# ATTACHMENT STYLE AS A RISK FACTOR FOR SUICIDE-RELATED BEHAVIORS IN YOUTH

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A Thesis

Presented to

The Faculty of the Department

of Psychology

University of Houston

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In Partial Fulfillment

Of the Requirements for the Degree of

Master of Arts

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By

Amanda Venta

Spring, 2012

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Suicide-related behaviors are of great importance, particularly among adolescents, where their prevalence is notably high. Specifically, suicide is a leading cause of death among adolescents (Xu, Kochanek, Murphy, & Tejada-Vera, 2010) and self-injury affects 13 - 23 % of adolescents in the general adolescent population and 40 - 60% of those in clinical settings (Darche, 1990; DiClemente, Ponton, & Hartley, 1991; Jacobson & Gould, 2007). Though many risk factors of suicide-related behavior have been identified, the most influential theoretical models of suicide attempt [i.e. Joiner's (2005) interpersonal-psychological theory] and self-injury [i.e. Nock's (2008) social signaling hypothesis] emphasize the role of an individual's interpersonal environment and connectedness in suicide-related behaviors. Given the known link between interpersonal functioning and attachment security (see Berlin, Cassidy, & Appleyard, 2008), a focus on examining attachment style as risk factor for suicidal behaviors seems warranted. Few studies, however, have explored this question in adolescents and those that have often suffer from important limitations, leaving this area largely unstudied.

Against this background, and addressing several limitations of prior research, the aims of the present study were to (a) determine which attachment styles are associated with suicide-related behaviors and (b) test the mediational role of social cognition in the relation between attachment and suicide-related behaviors. Specifically, 194 adolescents were recruited from an inpatient unit and assigned to one of three attachment styles (dismissing, secure, and preoccupied) and one sub-classification (disorganized), a total of four groups, based on an interview assessing attachment style. First, the link between these attachment classifications and suicide-related behaviors was evaluated with regression analyses, controlling for demographic and psychopathology variables.

Specifically, we explored which attachment styles (dismissing, secure, preoccupied, and disorganized) were associated with several categories of suicide-related behavior, including (a) suicidal ideation, (b) a single suicide attempt, (c) multiple suicide attempts, and (d) self-harm. Second, we sought to determine to what extent social cognition mediates the relation between attachment style and suicide-related behaviors and thoughts. While the findings of this study did not identify any significant relations between attachment classification, suicide-related thoughts and behaviors, or social cognitive style, factor analyses were used to explore attachment from a dimensional perspective. One of the three attachment factors identified through factor analyses, the preoccupied attachment factor, was associated with the presence of multiple attempts such that those with multiple attempts displayed less preoccupied anger than those with only one attempt. This finding and the absence of group differences when using a categorical measure of attachment style were discussed.

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# ATTACHMENT STYLE AS A RISK FACTOR FOR SUICIDE-RELATED BEHAVIORS IN YOUTH

## Importance of the problem

Suicide-related behaviors, particularly among adolescents, have recently attracted a great deal of scholarly interest because of the devastating consequences and social costs associated with completed suicide attempts. Specifically, suicide is the fifth leading cause of death among children and young adolescents and the third leading cause of death among older adolescents and young adults (Xu et al., 2010). Additionally, it is estimated that approximately one hundred non-fatal attempts take place for every completed adolescent suicide (Gould, Shaffer, & Greenberg, 2003), further highlighting the magnitude of this problem. Though suicide attempts are distinct from self-harm, the latter is an equally important health concern in adolescent populations, where the behavior is highly prevalent. Specifically, 13 - 23% of adolescents in the general population and 40 - 60% of those in clinical settings report a lifetime history of self-harm (Darche, 1990; DiClemente et al., 1991; Jacobson & Gould, 2007). Further, self-harm has been identified as a predictor of future suicide attempts (Whitlock & Knox, 2007) and for that reason, is also an important aspect of suicide prevention research.

## Nomenclature of suicide-related behavior

The expansive literature on suicidal behavior is often muddled by inaccurate and ambiguous terminology. To that end, Silverman and colleagues (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007) developed a nomenclature of suicide-related behavior that serves as a useful organizational scheme for the present study. Specifically, we will make use of their definitions of several suicide-related behaviors including suicide attempt and self-harm. Suicide-related behaviors, in this taxonomy, are defined as "self-inflicted, potentially injurious behavior[s]" (Silverman et al., 2007, p. 272).

Although this nomenclature is useful for discussing these behaviors, 'suicide-related behaviors' and 'suicidal behaviors' will be used interchangeably in this study due to the frequency of the alternate wording in existing research. These two behaviors, suicidal behaviors and self-harm, are distinguished from one another by the action's intent. Namely, self-harm is a "potentially injurious behavior for which there is evidence (either implicit or explicit) that the person did not intend to kill himself/herself" (Silverman et al., 2007, p.272) whereas a suicide attempt is a "potentially injurious behavior with a nonfatal outcome for which there is evidence (either explicit or implicit) of intent to die" (Silverman et al., 2007, p.272). Though both behaviors have a variety of subtypes based upon the consequences of the action (e.g. Self-Harm, Type I without injuries; Suicide Attempt, Type II with injuries; Suicide with fatal outcome, etc.), these main definitions suffice in the present study.

**Empirically identified risk factors for suicide-related behavior**

All suicide-related behaviors share several important risk factors in adolescence, including previous suicide-related behavior, psychological symptoms, behavior problems, substance use, and exposure to suicide-related behavior by others. Due to the particularly devastating consequences of suicide attempts, a great deal of research has focused primarily on uncovering risk factors for suicide attempts. For instance, Roberts, Roberts, and Xing (2010) identified marijuana use and caregiver suicide attempts as important predictors of suicide attempt in their community sample of adolescents. A study by Borowsky, Ireland, and Resnick (2001) of a similar sample identified several other important risk factors, such as previous suicide attempt, previous abuse, substance use (marijuana and alcohol), and school problems. In addition, Lewinsohn, Rhode, and

Seeley (1994) showed, in a community sample of older adolescents, that previous suicide attempt, current suicidal ideation, current depression, exposure to attempts, low self-esteem, and birth to an adolescent mother were the strongest predictors of future suicide attempt.

Though less research has attempted to identify risk factors for self-harm, extant literature suggests risk factors similar to those for suicide attempt (Boxer, 2010), possibly because of the large number (70%) of individuals engaging in both types of suicide-related behaviors (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Specifically, Nock (2010) reports that a childhood history of abuse (Klonsky & Moyer, 2008), interpersonal problems including poor verbal and problem-solving skills (Hilt, Cha, Nolen-Hoeksema, 2008; Nock & Mendes, 2008; Photos & Nock, 2006), and peer victimization and marginalization (Hilt et al., 2008; Young, Sweeting, & West, 2006) increase the risk of self-harm. Additionally, research suggests that insecure attachment style (Gratz, Conrad, & Roemer, 2002) and impulsivity (Perez, Venta, Garnaat, & Sharp, under review; Simeon & Favazza, 2010) are important risk factors as well.

Not surprisingly, psychiatric disorders have also been tied to the risk of suicide-related behaviors in adolescents. In one study, comorbid depression and anxiety or depression and a disruptive disorder conferred the greatest risk for suicide (Foley, Goldston, Costello, & Angold, 2006). Similarly, studies with adolescents hospitalized for psychiatric problems have linked many disorders including depressive, anxiety, and externalizing disorders (Goldston, Daniel, Erkanli, Reboussin, Mayfield, Frazier, & Treadway, 2009) and borderline personality disorder (Sharp, Green, Yaroslavsky, Venta, Zanarini, & Pettit, in press) to an increased risk of suicide attempts. Furthermore, many

psychological disorders, such as substance abuse, posttraumatic stress disorder, and intermittent explosive disorder (Zlotnick, Mattia, & Zimmerman, 1999); borderline personality disorder (Brown, Comtois, & Linehan, 2002; Sharp et al., in press); mood disorders (Haw, Houston, Townsend, & Hawton, 2002); and eating disorders (Claes, Vandereycken, & Vertommen, 2001) also increase the likelihood of self-harm.

Finally, a number of demographic variables such as sex, race, and age have also been identified as important correlates of suicide-related behavior. In fact, among adolescents and pre-adolescents aged 10 to 19, the rates of death by suicide and non-fatal self-harm differ markedly. Specifically, the Centers for Disease Control and Prevention (CDC, 2008) estimated the number of non-fatal self-injuries at 69.16 for every 100,000 children ages 10 to 14 but at 283.65 for every 100,000 adolescents ages 15 to 19. Similarly, death by suicide is ranked lower as the fourth leading cause of death among the younger age group versus third among the older age group. Taken together, these estimates warrant investigating the effect of age when exploring suicide-related behavior in youth. Additionally, it is well-established that adolescent females are more likely to engage in non-fatal suicide-related behaviors than their male counterparts (Lewinsohn, Rohde, & Seeley, 1996; Joe & Marcus, 2003), though this pattern does not hold when fatal suicide attempts are assessed, likely due to the lethality of the chosen method (Kposowa & McElvain, 2006). Additionally, culture and race seem to play a role in the rates of suicide-related behavior among American adolescents (Langhinrichsen-Rohling, Friend, & Powell, 2009). Specifically, African American and Asian American adolescents are at lowest risk of death by suicide, while Native American adolescents are at greatest risk (CDC, 2008). Furthermore, the aforementioned gender disparity changes

direction and magnitude depending on the ethnic group in question (Langhinrichsen-Rohling et al., 2009), further highlighting the importance of considering both variables when assessing risk factors for suicide-related behavior.

**Theoretical framework**

Given the overlap in risk factors for self-harm and suicide attempts, it is not surprising that theoretical models of both behaviors also share common ground. In fact, the two most influential theorists of suicide and self-harm, Thomas Joiner and Matthew Nock, respectively, both place a great deal of importance upon interpersonal connectedness in their theoretical models. Joiner's interpersonal-psychological theory of suicidal behavior (2005), for instance, suggests that people desire death because they experience sustained and co-occurring perceived burdensomeness and failed belongingness. Perceived burdensomeness is an individual's perception that they burden others (e.g. family and friends) by existing. Failed belongingness, while similar, focuses on the individual's perceived isolation from others. According to this theory, both sentiments together produce a desire for death. This model posits that these interpersonal struggles, when coupled with habituation to the pain and fear required for self-inflicted violence (e.g. through previous self-harm), result in the capacity and desire needed to enact lethal self-harm (i.e. suicide attempt).

Similarly, Nock's (2008) social signaling hypothesis highlights the interpersonal function of self-harm, placing it within an interpersonal context in much the same way. Specifically, Nock (2008) suggests that people self-injure in order to communicate with others because weaker means of communication, like talking, have failed. Thus, the individual escalates the strength of their communication, moving to physical expressions

which are then attended to and reinforced. Existing support for this hypothesis has focused on identifying deficits in communication among individuals who self-injure. Specifically, deficits in word generation (Photos & Nock, 2006) and emotional signaling (Gratz, 2006) have been identified in these samples. An alternate explanation, though, is that individuals self-injure because their social environment is invalidating of less intense attempts at communication. In other words, it is possible that individuals who self-injure do so not because of difficulty communicating, but rather due to a history of not being heard. Though existing research for this hypothesis has focused on the communication deficits of the self-injuring individual rather than his or her environment, a great deal of literature does suggest that emotional invalidation plays a strong role in the development of psychopathology in which self-harm is common (e.g. depression- Yap, Allen, & Ladouceur, 2008; personality disorder- Sauer & Baer, 2010; eating disorder- Haslam, Mountford, Meyer, & Waller, 2008). Shifting the focus of this model from the individual's communication difficulties to the interpersonal quality of their environment in this way warrants a closer look at the role of attachment security (or rather insecurity) in self-harm.

