use of support seeking relative to their use of other coping strategies, we computed scores on each of the support seeking, avoidance, and problem-solving scales by summing the composite items, and created a total score of coping strategy use by summing the three subscale scores. We then divided the support seeking score by the total coping strategy score to assess how frequently support seeking was used relative to the other strategies. The CSI has been shown to correlate positively with self-reported ($r_s = .46$ to $.56$; Amirkhan, 1990) and in vivo coping strategies selected in response to stressful laboratory procedures (Amirkhan, 1994), and is sensitive to changes in coping styles following intervention (Amirkhan, 1994). The CSI had acceptable internal consistency in this study ($\alpha = .85$).

DAILY MEASURES OF INTERPERSONAL COMPETENCE AND FUNCTIONING

Descriptive information for daily study measures are presented in Table 2.

Interpersonal Contact and Social Support—Participants were asked to report whether they had contact with their romantic partner(s) (defined as boyfriend, girlfriend, husband, wife, etc.), family members (defined as mother, father, sister, brother, aunt, uncle, cousin, etc.), or friends or peer(s) (defined as friends, classmates, coworkers, acquaintances, etc.) within each of the three diary periods (1 = “*yes*”, 0 = “*no*”). Contact was defined as inclusive of contact via email messages, phone calls, text messages, social media, and in-person interaction. If participants answered in the affirmative, they completed the Goldsmith Social Support Scale (GSSS; Goldsmith, McDermott, & Alexander, 2000) to rate their satisfaction with the support they received from this individual or group of individuals during that time period. The GSSS contains 12 bipolar adjective pairs (e.g., “*upsetting*–

reassuring,” “*considerate-inconsiderate*”), which are rated on a 7-point Likert-type scale. The GSSS has been found to discriminate between different aspects of support in standardized scripts (Goldsmith et al., 2000) and to correlate with measures of relationship satisfaction ($r = .56$; Logan & Cobb, 2013). Scores indexing perceived support for each source of support (romantic partners, family, and peers) were derived by averaging the 12 items.

Negative Interpersonal Interactions—Within each daily period, participants were asked to rate the presence (1) or absence (0) of 17 unpleasant interactions using the Test of Negative Social Exchange (TENSE; Ruehlman & Karoly, 1991). The TENSE assesses unpleasant interactions in four domains: Hostile/Impatient interactions (e.g., “someone lost his or her temper with me”), Insensitive interactions (e.g., “someone took me for granted”), Interfering interactions (e.g., “someone prevented me from working on my goals”), and Ridiculing interactions (e.g., “someone made fun of me”). We derived a total conflict score for each period by summing across all 17 items; daily conflict scores were derived by taking the mean of these three total scores within each day. Previous research supports the internal consistency, test-retest reliability across 2 days, and convergence of the TENSE scales with measures of social support ($r_s = -.11$ to $-.25$), loneliness ($r_s = .21$ to $.40$), and depression ($r_s = .32$ to $.52$; Ruehlman & Karoly, 1991).

Negative Affect—Participants rated their affective state within each time period using the Multidimensional Mood Questionnaire (MDMQ; Wilhelm & Schoebi, 2007), which consists of six bipolar items assessing three aspects of mood: valence, calmness, and energetic arousal. As described in a previous study (Turner et al., 2016), given the strong within-person correlations between the Valence and Calmness scales, we created a composite score by averaging these two z-transformed subscales to index daily negative affect, with higher scores indicating more negative and higher arousal emotional states. Previous research supports the within- and between-person reliability of the MDMQ, as well as its sensitivity to changes in mood within and between days (Wilhelm & Schoebi, 2007).

Use of Support Seeking to Cope—To assess daily coping, we used a 15-item version of the Coping Strategy Indicator that was used at baseline (Amirkhan, 1990). Each day, participants were instructed to briefly describe a problem they had encountered and, keeping that event in mind, to rate the extent to which they had used each coping strategy on a 3-point Likert-type scale (1 = “*Not at all*”, 3 = “*A lot*”). As with the baseline data, we created a composite score indicating participants’ use of support seeking relative to other coping strategies by summing scores on each of the three subscales to create a total score and then dividing the support seeking scale score by the total scale score. Participants completed this scale once per day, at the end of the diary entry.

ANALYTIC PLAN

A series of multivariate and univariate analyses of covariance were used to examine between-group differences in interpersonal competence, social anxiety, reassurance seeking, and use of support seeking relative to other coping strategies (controlling for relevant covariates). Five participants did not complete the baseline interpersonal measures, and were

therefore excluded from these analyses. With respect to the day-level outcomes, we applied multilevel models using HLM 7.01 (Raudenbush, Bryk, & Congdon, 2010). An advantage of using multilevel models is that they use restricted maximum likelihood estimation, allowing participants with missing data at level 1 to contribute to parameter estimates at level 2, thus maximizing power. To test Hypothesis 2a, presence or absence of contact with family members, peers, or romantic partners were each modeled using two-level hierarchical generalized linear models (HGLM), applying a Bernoulli distribution and logit link function to derive multilevel logistic regressions appropriate for these dichotomous variables. Group (NSSI vs. non-NSSI) and identified covariates were included as level 2 effects. For analyses pertaining to contact with romantic partners, only the subset of participants in a romantic relationship were included in the model (NSSI $n = 35$; non-NSSI $n = 23$). For all HGLM models, results are presented for the unit-specific model with robust errors. To test Hypothesis 2b, we used a two-level hierarchical linear model (HLM) with perceived support from romantic partners, family members, and peers within each time period as the dependent variable, and the level 2 effect of group and any relevant covariates as the independent variables. Hypothesis 2c had two components: a within-day lagged model, examining negative affect in the daily period (e.g., afternoon or evening) following a negative interpersonal interaction (i.e., $p + 1$), and a between-day model, examining the association between negative interpersonal interactions on day t and negative affect on the following day, $t + 1$. Lagged models were each tested using two-level HLM, with negative affect at times $p + 1$ and $t + 1$ as the dependent variables, level 1 effects of negative interpersonal interactions at times p or t (i.e., in the previous period or day) and negative affect at times p or t to control for the autocorrelation of negative affect, and level 2 effects of group and any relevant covariates. This hypothesis was tested by examining whether the level 2 effect of group significantly moderated the strength of the association between negative interpersonal interactions and later negative affect. Finally, Hypothesis 2d was tested using a two-level HLM model, with daily support seeking as the dependent variable, negative affect as a level 1 effect, and group as a level 2 moderator of both the intercept (i.e., baseline support seeking) and slope (i.e., strength of the relationship between negative affect and support seeking).

