DISCRETE INTERPERSONAL STRESS EXPERIENCES AND PROSPECTIVE SUICIDAL THOUGHTS AND BEHAVIORS ACROSS THE PUBERTAL TRANSITION

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ABSTRACT

Maya Massing-Schaffer: Discrete Interpersonal Stress Experiences and Prospective Suicidal Thoughts and Behaviors Across the Pubertal Transition
(Under the direction of Mitchell J. Prinstein)

Suicide risk dramatically increases across the pubertal transition. This study examined the relationship between two discrete interpersonal stressors, relational victimization and targeted rejection, and prospective suicide ideation and attempts. The potential moderating effects of pubertal development were also observed. 160 adolescents (ages 12 to 18) at heightened risk for self-injurious behaviors were followed over an eighteen-month interval. Participants completed phone-based assessments of suicidal thoughts and behaviors over the first nine months (Time 1) and the second nine months (Time 2). Independently coded measures of relational victimization and targeted rejection were derived from interviews of life stress at Time 1. Assessments of puberty and demographic information were collected at the beginning of Time 1. Findings from logistic regression analyses indicated that relational victimization at Time 1 was associated with increased odds of suicide attempt but not ideation at Time 2, after accounting for prior suicidality and depressive symptoms. Main and moderating effects of pubertal development were not significant. The current study sheds light on potential discrete interpersonal stress experiences associated with heightened risk for suicidal thoughts and behaviors in adolescent females. Evidence-based intervention programs and screening tools that directly target relational victimization are urgently needed.

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INTRODUCTION

Suicide risk dramatically rises across the pubertal transition, with rates of completed suicide increasing 17-fold between preadolescence (ages 10-14) and adolescence (15-24) (Boeninger, Masyn, Feldman, & Conger, 2010). These rates are especially high among adolescent girls. Data indicate that girls in the U.S. are 1.6 times more likely than boys to attempt suicide, with 22% of girls reporting suicidal ideation and 10.6% reporting suicide attempts each year (CDC, 2014). Despite the high public health impact of these trends− suicide remains the 2nd leading cause of death among 10-14 and 15-24 year olds, respectively (CDC, 2014)− researchers' ability to predict adolescent suicidal thoughts and behaviors has not improved over the last 50 years, and remains only slightly better than chance (Franklin et al., 2017). Furthermore, despite heightened risk of suicide in the transition to adolescence, little is known about how pubertal changes confer increased risk for suicide. More studies are needed to identify novel risk factors for suicide during this critical developmental transition.

Interpersonal stressors are strong predictors of suicide among males and females across the lifespan. Compared to other stressor domains (e.g., somatic and financial stressors), interpersonal life events are more strongly associated with suicidal ideation (Adams, Overholser, & Spirito, 1994; Belik, Cox, Stein, Asmundson, & Sareen, 2007; Borges et al., 2008; Fanous, Prescott, & Kendler, 2004; Fergusson, Woodward, & Horwood, 2000; Joiner & Rudd, 1995; Stein et al., 2010; Thompson et al., 2006; Wahlström, Michélsen, Schulman, & Backheden, 2010); attempts (Baca-Garcia et al., 2007; Belik et al., 2007; Belik, Stein, Asmundson, & Sareen, 2009; de Vanna et al., 1990; Fergusson et al., 2000); and death by suicide (Appleby, Cooper,

Amos, & Faragher, 1999; Cavanagh, Owens, & Johnstone, 1999; Duberstein, Conwell, Conner, Eberly, & Caine, 2004; Foster, Gillespie, McClelland, & Patterson, 1999; Waern, Rubenowitz, & Wilhelmson, 2003). Yet, it may be that some types of interpersonal stressors are especially relevant predictors of suicidal thoughts and behavior, particularly among adolescent girls. Few studies have examined the extent to which certain types of interpersonal stressors are most pertinent to suicide, however, leaving implications for prevention vague and nonspecific. As such, the following study will address this gap in the literature by exploring the potential contribution of two types of interpersonal stress: peer relational victimization and targeted social rejection.

Among researchers, peer victimization pertains to the experience of being a recipient of bullying, which has been defined as a form of aggression in which a relatively powerless person is exposed to repeated attacks, humiliation, or exclusion by an individual or group of individuals (Casper & Card, 2016; Hawker & Boulton, 2000; Salmivalli, 2010). Theoretical models of peer victimization offer two types of victimization: overt/physical; and covert/relational. Overt or physical victimization is characterized by harm to a child by physical threats or damage (Crick & Bigbee, 1998; Grotpeter & Crick, 1996). Relational victimization, however, involves behavior intended to damage peer acceptance through teasing, mocking, threatening, or making fun of the victim and spreading rumors (Cole, Maxwell, Dukewich, & Yosick, 2010; Crick & Bigbee, 1998; Grotpeter & Crick, 1996). The occurrence of peer victimization, including overt and relational forms, is remarkably common, with rates peaking in middle school years (Juvonen & Graham, 2001). Further, while males report higher rates of physical victimization, females are more likely to report experiences of relational victimization (Rudolph, Troop-Gordon, Hessel, & Schmidt, 2011). Of particular note, relational victimization is distinct from other forms of

interpersonal stressors. Although peer victimization can occur in the context of friendship, this type of interpersonal stress more often occurs within the context of non-close relationships (i.e., a child and peer(s) in a more powerful social position) (Graham & Bellmore, 2007). Moreover, peer victimization often involves continuity, or repetition over time (Craig & Pepler, 2007).

