

Attachment and Exploration in Adulthood

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In the present work, the relationship between attachment and exploration in adulthood is examined from both theoretical and empirical standpoints. Theoretically, attachment theory's exploration system is linked to R. W. White's (1959) concept of effectance motivation, and to the motive and goals constructs that are central to the achievement motivation literature. Empirically, 4 studies are presented that document a link between adult attachment (operationalized using categorical, continuous, and dimensional measures) and achievement motives (need for achievement and fear of failure) and achievement goals (mastery-approach, mastery-avoidance, performance-approach, performance-avoidance, and approach relative to avoidance personal strivings). Mediation analyses establish the role of challenge construal, threat construal, and competence valuation in accounting for the observed relationships.

Attachment theory is fundamentally grounded in a "control system" model of motivation (Bowlby, 1969, 1988). Drawing on ethological and evolutionary principles, Bowlby (1969, 1988) posited the existence of several innate behavioral control systems that serve the biological function of survival and procreation. Two such behavioral control systems (and, arguably, the two most central in attachment theory; Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000) are the attachment system and the exploration system. The attachment system exists to bring the infant into close proximity with its caregiver, thereby protecting the infant from harm and predation. The exploration system exists to propel the infant into the world to learn about the environment, thereby enhancing the likelihood of its safe and effective functioning.

Although the attachment and exploration systems are both integral to attachment theory, the two systems have received dramatically different amounts of attention in the attachment literature. Understandably, the attachment system has been the primary focus; theorists have developed elaborate models applicable not only to infants, but throughout the life course (e.g., Bowlby, 1969; Bretherton, 1987; Mikulincer & Shaver, in press; Sroufe & Waters, 1977). The exploration system, however, has received relatively little theoretical attention, both with regard to infancy and the rest of the life course, and both from the pioneers of the attachment tradition (i.e., Bowlby and Ainsworth) and those who have followed. The present research is designed to address this theoretical lacuna by suggesting how a more elaborate conceptualization of the exploration system may be developed. We begin by explicating the link between attachment and exploration espoused in attachment theory, proceed with our proposal for conceptualizing the exploration system, and then describe our empirical research.

Attachment and Exploration

A central tenet of attachment theory is that the operation of the attachment and exploration systems is closely intertwined (Ains-

worth, Blehar, Waters, & Wall, 1978; Bowlby, 1969). The infant is naturally propelled into the environment to explore and learn, but this exploratory activity exposes the child to risk. When danger is sensed, the attachment system is activated, impelling the child to return to the attachment figure for protection. In normal development, a complementary balance is struck between the two systems, enabling the infant to learn about the environment within the protective context of a proximal and responsive caregiver. In Ainsworth et al.'s (1978) words, the infant uses the caregiver as a "secure base from which to explore" (p. 22).

Caregivers differ in their response to their child's behavior, and Ainsworth et al. (1978) identified three types of attachment relationships on the basis of these differential response histories. Secure attachment results if the caregiver is readily available and responsive when the child seeks attachment, anxious/ambivalent attachment results if the caregiver is inconsistently available or responsive when the child seeks attachment, and avoidant attachment results if the caregiver neglects or rejects the child's entreaties for attachment. These attachment styles are theorized to be systematically linked to exploration. Secure attachment is hypothesized to allow the child to explore the environment in unimpeded fashion, because the child expects the caregiver to be available and responsive when needed (i.e., the caregiver serves as a secure base). Both types of insecure attachment, avoidant and anxious/ambivalent, are thought to hamper exploration. Avoidant attachment is hypothesized to lead to rigid exploration devoid of true interest, as the child defensively tries to cope with the perceived unavailability of a secure base. Anxious/ambivalent attachment is hypothesized to make the child anxious and distracted during exploration, as the child is preoccupied with the uncertainty of whether a secure base will be available if needed. Empirical work supports these attachment-exploration links in infancy and early childhood (for reviews, see Ainsworth et al., 1978; Bowlby, 1988; Cassidy & Berlin, 1994; Grossmann, Grossmann, & Zimmerman, 1999; Magai & McFadden, 1995; Moss & St. Laurent, 2001).