Likewise, viewing the correlates of suicide attempt through the lens of attachment theory highlights the likely importance of attachment style in the interpersonal risk factors in Joiner's (2005) theory and related research. For instance, a review of the literature by Van Orden and colleagues (Van Orden, Witte, James, Castro, Gordon, Braithwaite, et al., 2008) note many studies linking loneliness (Bonner & Rich, 1987; Dieserud, Røysamb, Ekeberg, & Kraft, 2001; Koivumaa-Honkanen, Honkanen, Viinamäki, Heikkilä, Kaprio, & Koskenvuo, 2001; Stravynski & Boyer, 2001; Waern,

Rubenowitz, & Wilhelmson, 2003), living alone (Conner, Duberstein, & Conwell, 1999; De Leo, Padoani, Scocco, Lie, Bille-Brahe, Arensman, et al., 2001; Gove & Hughes, 1980), and being unwed (Stack, 2000) to suicide attempts. Moreover, a similar review by Bostik and Everall (2006) describes research linking suicide-related behaviors with a number of family difficulties including troubled relationships with parents (Groleger, Tomori & Kocmur, 2003), frequent blame and criticism (Allison, Pearce, Martin, Miller, & Long, 1995), poor communication (Gould, Fisher, Parides, Flory, & Shaffer, 1996) and perceived lack of support within the family (Campbell, Milling, Laughlin, & Bush, 1993). Further, suicidal adolescents appear to have pervasive interpersonal problems extending to general social isolation (Bearman & Moody, 2004), peer rejection, and low social support among friends (Prinstein, Boergers, Spirito, Little, & Grapentine, 2000). Though the attachment literature is largely isolated from these studies, interpersonal functioning has been linked to attachment style many times (see Berlin et al., 2008 and discussion in the following section), suggesting that attachment theory is highly relevant to Joiner's (2005) theory as well.

**Interpersonal functioning and attachment style**

Attachment theory suggests that in infancy the emotional and physical needs of a child, and whether or not they are consistently met, create an internal working model of the self as deserving of care (or not) and others as reliable caregivers (or not), which essentially underlies the development of self-reliance and social competence (Bowlby, 1969; 1973). In the attachment literature, children have historically been classified as either secure or insecure, with the latter including avoidant, ambivalent, and disorganized-insecure subtypes. These classifications are largely based upon the Strange

Situation Paradigm (Ainsworth, Blehar, Waters, & Wall, 1978) in which infants are separated from their mothers and their reaction to the separation is used to determine attachment style. An avoidant child, for instance, shows no distress upon separation and, accordingly, does not seek out the caregiver when they are reunited. An ambivalent child, on the other hand, displays distress upon separation and seeks out the caregiver upon return, but rejects the caregiver's attempts to comfort the child. Finally, a disorganized-insecure child, (identified later by Main & Solomon, 1986) displays no clear attachment behaviors and instead simultaneously displays signs of ambivalence, avoidance, and distress. While securely attached children view their caregiver as reliable and themselves as worthy of care, and, as a result, display generally positive psychological correlates, insecurely attached children experience the opposite (Deklyen & Greenberg, 2008).

Perhaps the greatest consequences of attachment insecurity lie in the interpersonal domain. In fact, two major figures in the development of attachment theory John Bowlby and Mary Ainsworth emphasized the link between an individual's experiences with caregivers and their capacity to form relationships later on (Bowlby, 1979; Ainsworth, 1989). Moreover, attachment theory stresses that this relationship is causal, such that child-parent attachment produces internal working models that then stabilize and influence future relationships (Bowlby, 1969, 1973). This link has been empirically supported and relevant research was reviewed in a chapter by Berlin and colleagues (Berlin et al., 2008) focusing on relationships with siblings, friends, and partners. Though few studies have assessed the role of attachment security in sibling relationships, it does seem that the quality of these relationships is related to early maternal attachment.

Specifically, infant-mother attachment is associated with less conflict during early childhood (Volling & Belsky, 1992) and positive interactions with an older sibling (Teti & Abelard, 1989).

Similarly, there is evidence that childhood attachment to parents is mirrored in attachment to friends throughout adolescence (Berlin et al., 2008). Though expressed differently in different developmental stages, early child-mother attachment predicts friendships of greater quality, specifically, greater responsiveness (Pierrehumbert, Iannotti, Cummings, & Zahn-Waxler, 1989), more positive interactions (Kerns, 1994), and less negative interactions (Youngblade & Belsky, 1992). Moreover, children securely attached to their mothers during childhood are more likely to make friends with other securely attached children (Elicker, Englund, & Sroufe, 1992), demonstrate greater ability to establish close friendships (Freitag, Belsky, Grossmann, Grossmann, & Scheuerer-Englisch, 1996), have a greater number of friends (Elicker et al., 1992; Grossmann & Grossmann, 1991; Lewis & Feiring, 1989); and display greater peer- (Englund, Levy, Hyson, & Sroufe, 2000) and social-competence in adolescence (Sroufe, Egeland, & Carlson, 1999).

Not surprisingly, studies using samples of young adults have identified similar patterns with regard to romantic relationships. For instance, Simpson, Collins, Tran, and Haydon (2007) found that infant-mother attachment predicted peer competence in middle childhood, which predicted participant's representations of close friendships during adolescence, which, in turn, predicted positive feelings, greater support, and less negative behavior in romantic relationships during early adulthood (ages 20-23). Further, analyses of the same sample have determined that attachment security during infancy predicts

relationship security in early adulthood (ages 20-21, Roisman, Collins, Sroufe, & Egeland, 2005).

Given the interpersonal bent of the attachment classification system, and the importance of attachment style for interpersonal functioning suggested by this research, it seems logical to extend attachment theory to Joiner's (2005) interpersonal model of suicide and Nock's (2008) hypothesis about the interpersonal function of self-harm. In fact, several studies have identified a link between attachment and suicide-related behaviors in adolescents (Adam, Sheldon-Keller, & West, 1996; Bostik & Everall, 2006; Bostik & Everall, 2007; Dale, Power, Kane, Stewart, & Murray, 2010; de Jong, 1992; Lyon, Benoit, O'Donnell, Getson, Silber, & Walsh, 2000; Maimon, Browning, & Brooks-Gunn, 2010; Violato & Arato, 2004; Wright, Briggs, & Behringer, 2005; Zeyrek, Gençöz, Bergman, & Lester, 2009). Moreover, attachment style appears to serve a stress regulatory function (Fearon & Belsky, 2004) such that insecure individuals, in contrast to secure individuals, fail to signal distress and seek comfort in adaptive ways (Kobak, Cassidy, Lyons-Ruth, & Ziv, 2006) leaving them vulnerable to maladaptive coping behaviors (i.e. suicide-related behaviors). Similarly, a developmental theory put forth by Adam (1994) describes suicide-related behavior as an extreme response to an unresponsive or unavailable attachment figure, providing further theoretical support for the value of empirically assessing the role that attachment plays in suicide-related behavior.

**Interpersonal functioning and social cognition**

Though interpersonal functioning has been conceptualized and assessed in many ways, it is by now well known that a major factor influencing an individual's ability to

build and maintain relationships is their social cognitive capacity. Social cognition is "the processes by which children and adults understand themselves and others in terms of how they think, feel, perceive, imagine, react, attribute, infer, and so on" (Sharp, Fonagy, & Goodyer, 2008, p. 1) and underlies our ability to form relationships. In fact, social cognition is "essentially interpersonal" (Sharp et al., 2008, p. 6), existing purely in a social context. It is also well known that this process is markedly different among people and that some individuals experience profound disability in social cognition and struggle with interpersonal functioning as a result (Sharp et al., 2008; Sharp & Venta, in press). For instance, social cognition has played a key role in conceptualizations of children's peer relationships and bullying (Sutton, 2003) and social competence (Astington, 2003) in community samples.

Research with diagnostic samples has also begun to rely upon social cognition to make sense of the interpersonal deficits that cut across many disorders. Baron-Cohen and colleagues (Baron-Cohen, Leslie, & Frith, 1985), for instance, have done a great deal of work leading to the current understanding that social cognitive deficits are the root of the interpersonal problems identified in autism. Similarly, Mize and Pettit (2008) summarized the large literature (e.g. Dodge & Coie, 1987; Dodge & Crick, 1990; Dodge, 1993) on the social-cognitive deficits associated with conduct disorder and antisocial behavior in children, showing that hostile attribution biases may lie at the basis of the interpersonal difficulties these children experience. Social cognition has also been shown to be an important correlate of the interpersonal difficulties associated with depression (Kyte & Goodyer, 2008) and anxiety disorder (Banerjee, 2008) in children and adolescents. Finally, Sharp and colleagues (Sharp, Pane, Ha, Venta, Patel, Sturrek, &

Fonagy, 2011) showed that social-cognition is related to emerging borderline personality disorder in adolescents, which fits with conceptualizations of borderline personality disorder as essentially a disorder of interpersonal relatedness (Sharp & Fonagy, 2008).

Ultimately, it is clear that social cognitive capacity is closely tied to interpersonal functioning and the ability to form relationships and interact with others. For that reason, social cognition likely underlies the interpersonal vulnerability for suicide highlighted in Nock (2008) and Joiner's (2005) models of suicide-related behavior. Though social cognition appears to predict an individual's intention to self-harm and attempt suicide (O'Connor, Armitage, & Gray, 2006), the role of social cognition in suicide-related behaviors remains largely unstudied, particularly in adolescents. Moreover, no study has explored social cognition as a mediator in the relation between attachment style and suicide-related behaviors, despite ample evidence that a number of family factors (de Rosnay & Hughes, 2006; Dunn, Brown, Slomkowski, & Tesla, 1991; Fonagy, 2002; Meins, 1997; Perner, Ruffman, & Leekam, 1994; Sharp, Fonagy, & Goodyer, 2006), including attachment security (Fonagy, Steele, & Steele, 1991a; Fonagy, Steele, & Steele, 1991b), are largely responsible for social cognitive development.