Results

PRELIMINARY ANALYSES

Compliance With the Diary Protocol—There was no significant between-group difference in the number of diary entries completed (non-NSSI: $M = 13.07$, $SD = 2.02$, NSSI: $M = 12.10$, $SD = 3.39$; $t[114] = 1.86$, $p = .07$, $d = .35$, 95% CI of mean difference = $-.06$ to 2.01), and the majority of participants (86.2%) completed at least 12 of the 14 entries.

Group Differences—Information on the demographic and clinical characteristics of the NSSI and non-NSSI groups is provided in Table 1. Results revealed no significant between-group differences in age, educational attainment, or relationship status (i.e., single vs. in a romantic relationship). However, women and participants identifying as lesbian, gay, or bisexual were overrepresented in the NSSI group. Moreover, participants in the NSSI group

evidenced significantly higher rates of psychiatric disorders, including mood, anxiety, and personality disorders.

Identification of Covariates—We examined the relations between the dependent variables and several demographic or diagnostic characteristics, including age, gender (female/male), romantic relationship status (single/partnered), sexual orientation (heterosexual/non-heterosexual), employment status (employed full- or part-time/not employed), and number of current DSM-IV disorders. We included all covariates that were significantly associated with the dependent variable in subsequent analyses. For baseline variables with multiple subscales (i.e., SS-B, ICQ), we included covariates if they were significantly correlated with > 50% (i.e., three or more) of the subscales. The following covariates were identified: female gender was associated with one of the SS-B subscales (providing emotional support; $t[109] = -2.29, p = .02, d = .48$, 95% CI of mean difference = $-.48$ to -6.65), social anxiety ($t[109] = -2.16, p = .03, d = .50$, 95% CI of mean difference = $-.33$ to -7.90), and reassurance seeking ($t[109] = -2.37, p = .02, d = .57$, 95% CI of mean difference = $-.59$ to -6.73); non-heterosexual orientation was associated with two of the SS-B subscales (providing social support: $t[109] = 2.32, p = .02, d = .53$, 95% CI of mean difference = $.38$ to 4.85 ; providing advice: $t[109] = 2.07, p = .04, d = .47$, 95% CI of mean difference = $.18$ to 8.14), and reassurance seeking ($t[109] = 2.95, p = .004, d = .65$, 95% CI of mean difference = 1.44 to 7.32); age was associated with one of the SS-B subscales (providing advice: $t[111] = -.20, p = .03$, 95% CI = $-.03$ to $-.38$); and number of current psychiatric disorders was associated with all five ICQ subscales ($r[111] = -.19$ to $-.35, p < .05$, 95% CIs = $-.03$ to $-.51$), social anxiety ($r[111] = .47, p < .001$, 95% CI = $.34$ to $.59$), reassurance seeking ($r[111] = .49, p < .001$, 95% CI = $.32$ to $.62$), and use of support seeking to cope ($r[111] = -.28, p = .003$, 95% CI = $-.10$ to $-.47$).

For multilevel models, the following covariates were identified: female gender was associated with greater likelihood of having contact with family members ($\beta = 1.10$, OR = 3.00, 95% CI = 1.52 to 5.93, $t[109] = 3.21, p = .002$) and negative affect ($\beta = .39$, SE = .19, $t[110] = 2.03, p = .045$); participants in a romantic relationship were significantly less likely to report contact with peers ($\beta = -.70$, OR = .50, 95% CI = .34 to .73, $t[109] = -3.60, p < .001$) and family ($\beta = -.80$, OR = .45, 95% CI = .26 to .77, $t[109] = -2.97, p = .004$), and perceived less support during and following interactions with family ($\beta = -14.47$, SE = 2.91, $t[112] = -4.98, p < .001$); heterosexual participants reported significantly less negative affect ($\beta = -.40$, SE = .18, $t[110] = -2.15, p = .03$); and number of current psychiatric disorders was associated with perceived support from family ($\beta = -1.85$, SE = .79, $t[109] = -2.36, p = .002$) and peers ($\beta = -1.88$, SE = .62, $t[107] = -3.03, p = .003$).

PRIMARY ANALYSES

Group Differences in Baseline Interpersonal Functioning—Group means and standard deviations, as well as between-group comparisons and effect sizes, for each of the baseline measures are presented in Table 3. Consistent with Hypothesis 1, univariate analyses revealed that participants with (vs. without) NSSI reported significantly more social anxiety ($p = .004$), greater relationship-oriented reassurance seeking ($p = .003$), and less use of support seeking relative to other coping strategies ($p = .03$) at baseline. Effect sizes were

medium ($\eta^2_s = .05$ to $.08$). Contrary to Hypothesis 1, however, multivariate tests did not reveal significant group differences in perceived interpersonal competence ($p = .21$) or support provision ($p = .10$).

Group Differences in Daily Interpersonal Functioning—Results of the multilevel analyses are summarized in Table 4. Consistent with Hypothesis 2a, participants with (vs. without) NSSI reported less frequent contact with family members ($\beta = -.75$, $t[112] = -2.69$) and peers ($\beta = -.39$, $t[113] = -2.02$); contrary to this hypothesis, however, they reported more frequent contact with romantic partners ($\beta = .71$, $t[53] = 2.19$). Partially consistent with Hypothesis 2b, participants with (vs. without) NSSI reported less perceived support during and following interactions with peers ($t[110] = -2.68$), but did not differ from the non-NSSI group in their ratings of support received from romantic partners ($t[53] = -1.26$) or family members ($t[107] = -0.75$). Inconsistent with Hypothesis 2c, group did not significantly moderate the association of negative interpersonal interactions with subsequent negative affect within-day ($t[112] = -1.13$) or between days ($t[111] = 0.69$). Finally, and partially consistent with Hypothesis 2d, participants with (vs. without) NSSI were significantly less likely to use support seeking to cope with distress relative to other coping strategies ($t[114] = -2.43$); however, the association of negative affect with support seeking did not differ significantly by group ($t[114] = -.60$), suggesting that participants with and without NSSI were both less likely to cope by seeking support on days with higher levels of negative affect.