Bowlby (1969) posited that children generalize the expectations acquired from interactions with caregivers into mental representations (i.e., working models) of the availability and responsiveness of attachment figures, and of their own worthiness of love and support. These working models are thought to guide affect, cognition, and behavior in attachment situations and beyond, and are

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presumed to provide continuity in attachment relationships over time, even into adulthood. Hazan and Shaver (1987) facilitated the investigation of attachment in adults by drawing a parallel between infant–caregiver relationships and adult love relationships, and by demonstrating the direct applicability of Ainsworth’s tripartite framework to adult romantic attachments. Recent research indicates that adult attachment may be conceptualized in terms of two underlying dimensions, labeled *avoidance* and *anxiety* (Brennan, Clark, & Shaver, 1998; Fraley & Shaver, 2000). High avoidance represents defensive dismissal or avoidance of close relationships, whereas low avoidance represents comfort with closeness and confidence in the dependability of others. High anxiety represents anxious or fearful preoccupation with close relationships, whereas low anxiety represents confidence that one will be accepted in close relationships. A burgeoning literature has linked adult attachment (conceptualized both in categorical and dimensional terms) to a host of variables, both attachment-based and beyond (for reviews, see Reis & Patrick, 1996; Shaver & Hazan, 1993).

Both Bowlby (1988) and Ainsworth (1990) explicitly contended that the attachment-exploration link (and the secure base concept in particular), as initially articulated with regard to infants, was applicable across the life course (in Bowlby’s, 1988, words, “from the cradle to the grave” [p. 163]). However, neither theorist elaborated on this point beyond a few brief generalities about older individuals (i.e., adolescents and adults) spending longer periods of time and distance from their secure base during exploration, and their using parental surrogates such as mentors, priests, or therapists as a secure base from which to explore (Ainsworth, 1985; Bowlby, 1988). Few additional conceptual statements have appeared in the attachment literature. Those theorists who have discussed adult exploration have tended to draw a simple parallel between infant manifestations of exploration and their putative adult analogues, which are said to include such variables as pursuing recognition from peers, establishing emotional independence from parents, and maintaining close friendships (Allen & Land, 1999; Grossmann et al., 1999).

Empirical research on adult attachment has focused primarily on the domain of interpersonal relations, especially close relations, and has paid relatively little attention to the dynamic interplay of attachment and exploration (Reis, Collins, & Berscheid, 2000). Nevertheless, a few such studies have been conducted. These investigations have revealed links between adult attachment styles and variables such as cognitive curiosity, openness to intellectual experiences, interest in adventurous leisure activities, and orientations to work (Carnelley & Ruscher, 2000; Green & Campbell, 2000; Hazan & Shaver, 1990; Mikulincer, 1997). However, this research, like the aforementioned theorizing, has tended to posit direct parallels between infant and adult exploration behavior with little in the way of a deeper conceptual analysis of the nature of the exploration system in adulthood. Indeed, Hazan and Shaver (1990) ended their article on attachment and work (which focused mainly on attitudes and affects toward work in general) by explicitly acknowledging the need for a more rigorous conceptualization of adult exploration and its link to attachment.

The Exploration System

Bowlby developed the foundations of attachment theory at a time when several prominent theorists were declaring that individuals possess an innate motivational propensity for curiosity, play,

and exploration (e.g., Berlyne, 1960; Harlow, 1953; Piaget, 1952; White, 1959). Bowlby (1969) explicitly recognized the influence of Berlyne, Harlow, and Piaget, and his description of the exploration system clearly accorded with their theories. White’s (1959, 1960, 1963) conceptualization of effectance motivation was the most elaborate and influential of the motivational models proposed during this time. Although Bowlby did not directly mention White’s theorizing, early on Ainsworth (1967) used White’s terminology in characterizing the exploration system. Later, she stated that attachment theory’s exploration system seems concordant with White’s effectance motivation concept, and hinted at their conceptual equivalence (Ainsworth, 1990). Considering attachment theory’s exploration system as the conceptual equivalent of effectance motivation opens the door to a more extensive theoretical analysis of the attachment-exploration link, as we explicate below.