**Limitations in existing research on attachment and suicide-related behaviors**

Importantly, research in the area of attachment and suicide-related behaviors has suffered from several limitations. Specifically, research on attachment in adolescence has struggled with a paucity of measures that take developmental factors into account. The methodological issues of administering adult measures to populations in which they have not been validated undoubtedly limits the strength of any notable findings given research suggesting that the role of attachment varies widely throughout the

developmental stages. In fact, Kobak and colleagues (Kobak et al., 2006; Kobak, Cassidy, & Ziv, 2004) assert that threats to secure attachment change "dramatically with development" (Kobak et al., 2006, p.335), from physical separations in infancy to verbal threats of rejection or abandonment in later developmental periods. Further, adolescence seems to be a particularly sensitive period for change in the way attachment is represented. Allen and Land (1999), for instance, describe the development of autonomy as a core feature of this developmental stage and, as such, the function of attachment relationships transitions from essential caregiving to a stage on which adolescent autonomy can develop, further highlighting the danger of using attachment tools designed for other developmental stages. Still, in a review of studies exploring adolescent attachment and psychopathology by Kobak and colleagues (Kobak et al., 2006), more than half of studies cited (e.g., Allen, Hauser, & Borman-Spurrell, 1996; Kobak, Sudler, & Gamble, 1991; Marsh, McFarland, Allen, Boykin McElhaney, & Land, 2003; Nakashi-Eisikovits, Dutra, & Westen, 2002) relied upon adult attachment classifications. As a result, studies are often incompatible with one another and results cannot be replicated.

Furthermore, studies have relied upon other indices of interpersonal functioning (related to but not consistent with attachment classifications) when their research question is in regard to attachment style, producing confusion in the operationalization of attachment. Specifically, attachment research frequently assesses constructs such as separation anxiety (Brown & Wright, 2003; Wright et al., 2005), parental bonding (Wichstrøm, 2009; Rossow & Wichstrøm, 2010), and family functioning (Lyon et al., 2000), rather than traditional attachment styles. Needless to say, studies relying upon non-generalized assessment tools suffer from even greater limitations in this regard. For

instance, Bostik and Everall (2006) and Lessard and Moretti (1998) used the results of a semi-structured, open-ended interview to assign attachment classifications. Without employing an standardized assessment instrument, studies like these are impossible to replicate and the validity of results is questionable. Similarly, many existing studies in this area rely upon very small sizes (e.g., Wright et al., 2005 rely upon a total sample of 35 divided into 3 unequal groups of 10, 10 and 15) and fail to report relevant statistics (Bostik & Everall, 2006) or identify and control for demographic and psychopathological covariates (Rossow & Wichstrøm, 2010; Wright et al., 2005; Bostik & Everall, 2006; Lyon et al., 2000). Furthermore, the emphasis of the attachment literature has historically been on mother-child attachment (Freeman, Newland, & Coyl, 2010) and, as such, the study of father-child attachment is significantly less established. Still, newer research has suggested that father-child attachment plays an important role in a child's development (Grossmann, Grossmann, Fremmer-Bombik, Kindler, Scheurerer-Englisch, & Zimmermann, 2002; Grossmann, Grossmann, Kindler, & Zimmermann, 2008) and, therefore, should carry significant weight in the future of attachment research.

Another important limitation of research in this area is that it has not fully integrated the wealth of existing literature about suicide-related behaviors in adolescents. Specifically, the majority of these studies do not adhere to a structured taxonomy when discussing suicide-related behaviors, and thus suffer from ambiguity with regard to classification of individuals along this dimension. Similarly, studies making use of Joiner's (2005) influential model of suicide and Nock's (2008) hypothesis of self-harm are unlikely to frame their hypotheses and findings in the context of attachment theory. Ultimately, these two areas of literature have not come together in a way that employs

scientific rigor with regard to the study of both attachment and suicide-related behaviors. Moreover, no study, to our knowledge, has explored the role of social cognitive skills in the relation between attachment and suicide-related behaviors and thoughts.

**The current study**

The present study sought to determine which attachment styles were associated with self-harm and suicide attempt while improving upon several of these limitations. Specifically, we explored which attachment styles (dismissing, secure, preoccupied, and a sub-classification of disorganized) were associated with several categories of suicide-related behavior, including (a) suicidal ideation, (b) a single suicide attempt, (c) multiple suicide attempts, and (d) self-harm. In order to address the aforementioned limitations, we relied upon both Joiner (2005) and Nock's (2008) established theories and the established nomenclature of suicide-related behavior. Additionally, we included assessments of psychopathology and collected data on age, sex, and ethnicity in order to explore, and control for, relations between these factors and key study variables. Finally, we adhered to a clear nomenclature for discussing adolescent attachment, and assessed it thoroughly by relying upon the Child Attachment Interview (CAI; Target, Fonagy, Shmueli-Goetz, Data, & Schneider, 2007).

The CAI is a semi-structured interview designed to assess attachment style in youth who are not developmentally appropriate for the Strange Situation Paradigm described earlier and yet are not expected to be sufficiently mature for an adult measure of attachment. The CAI was developed in order to assess attachment style in children without ignoring developmental considerations such as the maturity of internal working models and the age-related transition of attachment figures from physically proximal to

emotionally available. In addition to bridging the gap between infant and adult measures of attachment, this interview modernizes the assessment of attachment in children by employing a systematic procedure for coding interviews in order to arrive at a scientifically-derived attachment classification. On the basis of behavioral observation and the interview narrative, the child is assigned to one of the following attachment styles: dismissing, secure, and preoccupied. These classifications are assigned according to scores rated on each of the following domains: emotional openness, balance of positive and negative references to attachment figures, use of examples, preoccupied anger (coded separately for mother and father), idealization (coded separately for mother and father), dismissal (coded separately for mother and father), resolution of conflicts, and overall coherence.

Additionally, a disorganized/atypical behavior sub-classification can be assigned, regardless of primary attachment classification, in the presence of bizarre or contradictory behavior. Specifically, this sub-classification should be assigned to children who display controlling-punitive, bizarre, incoherent, affectively unstable or incongruous, or dissociative behavior during the interview. Though the disorganized/atypical distinction is not in actuality an attachment classification on the CAI, there is evidence suggesting that it increases the risk for suicide (Adam et al., 1996). Thus, this sub-classification was treated as a dichotomous variable in the present study and analyses were conducted, in order to determine the role of atypical/disorganized behavior in suicide-related behaviors.

**Hypotheses about the relation between attachment and suicide-related behaviors**

Given research by Adam and colleagues (Adam et al., 1996) suggesting that non-suicidal adolescent males are likely to report dismissing attachment whereas non-suicidal

females are likely to report secure attachment, we suspected that neither attachment style would be associated with any suicide-related behaviors or thoughts. Similarly, preoccupied attachment, with a sub-classification of disorganized, differentiated their sample of suicidal adolescents from their non-suicidal counterparts, while preoccupied attachment alone did not, suggesting that preoccupied attachment alone is not predictive of suicide-related behaviors. Still, preoccupied attachment has often been tied to suicidal ideation (Adam et al., 1996; Lessard & Moretti, 1998) in adolescents, suggesting that the preoccupied classification would be tied to suicidal ideation, but not suicide attempted, in our sample. Additionally, the preoccupied attachment style is characterized by preoccupied anger with regard to both parents (Shmueli-Goetz, Target, Fonagy, & Datta, 2008) and, more specifically, derogation of attachment figures (Target et al., 2007). Because expression of intense feelings like anger is often cited as a major motivation for self-harming behavior in adolescents (Peterson, Freedenthal, Sheldon, & Andersen, 2008; Klonsky & Muehlenkamp, 2007), we also expected that a preoccupied attachment style would be associated with self-harming behavior in addition to suicide ideation. Moreover, disorganized attachment has often been tied to some of the most severe forms of psychopathology (Fonagy, Leigh, Steele, Steele, Kennedy, Matoon, et al., 1996). For that reason, we expected that a disorganized sub-classification would be associated with self-harm, suicidal ideation, a single suicide attempt, and multiple suicide attempts.

**Hypotheses about the mediational role of social cognition**

Given the aforementioned research tying social cognition to both interpersonally-based models of suicide and attachment security, we expected that social cognition would mediate links between attachment style and suicide-related behaviors. Which social-

cognitive styles in particular would be associated with which suicide-related thoughts and behaviors and attachment styles, however, was more difficult to postulate due to the dearth of research exploring these constructs together. Still, making use of existing research in other areas led to informed hypotheses in the present study.

For instance, it is well-known that Borderline Personality Disorder (BPD) is associated with disorganized attachment (Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004) and that BPD is strongly and uniquely associated with suicide attempts (Gunderson, 1984; Keel, Dorer, Eddy, Franko, Charatan, & Herzog, 2003; Yen, Shea, Pagano, Sanislow, Grilo, McGlashan et al., 2003) and other suicide-related behaviors (Muehlenkamp, Ertelt, Miller, & Claes, 2011) even when controlling for other forms of psychopathology. Because individuals with BPD have also been characterized as having a hypermentalizing social cognitive style, meaning that they over-interpret social cues (Sharp et al., 2011), we expected that hypermentalizing would mediate the relation between disorganized attachment and all suicide-related behaviors and thoughts.

Additionally, existing research ties anxiety disorders to both a preoccupied attachment style (Fonagy et al., 1996) and social-cognitive hypervigilance with regard to possible threat and negative evaluations (Banerjee, 2008). Therefore, we expected that hypermentalizing would be associated with preoccupied attachment as well. In light of the aforementioned relation between preoccupied attachment and self-harm and suicidal ideation, we expected that hypermentalizing would mediate the relation between preoccupied attachment style and these two suicide-related variables. It is important to note that while other social cognitive styles such as undermentalizing and no mentalizing have previously been identified, the dearth of research exploring them in the context of

attachment and suicide-related behaviors precludes the formation of informed hypotheses. For that reason, both hypotheses and analyses in the present study were limited to the hypermentalizing style.

## Methods

### Participants

194 adolescents between the ages of 12 and 18 were recruited as part of a larger study exploring the development of psychopathology among adolescents in inpatient care. The inpatient unit usually serves adolescents with severe treatment-refractory behavior, psychiatric, and substance disorders. While the unit is in principle open to all mental disorders, the present study adopted the following exclusion criteria: (a) diagnosis of schizophrenia or any psychotic disorder, and/or (b) diagnosis of mental retardation. Inclusion criteria were age between 12 and 17 and English fluency. Ultimately, 59.30% of the sample ($n$ = 115) was female and the average age was 15.97 years ($SD$ = 1.40). The sample was ethnically diverse and the breakdown was as follows: 90.2% white, 3.1% Hispanic, 2.1% Asian, 2.1% bi- or multi-racial, 0.5% black, and 2.0% who identified as "Other." Information regarding the prevalence of various psychiatric disorders is presented in Table 1.

### Measures

**Attachment.** The Child Attachment Interview (CAI; Target et al., 2007) is an interview-based measure assessing attachment style by accessing children's mental representations of their attachment figures. The CAI accomplishes this by isolating attachment figures of particular importance to the child and then asking about the affective qualities of the relationship described. To that end, the interviewer asks the

child to describe each attachment figure using three words and then probes further for what happens when the attachment figure is angry with the child and in what ways the child wishes to be like the attachment figure. Further, the interviewer elicits information about the responsiveness of attachment figures and the child's valuing of attachment experiences by asking questions regarding illness, loss, abuse, and separation. The interview is conducted in private and videotaped in order to aid in coding the child's attachment style later on.