Targeted rejection is defined as a type of social rejection that is directed at, and meant to affect, a single person, and that involves an active and intentional severing of relational ties with that person (Slavich et al., 2010). In contrast to relational victimization, targeted rejection occurs in the context of close, established relationships. For example, a targeted rejection break-up occurs when an individual is broken up with by his or her romantic partner; a non-targeted rejection break-up occurs when an individual initiates a break up with his or her romantic partner (Slavich, Thornton, Torres, Monroe, & Gotlib, 2009). Targeted rejection can be characterized by two major components: (1) isolated impact and (2) loss of social ties. Notably, events of this type may occur in any life domain, including work, school, or relationship.

Notably, relational victimization and targeted rejection both represent interpersonal stressors that may be especially relevant to suicidal thoughts and behaviors. Indeed, both are examples of interpersonal loss, as described within the NIMH RDoC system. However, despite some theoretical overlap, relational victimization and targeted social rejection have emerged from disparate literatures. In particular, relational victimization has received considerable attention from peer relations researchers, who have pointed to strong links between victimization and a host of negative outcomes (Casper & Card, 2016; Crick, Casas, & Nelson, 2002). Targeted rejection, however, has been discussed by life stress researchers, primarily in the context of adult depression. Although strong associations between both types of interpersonal stress and internalizing symptomatology have been revealed, no studies have compared the

unique effects of these stressors in predicting adolescent suicidality. This study aims to bridge the gap between these two literatures, providing an examination of both constructs as related, yet distinct, predictors of suicidal thoughts and behaviors in adolescence.

Relatively few studies have examined relational victimization as a predictor of suicidal thoughts and behaviors. Among extant studies, mixed evidence has emerged. In a recent meta-analysis of cross-sectional studies, relational victimization was significantly associated with suicide ideation among individuals ages 9 to 21 years old (Gini & Espelage, 2014). However, some cross-sectional data do not support a link between peer victimization and increased risk for suicidal ideation and attempts (Dempsey, Haden, Goldman, Sivinski, & Wiens, 2011; Heilbron & Prinstein, 2010).

Few longitudinal studies have tested the extent to which peer victimization increases risk for later development of suicidal ideation or attempt. Among the few prospective studies, results are similarly inconsistent. In one study of Norwegian adolescents, support for a link between peer victimization and later suicidal ideation was not found, after controlling for baseline suicidality (Undheim, 2013). However, in a recent prospective study, victimization by peers at age 13 predicted suicidal ideation and suicide attempt at age 15, even after controlling for baseline suicidality, mental health problems, and demographic confounds. Moreover, youth who reported victimization at both 13 and 15 years were at the greatest risk for suicidal ideation and attempt at 15 years, indicating that longer histories of victimization may yield increased risk for suicidality (Geoffroy et al., 2016). This finding was supported in a second longitudinal study, which included multiple informants (e.g., child, parent and teacher) for the assessment of victimization (Winsper, Lereya, Zanarini, & Wolke, 2012). However, victim status included

both overt and covert forms of victimization in the latter study, so the unique effects of relational victimization on later suicidality are unclear.

Although no studies have examined targeted rejection in the context of suicide, recent evidence suggests that targeted rejection may be especially relevant to depression. In particular, researchers found that risk for depression increased significantly among individuals who recently experienced a targeted rejection event (Murphy, Slavich, Rohleder, & Miller, 2013). Further, Murphy and colleagues (2013) found that adolescent females at risk for depression had significantly higher levels of inflammatory markers after experiencing targeted rejection. Although the degree to which these findings extend to outcomes other than depression is not fully understood, this work may have strong implications for identifying specific interpersonal stressors relevant to adolescent suicide.

While there is some accumulating evidence that peer victimization and targeted social rejection may contribute to suicidality among adolescents, the extant literature is marked by several methodological limitations. First, the majority of prior research consists of cross-sectional studies. This trend is especially problematic, as the direction of effects cannot be established. For example, some researchers have suggested that internalizing symptomatology may increase risk for peer victimization (Hodges, Boivin, Vitaro, & Bukowski, 1999; Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999). As such, more studies examining the extent to which peer victimization experiences predict later suicidality are needed. Second, the preponderance of research on victimization and suicidality has relied on self-report measures of both constructs (Cole et al., 2010). Self-report measures of peer victimization have limitations, as individuals are susceptible to reporter biases (i.e., underreporting or overreporting) (Cillessen & Bellmore, 1999; Cole et al., 2010; De Los Reyes & Prinstein, 2004). Some prior studies have

used peer nominations to assess exposure to peer victimization, which offer a significant methodological advantage over self-report measures (Kim & Leventhal, 2008). Still, these procedures may be vulnerable to sequencing biases (i.e., names listed higher on the rosters receive more nominations) and reporter biases (Kim & Leventhal, 2008; Poulin & Dishion, 2008). Furthermore, peer nomination techniques do not address the severity of interpersonal stress (Poulin & Dishion, 2008). As such, absent yet from this literature are interview-based measures, which allow for independently-rated measures of discrete, interpersonal stress experiences.