White (1959) defined effectance motivation as the desire for effective, competent interactions with the environment, and he characterized this motivational source as an innate, organismic propensity that impels the individual to investigate, manipulate, and master the environment. The infant’s natural tendency toward investigatory, exploratory play is considered the prototypic behavioral manifestation of effectance motivation. Effective engagement with the environment is said to produce an intrinsically pleasurable affective experience labeled “a feeling of efficacy,” which White (1965) likened to “joy in being a cause” (p. 203). Effectance motivation is presumed to be in perpetual operation unless interrupted by pressing concerns (e.g., hunger, fear about safety or security) and, interestingly, White (1963) identified unresponsive or inconsistently responsive caregivers as a common source of such concern. White (1959) also asserted that the biological/evolutionary function of effectance motivation is to promote learning and the development of skills and abilities that enable the individual to adapt to his or her surroundings; the psychological function of effectance motivation is to provide the individual with the pleasurable feelings of efficacy that accompany competent interaction with the environment. White (1960) viewed effectance motivation as an important motivational source throughout the life course, stating that one reason that adults invest effort in sport, school, and work activities is their desire to be effective and competent in their daily behavior. White (1959) portrayed effectance motivation in infants and young children as undifferentiated, but he presumed it to become differentiated over time into more complex motivational constructs such as the motive to achieve.

In suggesting a link between effectance motivation and the motive to achieve, White raised the possibility of connecting his theory with the broader literature on achievement motivation. Competence is integral to this latter literature; conceptually, achievement motivation research and theory focuses on competence motivation—the energization and direction of competence-based behavior (Elliot, 1997). Competence is also clearly integral to the effectance motivation concept (White, 1959, 1960). As such, it seems logical to suggest that the innate motivational propensity proposed by White represents a need to be competent in one’s actions, and to view effectance motivation as the initial manifestation of competence motivation (Elliot, McGregor, & Thrash, 2002). In essence, effectance motivation is what competence motivation looks like in its purest and most fundamental form.

The achievement motivation literature contains much research on how this initial form of competence motivation changes from

infancy to adulthood as a function of maturation and experience. The emergence of the self-concept (Harter, 1998; Lewis, 1993), the development of elaborate reasoning capacities (Heckhausen, 1982; Stipek, Recchia, & McClintic, 1992), the acquisition of self-regulatory and metacognitive skills (Dweck, 1999; Elliot et al., 2002), and repeated encounters with success and failure (and accompanying responses from important others; McClelland, 1973) all influence how competence motivation develops quantitatively and qualitatively until reaching its “differentiated” (White, 1959, p. 323) adult form. In some adult instantiations, competence motivation is rather straightforwardly and purely manifested in appetitive desires or strivings, whereas in other forms it becomes reoriented away from its natural appetitive nature toward more self-protective, avoidance-oriented desires and strivings (Elliot et al., 2002).

The two most prominent constructs in research and theory on competence motivation in adulthood are achievement motives and achievement goals (Elliot, 1997). Achievement motives represent broad, affectively based dispositions toward competence. The two primary achievement motives are need for achievement—the tendency to orient toward positive possibilities in achievement settings because one feels pride upon success—and fear of failure—the tendency to orient toward negative possibilities in achievement situations because one feels shame upon failure (Atkinson, 1957). Achievement goals are more concrete cognitive representations of possible competence-based outcomes. Four primary achievement goals have been identified (Elliot & McGregor, 2001): mastery-approach goals (striving to attain task-based standards of competence), mastery-avoidance goals (striving to avoid task-based standards of incompetence), performance-approach goals (striving to attain norm-based standards of competence), and performance-avoidance goals (striving to avoid norm-based standards of incompetence).

The Present Research

If, as argued above, (a) adult achievement motivation represents a differentiated manifestation of early competence motivation, (b) early competence motivation is conceptually equivalent to White’s effectance motivation, and (c) effectance motivation is interchangeable with Bowlby’s exploration system, then a theoretically grounded way to examine the attachment-exploration link in adulthood is to investigate relationships between adult attachment constructs on the one hand and adult achievement motivation constructs such as motives and goals on the other hand. This is what we did in the present research.