Coding the CAI requires three days of training at the Anna Freud Center in association with the Sub Department of Clinical Health Psychology at University College London. These training sessions are run by the measure's authors and focus upon the coding process, with secondary emphasis on the interview's administration. Specifically, attendees are trained to code interviews from videotapes and transcribed narratives on the basis of emotional openness, balance of positive and negative reference to attachment figures, use of examples, preoccupied anger, idealization, dismissal, resolution of conflicts, and overall coherence. These ratings are then used to assign a main attachment classification from secure, preoccupied, and dismissing to both mother and father separately (or alternate attachment figures if relevant). In the present study, the disorganized/atypical distinction was used as an attachment classification (though it is technically a sub-classification) in light of evidence suggesting that disorganization is particularly relevant to suicide-related behaviors.

Following the training, individuals interested in becoming certified interview coders must complete a lengthy reliability process. Specifically, each trainee must watch and code three sets of ten interviews, receiving feedback from the measure's authors in

between each set. Only when the trainee has achieved 85% agreement with the authors in attachment classification is certification granted.

A strength of the CAI, no doubt, lies in its rigorously evaluated psychometric properties in both clinical and community samples. In fact, it is the only interview-based measure of attachment style acceptable for use with children that reports a complete psychometric evaluation. Specifically, Shmueli-Goetz and colleagues (Shmueli-Goetz et al., 2008) provide an in-depth analysis of the interview's interrater reliabilities, internal consistency, test-retest reliability, discriminant validity, and construct validity using two samples, one recruited from schools (i.e. community sample) and one recruited from psychiatric clinics (i.e. referred sample). In their analysis of a community sample, interrater reliability was measured using interclass correlations (ICC) for three trained coders on all CAI scales. These were computed and correlations ranged from .71 to .94 with only one exception, idealization of father (*ICC* = .38), which largely suffered from limited information about fathers in many CAI narratives. Moreover, interrater agreement for the main classifications were very good with regard to both mother and father ($\kappa$ = .92 for both classifications). Additionally, the authors determined that naïve raters who had completed the aforementioned three-day training course could reliably code the interviews as well. Internal consistency was also good in the community sample, between .82 and .87 for all scales except those that included preoccupied anger, likely because these behaviors are rare and most often associated with only one parent. In the psychiatrically referred sample, the majority of scales ranged between .83 and .86, with the same exception as the community sample (.49).

Test-retest reliability in the community sample was also assessed and suggested

stability of attachment over three months and one year. More specifically, stability coefficients were high over three months (*Median* = .69) and moderate over one year (*Median* = .54). Similarly, the stability of overall classifications was moderate over three months ($\kappa$ = .69 for mother and $\kappa$ = .64 for father) and one year ($\kappa$ = .67 for mother and $\kappa$ = .52 for father). In order to assess discriminant validity in the community sample, the authors conducted a series of one-way analyses of variance which revealed that overall attachment classifications were not related to demographic variables such as age, gender, socioeconomic status, ethnicity, and number of parents in the household. In the referred sample, the only demographic variable significantly related to attachment classification was gender, with males being more likely to be deemed insecure. Moreover, verbal IQ and expressive language were not significantly related to attachment classification in either sample. Further, the referred sample was significantly different from the community sample with regard to the distribution of attachment patterns observed and scores on individual scales associated with attachment security, suggesting adequate criterion validity.

Finally, Shmueli-Goetz and colleagues (2008) assessed convergent (i.e. concurrent) validity in the referred sample using the Separation Anxiety Test (SAT; Wright, Binney, & Smith, 1995), the Adult Attachment Interview (AAI; George et al., 1985), and the Hampstead Child Adaptation Measure (HCAM; Target, Fonagy, Schneider, Ensink, & Janes, 2000). The SAT was used as an independently coded measure of attachment and, as expected, showed strong agreement with the CAI (64%). Similarly, the AAI was given to mothers in hopes of identifying an association between mother and child attachment and, as expected, the relation was significant ($p < .004$),

highlighting a link between maternal and child attachment styles and adding to the convergent validity of the CAI. Similarly, HCAM scores on subscales assessing Quality of Relationship and Attachment-Related Processes were significantly related to attachment security on the CAI.

Interrater agreement in the present sample was computed based on approximately 15% of the sample size, or 31 interviews. Three coders who had completed the aforementioned training procedure coded these interviews independently and in-private and interrater agreement was calculated. The interviews selected for interrater reliability analyses were selected at random from the entire sample ($N$ = 194). Given that attachment classification is determined separately for mother and father, interrater agreement was calculated separately. Furthermore, interrater agreement was calculated in two ways: first by assessing agreement in the secure versus insecure split (two-way classification: secure and insecure) and second by assessing agreement with regard to sub classifications (four-way classification: secure, preoccupied, dismissing, and disorganized). With regard to mother, interrater agreement for the two-way classification was $\kappa$ = .74, demonstrating substantial agreement (Viera & Garrett, 2005). Interrater agreement for the four-way classification for mother was $\kappa$ = .68, again reflecting substantial agreement (Viera & Garrett, 2005). With regard to father, interrater agreement for the two-way classification was $\kappa$ = .63, indicating substantial agreement (Viera & Garrett, 2005). Finally, agreement for the four-way classification for father was $\kappa$ = .59, showing moderate agreement between raters once again.

Interclass correlations (Pearson's correlations) between the two raters' CAI scale scores were also computed to determine agreement on dimensional aspects of attachment.

The two raters were significantly correlated with one another on all subscales ($p \leq .001$ in all cases). All correlations ranged between 0.53 (dismissing with regard to father) and .90 (idealization with regard to father) and the average correlation was .66.

**Suicide-Related Thoughts and Behaviors.** In order to assess each adolescent's history of suicide attempts and suicidal ideation, we used the suicide-related items of the NIMH-Diagnostic Interview Schedule for Children-IV (C-DISC; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The C-DISC is a widely used diagnostic interview for children and adolescents ages 9 to 17 and includes an assessment of suicidal behaviors. For the present study, this assessment was used to construct dichotomous variables assessing (a) suicidal ideation during the past year, (b) single lifetime suicide attempt, and (c) multiple lifetime suicide attempts. These interviews were conducted by doctoral psychology students or clinical research assistants who had completed training and several practice sessions administering the interview under the supervision of a clinical psychologist. The interview was administered to the adolescent (though a parent version also exists), in light of evidence from Prinstein, Nock, Spirito and Grapentine (2001) suggesting that adolescents are able to report on their own suicidal behaviors with greater validity than their parents.

Self-harm was assessed using the Deliberate Self Harm Inventory (DSHI; Gratz, 2001), a 17-item self-report measure that assesses the frequency, severity, duration, and type of self-harm behavior. This measure specifies self-harm behaviors as those that are "deliberate, direct destruction or alteration of body tissue without conscious suicidal attempt, but resulting in injury severe enough for tissue damage (e.g., scarring) to occur" (Gratz, 2001, pg. 255). In this study, a dichotomous variable was created by separating

participants who endorsed any of the 17 items from those who did not endorse any self-harming behaviors according to the procedure outlined by the measure's author (Gratz, 2001).

**Social Cognition.** The Movie for the Assessment of Social Cognition (MASC; Dziobek, Fleck, Kalbe, Rogers, Hassenstab, Brand, et al., 2006) is a computer-based measure of social cognitive abilities that assesses mentalizing or theory of mind abilities needed to navigate social situations in daily life. To that end, each adolescent is asked to watch a short film (15 minutes) about four characters planning and getting together for a dinner party. As in daily life, this experience elicits emotions and mental states including anger, affection, gratefulness, jealousy, fear, ambition, embarrassment, and disgust from the characters. At 45 points throughout the film, an interviewer pauses to ask questions concerning the characters' mental states (e.g., "What is Betty feeling?", "What is Cliff thinking?"). Correct responses are scored as one point and added to an overall score that is supplemented by three subscales, (a) hypermentalizing reflecting over-interpretative mental state reasoning; (b) undermentalizing involving insufficient mental state reasoning resulting in incorrect, "reduced" mental state attribution; and (c) no mentalizing (Montag, Ehrlich, Neuhaus, Dziobek, Heekeren, Heinz, & Gallinat, 2009). This task has proven a reliable and sensitive means of detecting subtle mindreading difficulties in adults (Dziobek et al., 2006), young adults (Smeets, Dziobek, & Wolf, 2009), and a variety of inpatient groups (Dziobek, Fleck, Rogers, Wolf, & Convit, 2006; Montag et al., 2009).

**Psychopathology.** The C-DISC was also used to diagnose psychiatric disorders that have been tied to suicide-related behaviors. It covers DSM-IV, DSMIII-R, and ICD-10, assessing more than 30 diagnoses. For the purposes of this study, only current

"Positive Diagnoses" that meet all DSM criteria on the clinical report of the C-DISC were considered. All positive diagnoses were grouped into the diagnostic sections (i.e. internalizing disorder and externalizing disorder) in order to limit the number of confounding variables under consideration.

**Procedures**

This study was approved by the appropriate institutional review board and forms part of a larger outcomes-based study (Sharp, Williams, Ha, Baumgardner, Michonski, Seals, et al., 2009). All adolescents admitted to an inpatient psychiatric unit were approached on the day of admission about participating in this study. Informed consent from the parents was collected first, and if granted, assent from the adolescent was obtained in person. Adolescents were then consecutively assessed by doctoral level clinical psychology students, licensed clinicians, and/or trained clinical research assistants. Diagnostic interviews were conducted independently and in private with the adolescents according to the standard procedures of the C-DISC previously described. Because this study was conducted in a naturalistic setting, the order of assessments was random in most cases. However, all adolescents were assessed within the first two weeks following admission. The average length of stay in this program is four to six weeks.

## Results

**Demographic and psychopathological differences in suicide-related thoughts and behaviors**

The prevalence of suicide-related thoughts and behaviors and group differences in age, sex, ethnicity, and psychopathology are presented in Table 2. Suicide attempters were compared to non-attempters with regard to age (independent samples *t*-test), sex

(chi-square analyses), ethnicity (chi-square analyses), and psychopathology (chi-square analyses). This procedure was replicated comparing those with multiple attempts to those with single attempts, those with and without suicidal ideation, and those who have and have not engaged in self-harm. The presence of an internalizing disorder was significantly associated with the presence of a suicide attempt, suicide ideation, and self-harm. The presence of an externalizing disorder was exclusively associated with the presence of self-harm. Similarly, the sex distribution differed significantly with regard to self-harm status with females making up a greater portion of the self-harming group than the non-self-harming group. Any variable (i.e. internalizing disorder, externalizing disorder, or sex) that was significantly associated with a suicide-related thought or behavior was included as a covariate in subsequent analyses exploring that outcome.

The prevalence of each attachment classification and group differences in age, sex, ethnicity and psychopathology are presented in Table 3. All comparisons were made separately for mother and father. For example, adolescents who were secure, preoccupied, dismissing, and disorganized with regard to mother were compared on the basis of sex, ethnicity, and psychopathology using chi-square analyses. The only significant differences noted were with regard to the presence of an externalizing disorder. Specifically, externalizing disorders were most prevalent in the disorganized classification (63.64% of those disorganized with mother had an externalizing disorder and 63.64% of those disorganized with father had an externalizing disorder) and least prevalent in the secure classification (32.20% of those secure with mother had an externalizing disorder and 29.31% of those secure with father had an externalizing disorder). One-way analyses of variance comparing the attachment classifications with

regard to age did not suggest that the groups differ significantly from one another ($F$ = 2.38, $p$ = .07, Levene's statistic (homogeneity of variance) = 2.02, $p$ = .11).