Finally, there is reason to suspect that relational victimization and targeted rejection may be especially relevant to suicide in adolescence, compared to other developmental periods. During the onset of puberty, an influx of hormones causes increased sensitivity in socioaffective brain circuits due, in part, to the effects of these hormones on neurotransmitter systems. In particular, brain regions that are associated with social and emotional functionality are among those strongly affected by these hormonal changes (Somerville, 2013). Therefore, adolescents more advanced in pubertal development may be especially vulnerable to the effects of highly socially and emotionally relevant stressors, such as relational victimization or targeted rejection. Indeed, adolescents have shown evidence of heightened emotional responsiveness to experimentally manipulated social rejection at later pubertal stages. For example, Sebastian and colleagues (2010) found that relative to adults, adolescents who were excluded from a simulated ball-tossing game showed greater activity in the medial prefrontal cortex, a region associated with socioaffective processes (Sebastian, Viding, Williams, & Blakemore, 2010). At the same time that pubertal changes contribute to increased sensitivity to socioaffective information, the brain structures responsible for cognitive and emotional self-regulation (i.e., the prefrontal

cortex) are still maturing. Taken together, adolescents with high levels of pubertal development may be less capable of exerting cognitive or emotional control, particularly in emotionally or socially threatening situations (Somerville, 2013). These processes are especially salient in the context of suicide, which has been strongly associated with decreased cognitive control (Minzenberg et al., 2015). As such, pubertal development may be important for understanding the effects of interpersonal stress, particularly relational victimization and targeted rejection, on suicidal behavior.

The Current Study

The current study employed a prospective design using data from a sample of adolescent girls (n=160; ages 12-16) who are at risk for suicidality. The first aim is to better understand the relationships between interpersonal stress, particularly relational victimization and targeted rejection, and suicidality, including suicidal ideation and attempts. It is hypothesized that relational victimization and targeted rejection will be associated longitudinally with suicide ideation and attempts, above and beyond the effects of non-interpersonal stressful life events, demographic factors, and prior depression and suicidality. Supplemental analyses examined whether the effects of these interpersonal stressors would be stronger for girls who experienced advanced pubertal development. These hypotheses were examined during a critical developmental vulnerability period for the emergence of suicidal thoughts and behaviors as well as increases in rates of interpersonal stressors. A prospective design and semi-structured interview assessment of life stress were used to address limits of previous studies. Finally, the participants in this study included a clinically-referred sample of adolescent females at high risk for suicidality, offering an opportunity to examine these hypotheses within a sample rarely included in prior work.

Relational victimization and targeted social rejection were examined in a manner consistent with the conceptual literatures from which they were drawn. Specifically, peer relational victimization was conceptualized as only occurring within the context of non-close relationships (i.e., a non-friend, peer from school). However, targeted social rejection occurred only within the context of close, established relationships (i.e., close friends, romantic partners, family, or teachers). Second, while relational victimization did not require a change in relationship status, targeted rejection resulted in the severing of relational ties. As such, targeted rejection events were characterized by significant loss within one's social network (Gilbert, 1992). Third, targeted social rejection could occur within multiple relationship domains, including peers, romantic relationships, families, and teachers. Peer relational victimization, however, occurred only between similar-aged peers. Finally, peer relational victimization was often marked by continuity, or repetition over time (Craig & Pepler, 2007). Although individuals could experience multiple instances of targeted social rejection, this construct was conceptualized as an isolated episode.

METHOD

Participants

Participants included 160 adolescent females between the ages of 12 and 16 (*M*= 14.60, *SD*= 1.40) with a history of mental health concerns in the 2 years prior to the study. Approximately 63.8% of participants identified as Caucasian; 24.4% as African-American; 1.3% as Asian-American; and 10.6% as multiracial. In addition, 6.3% of the sample identified as Hispanic/Latina. The majority of adolescents reported living in a two-parent household (59.4%), with 38.8% two biological parents, 17.5% two adult caregivers (i.e., biological parent and a stepparent, grandparent or other relative), and 3.1% adoptive parents. Additionally, 39.4% reported living in a single-adult household. Household caregiver data were not reported by 1.3% of the sample. Of the original sample of 220 adolescents, 57 were excluded from the current analyses due to missing interview data at follow-up. Specifically, these participants were not retained due to withdrawal from the study (n=3), refusal (n=23) and inability to contact the family (n=31). No significant differences were found in age, minority status, depressive symptoms, or suicidality at baseline between the 160 participants in the current study and the original sample of 220 (all *ps* > .15). Participants who completed all measures reported significantly higher levels of pubertal development compared to those who were missing data [$t(239) = 6.13$, $p < .001$, $d = 0.73$]. As such, the study sample may overrepresent those with higher levels of pubertal development.