POST-HOC ANALYSES

Given the significant group differences in baseline measures of social anxiety, excessive reassurance seeking, and use of support seeking relative to other coping strategies, we examined the extent to which these baseline differences accounted for the observed between-group differences in daily interpersonal functioning. After including these three baseline variables as additional level-2 covariates in the multilevel models, the previously observed group difference in contact with peers became nonsignificant ($OR = .86$, 95% $CI = .55$ to 1.36 , $t[105] = -.63$, $p = .53$) and baseline social anxiety accounted for significant variance in likelihood of having contact with peers ($OR = 0.97$, 95% $CI = .94$ to $.99$, $t[105] = -2.22$, $p = .03$). However, group differences in daily contact with family members ($OR = .32$, 95% $CI = .16$ to $.63$, $t[104] = -3.36$, $p = .001$) and romantic partners ($OR = 2.35$, 95% $CI = .99$ to 5.58 , $t[50] = 1.99$, $p = .05$) remained significant. With respect to perceived support, the previously observed group differences in perceived support from peers became nonsignificant when the baseline measures were included in the model ($\beta = -2.72$, $SE = 2.21$, $t[102] = -1.24$, $p = .22$) and the use of support seeking to cope accounted for daily levels of perceived support from peers ($\beta = 26.68$, $SE = 13.42$, $t[102] = 1.99$, $p = .05$). Finally, group differences in the daily use of support seeking to cope became nonsignificant when baseline measures of social anxiety and reassurance seeking were included in the model ($\beta = -.008$, $SE = .008$, $t[107] = -1.01$, $p = .32$), with baseline social anxiety emerging as the only significant predictor of the daily use of support seeking to cope with distress ($\beta = -.0016$, $SE = .0004$, $t[107] = -3.88$, $p < .001$).

Discussion

This study takes an important step in testing interpersonal theories of NSSI by examining how daily interpersonal experiences relate to global interpersonal impairments in young adults with NSSI. Our findings highlight a number of important differences in both baseline and daily interpersonal functioning between young adults with versus without recent repeated NSSI. First, these findings underscore specific impairments in peer relationships experienced by individuals with NSSI. Specifically, young adults with (vs. without) NSSI reported less frequent contact with peers during the 2-week diary period, and perceived these peer interactions to be less supportive. Notably, however, these differences in daily peer interactions were accounted for by group differences in baseline levels of social anxiety and the use of support seeking to cope with distress. These findings are consistent with the cognitive vulnerability–stress model of NSSI (Guerry & Prinstein, 2010), which suggests that cognitive and behavioral processes associated with anxiety interfere with effective interpersonal behaviors in people with NSSI. Moreover, these findings highlight several potential mechanisms through which individuals with NSSI may experience worse quality peer relationships (Claes et al., 2010; Hilt et al., 2008; Hoff & Muehlenkamp, 2009), including the experience of less frequent and less satisfying peer interactions, behavioral and cognitive difficulties associated with social anxiety (e.g., fears of negative evaluation and associated behavioral avoidance), and the tendency to rely on intrapersonal (vs. interpersonal) coping strategies during times of distress. Over the long term, these pathways are likely to result in difficulties forming and maintaining positive peer relationships. Moreover, a reluctance to confide in peers to cope with distress may contribute to a sense of isolation and dissatisfaction in peer relationships. Future micro-longitudinal research examining other aspects of peer interactions, as well as specific cognitive biases such as rejection sensitivity and negative attribution bias, may elucidate additional reasons why individuals with NSSI have greater difficulties preserving positive, supportive relationships with their peers.

Findings from this study also highlight potentially important impairments in relationships with family members. Consistent with both developmental models of NSSI (Yates, 2004) and previous research showing that adolescents and young adults with NSSI report worse quality relationships with their caregivers (Gratz et al., 2002; Muehlenkamp et al., 2013), participants with (vs. without) NSSI reported less frequent contact with their families over the 2-week diary period. This difference was not related to baseline group differences in social anxiety, reassurance seeking, or the use of support seeking to cope. It should be noted, however, that although they had less contact with family members, young adults with NSSI did not differ from the non-NSSI group in their perceptions of support during and following interactions with their families. Thus, poorer quality of relationships with caregivers in populations with NSSI may be best accounted for by differences in the quantity rather than quality of interpersonal interactions. The extent to which these differences are related to the problems in early caregiving relationships theorized to contribute to NSSI in some models of this behavior (Yates, 2004) requires further examination.

With respect to romantic relationships (and contrary to our expectations), results suggested that participants with NSSI reported *more* frequent contact with their romantic partners than