**Relation between attachment classification and suicide-related thoughts and behaviors**

The first aim of this study was to determine which attachment styles were associated with suicide-related thoughts and behaviors, specifically suicidal ideation, a single suicide attempt, multiple suicide attempts, and self-harm. Adolescents were classified along one attachment variable with four categories as follows: (0) secure without disorganization, (1) dismissing without disorganization, (2) preoccupied without disorganization, and (3) disorganization with any primary classification . Each child was coded separately for mother and father. It is important to note that while in most cases the adolescent's biological parents were coded as attachment figures, some circumstances required alterations to this procedure. In three cases the adolescent did not view his or her biological mother as a caregiver and offered an alternate family member instead. Specifically, in two cases the adolescent's grandmother was rated as the maternal attachment figure and in one instance the adolescent's adoptive mother was rated in place of her biological mother. Similarly, three adolescents did not have a father figure that could be coded and were therefore missing attachment data with respect to father. One more adolescent described her step-father as a caregiver following her father's death during her infancy and therefore he was coded as the paternal attachment figure. The prevalence of each attachment category in the present sample and another sample of psychiatrically referred youth is presented in Table 4. Furthermore, the relation between each suicide-related thought or behavior and attachment classification is presented in

Table 5. Chi-square analyses did not reveal any significant differences between adolescents who did and did not endorse each suicide-related thought or behavior with regard to attachment classification.

The attachment variable, along with the aforementioned demographic and psychopathological covariates, was then used as a predictor variable in a series of binary logistic regression analyses in which various suicide-related thoughts and behaviors served as the outcome variables. With respect to mother, attachment classification and internalizing disorder were entered as predictors in a binary logistic regression predicting suicide attempt and only the presence of an internalizing disorder was significantly associated with suicide attempt ($\beta$ = .82, $p$ = .05). These same variables were entered as predictors in a binary logistic regression predicting suicide ideation and, again, only internalizing disorder was significantly associated with suicide ideation ($\beta$ = 1.85, $p$ > .001). Internalizing disorder was removed from the model when using multiple suicide attempts as the outcome variable because it did not demonstrate a significant association with that outcome at the bivariate level. No attachment classification demonstrated a significant relation to multiple attempts. Finally, binary logistic regression with self-harm status as the outcome variable was conducted using attachment classifications, sex, internalizing, and externalizing disorder as predictor variables. Only sex ($\beta$ = -1.12, $p$ = .001), internalizing ($\beta$ = -1.13, $p$ = .005), and externalizing ($\beta$ = -.92, $p$ = .01) were significantly associated with self-harm status.

These analyses were repeated with respect to father. Specifically, attachment classification and internalizing disorder were entered as predictors of suicide attempt in binary logistic regression and only internalizing disorder was significantly associated

with the presence of a suicide attempt ($\beta$ = .81, $p$ = .05). These same variables were entered as predictors in binary logistic regression predicting suicide ideation and, again, only internalizing disorder was significantly associated with the outcome ($\beta$ = 1.84, $p$ < .001). Internalizing disorder was removed from the model when using multiple suicide attempts as the outcome variable. No attachment classifications were significantly associated with multiple attempts. Finally, attachment classification, sex, internalizing, and externalizing were used as predictors in a logistic regression predicting self-harm status. No attachment classification demonstrated a significant relation to self-harm status but sex ($\beta$ = 1.07, $p$ = .002), internalizing disorder ($\beta$ = 1.20, $p$ = .004), and externalizing disorder ($\beta$ = .83, $p$ = .02) did.

**Social cognition as a mediator between attachment and suicide-related thoughts and behaviors**

The second aim of this study was to determine to what extent social cognition mediated the relation between attachment style and suicide-related behaviors and thoughts. Given that no significant relations between attachment and suicide-related thoughts and behaviors were identified in analyses related to the first aim, it was not possible to explore the role of a mediator. Nonetheless, the relations between social cognition, attachment, and suicide-related thoughts and behaviors are largely unknown and, therefore, these relations were explored at the bivariate level and are presented in Table 6. One-way univariate analyses of variance and independent sample t-tests were used to explore differences in social cognitive style with regard to attachment classification and suicide-related thoughts and behaviors and did not reveal any significant differences.

**Further Analyses: Relations between suicide variables and CAI subscales**

Given the lack of significant findings when exploring attachment as a categorical variable (i.e. secure, preoccupied, dismissing, or disorganized) further analyses were conducted using the CAI scale scores in order to explore attachment as a dimensional construct. The CAI uses 11 scales (ranging from 1 to 9) in order to assign attachment classifications. Specifically adolescents are rated on emotional openness, balance of positive and negative references, use of examples, resolution of conflicts, overall coherence, idealization of mother, idealization of father, dismissal of mother, dismissal of father, preoccupied anger toward mother, and preoccupied anger towards father. Independent sample *t*-tests were used to compare adolescents with and without suicide-related thoughts and behaviors on these scales. No differences on these scales were noted when comparing adolescents with and without a lifetime suicide attempt. Similarly, no differences were found when comparing adolescents who did and did not endorse suicide ideation or self-harm. The only significant group difference between adolescents with multiple attempts and those with single attempts was with regard to idealization of father ($t$ = -2.71, $p$ = .009), such that those with multiple attempts demonstrated greater idealization ($M$ = 3.28) than those with a single attempt ($M$ = 1.84).

**Further Analyses: Factor analysis**

Using the scales in any further analyses is precluded by their high intercorrelations (presented in Table 7), many as high as .79 and .80. For that reason, maximum likelihood factor analysis with oblique, promax rotation was used to reduce the number of variables to gain a better understanding of the factor structure underlying the CAI. As can be seen in Figure 1 and Table 8, three components were extracted from all

11 CAI scales. A cutoff score of 0.4 was used to analyze factor loadings according to convention, such that items with a factor loading greater than or equal to 0.4 with factor one were retained on that factor. Using this cutoff, no subscale loaded onto multiple factors. The first factor was highly correlated with emotional openness, use of examples, overall coherence, resolution of conflict, balance of positive and negative references and dismissal of mom and dismissal of dad. This factor was named the coherence factor given that, conceptually, all of those subscales are associated with an adolescent's ability to coherently, or authentically and realistically, discuss their attachment relations. The second factor, named the preoccupied anger factor, was highly associated with preoccupied anger with regard to mother and preoccupied anger with regard to father. Finally, the third factor was highly correlated with idealization of mother and idealization of father and was therefore named the idealization factor. Together the three factors, rotated using the promax with Kaiser normalization method, explained 66.43% of the variance of all 11 scales. It is important to note that the preoccupied anger, dismissing, and idealization subscales were reverse coded prior to being entered into the factor analyses so that all factors would correspond to the same scoring system in which higher scores are associated with more positive outcomes (e.g. higher emotional openness or lower preoccupied anger).

In order to explore relations between suicide-related thoughts and behaviors and these three factors, continuous attachment variables were then created by summing the items associated with each of the aforementioned factors. The items that loaded onto factor 1, the overall coherence factor, were summed to produce a continuous variable representing "overall coherence". The items that loaded onto factors two and three were

also summed to produce continuous variables of "preoccupied anger" and "idealization", respectively. Independent *t*-tests were then used to compare adolescents with and without each suicide-related thought and behavior on the basis of these factors and the results are presented in Table 9. Several significant group differences were noted. Specifically, adolescents with multiple attempts reported significantly lower preoccupied anger and significantly higher idealization than those with single attempts. Also, adolescents who endorsed self-harm scored significantly higher in preoccupied anger than those who did not.

These significant group differences were then explored at the multivariate level, controlling for the demographic and psychopathology variables that showed significant relations to the outcome variables at the bivariate level. Specifically, the preoccupied anger and idealization factors were entered separately as predictors in two binary logistic regression analyses in which multiple attempt status was the outcome variable. The preoccupied anger factor remained significantly associated with multiple attempt status ($B$ = .18, $SE$ = .09, $p$ = .05, *Exp (B)* = 1.20) when explored using binary logistic regression but the idealization factor did not. Similarly, the preoccupied anger factor, internalizing, externalizing, and sex were entered as predictor variables in a binary logistic regression in which self-harm status served as the outcome variable and preoccupied anger lost predictive significance ($B$ = -.05, $SE$ = 0.5, $p$ = .28, *Exp (B)* = .95) in the presence of the covariates in the model.

## Discussion

The first aim of the present study was to explore which attachment styles were associated with several categories of suicide-related behavior including suicide ideation,

single and multiple suicide attempts, and self-harm. We expected to find that neither dismissing nor secure attachment styles would be associated with any suicide-related thoughts or behaviors; that a preoccupied style would be associated with suicide ideation and self-harm; and that disorganized attachment would be associated with self-harm, suicide ideation, and suicide attempts. Chi-square analyses at the bivariate level and regression analyses at the multivariate level revealed that no attachment classification was significantly associated with any suicide-related thought or behavior in a sample of inpatient adolescents. The relation between psychopathology and suicide-related thoughts and behaviors identified in previous research, however, was confirmed with regard to suicide attempt, suicide ideation, and self-harm. Furthermore, the presence of an externalizing disorder was tied to attachment style with the greatest proportion of externalizing adolescents being classified as disorganized.

The second aim of the present study was to explore the role of social cognition as a mediator in the relation between attachment style and suicide ideation and we expected to find that a hypermentalizing style would mediate the hypothesized relation between preoccupied attachment and self-harm and suicide ideation. Given that no relation between attachment classifications and suicide-related thoughts or behaviors was identified with analyses relating to the first aim, this hypothesis could not be explored. Instead, bivariate relations between mentalizing style, attachment classification, and suicide-related thoughts and behaviors were explored and did not reveal any significant group differences. More specifically, no differences in any of the three mentalizing styles were noted for adolescents who did and did not endorse each suicide-related outcome or by attachment style.

The absence of any significant relations between attachment style and suicide-related thoughts and behaviors stands in contrast to existing studies among adolescents which tie suicide ideation and suicide attempts to preoccupied attachment and disorganized attachment, respectively (Adam et al., 1996; Lessard & Moretti, 1998). Furthermore, the absence of findings in this regard seems contradictory to the well-identified links between psychopathology and suicide-related thoughts and behaviors and between psychopathology and attachment insecurity (Fonagy et al., 1996). While the present study did successfully identify a link between disorganized attachment and externalizing disorders, it was an internalizing diagnosis that was most frequently associated with suicide-related outcomes (i.e. single attempt, suicide ideation, and self-harm). In other words, the form of psychopathology most associated with attachment disturbance was not the form of psychopathology most represented among adolescents who endorsed suicide-related thoughts and behaviors.