Recruitment

Participants were referred from local inpatient units, outpatient clinics, community mental health agencies, local high schools, and community advertisements, including flyers, emails and TV commercials. Participants were considered eligible to participate in the current study if the following inclusion criteria were met: 1) female gender; 2) 12 to 16 years old; and 3) a history of mental health concerns (i.e., affective disorders, anxiety, substance use, disruptive behavior disorders) in the two years prior to the study. A history of mental health concerns was defined as having either prior 1) psychiatric diagnosis; 2) mental health treatment; or 3) experience of elevated psychopathological symptoms, as indicated by parents' report to a modified KSADS-PL screener administered at the time of recruitment (KSADS-PL; Kaufman, Birmaher, Brent, & Rao, 1997). These inclusion criteria were selected to recruit a sample of adolescents at increased risk for engaging in suicidal behaviors. Participants were excluded from the study if they did not meet these inclusion criteria, or if they met exclusion criteria (i.e., active psychosis, pervasive developmental disorder, or parent-reported intellectual disability).

Procedure

Participants completed measures as part of a study that involved a baseline laboratory visit and follow-up calls every three months until 18 months post-baseline. For the purposes of these analyses, this 18-month period of intermittent assessment was divided into two epochs. Time 1 reflected suicide assessments over the first nine months. Time 2 captured the latter nine months. At the end of the initial epoch, Time 1, participants completed self-report questionnaires assessing depressive symptoms. At this same time point, a trained researcher administered a separate phone interview with adolescents assessing the occurrence of negative life events in the initial nine-month period (see Measures). To ensure accurate reporting of suicidal thoughts and behaviors during each epoch, phone-based structured clinical interviews

were conducted at three-month intervals. Time 2 suicidal ideation and attempts were based on three phone-based structured clinical interviews in the nine months following Time 1. Demographic information and data on adolescent pubertal development were collected at the original baseline laboratory visit. Participants were offered gift cards as compensation for their participation. Risk procedures based on those outlined by Helms and Prinstein (2014) were employed for all safety concerns.

Measures

Demographics. A brief self-report Demographics Questionnaire was administered at the original baseline visit to obtain data on age, race, and ethnicity.

Interpersonal Stress, Relational Victimization and Targeted Rejection. The Youth Life Stress Interview (Rudolph & Flynn, 2007) was administered at Time 1 to assess the occurrence of negative life events in the nine months prior to Time 1. Trained researchers probed for negative life events by asking, "Has anything happened in the past nine months that has upset you or caused you trouble, or have there been any big changes in your family or in your life?" For each episode, interviewers assessed the date, nature (i.e., details of what happened, duration, and consequences) and surrounding context (such as circumstances and resources to cope with it, expectedness, and prior experience with similar events). This information was paraphrased and recorded onto a transcript at the time of the phone call. Participants were also asked to estimate the dates of all stressful life events. Transcripts were stored on an encrypted drive accessible only by research staff.

In the present study, interviews were coded to determine the extent to which adolescents' life events were characterized as interpersonal vs. non-interpersonal. Based on prior work, interpersonal events were defined in this study as stressors that predominantly involve

relationships with other people (e.g., argument, break-up of relationship) or affect the participants' relationships with other people (e.g., a significant figure moves away or becomes ill) (Shih, Eberhart, Hammen, & Brennan, 2006). Stressors were considered non-interpersonal if they did not meet these criteria. Every episodic stressor was coded as either falling into the interpersonal or non-interpersonal subcategory, with no overlap between subcategories. In addition, each interpersonal event was coded as relational victimization, targeted rejection or other interpersonal stressors (non-specified). Coding was conducted by a team of two graduate students with extensive experience coding LSI interviews. These raters were also blind to the participants' diagnoses and subjective responses.

For relational victimization, the coders used a coding protocol based on previous researchers' definitions of relational victimization. In particular, events were considered to meet criteria for relational victimization if they involved "the experience of being the recipient of aggressive behavior from peers" (Casper & Card, 2016; Hawker & Boulton, 2000). Further, events coded as relational victimization involved three additional criteria: 1. Occurred within the context of non-close relationships (i.e., non-friend peers); 2. Involved an imbalance of power between perpetrator and victim (Graham & Bellmore, 2007); and 3. Occurred within a peer context (i.e., not within family or other domains).