participants without NSSI. Moreover, participants with and without NSSI did not differ in their perceptions of support during and following their interactions with romantic partners. One possible explanation is that contact with romantic partners may reflect a compensatory strategy. Specifically, the greater social anxiety and avoidance of peers exhibited by young adults with NSSI may promote greater reliance on romantic partners to provide support and reassurance. However, reliance on a single source of support may tax that relationship, contributing to relationship distress and potential conflict over time. This could explain why individuals with (vs. without) NSSI have been found to report higher rates of conflict and violence in their romantic relationships (see Levesque, Lafontaine, Bureau, Cloutier, & Dandurand, 2010; Rizzo et al., 2014; Taliaferro & Muehlenkamp, 2015). Indeed, results of this study suggest that individuals with NSSI are more likely to seek excessive reassurance from others—a relationship behavior linked to relationship stress and depression (see Evraire & Dozois, 2011; Starr, 2015; Stewart & Harkness, 2015). Thus, although individuals with NSSI may not experience their daily interactions with romantic partners as less supportive than those of individuals without NSSI, their relationship behaviors could have a detrimental impact on the quality and health of their romantic relationships in the long term. Alternatively, given past findings of greater expressive suppression among young adults with NSSI (McClain Jacobson, Hill, Pettit, & Grozeva, 2015; Richmond, Hasking, & Meaney, 2015), the more frequent contact with romantic partners reported by individual with (vs. without) NSSI may not correspond to a greater frequency of expressions of distress or negative affect. Rather, the tendency to suppress the expression of negative affect may promote the avoidance of difficult or distressing topics, leading to greater perceptions of support (see Kashdan, Volkmann, Breen, & Han, 2007). Together, these findings suggest that many of the interpersonal impairments previously documented among individuals with NSSI could be related to an overreliance on certain sources of support at the exclusion of more varied sources of support, coupled with dysfunctional interpersonal behaviors (e.g., excessive reassurance seeking, social avoidance). These findings are consistent with the developmental theory of NSSI (Yates, 2004), which posits that negative experiences in childhood can lead to impairments across motivational, affective, and interpersonal domains, including social anxiety, avoidance, and reassurance seeking. Moreover, findings may inform the social signaling hypothesis (Nock, 2008) by explicating specific behaviors that impair the ability of self-injuring individuals to meet interpersonal goals (increasing the reliance on more costly behavioral signals of distress such as NSSI).

Although the aforementioned findings provide insight into the pervasive interpersonal problems reported by individuals with NSSI, this study also yielded a number of unexpected findings. For example, inconsistent with the social signaling hypothesis (Nock, 2008) and previous work demonstrating impaired social competence among individuals with NSSI (Baetens et al., 2012), we did not find significant differences between the NSSI and non-NSSI groups in their perceived interpersonal competence or likelihood of providing support to others at baseline. Study differences in the sample age (i.e., young adult vs. adolescents) and measures used to assess interpersonal competence (i.e., two measures assessing specific domains of competence vs. a broad survey of youth competencies) may account for the discrepant findings of the current study compared to a previous study (Baetens et al., 2012). Further research using more objective measures of interpersonal competence (e.g., in vivo

tasks requiring the participant to provide or receive support, or navigate a disagreement) is needed to clarify whether individuals with NSSI in fact struggle to perform specific interpersonal tasks. A second unexpected finding was the absence of between-group differences in the strength of the association between negative interpersonal interactions and subsequent negative affect, either later that day or the following day. These findings are inconsistent with the cognitive vulnerability–stress model of NSSI (Guerry & Prinstein, 2010), which posits more intense emotional reactivity to interpersonal stressors among individuals with NSSI. One possible explanation for this unexpected finding is that the assessment schedule utilized in this study was not sufficiently sensitive to detect differences in emotional reactivity to interpersonal stressors, either because these emotional responses are more brief (e.g., lasting an hour or less) or more enduring (e.g., lasting several days) than would be characterized by three retrospective reports per day. It is also possible that because our measure of negative interpersonal interactions did not assess the source of the conflict (e.g., romantic partner or close friend versus acquaintance), we were not able to distinguish the particular interactions that are most likely to provoke intense negative affect in this population. It should also be noted that although some laboratory studies have found greater physiological arousal in response to a frustrating (non-interpersonal) task among youth with (vs. without) a history of NSSI (Nock & Mendes, 2008), others have found attenuated cortisol responses during stressful interpersonal tasks among women with (vs. without) NSSI (Kaess et al., 2012). Further work is needed to clarify the nature and intensity of emotional responses to interpersonal stressors in populations with and without NSSI.

In interpreting the results of this study, a number of limitations should be considered. First, this study examined interpersonal functioning among individuals with an established pattern of NSSI (i.e., at least 10 lifetime episodes). Moreover, the sample reported relatively severe NSSI, as evidenced by high rates of cutting and past medical treatment for NSSI, as well as the use of multiple methods of NSSI (see Turner, Layden, Butler, & Chapman, 2013). Although this is a clinically relevant population, the extent to which our findings generalize to individuals with less frequent, severe, or emerging NSSI remains unclear. Second, this study focused on young adults; thus, findings may not generalize to adolescent or older adult populations. Given the changing nature of interpersonal support across these developmental periods, future research should examine both baseline and daily interpersonal functioning among more diverse groups of individuals with emerging and established patterns of NSSI. Third, although the use of a daily diary procedure was expected to reduce participant burden and increase compliance and response rates relative to procedures with multiple daily assessments, the daily diary may introduce bias related to the retrospective nature of the daily reporting. Moreover, a more frequent daily assessment schedule would facilitate a more fine-grained analysis of the associations between negative affect and social support within each day. Fourth, the exclusive reliance on participant self-reported interpersonal experiences may be influenced by trait-level cognitive styles and interpretation biases that color perceptions of interpersonal experiences. Future research should incorporate ratings from close family members, friends, and/or romantic partners to corroborate participants' reports of their interpersonal competence, contact, reactivity, and support. More objective ratings of interpersonal competence, as well as partner support behavior, could also be obtained by coding the interactions of individuals with NSSI and their romantic partners in

the laboratory. Finally, given that the current study did not assess global indicators of interpersonal functioning (e.g., global loneliness or perceived relationship quality; size of each individual's social support network), the overall level of interpersonal functioning among participants cannot be determined. It is possible that some of the observed differences in peer interpersonal functioning (e.g., less frequent contact with peers) may stem from group differences in the size or availability of participants' social networks. Future research examining the scope and size of social networks is needed. Additionally, it is possible that the unexpected lack of differences in some aspects of daily interpersonal functioning may be due to sample characteristics and an unusually nondistressed NSSI sample.

Despite these limitations, the current research provides a direct test of several key tenets of extant interpersonal models of NSSI (Nock, 2008; Prinstein et al., 2009; Yates, 2004). Consistent with these models, results suggest that individuals who engage in NSSI are less likely to perceive their interactions with peers as supportive and to seek support to cope with distress on a daily basis—differences that are accounted for by greater social anxiety and tendency to rely on intrapersonal (vs. interpersonal) coping strategies during times of distress. Individuals who engage in NSSI may experience more insecurity in their relationships with others, driving avoidance of peers on the one hand and excessive reassurance seeking on the other. By investigating differences in both baseline interpersonal functioning and day-to-day interpersonal experiences, the results of this study elucidate areas of impairment (i.e., lack of contact and/or perceived support in relationships with peers and family) and relative resilience (i.e., contact with and perceived support from romantic partners). Additional research in this area may lead to a better understanding of how, when, and why specific interpersonal events prompt or maintain NSSI behavior, thereby identifying potential areas of intervention.