One possible explanation for the lack of significant relations between attachment classifications and suicide-related outcomes in this particular study is that the attachment classifications identified here are not directly comparable to those identified in previous research. For instance, Adam and colleagues (1996) treated disorganization as a sub-classification that could be assigned with any attachment classification whereas disorganization in the present sample was treated as a discrete attachment style. Furthermore, the distribution of attachment style in the present sample is notably different from that reported by Adam and colleagues (1996), despite samples of comparable age. For instance, they report that 62% of adolescent who reported a prior history of suicide attempt or severe suicide ideation showed a disorganized attachment

style whereas, in the present study, only 39.4% of those who had made a suicide attempt and 54.5% of those with suicide ideation were classified as disorganized. This difference may be accounted for by a notable methodological difference between these two studies. Specifically, Adam and colleagues (1996) used the Adult Attachment Interview, with some adaptations for adolescents, while we used the CAI. Still, the distribution of attachment styles in our sample also deviated from that reported by the authors of the CAI (Schmueli-Goetz et al., 2008). Specifically, the present study included a larger percentage rated as disorganized and a smaller percentage rated as dismissing than Schmueli-Goetz and colleagues (2008). It is important to note, however, that the latter was conducted using a sample of children with a mean age of 10.4 years rather than a sample of adolescents, and thus, may point to developmental changes in attachment style. Alternatively, these differences in the proportion of each attachment style may signify that the CAI performs differently in adolescents than it does in children and, perhaps, that it is not appropriate for use in that population. For instance, one of the probes in the CAI asks adolescents about a time during which they were away from their parents. Reponses that suggest the adolescent did not mind a separation of several days merit coders to assign an elevated score for dismissing attachment style. This probe stands out, though, as an item that may elicit very different responses from adolescents than from and children. While children denying the impact of a separation may indicate a dismissing stance, adolescents denying the impact of a separation may simply be a reflection of increased maturity or the result of increased autonomy and independence. Therefore, using the CAI and its coding guidelines in adolescents may be inaccurately assessing attachment style in this age group.

Another possible explanation for the lack of significant relations between attachment classifications and suicide-related thoughts and behaviors is the overall psychological distress represented in this sample. The present study explored a sample of adolescents from an inpatient unit exclusively (whereas Adam et al.'s (1996) sample also included outpatients and adolescents in day programs) and therefore represents an extreme end of the spectrum. In fact, exploring the rate of suicide in various attachment classifications revealed that the lowest rate of suicide attempt (in the secure group) was still 35.6% of the sample. Likewise, the lowest rates of suicide ideation and self-harm represented 39.0% and 57.1% of the sample. These proportions suggest a very high rate of suicide-related thoughts and behaviors across the board and may make it difficult to identify differences between attachment classifications that may have emerged with community or outpatient samples. Additionally, the wide array of psychopathology noted in this sample suggests that perhaps the expected relation between attachment insecurity and suicide-related thoughts and behaviors is overwhelmed by adolescents who endorse suicide-related thoughts and behaviors despite secure attachments. Further research with varied samples is needed in order to better understand whether relations between attachment security and suicide-related thoughts truly exist and were obscured by the overall level of suicidality in the present study.

The lack of significant differences in suicide-related thoughts and behaviors with regard to attachment classifications may also indicate that the attachment categories being used in the CAI do not reflect variation in attachment security accurately or with sufficient precision. Specifically, these findings call into question whether attachment classifications are superior to assessments that measure attachment dimensionally. For

that reason, analyses exploring the factor structure of the CAI were performed and revealed that the measure falls into three general factors. These factors, at the trait level, seem to represent overall coherence, preoccupied anger, and idealization. The emergence of these three distinct factors suggests that perhaps the CAI has a factor structure that is incompatible with the current rating system. Specifically, the CAI is intended to be coded with regard to three attachment styles (secure, dismissing, preoccupied), and 1 subclassification (disorganized). This coding scheme is not mirrored by the factor structure detected in the present study, suggesting that perhaps using the CAI as a categorical measure does not accurately reflect attachment security at the trait level and therefore hides the relation between attachment security and suicide-related thoughts and behaviors. Further research exploring the factor structure of other attachment interviews, and the CAI in other samples, is needed, however, in order to justify using the measure with a different coding scheme or as a dimensional measure with three subscales.

Exploratory analyses using these subscales, though, rather than the traditional attachment classifications, did reveal significant differences between multiple attempters and single attempters and between those who did and did not endorse self-harm. Once controlling for psychopathology and demographics, though, only the preoccupied anger factor remained significantly associated with multiple attempts. Initial hypotheses pointed to the relation between anger and self-harm as evidence to suggest that preoccupied anger would be elevated in the self-harming group and, while it was, this relation washed out when covariates were controlled for. The elevated preoccupied anger displayed by the single attempters when compared to multiple attempters seems to contradict existing evidence that has identified a relation between elevated anger and

suicide related thoughts and behaviors (e.g. Peterson et al., 2008; Klonsky & Muehlenkamp, 2007). More fine grained analyses of existing research regarding anger, however, suggests that it can be expressed in two distinct ways: anger expressed outwardly through verbal or physical means (Speilberger, 1988), and anger expressed inwardly through suppression (Speilberger, Krasner, & Soloman, 1988). This distinction may explain why previous research regarding the relation between anger and suicide-related thoughts and behaviors (as summarized by Daniel, Goldston, Erkanli, Franklin, & Mayfield, 2009) is mixed with some studies demonstrating increased anger in suicidal groups (e.g. Lehnert, Overholser, & Spirito, 1994) while others find that anger does not differentiate between groups (e.g. Horesh, Orbach, Gothelf, Efrati, & Apter, 2003). Previously, inwardly directed anger has shown a relation to suicide-related thoughts and behaviors in other studies with adolescents. In fact, inward anger has been identified as a correlate of suicide attempt (Myers, McCauley, Calderon, & Treder, 1991) and suicide ideation (Goldney, Winefield, Saebel, Winefield, & Tiggeman, 1997). In light of this research, it is possible that the decreased anger noted among multiple attempters (compared to single attempters) does not signify decreased anger overall but rather decreased outward anger that, in turn, is manifest in the form of inward anger and is therefore related to greater suicide attempts. It is important to note, however, that the preoccupied subscale of the CAI assesses verbal and nonverbal expression of anger towards attachment figures during the interview and is therefore a measure of outward anger only. Therefore, any discussion regarding the role of inward anger in this sample's multiple attempters is purely theoretical. Furthermore, the distinction between inward and outward anger may point to a limitation of the CAI in that it assesses only one

manifestation of anger, neglecting what may be a relevant piece of an individual's attachment picture. Certainly further research exploring how both types of anger relate to attachment security is needed and may better inform the findings of the present study.

Aside from the methodological issues associated with measuring attachment style in this population (i.e. developmentally appropriate measures and dimensional versus categorical measures), there are several other limitations of note. Specifically, attachment style was measured upon admission to the hospital and may therefore be subject to mood dependent recall bias. In other words, the setting in which this research was conducted may not elicit an accurate picture of the adolescent's attachment style given that the family has likely undergone a difficult circumstance in relation to the adolescent's admission to an inpatient unit. To our knowledge, no study has explored mood effects in the assessment of attachment among adolescents, children, or adults and, therefore, it is difficult to determine whether this was a factor in the present study. However, research does support the link between current mood and memory retrieval (see Kenealy, 1997 for a review) and, therefore, it seems logical to assume that recent family conflict would have some effect on an adolescent's recall of events during the CAI. This is likely a noteworthy limitation of the present study and area for future research. Additionally, attachment classifications in this study were only assigned for two attachment figures per child. While, as already noted, some adolescents described caregivers other than their biological parents as their primary attachment figures, no attention was paid to secondary attachment figures in this study. Specifically, an adolescent's relation to significant caregivers other than their parents was not coded and therefore, analyses may have ignored attachment security (or insecurity) that occurred in

the context of relationships with nannies, other family members, or close others. To our knowledge, no study thus far has explored the role of attachment security to a non-parents among adolescents but these relationships can certainly be of great importance to children and adolescents and, therefore, warrant further attention from researchers.

Notwithstanding these limitations, the findings of the present study are strengthened in several ways. Specifically, attachment was measured using an interviewer-based, psychometrically sound measure as were suicide-related thoughts and behaviors. Furthermore, the assessment of psychopathological and demographic covariates allows for a complete picture when exploring the relation between attachment and suicide-related thoughts and behaviors that is not subject to typical confounds. Finally, the CAI was explored using both categorical and dimensional analyses and therefore represents a novel use of this measure and sets the stage for further research exploring both this measure, and attachment security, from a dimensional perspective.

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Tables and Figures

*Table 1*.

Prevalence of various forms of psychopathology.

| | Met full criteria during the past year (%) |
|---|---|
| Internalizing Disorders | |
| Major Depressive Disorder | 38.7 |
| Dysthymia | 0.5 |
| Agoraphobia | 9.3 |
| Generalized Anxiety Disorder | 13.4 |
| Obsessive Compulsive Disorder | 24.7 |
| Panic Disorder | 12.4 |
| Post-traumatic Stress Disorder | 7.7 |
| Separation Anxiety Disorder | 11.9 |
| Social Phobia | 16.0 |
| Specific Phobia | 16.0 |
| Externalizing Disorders | |
| ADHD | 19.6 |
| Conduct Disorder | 21.6 |
| Oppositional Defiant Disorder | 22.2 |
| Other Disorders | |
| Anorexia Nervosa | 4.6 |
| Bulimia | 0.5 |
| Hypomania | 3.1 |
| Mania | 3.6 |
| Schizophrenia | 3.1 |

*Notes.* Diagnoses were based upon the Computerized Diagnostic Interview Schedule for Children (Shaffer et al., 2000). These prevalence rates are exclusively with regard to positive diagnoses in which the adolescent endorsed all necessary diagnostic criteria (i.e. intermediate diagnoses were not included).

*Table 2.*

Differences in demographics and psychopathology with regard to suicide variables.

| | Attempt ($n$ = 72) *M* (SD) or % | No Attempt ($n$ = 122) *M* (SD) or % | *t* | $\chi^2$ |
|---|---|---|---|---|
| Age | 16.01 (1.38) | 15.95 (1.42) | -.32 | - |
| Female sex | 62.50% | 57.38% | - | .49 |
| Ethnicity | - | - | - | 6.60 |
| Internalizing | 87.50% | 75.41% | - | 4.12* |
| Externalizing | 44.44% | 40.16% | - | .34 |
| | Multiple Attempts ($n$ = 34) *M* (SD) or % | Single Attempt ($n$ = 38) *M* (SD) or % | *t* | $\chi^2$ |
| Age | 15.75 (1.45) | 16.18 (1.30) | 1.33 | - |
| Female sex | 58.82% | 65.79% | - | .37 |
| Ethnicity | - | - | - | 9.22 |
| Internalizing | 88.24% | 86.84% | - | .03 |
| Externalizing | 38.24% | 47.37% | - | .61 |
| | Suicide Ideation ($n$ = 90) *M* (SD) or % | No Ideation ($n$ = 104) *M* (SD) or % | *t* | $\chi^2$ |
| Age | 15.95 (1.40) | 15.99 (1.41) | .20 | - |
| Female sex | 64.44% | 54.81% | - | 1.86 |
| Ethnicity | - | - | - | 7.09 |
| Internalizing | 93.33% | 68.27% | - | 18.87*** |
| Externalizing | 47.78% | 35.54% | - | 2.51 |
| | Self-Harm ($n$ = 125) *M* (SD) or % | No Self-Harm ($n$ = 69) *M* (SD) or % | *t* | $\chi^2$ |
| Age | 15.93 (1.38) | 16.06 (1.44) | .63 | - |
| Female sex | 68.80% | 42.03% | - | 13.20*** |
| Ethnicity | - | - | - | 5.53 |
| Internalizing | 88.80% | 63.77% | - | 17.34*** |
| Externalizing | 49.60% | 27.40% | - | 8.90** |

*Notes.* See Table 1 for disorders included under the Internalizing and Externalizing headings. * $p < .05$. ** $p < .01$. *** $p < .001$.