For targeted rejection, the coders followed a coding scheme created by Dr. George Slavich. The coding scheme involves following a decision tree to identify whether a particular event may be characterized as targeted rejection. The decision tree follows five criteria: 1) Subject as the primary target of the event; 2) Rejection of the subject by another person or group of persons is the most salient feature of the event; 3) Rejection event is characterized by a clear intent to reject the subject (i.e., does not result from inaction or negligence); 4) The event is

characterized by isolated impact in which only the target individual experienced the crux of the rejection; and 5) The rejection event entails a break in the relationship, or severing of relational ties. Notably, targeted rejection events could only occur within the context of close, established relationship, and could involve multiple interpersonal domains (i.e., peer, family, or school). Only events in which all five criteria were satisfied were considered targeted rejection events.

Given that the interview was not designed to assess relational victimization or targeted rejection specifically, a conservative approach was taken in the absence of information. Reliability among coders was established, with kappas of .845 for relational victimization, .801 for targeted rejection, and .853 for non-interpersonal stressors. In the present study, life events variables were analyzed in terms of frequency (i.e., number of discrete non-interpersonal, relational victimization, or targeted rejection events in the nine months prior to Time 1).

Suicidal Thoughts and Behavior. Suicidality was assessed using the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007). This structured clinical interview provides a comprehensive assessment of several aspects of suicidality. In total, the SITBI includes 169 items divided into six modules: suicide ideation, suicide gesture, suicide plan, suicide attempt, non-suicidal self-injury, and thoughts of non-suicidal self-injury. In the present analyses, suicidality was measured through two, dichotomous indicators of (1) suicidal ideation and (2) suicide attempts. At all three assessments within the first epoch (Time 1) and second epoch (Time 2), suicidal ideation (e.g., "Have you ever had thoughts of killing yourself?") and suicide attempts (e.g., "Have you ever done something to try to kill yourself?") were assessed. In the current study, the outcome variables included any suicidal ideation or attempts reported in the nine months prior to Time 2 while controlling for any suicidality in the nine months prior to Time 1. This structure allowed for the establishment

of temporal order among independent and dependent variables. The SITBI has shown good interrater reliability among adolescents and young adults ($\kappa = 0.99$), test-retest reliability over 6 months ($\kappa = 0.70$), and strong agreement with other measures of suicide related thoughts and behaviors (Nock et al., 2007; Venta & Sharp, 2014).

Depressive Symptoms. Depressive symptoms at Time 1 were assessed using the Mood and Feelings Questionnaire (MFQ; Costello & Angold, 1988). This self-report measure contains 33 items assessing youths' depressive symptoms over the prior two weeks. Items include statements such as "I didn't enjoy anything at all" and "I felt miserable or unhappy". Statements are scored on a 3-point scale, ranging from 0 (*not true*) to 2 (*mostly true*), with higher scores indicating higher levels of depressive symptoms. Four items assessing suicidal ideation were removed from the present analyses. The MFQ has demonstrated excellent reliability and validity (Daviss et al., 2006). In the current study, this measure showed adequate internal consistency ($\propto$=.94).

Pubertal Development and Timing. The Pubertal Development Scale (PDS; Petersen, Crockett, Richards, & Boxer, 1988) was used to measure pubertal development. This self-report measure contains five items assessing girls' pubertal development. These questions probe for physical development, including body hair, skin changes, growth spurt, breast development and menarche. The first four items are scored on a 4-point Likert scale, ranging from 1 (*no development*) to 4 (*development seems complete*). The menarche item is dichotomous (1= *no*, 4= *yes*). Both adolescent and caregiver reports of pubertal status were obtained. Mean scores were computed across the five items for both reports ($\propto$=.74 for adolescent and $\propto$=.72 for caregiver), with higher scores indicating more advanced pubertal development. Pubertal development was computed by averaging adolescents' and caregivers' mean scores on the measure (r=.74)

(Rudolph, 2008). The PDS has demonstrated excellent psychometric properties (Petersen et al., 1988).

Data Analytic Plan

Spearman and Pearson correlations were computed to evaluate associations between all study variables, including demographics (age, racial and ethnic minority status), depressive symptoms, suicidality at Times 1 and 2, interpersonal and non-interpersonal stress, and pubertal development. To examine the unique effects of relational victimization and targeted rejection on likelihood of suicide ideation and attempts, two sets of binomial logistic regression analyses were conducted. Given that suicidal ideation and attempts have been shown to consistently vary by previous attempts, depression (O'Connor, Smyth, Ferguson, Ryan, & Williams, 2013), age (Nock et al., 2013) and race (Goldston et al., 2008), these factors were entered as covariates to minimize variance attributable to potentially confounding variables. In the first set, suicide ideation at Time 2 was regressed onto prior ideation (Step 1), demographics (age and race) (Step 2), depressive symptoms and frequency of non-interpersonal life events (Step 3), and frequency of relational victimization and targeted rejection life events (Step 4). In the second set, suicide attempts at Time 2 were regressed onto the same pattern of predictors [i.e., prior ideation and attempts, demographics (age and race), depressive symptoms and frequency of non-interpersonal life events, and frequency of relational victimization and targeted rejection life events]. To examine the potential moderating effects of pubertal status, a third step included a product term of relational victimization/targeted rejection and pubertal development.