Acknowledgments

The first author wishes to gratefully acknowledge the Canadian Institutes of Health Research for the CGS Doctoral Award and Banting Postdoctoral Fellowship that supported this work. Funding for this study was provided by an Operating Grant from the Canadian Institutes of Health Research awarded to the third and fourth authors.

References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4. Washington, DC: Author; 2000. text rev
- Amirkhan JH. A factor analytically derived measure of coping: The Coping Strategy Indicator. *Journal of Personality and Social Psychology*. 1990; 59(5):1066–1074. <http://dx.doi.org/10.1037/0022-3514.59.5.1066>.
- Amirkhan JH. Criterion validity of a coping measure. *Journal of Personality Assessment*. 1994; 62(2): 242–261. http://dx.doi.org/10.1207/s15327752jpa6202_6. [PubMed: 8189334]
- Andover MS, Pepper CM, Gibb BE. Self-mutilation and coping strategies in a college sample. *Suicide and Life-Threatening Behavior*. 2007; 37:238–243. <http://dx.doi.org/10.1521/suli.2007.37.2.238>. [PubMed: 17521275]
- Baetens I, Claes L, Muehlenkamp J, Grietens H, Onghena P. Differences in psychological symptoms and self-competencies in non-suicidal self-injurious Flemish adolescents. *Journal of Adolescence*. 2012; 35(3):753–759. <http://dx.doi.org/10.1016/j.adolescence.2011.11.001>. [PubMed: 22189014]

- Buhrmester D, Furman W, Wittenberg MT, Reis HT. Five domains of interpersonal competence in peer relationships. *Journal of Personality and Social Psychology*. 1988; 55(6):991–1008. <http://dx.doi.org/10.1037/0022-3514.55.6.991>. [PubMed: 3216292]
- Claes L, Houben A, Vandereycken W, Bijttebier P, Muehlenkamp J. Brief report: The association between non-suicidal self-injury, self-concept and acquaintance with self-injurious peers in a sample of adolescents. *Journal of Adolescence*. 2010; 33(5):775–778. <http://dx.doi.org/10.1016/j.adolescence.2009.10.012>. [PubMed: 19910041]
- Cramer D. How a supportive partner may increase relationship satisfaction. *British Journal of Guidance and Counselling*. 2006; 34(1):117–131. <http://dx.doi.org/10.1080/03069880500483141>.
- Evraire LE, Dozois DJA. An integrative model of excessive reassurance seeking and negative feedback seeking in the development and maintenance of depression. *Clinical Psychology Review*. 2011; 31(8):1291–1303. <http://dx.doi.org/10.1016/j.cpr.2011.07.014>. [PubMed: 21983554]
- First, MB., Spitzer, RL., Gibbon, M., Williams, JBW. Structured Clinical Interview for DSM-IV Axis I Disorders, Clinician Version (SCID-CV). Washington, DC: American Psychiatric Press; 1996.
- Giletta M, Scholte RHJ, Engels RC, Ciairano S, Prinstein MJ. Adolescent non-suicidal self-injury: A cross-national study of community samples from Italy, the Netherlands and the United States. *Psychiatry Research*. 2012; 197(1–2):66–72. <http://dx.doi.org/10.1016/j.psychres.2012.02.009>. [PubMed: 22436348]
- Glassman LH, Weierich MR, Hooley JM, Deliberto TL, Nock MK. Child maltreatment, non-suicidal self-injury, and the mediating role of self-criticism. *Behavior Research and Therapy*. 2007; 45(10):2483–2490. <http://dx.doi.org/10.1016/j.brat.2007.04.002>.
- Glenn CR, Klonsky ED. Nonsuicidal self-injury disorder: An empirical investigation in adolescent psychiatric patients. *Journal of Clinical Child and Adolescent Psychology*. 2013; 42(4):496–507. <http://dx.doi.org/10.1080/15374416.2013.794699>. [PubMed: 23682597]
- Goldsmith DJ, McDermott VM, Alexander SC. Helpful, supportive and sensitive: Measuring the evaluation of enacted social support in personal relationships. *Journal of Social and Personal Relationships*. 2000; 17(3):369–391. <http://dx.doi.org/10.1177/0265407500173004>.
- Gratz KL. Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment*. 2001; 23(4):253–263. <http://dx.doi.org/10.1023/A:1012779403943>.
- Gratz KL, Chapman AL, Dixon-Gordon KL, Tull MT. Exploring the association of deliberate self-harm with emotional relief using a novel Implicit Association Test. *Personality Disorders: Theory, Research, and Treatment*. 2016; 7(1):91–102. <http://dx.doi.org/10.1037/per0000138>.
- Gratz KL, Conrad SD, Roemer L. Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry*. 2002; 72(1):128–140. <http://dx.doi.org/10.1037/0002-9432.72.1.128>. [PubMed: 14964602]
- Guerry JD, Prinstein MJ. Longitudinal prediction of adolescent nonsuicidal self-injury: Examination of a cognitive vulnerability-stress model. *Journal of Clinical Child and Adolescent Psychology*. 2010; 39(1):77–89. <http://dx.doi.org/10.1080/15374410903401195>. [PubMed: 20390800]
- Guertin T, Lloyd-Richardson E, Spirito A, Donaldson D, Boergers J. Self-mutilative behavior in adolescents who attempt suicide by overdose. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2001; 40(9):1062–9. <http://dx.doi.org/10.1097/00004583-200109000-00015>. [PubMed: 11556630]
- Heath NL, Ross S, Toste JR, Charlebois A, Nedecheva T. Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioral Science*. 2009; 41(3):180–186. <http://dx.doi.org/10.1037/a0015732>.
- Heimberg RG, Horner KJ, Juster HR, Safren SA, Brown EJ, Schneier FR, Liebowitz MR. Psychometric properties of the Liebowitz Social Anxiety Scale. *Psychological Medicine*. 1999; 29:199–212. [PubMed: 10077308]
- Hilt LM, Nock MK, Lloyd-Richardson E, Prinstein MJ. Longitudinal study of nonsuicidal self-injury among young adolescents: Rates, correlates, and preliminary test of an interpersonal model. *Journal of Early Adolescence*. 2008; 28(3):455–469. <http://dx.doi.org/10.1177/0272431608316604>.