*Table 3.*

Differences in demographics and psychopathology with regard to attachment style.

| Maternal | Secure | Dismissing | Preoccupied | Disorganized | $\chi^2$ |
|---|---|---|---|---|---|
| Female sex | 54.24% | 59.46% | 71.43% | 57.58% | 2.37 |
| Ethnicity | - | - | - | - | 12.88 |
| Internalizing | 74.58% | 81.08% | 82.14% | 84.85% | 1.70 |
| Externalizing | 32.20% | 37.84% | 46.43% | 63.64% | 9.43* |
| Paternal | Secure | Dismissing | Preoccupied | Disorganized | $\chi^2$ |
| Female sex | 58.62% | 59.72% | 60.71 | 57.58% | .08 |
| Ethnicity | - | - | - | - | 16.59 |
| Internalizing | 77.59% | 80.56% | 78.57% | 84.85% | .75 |
| Externalizing | 29.31% | 38.89% | 50.00% | 63.64% | 11.21* |

*Notes*. * $p < .05$

*Table 4*.

The prevalence of various attachment styles with regard to both mother and father in the present sample and Schmueli-Goetz et al. (2008).

| | Maternal | | Paternal | |
|---|---|---|---|---|
| Style | Present Sample ($n$ = 194) | Schmueli-Goetz et al. (2008) | Present Sample ($n$ = 191) | Schmueli-Goetz et al. (2008) |
| Secure | 30.4% | 30% | 30.4% | 23% |
| Insecure | 69.5% | 70% | 69.7% | 76% |
| Dismissing | 38.1% | 50% | 37.7% | 55% |
| Preoccupied | 14.4% | 11% | 14.7% | 13% |
| Disorganized | 17.0% | 9% | 17.3% | 8% |

*Notes.* The data taken from the work of Shmueli-Goetz and colleagues (2008) is from a psychiatrically referred sample ($N$ = 65) in which the mean age was 10.4 ($SD$ = 1.2) and 41.5% were female.

*Table 5*.

Relations between each suicide-related thought or behavior and attachment classification

| Maternal | Secure | Dismissing | Preoccupied | Disorganized | $\chi^2$ |
|---|---|---|---|---|---|
| Suicide Attempt | 35.6% | 37.8% | 35.7% | 39.4% | .17 |
| Suicide Ideation | 39.0% | 48.6% | 46.4% | 54.5% | 2.34 |
| Multiple Attempt | 47.6% | 48.3% | 44.4% | 46.2% | .05 |
| Self-Harm | 57.6% | 66.2% | 57.1% | 78.8% | 4.91 |
| Paternal | Secure | Dismissing | Preoccupied | Disorganized | $\chi^2$ |
| Suicide Attempt | 32.8% | 40.3% | 39.3% | 39.4% | .88 |
| Suicide Ideation | 39.7% | 47.2% | 50.0% | 54.5% | 2.10 |
| Multiple Attempt | 47.4% | 50.0% | 40.0% | 46.2% | .31 |
| Self-Harm | 55.2% | 63.9% | 64.3% | 78.8% | 5.09 |

*Notes*. $\chi^2$ computed comparing adolescents with and without the relevant suicide-related thought or behavior on the basis of attachment classification.

*Table 6.*

Relations between social cognition, attachment, and suicide-related thoughts and behaviors

| | Hyper MZ M (SD) | *F* | No MZ M (SD) | *F* | Less MZ M (SD) | *F* |
|---|---|---|---|---|---|---|
| Maternal Attachment | | | | | | |
| Secure | 7.2 (3.16) | | 1.71 (1.54) | | 3.08 (1.91) | |
| Dismissing | 7.97 (4.32) | 1.46 | 1.66 (1.65) | 1.66 | 3.51 (2.24) | .52 |
| Preoccupied | 7.11 (4.11) | | 1.39 (1.47) | | 3.43 (2.01) | |
| Disorganized | 8.82 (4.36) | | 2.27 (1.86) | | 3.52 (2.36) | |
| Paternal Attachment | | | | | | |
| Secure | 7.12 (3.19) | | 1.79 (1.58) | | 3.10 (1.87) | |
| Dismissing | 8.15 (4.38) | 1.95 | 1.67 (1.69) | 2.35 | 3.65 (2.40) | .97 |
| Preoccupied | 6.89 (3.97) | | 1.18 (1.28) | | 3.07 (1.44) | |
| Disorganized | 8.82 (4.36) | | 2.27 (1.86) | | 3.52 (2.36) | |
| Suicide-Related Variables | | *t* | | *t* | | *t* |
| Suicide Attempt | 8.07 (4.41) | -.82 | 1.61 (1.71) | .86 | 3.25 (2.07) | .61 |
| No Attempt | 7.58 (3.73) | | 1.82 (1.60) | | 3.44 (2.16) | |
| Suicide Ideation | 8.17 (4.42) | -1.31 | 1.61 (1.57) | 1.04 | 3.30 (1.99) | .43 |
| No Ideation | 7.41 (3.57) | | 1.86 (1.70) | | 3.43 (2.42) | |
| Multiple Attempt | 9.15 (4.55) | -1.92 | 1.91 (1.93) | -1.42 | 3.21 (2.24) | .17 |
| Single Attempt | 7.18 (4.13) | | 1.34 (1.46) | | 3.29 (1.93) | |
| Self-Harm | 7.95 (4.27) | -.89 | 1.71 (1.70) | .35 | 3.33 (2.01) | .38 |
| No Self-Harm | 7.42 (3.44) | | 1.80 (1.53) | | 3.45 (2.33) | |

*Notes*. The means and standard deviations displayed are for the group listed in the first column. For instance, the mean hypermentalizing score for adolescents coded as secure with regard to mother is 7.2.

*Table 7.* Correlations between scales

| | Emotional Openness | Balance | Use of Examples | Preoccupied Anger (M) | Preoccupied Anger (F) | Idealization (M) | Idealization (F) | Dismissal (M) | Dismissal (F) | Resolution of Conflict | Overall Coherence |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Emotional Open | 1 | | | | | | | | | | |
| Balance | .72*** | 1 | | | | | | | | | |
| Use of Examples | .83*** | .69*** | 1 | | | | | | | | |
| Preoccupied (M) | -.11 | -.39*** | -.11 | 1 | | | | | | | |
| Preoccupied (F) | -.14 | -.32*** | -.10 | .42*** | 1 | | | | | | |
| Idealization (M) | -.17* | -.19** | -.07 | -.23*** | .04 | 1 | | | | | |
| Idealization (F) | -.18* | -.20** | -.14 | .12 | -.23*** | .44*** | 1 | | | | |
| Dismissal (M) | -.57*** | -.41*** | -.61*** | -.05 | -.06 | -.24*** | -.06 | 1 | | | |
| Dismissal (F) | -.58*** | -.47*** | -.57*** | -.04 | .02 | .03 | -.10 | .59*** | 1 | | |
| Resolution | .72*** | .78*** | .70*** | -.36*** | -.35*** | -.06 | -.03 | -.44*** | -.51*** | 1 | |
| Coherence | .85*** | .79*** | .79*** | -.23*** | -.26*** | -.20*** | -.14* | -.49*** | -.54*** | .81*** | 1 |

*Notes.* * $p < .05$. ** $p < .01$. ***$p < .001$.

*Table 8.*

Rotated pattern matrix.

| | Factor | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Emotional Openness | .91 | -.04 | .11 |
| Balance of Descriptions | .61 | .38 | .14 |
| Use of Examples | .92 | -.06 | .00 |
| Preoccupied Anger with Mother | -.15 | .83 | -.24 |
| Preoccupied Anger with Father | -.09 | .62 | .03 |
| Idealization with Mother | -.05 | -.18 | 1.03 |
| Idealization with Father | .03 | -.02 | .44 |
| Dismissal of Mother | .87 | -.31 | -.31 |
| Dismissal of Father | .82 | -.23 | -.05 |
| Resolution of Conflict | .66 | .38 | .00 |
| Overall Coherence | .80 | .19 | .14 |

*Notes.* Extraction method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization. Prior to completing factor analysis, the preoccupied anger, idealization, and dismissal scales were reversed so that all scales were rated with the same direction with higher scores indicating more positive outcomes (e.g. higher scores indicate higher emotional openness and lower preoccupied anger).

*Table 9.*

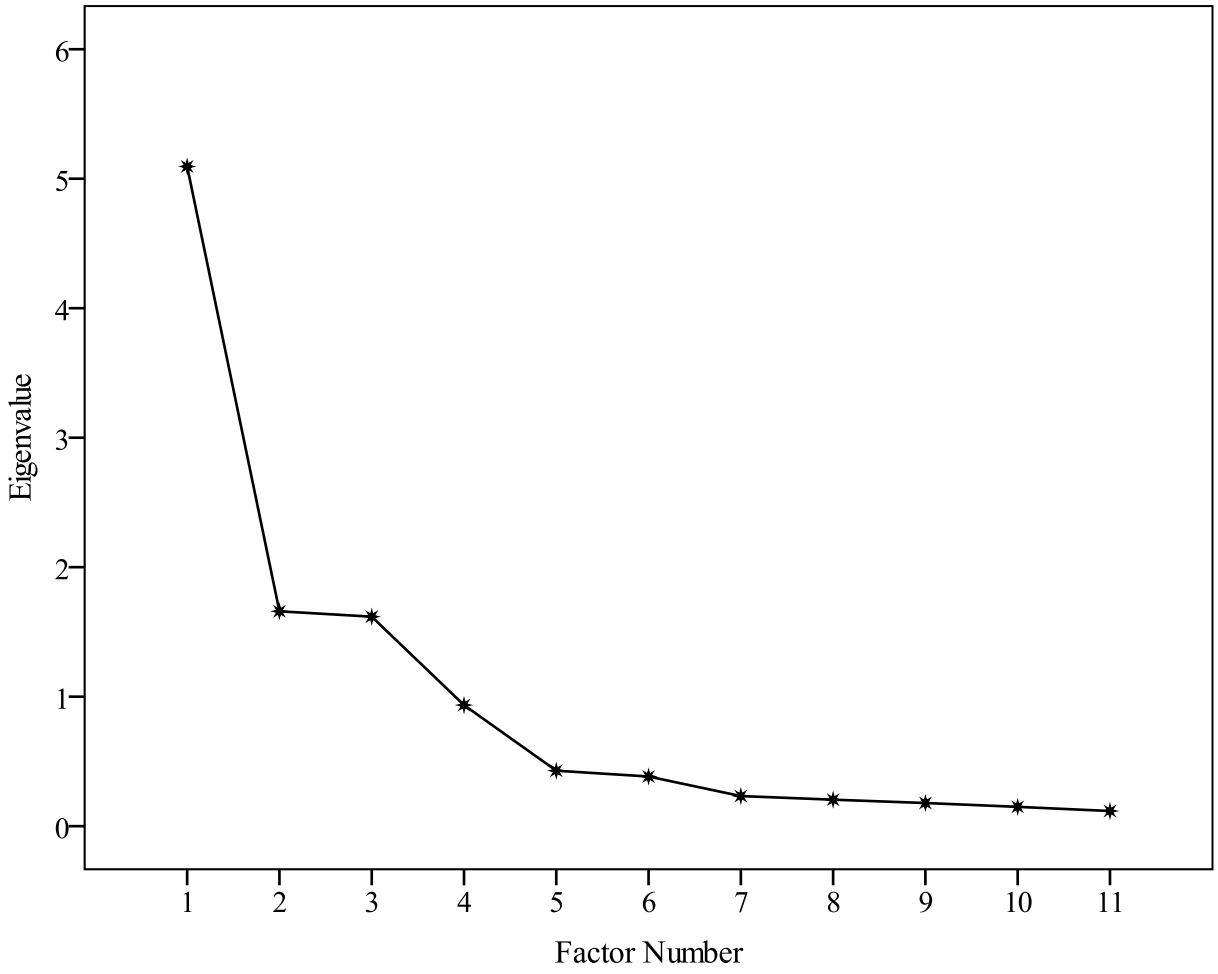
Independent samples t-tests comparing adolescents with and without suicide-related thoughts and behaviors on the basis of the coherence, preoccupied anger, and idealization factors.