RESULTS

A summary of descriptive statistics of study variables is reported in Table 1. The average level of reported depressive symptomatology as indexed by MFQ total scores was moderate, indicating elevated levels of depressive symptoms in the sample (Wood, Kroll, Moore, & Harrington, 1995). On average, individuals reported between three and four events coded as non-interpersonal stressors in the nine months prior to Time 1. Participants also averaged less than one relational victimization event within the rating period. Further, participants reported less than one targeted rejection event in the nine months prior to Time 1. Approximately 58 (36.3%) and 12 (7.5%) participants reported suicidal ideation and suicide attempts, respectively, between Times 1 and 2. Further, 47 (29.4%) and 11 (6.9%) participants reported suicidal ideation and suicide attempts, respectively, at Time 2. Finally, the average level of pubertal development as indexed by mean adolescent and caregiver scores on the PDS was moderate, suggesting mid- to high levels of pubertal status in the study sample.

The results of the logistic regression analyses prospectively predicting suicide ideation are presented in Table 2. Consistent with prior research, prior suicidal ideation and higher levels of self-reported depressive symptoms were significantly associated with greater odds of prospective suicidal ideation. Among interpersonal stressors, relational victimization approached significance (β=.586, SE=.343, p=.088, odds ratio=1.796). Targeted rejection was not significantly associated with increased odds of prospective suicidal ideation. Results from a test of main effects of pubertal development, as well as its interaction with interpersonal

stressors, were not significant for suicide ideation; as such, these results were excluded from the table.

The results of the logistic regression analyses prospectively predicting suicide attempts are presented in Table 3. Among interpersonal stressors, results indicated that higher incidence of relational victimization was significantly associated with greater odds of prospective suicide attempts, even after accounting for prior suicidal ideation, attempts, and depressive symptoms (β=1.205, SE=.486, *p*=.013, odds ratio=3.335). Specifically, a one-point increase in discrete relational victimization experiences results in an increase in odds of attempting suicide by 3.335. Targeted rejection was not significantly associated with increased odds of prospective suicidal attempts. Results from a test of main effects of pubertal development, as well as its interaction with interpersonal stressors, were excluded from the table due to non-significance.

DISCUSSION

The first goal of the current investigation was to broaden our understanding of the link between different types of discrete, interpersonal stress experiences and suicidal thoughts and behaviors in adolescence. The current examination extends beyond the approach of focusing on overall levels of stress towards more refined analyses involving specific types of stress contributing to risk for suicidality (Shahar, Joiner, Zuroff, & Blatt, 2004). Findings from logistic regression analyses revealed that higher incidence of relational victimization, but not targeted rejection, was significantly associated with greater odds of prospective suicide attempts, even after adjusting for prior suicidal ideation, attempts, and depressive symptoms. This outcome clarifies and extends previous findings by demonstrating a significant longitudinal association between relational victimization and suicide attempts (Dempsey et al., 2011; Geoffroy et al., 2016; Gini & Espelage, 2014; Heilbron & Prinstein, 2010; Undheim, 2013). These findings also provide novel information suggesting that, compared to other types of interpersonal stress (i.e., targeted rejection), relational victimization experiences may be especially relevant to increased risk for later suicidal behavior among at-risk, adolescent females.

Results from the present study address several gaps in the extant literature. First, this study's use of a prospective design and at-risk sample expands on prior research on this topic, which mostly consists of cross-sectional designs and normative samples. Further, this study enlists a novel approach to measuring interpersonal stress experiences through its use of independently-rated semi-structured interviews. This method offers an advantage over prior measures of interpersonal stress (i.e., self-report or sociometric measures), which are susceptible to reporter

biases. Importantly, results from this study may also aid the efforts of mental health providers and suicide prevention. In particular, these findings support the unique role of relational victimization as a distinct predictor of suicide attempts in adolescent females. Given the ongoing priority given to identifying novel risk factors for suicide behavior, findings from this study have important implications for identifying who will go on to attempt suicide.

Several conceptual explanations may account for the prospective link between relational victimization, but not targeted rejection, and suicide attempts found in the current study. First, it may be that relational victimization is more developmentally normative in adolescence compared to targeted rejection. The impact of peer victimization on psychosocial adjustment in youth has long been a topic of interest to clinical psychologists and peer relations researchers, in part due to its salience during this time period. A large body of research studying the detrimental effects of relational victimization further supports this research priority (Casper & Card, 2016; Crick et al., 2002). Indeed, prior studies have indicated high rates of relational victimization in youth, with rates peaking in middle school years (Juvonen & Graham, 2001). Targeted rejection, however, remains a relatively newly studied form of interpersonal stress, and prevalence rates of targeted rejection in at-risk adolescent girls remain unknown. In one study of targeted rejection in a normative sample of adolescents, however, the authors note a low base rate of targeted rejection events in the sample (approximately 12% of major life events) (Murphy, Slavich, Chen, & Miller, 2015). Of note, however, the prevalence rates of relational victimization and targeted rejection in the present study were similar, with targeted rejection occurring at even slightly higher rates. As such, more research is needed to assess the extent to which the prevalence of these interpersonal stressors in youth may account for their differential links to suicidality found in this study.