Just as there are optimal and nonoptimal forms of attachment, there are optimal and nonoptimal forms of achievement motivation. Several theorists have argued that approach-oriented motivation, and mastery pursuit in particular, is the natural and optimal form of achievement motivation (e.g., Deci & Ryan, 1985; Dweck, 1999), whereas avoidance-oriented motivation is a nonoptimal form of achievement motivation (Elliot, 1997; Elliot et al., 2002). Our general hypotheses may be articulated in terms of the link between secure–insecure attachment and approach-avoidance achievement motivation.

Our first general hypothesis is that in adulthood, as in infancy, secure attachment affords optimal, unimpeded exploration in achievement settings. The internalized representation of a secure base is presumed to serve as a resource that allows individuals to

freely exercise their natural, approach-based motivational tendencies, and mastery pursuits in particular. For secure individuals, the possibility of failure is not an anxiety-provoking, distracting concern, because they expect attachment figures to be available, supportive, and reassuring, independent of their achievement outcomes. Consequently, their attachment system tends to be relatively quiescent.

Our second general hypothesis is that insecure attachment interferes with optimal exploration in achievement settings. The lack of a secure base is presumed to interfere with approach-based tendencies by making attachment concerns salient and by reorienting the individual toward the avoidance of failure. The possibility of failure is an anxiety-provoking, distracting concern for insecurely attached persons, because they believe that should failure occur, attachment figures may not be available, accepting, or unconditionally responsive to their entreaties for support and reassurance. Thus, ongoing concerns about attachment security keep insecure individuals from feeling safe enough to optimally explore the environment, leading them to focus more directly on avoiding danger. Another way of stating these two general hypotheses is that securely attached persons are able to construe achievement situations as a positive challenge and fully engage in the appetitive pursuit of competence, whereas insecurely attached persons construe achievement situations as a threat and self-protectively seek to avoid incompetence. Of course, insecurity is not manifested in the same way in all individuals. Considerable evidence indicates that different types of attachment insecurity (e.g., anxious-ambivalence, avoidance) lead individuals to regulate their attention, emotion, and behavior in different ways (see Mikulincer & Shaver, *in press*, for a review). We address these distinctions below in the context of the individual studies that follow.

In this article, we present four studies that test our hypotheses. Studies 1–4 examined the associations of categorical, continuous, and dimensional measures of attachment with achievement motives and goals.¹ Study 4 additionally examined the mediational processes through which attachment dimensions lead to achievement goal adoption. The specific rationale and hypotheses for each study are presented prior to each investigation.²

Study 1

In Study 1 we examined the relationship between attachment and achievement motives and goals using a categorical measure of attachment. With regard to motives, we posit that secure attachment enables dispositional motivational tendencies to develop in natural, appetitive fashion, and that insecure attachment disrupts this process by reorienting individuals to defend against failure. As such, we hypothesized that securely attached participants would have higher need for achievement and lower fear of failure than would insecurely attached (both avoidant and anxious/ambivalent) participants.

¹ Although categorical and continuous measures of attachment are not as popular as dimensional measures in the current literature, we thought documenting consistent results across the different types of measures would provide the strongest support for our hypotheses.

² Power analyses indicated that the power to detect a medium effect size in each study was at least .99; the power to detect a small effect size varied across the four studies from .38 to .50 (Cohen, 1988).