- Hoff ER, Muehlenkamp JJ. Nonsuicidal self-injury in college students: The role of perfectionism and rumination. *Suicide and Life-Threatening Behavior*. 2009; 39(6):576–587. <http://dx.doi.org/10.1521/suli.2009.39.6.576>. [PubMed: 20121321]
- Joiner TE, Alfano MS, Metalsky GI. When depression breeds contempt: reassurance seeking, self-esteem, and rejection of depressed college students by their roommates. *Journal of Abnormal Psychology*. 1992; 101(1):165–173. [PubMed: 1537962]
- Joiner TE, Metalsky GI. Excessive reassurance seeking: Delineating a risk factor involved in the development of depression. *Psychological Science*. 2001; 12(5):371–378. [PubMed: 11554669]
- Kaess M, Hille M, Parzer P, Maser-Gluth C, Resch F, Brunner R. Alterations in the neuroendocrinological stress response to acute psychosocial stress in adolescents engaging in nonsuicidal self-injury. *Psychoneuroendocrinology*. 2012; 37(1):157–161. <http://dx.doi.org/10.1016/j.psyneuen.2011.05.009>. [PubMed: 21676550]
- Kashdan TB, Volkmann JR, Breen WE, Han S. Social anxiety and romantic relationships: The costs and benefits of negative emotion expression are context-dependent. *Journal of Anxiety Disorders*. 2007; 21(4):475–492. <http://dx.doi.org/10.1016/j.janxdis.2006.08.007>. [PubMed: 17045778]
- Klonsky ED. The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review*. 2007; 27(2):226–239. <http://dx.doi.org/10.1016/j.cpr.2006.08.002>. [PubMed: 17014942]
- Levesque C, Lafontaine M, Bureau J, Cloutier P, Dandurand C. The influence of romantic attachment and intimate partner violence on non-suicidal self-injury in young adults. *Journal of Youth and Adolescence*. 2010; 39(5):474–483. <http://dx.doi.org/10.1007/s10964-009-9471-3>. [PubMed: 19885722]
- Logan JM, Cobb RJ. Trajectories of relationship satisfaction: Independent contributions of capitalization and support perceptions. *Personal Relationships*. 2013; 20(2):277–293. <http://dx.doi.org/10.1111/j.1475-6811.2012.01408.x>.
- McClain Jacobson C, Hill RM, Pettit JW, Grozeva D. The association of interpersonal and intrapersonal emotional experiences with non-suicidal self-injury in young adults. *Archives of Suicide Research*. 2015; 19(4):401–413. <http://dx.doi.org/10.1080/13811118.2015.1004492>. [PubMed: 26212592]
- Muehlenkamp J, Brausch A, Quigley K, Whitlock J. Interpersonal features and functions of nonsuicidal self-injury. *Suicide and Life-Threatening Behavior*. 2013; 43(1):67–80. <http://dx.doi.org/10.1111/j.1943-278X.2012.00128.x>. [PubMed: 23082783]
- Nichols AL, Webster GD. Designing a brief measure of social anxiety: Psychometric support for a three-item version of the Interaction Anxiousness Scale (IAS-3). *Personality and Individual Differences*. 2015; 79:110–115.
- Nock MK. Actions speak louder than words: An elaborated theoretical model of the social functions of self-injury and other harmful behaviors. *Applied & Preventive Psychology*. 2008; 12(4):159–168. <http://dx.doi.org/10.1016/j.appsy.2008.05.002>. [PubMed: 19122893]
- Nock MK. Why do people hurt themselves?: New insights into the nature and functions of self-injury. *Current Directions in Psychological Science*. 2009; 18(2):78–83. <http://dx.doi.org/10.1111/j.1467-8721.2009.01613.x>. [PubMed: 20161092]
- Nock MK, Mendes WB. Physiological arousal, distress tolerance, and social problem-solving deficits among adolescent self-injurers. *Journal of Consulting and Clinical Psychology*. 2008; 76(1):28–38. <http://dx.doi.org/10.1037/0022-006X.76.1.28>. [PubMed: 18229980]
- Nock MK, Prinstein MJ, Sterba SK. Revealing the form and function of self-injurious thoughts and behaviors: A real-time ecological assessment study among adolescents and young adults. *Journal of Abnormal Psychology*. 2009; 118(4):816–827. <http://dx.doi.org/10.1037/a0016948>; 10.1037/a0016948.supp. [PubMed: 19899851]
- Prinstein, MJ., Guerry, JD., Browne, CB., Rancourt, D. Interpersonal models of nonsuicidal self-injury. In: Nock, MK., editor. *Understanding nonsuicidal self-injury: Origins, assessment, and treatment*. Washington, DC: American Psychological Association; 2009. p. 79-98. <http://dx.doi.org/10.1037/11875-005>
- Raudenbush, SW., Bryk, AS., Congdon, R. HLM 7 for Windows. Skokie, IL: Scientific Software International, Inc; 2010.