In addition to differences in developmental relevance, it may be that characteristics of relational victimization are especially harmful compared to targeted rejection. For example, in the present study, relational victimization predominantly involved negative comments and rumor-spreading about the study participant, which included remarks about appearance, sexual orientation, race, and engagement in sexual activity. Given the importance of peers as a primary social context during this period, it is reasonable to suspect that exposure to these forms of relational aggression would be particularly damaging. Furthermore, relational victimization events were often characterized by getting teased, laughed at, threatened, mocked, and made fun of, often by more than one aggressor with higher "social rank." As such, the power imbalance aspect of relational victimization may drive feelings of humiliation, embarrassment and isolation that can precipitate suicide attempts in youth. While targeted social rejection is similarly associated with loss, threat, and devaluation by members of one's social group (Gilbert, 1992), targeted rejection presumes the presence of a social network, such as a "best friend" or romantic partner. As such, it may be that adolescents who experience targeted rejection have additional social supports in place that can buffer against the effects of a targeted rejection experience. Further research examining the mechanisms through which these forms of interpersonal stress may lead to suicide outcomes is needed to address these questions.

Of note, neither relational victimization nor targeted rejection was associated with increased odds of prospective suicide ideation after accounting for prior ideation and depressive symptoms. These findings add to efforts towards teasing apart processes that are uniquely related to depression, suicidal ideation, or suicide attempts. For example, despite compelling prior research suggesting that targeted rejection experiences have powerful implications for the development and course of depression, findings from the current study do not support a link

between targeted rejection and suicide (Slavich et al., 2009). As such, targeted rejection may represent a form of interpersonal stress that is strongly linked to depression, but not suicide. Additionally, given that relational victimization was associated with increased odds of suicide attempts but not ideation, results from the current study contribute to a better understanding of processes that lead to suicide attempts, but not necessarily thoughts of suicide. These findings build on prior research indicating that depression and suicide outcomes may be associated with distinct sets of predictors, and more research is needed to fully understand these disparities.

Several limitations may be relevant to the interpretation of these findings. First, although longitudinal research is rare and the prospective design is an important strength of the current study, a growing body of research highlights the importance of complementing studies of long-term risk factors with short-term models of suicide risk. Indeed, while findings from the present study offer great insight into who is at long-term risk for attempting suicide, suicide research may also benefit from using shorter time frames to highlight when individuals are at risk for suicide (Franklin et al., 2017). Further, it may be that some interpersonal stressors pose long-term risk for suicide, whereas others may serve as short-term, time-sensitive risk factors. As such, additional research is needed to evaluate the extent to which relational victimization and targeted rejection experiences pose as proximal risk factors, recognizing that the latencies between predictors and suicidal thoughts and behaviors may occur within minutes rather than months or years.

Additionally, the study findings should be interpreted in the context of several methodological and analytic considerations. First, the interviews used in the current study to assess interpersonal stress experiences were designed to capture a broad range of stressful, interpersonal events; however, the interpersonal stress experiences selected for the current

study—relational victimization and targeted rejection—were not explicitly probed. Although a conservative approach was used in the absence of information, it may be that the present interviews did not capture sufficient details to code interpersonal stress experiences reliably and confidently. As such, although the use of objectively coded, interview-based measures of interpersonal stress offers several advantages over self-report and peer nomination (i.e., protects against reporter biases; allows for greater confidence that the measures of interpersonal stress used in this study accurately represent the constructs that were intended to be measured), future studies may use an interview approach that directly probes for interpersonal stress variables of interest. Second, potential moderators of the link between interpersonal stress experiences and prospective suicidality were not considered in the present analyses. For example, a host of psychological factors (i.e., ability to cope with stress, attributional style, executive control), stressor factors (i.e., number and severity of the stressors, stressor domain, including peer, romantic or family) and environmental factors (i.e., SES) may affect the strength of the link between interpersonal stress and suicide. Finally, the participants in the present study included females who were at-risk for experiencing suicidal thoughts and behaviors. Although the specific inclusion of females, as well as an at-risk sample, is considered a strength of the current investigation, the results from this study may not generalize to normative samples or adolescent males.

Finally, a second aim of the current study was to explore the potential moderating effects of pubertal development on interpersonal stress and suicidality. Findings did not support a main effect of pubertal development on prospective suicide ideation or attempts. Additionally, evidence was not found for an interaction between pubertal development and interpersonal stressors in predicting later suicidality. Several considerations may account for these null results.