| | Coherence M (SD) | *t* | Preoccupied Anger M (SD) | *t* | Idealization M (SD) | *t* |
|---|---|---|---|---|---|---|
| Suicide attempt | 32.83 (11.29) | .49 | 15.44 (3.22) | -1.11 | 15.01 (4.04) | .80 |
| No attempt | 33.71 (12.65) | | 14.84 (4.33) | | 15.43 (3.19) | |
| Suicide ideation | 32.79 (11.32) | .63 | 15.07 (3.37) | -.01 | 15.13 (3.72) | .51 |
| No ideation | 22.89 (12.83) | | 15.06 (4.41) | | 15.40 (3.36) | |
| Multiple attempts | 32.46 (12.23) | .14 | 16.34 (2.53) | -2.03* | 13.91 (4.33) | 2.23* |
| Single attempt | 32.83 (10.75) | | 15.00 (3.02) | | 16.00 (3.53) | |
| Self-Harm | 33.16 (11.44) | .33 | 14.63 (4.13) | 2.04* | 15.25 (3.43) | .15 |
| No self-harm | 33.76 (13.33) | | 15.83 (3.51) | | 15.33 (3.72) | |

*Notes.* The coherence, preoccupied anger, and idealization subscales were created by summing the CAI subscales related to factors 1, 2, and 3 as noted in Table 8. Prior to summing the subscales, the preoccupied anger, idealization, and dismissal scales were reversed so that all scales were rated with the same direction with higher scores indicating more positive outcomes. Therefore, all of the factor scores above should be interpreted as follows: high scores indicate greater coherence, less preoccupied anger, and less idealization and low scores indicate lower coherence, more preoccupied anger, and more idealization. * $p < .05$.

*Figure 1.*

Scree plot.



Appendix A

**Data analytic strategy**

The present study had two aims. The first was to determine which attachment styles were associated with suicide-related behaviors and thoughts, specifically suicidal ideation, a single suicide attempt, multiple suicide attempts, and self-harm. As previously stated, we expected that secure and dismissing attachment styles would not be associated with any suicide-related behaviors or thoughts whereas disorganized attachment would be associated with a single attempt, multiple attempts, self-harm, and suicidal ideation. Additionally, we expected to identify links between preoccupied attachment and both suicidal ideation and self-harm but not suicide attempts.

The second aim was to determine to what extent social cognition mediated the relation between attachment style and suicide-related behaviors and thoughts. To that end, relations between suicide-related behaviors, attachment styles, and social cognition abilities (MASC) were explored. As previously stated, we expected that hypermentalizing would mediate the relation between disorganized and preoccupied attachment and suicide-related behaviors and thoughts, due to the aforementioned relation between social cognition and interpersonal variables implicated in suicide-related behaviors. Specifically, we expected that (a) hypermentalizing would mediate the relation between disorganized attachment and all suicide-related behaviors and thoughts and (b) hypermentalizing would mediate the relation between preoccupied attachment and suicidal ideation and self-harm. In order to accomplish these aims, the following data analytic strategy was followed.

First, the data was cleaned and preliminary analyses were conducted. The latter focused on assessing differences in suicide attempts, suicidal ideation, and self-harm with regard to age,

sex, ethnicity, and psychopathology in order to determine which variables must be controlled for in subsequent analyses. Specifically, these relations were assessed using a series of four analyses. For instance, in the first, suicide attempters were compared to non-attempters with regard to age (independent samples *t*-test), sex (chi-square analyses), ethnicity (chi-square analyses), and psychopathology (chi-square analyses). Any relations that prove significant were then included in subsequent analyses. This procedure was replicated comparing those with multiple attempts to those with single attempts, those with and without suicidal ideation, and those who have and have not engaged in self-harm.

Second, each adolescent was assigned to one of three attachment styles (dismissing, secure, and preoccupied) and a sub-classification (disorganized/atypical) on the basis of CAI video recordings and verbatim transcripts. More specifically, adolescents were classified along one dichotomous dummy coded variable with four conditions as follows: (a) secure without disorganization (yes/no), (b) dismissing without disorganization (yes/no), (c) preoccupied without disorganization (yes/no), and (d) disorganization with any primary classification (yes/no). Then, a series of four binary logistic regression analyses were conducted.

In preparation for binary logistic regression, multicollinearity was assessed by calculating the tolerance and VIF. According to Menard (1995), a tolerance value greater than 0.1 will be considered acceptable for the present study. Additionally, a VIF value less than 10 will be considered acceptable according to the recommendation of Myers (1990). In these regression analyses, the outcomes were the presence or absence of (a) suicidal ideation, (b) self-harm, (c) single suicide attempt, and (d) multiple suicide attempts, respectively. Each dummy-coded attachment style variable was entered as a predictor variable. Demographic (e.g. age, sex, race,

etc.) and psychopathological variables that demonstrated a significant relation to suicide-related behaviors at the bivariate level were controlled for by entering them as predictors as well.

The mediational role of social cognitive style in the relation between suicide-related thoughts and behaviors and attachment style (established with the aforementioned analyses) was tested using the procedure outlined by Baron and Kenny (1986). Specifically, these analyses tested the mediational role of a hypermentalizing style in the relation between disorganized and preoccupied attachment styles and suicide-related thoughts and behaviors. In order to prove mediation using Baron and Kenny's (1986) procedure, the following conditions must be met in a series of three regressions: (a) the independent variable should be significantly associated with the dependent variable, (b) the independent variable should be significantly associated with the mediator, and (c) the mediator should be significantly associated with the dependent variable and decrease the effect of the independent variable when both the mediator and independent variable are included in the analysis. Total mediation occurs only when the effect of the independent variable is absent once the mediator is included in the model. Partial mediation occurs when the effect of the independent variable is reduced, but not completely eliminated, when the mediator is included in the model. If partial mediation occurs, Post-hoc probing of the significant mediational model must be conducted with Sobel's equation (Sobel, 1990; as recommended by Holmbeck, 2002; Baron & Kenny, 1986), which tests the significance of the decrease in the effect of the independent variable on the dependent variable in the presence of a mediator. In this study, we tested whether (a) attachment style was associated with suicide-related behaviors as per the first aim and aforementioned analyses, (b) attachment style was significantly associated with social cognitive style, and (c) social cognitive style was significantly associated with suicide-related behaviors and lessened the effect of attachment style when entered

simultaneously. For example, if multivariate analyses confirmed the hypothesized relation between disorganized attachment and suicide attempt, regression analyses would be used to determine whether disorganized attachment style was associated with a particular social cognitive style (i.e., hypermentalizing). If there was a significant relation between disorganized attachment and hypermentalizing, as expected, then hypermentalizing and disorganized attachment style would be entered as simultaneous predictors in a regression analysis with suicide attempt as the outcome variable. Complete mediation occurs when the relation between disorganized attachment and suicide attempt loses significance in the presence of hypermentalizing.

Finally, all of these analyses were conducted twice; once utilizing the maternal attachment style as the independent variable and once utilizing the paternal attachment style as the independent variable, given research suggesting that attachment style differs with regard to the attachment figure in question (Grossman et al., 2008). Given the limited research exploring paternal attachment style, we did not have sufficient theoretical backing to make differential hypotheses about the role of paternal and maternal attachment in suicide-related thoughts and behaviors. Thus, the aforementioned hypotheses were explored with regard to both maternal and paternal attachment style.

Appendix B

**Power Analyses**

The present power analyses are based on a study exploring the role of attachment in suicide-related behavior in adults conducted by Stepp, Morse, Yaggi, Reynolds, Reed, and Pilkonis (2008). This study was selected as a model for our analyses because the data analytic strategy, binary logistic regression with suicide-related outcomes, closely approximates that of the present study. Therefore, data presented in their study formed the basis of our power analyses, conducted using the Proc Power (logistic) command in SAS 9.2. Specifically, the authors report that approximately 12% of their sample (predominantly inpatient) made at least one suicide attempt and note a robust association (OR = 2.03) between attachment anxiety (based upon a two-factor classification and a consensus rating process unique to the authors' research program) and suicide attempt when controlling for sex, age, and ethnicity. Moreover, the descriptive statistics they present concerning attachment anxiety were used to approximate the expected distribution of the predictor variable. Based on these estimates, we expected that a sample size of 194 would be sufficient to obtain power of 0.8 in our own analyses.

Based upon the work of Shmueli-Goetz and colleagues (2008) with a psychiatrically referred sample, we expected that the distribution of attachment classifications would be as follows: 30% secure with mother, 23% secure with father, 50% dismissing with mother, 55% dismissing with father, 11% preoccupied with mother, 13% preoccupied with father, 9% disorganized with mother, and 8% disorganized with father. Therefore, with a sample size of 194 the expected number of adolescents in each category is approximately (rounded to the nearest whole number): 58 secure with mother, 45 secure with father, 97 dismissing with mother, 107 dismissing with father, 21 preoccupied with mother, 25 preoccupied with father, 18

disorganized with mother, and 16 disorganized with father.

Appendix C

**Timeline**

- June 1 – August 15 — Complete coding certification
- August 16 – November 30 — Code attachment style for 194 CAIs
- December 1 – December 5 — Enter attachment style into dataset and clean data
- December 6 – December 14 — Perform data analyses
- December 15 – January 15 — Write results and discussion
- Mid January — Schedule thesis defense