- Richmond S, Hasking P, Meaney R. Psychological distress and non-suicidal self-injury: The mediating roles of rumination, cognitive reappraisal and expressive suppression. *Archives of Suicide Research*. 2015 Epub ahead of print.
- Rizzo CJ, Esposito-Smythers C, Swenson L, Hower HM, Wolff J, Spirito A. Dating violence victimization, dispositional aggression, and nonsuicidal self-injury among psychiatrically hospitalized male and female adolescents. *Suicide and Life-Threatening Behavior*. 2014; 44(3): 338–351. <http://dx.doi.org/10.1111/sltb.12081>. [PubMed: 24612026]
- Ruehlman LS, Karoly P. With a little flak from my friends: Development and preliminary validation of the Test of Negative Social Exchange (TENSE). *Psychological Assessment*. 1991; 3(1):97–104. <http://dx.doi.org/10.1037/1040-3590.3.1.97>.
- Selby EA, Bender TW, Gordon KH, Nock MK, Joiner TE Jr. Non-suicidal self-injury (NSSI) disorder: A preliminary study. *Personality Disorders: Theory, Research, and Treatment*. 2011; 3(2):167–175. <http://dx.doi.org/10.1037/a0024405>.
- Snir A, Rafaeli E, Gadassi R, Berenson K, Downey G. Explicit and inferred motives for nonsuicidal self-injurious acts and urges in borderline and avoidant personality disorder. *Journal of Personality Disorders*. 2015; 6(3):267–277. <http://dx.doi.org/10.1037/per0000104>.
- Starr LR. When support seeking backfires: Co-rumination, excessive reassurance seeking, and depressed mood in the daily lives of young adults. *Journal of Social and Clinical Psychology*. 2015; 34(5):436–457. [PubMed: 29151669]
- Stewart JG, Harkness KL. The interpersonal toxicity of excessive reassurance-seeking: Evidence from a longitudinal study of romantic relationships. *Journal of Social and Clinical Psychology*. 2015; 34(5):392–410.
- Taliaferro LA, Muehlenkamp JJ. Factors associated with current versus lifetime self-injury among high school and college students. *Suicide and Life-Threatening Behavior*. 2015; 45(1):84–97. <http://dx.doi.org/10.1111/sltb.12117>. [PubMed: 25169623]
- Turner BJ, Cobb RJ, Gratz KL, Chapman AL. The role of interpersonal conflict and perceived social support in nonsuicidal self-injury in daily life. *Journal of Abnormal Psychology*. 2016; 125(4): 588–598. <http://dx.doi.org/10.1037/abn0000141>. [PubMed: 26845256]
- Turner BJ, Layden BK, Butler SM, Chapman AL. How often, or how many ways: Clarifying the relationship between non-suicidal self-injury and suicidality. *Archives of Suicide Research*. 2013; 17(4):397–415. <http://dx.doi.org/10.1080/13811118.2013.802660>. [PubMed: 24224673]
- Vaux A, Riedel S, Stewart D. Modes of social support: The Social Support Behaviors (SS-B) Scale. *American Journal of Community Psychology*. 1987; 15(2):209–232. <http://dx.doi.org/10.1007/BF00919279>.
- Watson D, Friend R. Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology*. 1969; 33(4):448–457. <http://dx.doi.org/10.1037/h0027806>. [PubMed: 5810590]
- Wilhelm P, Schoebi D. Assessing mood in daily life: Structural validity, sensitivity to change, and reliability of a short-scale to measure three basic dimensions of mood. *European Journal of Psychological Assessment*. 2007; 23(4):258–267. <http://dx.doi.org/10.1027/1015-5759.23.4.258>.
- Yates TM. The developmental psychopathology of self-injurious behavior: Compensatory regulation in post-traumatic adaptation. *Clinical Psychology Review*. 2004; 24:35–74. <http://dx.doi.org/10.1016/j.cpr.2003.10.001>. [PubMed: 14992806]
- Zanarini MC, Frankenburg FR, Chauncey DL, Gunderson JG. The diagnostic interview for personality disorders: Interrater and test-retest reliability. *Comprehensive Psychiatry*. 1987; 28(6):467–480. [http://dx.doi.org/10.1016/0010-440X\(87\)90012-5](http://dx.doi.org/10.1016/0010-440X(87)90012-5). [PubMed: 3691072]

Table 1

Demographic and Diagnostic Characteristics of the Sample as a Function of NSSI Group Status

| | Non-NSSI <i>n</i> = 56 | NSSI <i>n</i> = 60 |
|---|---------------------------|----------------------------|
| Age <i>M</i> (<i>SD</i>) | 23.91 (5.14) | 23.14 (4.19) |
| % female | 69.6 | 85.0 [*] |
| % heterosexual | 92.5 | 61.7 ^{***} |
| % completed university degree | 30.9 | 23.8 |
| % in romantic relationship | 41.7 | 58.9 |
| Number of current DSM-IV disorders <i>M</i> (<i>SD</i>) | 0.31 (0.66) | 2.05 (2.02) ^{***} |
| % with at least one current DSM-IV disorder | 21.5 | 73.3 ^{***} |
| Current mood disorders (%) | 3.6 | 23.3 ^{**} |
| Major depressive disorder | 1.8 | 13.3 [*] |
| Dysthymic disorder | 1.8 | 8.3 |
| Bipolar disorder | 0 | 3.3 |
| Current anxiety disorders (%) | 12.5 | 55.0 ^{***} |
| Generalized anxiety disorder | 1.8 | 15.0 [*] |
| Specific phobia | 5.4 | 16.7 |
| Social phobia | 3.6 | 20.0 ^{**} |
| Current alcohol abuse (%) | 1.8 | 5.0 |
| Current personality disorders (%) | 10.9 | 40.0 ^{***} |
| Frequency of NSSI <i>M</i> (<i>SD</i>) | – | 421.28 (571.12) |
| Number of NSSI methods <i>M</i> (<i>SD</i>) | – | 6.12 (2.48) |
| Cutting behavior <i>n</i> (%) | – | 51 (85%) |
| Medically treated for NSSI <i>n</i> (%) | – | 20 (33%) |

Note. Current mood, anxiety, and alcohol use disorders were defined as having met diagnostic criteria within the past month (although not in the past 2 weeks for current mood disorders). Current personality disorders were defined as having met diagnostic criteria within the past 2 years.

^{*}
 $p < .05$,

^{**}
 $p < .01$,

^{***}
 $p < .001$; significance tests are presented for bivariate comparisons.