First, although levels of pubertal maturation ranged across participants in this study, the sample included an overrepresentation of females who were more pubertally advanced. As such, additional research with samples representing lower levels of pubertal development is needed to better understand the role of puberty in interpersonal stress and suicide. Additionally, the assessment of pubertal development in the current study relied on subjective measures. As such, it is possible that reports of puberty in this study were affected by reporter biases. However, both parent and child report was used in the current study, offering an advantage over the use of just one reporter. Further, prior studies have demonstrated that self-reported pubertal status is associated with physicians' physical assessment of pubertal development (Shirtcliff, Dahl, & Pollak, 2009). Still, future research could benefit from including health professional ratings or physiological measures of pubertal development to address potential biases associated with self-report measures.

In sum, the results from this study shed light on potential types of interpersonal stress experiences relevant to prospective suicidal attempts in adolescent females. Specifically, this study provides evidence that discrete experiences of relational victimization, but not targeted rejection, are associated with increased odds of prospective suicide attempts. These findings represent an important step towards conducting fine-grained analyses examining specific types of interpersonal stress that may be relevant to suicide. Additionally, these findings have important implications for mental health providers and suicide prevention efforts. In clinical settings, practitioners may consider early screening for relational victimization to better identify clients at high risk for suicide attempts. Additionally, evidence-based prevention and intervention programs that directly target relational victimization are urgently needed.

APPENDIX 1: SUMMARY OF DESCRIPTIVE STATISTICS AND INTERCORRELATIONS BETWEEN STUDY VARIABLES

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	–											
2. Minority status	-.046	–										
3. Depressive symptoms	.224**	-.045	–									
4. Time 1 SI	.209**	-.128	.382*	–								
5. Time 1 SA	.075	-.074	.226**	.378**	–							
6. Non-interpersonal	.339**	-.065	.204**	.121	.121	–						
7. Relational victimization	.090	-.124	.043	.006	.099	-.033	–					
8. Targeted rejection	.100	-.086	.201*	.156*	.157*	-.089	.118	–				
9. Pubertal development	.596**	-.086	.237**	.179*	.069	.223**	.171*	.171*	–			
10. Pubertal timing	.086	-.069	.151	.085	.034	.057	.155	.155	.850**	–		
11. Time 2 SI	.061	-.103	.356**	.370**	.337**	.033	.138	.149	.053	.029	–	
12. Time 2 SA	.112	-.108	.229**	.155	.298**	.054	.249**	.129	.076	.028	.421**	–
mean (SD) / n (%)	14.60(1.40)	60(37.5)	42(36.9)	58(36.3)	12(7.5)	3.76(2.13)	.31(.56)	.62(.98)	3.36(.49)	-.11(.93)	47(29.4)	11(6.9)

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. SA = suicide attempts; SI = suicide ideation. Pearson correlations are reported for age, depressive symptoms, relational victimization, targeted rejection, non-interpersonal stressors, pubertal development and pubertal timing. Spearman correlations are reported for minority status, Time 1 and Time 2 suicidal ideation, and Time 1 and Time 2 suicide attempts

APPENDIX 2: MULTIVARIATE LOGISTIC REGRESSION ANALYSES PREDICTING PROSPECTIVE SUICIDE IDEATION.

Predictor	$\Delta\chi^2$ (df)	*b(SE b)*	OR	Wald	*p*
Step 1	21.502(1)				
Prior SI		1.388(.425)	4.005	10.681	.001**
Prior SA					
Step 2	.664(2)				
Age		-.151(.161)	.860	.882	.348
Minority Status		-.244(.419)	.783	.339	.560
Step 3	9.815(2)				
Depressive Symptoms		1.673(.572)	5.328	8.545	.003**
Non-Interpersonal		-.042(.100)	.959	.177	.674
Step 4	3.491(2)				
Relational Victimization		.586(.343)	1.796	2.907	.088
Targeted Rejection		.124(.189)	1.133	.432	.511

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. SA = suicide attempt. SE = standard error; SI = suicide ideation.

APPENDIX 3: MULTIVARIATE LOGISTIC REGRESSION ANALYSES PREDICTING PROPSECTIVE SUICIDE ATTEMPTS.

Predictor	$\Delta\chi^2$ (df)	*b(SE b)*	OR	Wald	*p*
Step 1	8.919(2)				
Prior SI		-.394(.996)	.675	.156	.693
Prior SA		2.062(.994)	7.860	4.305	.038*
Step 2	2.738(2)				
Age		.190(.341)	1.209	.309	.578
Minority Status		-.749(.867)	.473	.746	.388
Step 3	2.737(2)				
Depressive Symptoms		1.863(1.000)	6.446	3.475	.062
Non-Interpersonal Stressors		-.129(.184)	.879	.494	.482
Step 4	6.961(2)				
Relational Victimization		1.205(.486)	3.335	6.145	.013*
Targeted Rejection		.268(.295)	1.307	.827	.363

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. SA = suicide attempt. SE = standard error; SI = suicide ideation.

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