Table 2

Descriptive Information and Reliability of Baseline and Daily Diary Measures

| | N observations | Min | Max | Mean | SD |
|------------------------------------|----------------|------|------|-------|-------|
| ICQ - initiating | 111 | 8 | 38 | 23.99 | 6.60 |
| ICQ - disclosing | 111 | 8 | 35 | 22.15 | 6.89 |
| ICQ - provide support | 111 | 8 | 39 | 24.14 | 6.73 |
| ICQ - asserting/disagreeing | 111 | 17 | 40 | 31.79 | 5.24 |
| ICQ - conflict | 111 | 12 | 37 | 26.74 | 5.49 |
| SS-B - emotional support | 111 | 23 | 50 | 41.92 | 6.88 |
| SS-B - practical support | 111 | 16 | 35 | 28.19 | 5.14 |
| SS-B - financial support | 111 | 12 | 40 | 29.20 | 6.75 |
| SS-B - advice/guidance | 111 | 11 | 40 | 25.62 | 7.79 |
| SS-B - social support | 111 | 24 | 60 | 47.05 | 9.09 |
| Social anxiety | 111 | 0 | 28 | 12.10 | 8.42 |
| Reassurance seeking | 111 | 4 | 28 | 11.96 | 6.85 |
| Support seeking (baseline) | 111 | 0.17 | 0.46 | 0.34 | 0.06 |
| Contact with peers | 4408 | 0 | 1 | 0.42 | 0.49 |
| Contact with family | 4414 | 0 | 1 | 0.33 | 0.47 |
| Contact with romantic partners | 2475 | 0 | 1 | 0.51 | 0.50 |
| Support from peers | 1833 | 12 | 84 | 61.28 | 14.99 |
| Support from family | 1436 | 12 | 84 | 58.37 | 16.19 |
| Support from romantic partners | 1273 | 12 | 84 | 63.64 | 17.26 |
| Negative affect | 4424 | 0 | 6 | 2.57 | 1.32 |
| Negative interpersonal interaction | 4417 | 0 | 17 | 1.07 | 2.33 |
| Support seeking (daily) | 1432 | 0.14 | 0.54 | 0.28 | 0.07 |

Note. ICQ = Interpersonal Competence Questionnaire; SS-B = Social Support Behaviors Scale.

Table 3

Self-Reported Baseline Interpersonal Functioning as a Function of NSSI Status

| | Non-NSSI | | NSSI | | F | p | η^2 |
|-----------------------------|----------|------|----------|------|------|------|----------|
| | (n = 56) | | (n = 60) | | | | |
| | M | SD | M | SD | | | |
| ICQ - initiating | 25.59 | 5.81 | 22.47 | 6.98 | | .24 | .01 |
| ICQ - disclosing | 24.15 | 5.99 | 20.26 | 7.19 | | .07 | .03 |
| ICQ - provide support | 26.44 | 6.52 | 21.95 | 6.23 | 1.45 | .03 | .05 |
| ICQ - asserting/disagreeing | 32.44 | 5.22 | 31.18 | 5.23 | | .74 | .001 |
| ICQ - conflict | 28.31 | 5.21 | 25.25 | 5.36 | | .16 | .02 |
| SS-B - emotional support | 41.30 | 7.47 | 42.51 | 6.28 | | .36 | .008 |
| SS-B - practical support | 27.76 | 5.67 | 28.60 | 4.59 | | .39 | .007 |
| SS-B - financial support | 29.06 | 6.60 | 29.33 | 6.95 | 1.88 | .83 | <.001 |
| SS-B - advice/guidance | 24.48 | 7.31 | 26.70 | 8.14 | | .13 | .02 |
| SS-B - social support | 45.80 | 9.71 | 48.23 | 8.38 | | .16 | .02 |
| Social anxiety and distress | 8.20 | 7.04 | 15.79 | 7.98 | 8.57 | .004 | .07 |
| Reassurance seeking | 23.21 | 6.22 | 27.98 | 5.72 | 9.18 | .003 | .08 |
| Support seeking | 0.36 | 0.05 | 0.32 | 0.07 | 5.04 | .03 | .05 |

Note. ICQ = Interpersonal Competence Questionnaire; SS-B = Social Support Behaviors Scale. Inferential analyses and effect sizes are presented for analyses with covariates, but unadjusted (raw) means and standard errors are presented.

Table 4

Multilevel Analyses Comparing Daily Interpersonal Experiences Between Participants With and Without NSSI

| | | OR | 95% CI | <i>p</i> |
|---------------------------------------|------------------|-----------|---------------|-----------------|
| Contact with peers | Intercept | 1.15 | (0.82, 1.61) | 0.430 |
| | Group | 0.68 | (0.46, 0.99) | 0.046 |
| Contact with family | Intercept | 0.33 | (0.17, 0.61) | <0.001 |
| | Group | 0.47 | (0.27, 0.82) | 0.008 |
| Contact with partners | Intercept | 0.84 | (0.55, 1.28) | 0.408 |
| | Group | 2.04 | (1.06, 3.92) | 0.033 |
| | | Est. | SE | <i>p</i> |
| Support from peers | Intercept | 62.50 | 1.38 | <0.001 |
| | Group | -5.10 | 1.90 | 0.008 |
| Support from family | Intercept | 58.11 | 1.99 | <0.001 |
| | Group | -2.05 | 2.79 | 0.460 |
| Support from partners | Intercept | 65.15 | 2.54 | <0.001 |
| | Group | -4.30 | 3.43 | 0.215 |
| Within-day affect following conflict | | Est. | SE | <i>p</i> |
| | Intercept | 1.05 | 0.28 | <.001 |
| | Conflict | -0.03 | 0.05 | 0.61 |
| | Conflict * Group | -0.03 | 0.03 | 0.26 |
| Between-day affect following conflict | Intercept | 1.29 | 0.40 | 0.001 |
| | Conflict | -0.20 | 0.07 | 0.006 |
| | Conflict * Group | 0.02 | 0.03 | 0.49 |
| | | Est. | SE | <i>p</i> |
| | Intercept | 0.29 | 0.005 | <0.001 |
| | Group | -0.02 | 0.007 | 0.017 |
| Support Seeking | | | | |
| | Affect | -0.002 | 0.005 | 0.748 |
| | Group * Affect | -0.004 | 0.006 | 0.549 |

Note. Each model adjusted for the appropriate level 2 covariates.