Whereas achievement motives represent deeply ingrained dispositional tendencies, achievement goals represent strategic, context-specific aims (Elliot & Thrash, 2001). Mastery-approach goals are purely appetitive, competence-based strivings (most directly akin to effectance pursuit), and performance-avoidance goals are purely aversive strivings focused on evading incompetence. We hypothesized that securely attached participants would be more likely to adopt mastery-approach goals and less likely to adopt performance-avoidance goals than would insecurely attached participants. We made no specific predictions differentiating avoidant and anxious/ambivalent individuals, although these different forms of insecure attachment may be linked to the strategic adoption of different achievement goals. As for performance-approach goals, which are appetitive and competence-based, but often encompass self-presentational and even some aversive concerns (Elliot, 1999), we offered no a priori predictions.³

In Study 2 we also assessed achievement goals idiographically, with personal goal statements generated by participants themselves (see Emmons, 1986; Little, 1989). Idiographic goal assessments yield a single, omnibus measure of approach (relative to avoidance) goals, therefore our predictions were comparably omnibus in nature: We anticipated that securely attached participants would adopt more approach (relative to avoidance) personal achievement goals than would insecurely attached (both avoidant and anxious/ambivalent) participants.

Method

Participants and Procedure

One hundred ninety-two (79 male, 113 female) university undergraduates participated for extra credit. Data were collected in four large group sessions. Participants were informed that they would be completing different personality-relevant measures in each session.⁴

In the first session, held during the first week of the semester, participants completed achievement motive measures. In the second session, 1 week later, participants reported their achievement goals for the course. Another week later, in the third session, participants completed a personal achievement goals measure. In the final session, 7 weeks later, participants completed an attachment measure.

Measures

Attachment. Hazan and Shaver's (1987) categorical measure was used to assess attachment. In this assessment, participants read descriptions of secure, avoidant, and anxious/ambivalent attachment styles, and indicate the one that best describes how they feel in romantic relationships. This measure has been used widely and has reasonable validity and reliability (Crowell, Fraley, & Shaver, 1999). Fifty percent of participants selected the secure category, 30% selected the avoidant category, and 20% selected the anxious/ambivalent category.

Achievement motives. Need for achievement and fear of failure were assessed with Hermans's (1990) measures, which are based on Atkinson and Feather's (1966) portraits of the "achievement-oriented" and "failure-threatened" personalities. The revised versions of the need for achievement (31 items; e.g., "I have a tendency to work long and hard at a task, even when difficulty is encountered") and fear of failure (27 items; e.g., "I try to avoid failure at all costs") measures were used. Research attests to the reliability and validity of each measure (Elliot & Church, 1995). Participants' responses on 1 (*strongly disagree*) to 5 (*strongly agree*) scales were summed to form the need for achievement ($\alpha = .84$) and fear of failure ($\alpha = .86$) indexes.

Achievement goals. Elliot and Church's (1997) achievement goals questionnaire was used to assess participants' mastery-approach (e.g., "It is important for me to understand the content of this course as thoroughly as possible"), performance-approach (e.g., "It is important for me to do well compared to others in this class"), and performance-avoidance (e.g., "I just want to avoid doing poorly in this class") goals for the course. Each goal measure is composed of six items and has been shown to be reliable and valid (see Elliot & Church, 1997). Participants responded on 1 (*not at all true of me*) to 7 (*very true of me*) scales that were summed to form the mastery-approach ($\alpha = .89$), performance-approach ($\alpha = .91$), and performance-avoidance ($\alpha = .76$) goal indexes.

Personal achievement goals. Elliot and Sheldon's (1997) idiographic achievement goals questionnaire was used to assess personal achievement goals. Participants were introduced to the concept of achievement goals, and then generated their own list of eight personal achievement goals that they pursue in daily life. Two trained coders independently categorized each goal as approach or avoidance (interjudge agreement exceeded 99%). An approach (relative to avoidance) goals index was created by summing the number of approach goals on each participant's list.

Results and Discussion

Overview of Analyses

Tiered simultaneous regression analyses were used to examine the relationships between attachment style and the achievement motivation variables. First, a pair of orthogonal contrasts compared secure (+2) versus insecure (avoidant = -1, anxious/ambivalent = -1) attachment styles and avoidant (+1) versus anxious/ambivalent (-1) attachment styles. Subsequent follow-up tests contrasted the secure group to each of the insecure groups (this data analytic approach minimized the family-wise Type I error rate). In this and all subsequent studies, gender was included as an additional factor in preliminary analyses, and was retained in final analyses when significant.⁵

Analyses

The regression of need for achievement on the orthogonal contrasts indicated that secure participants were higher in need for achievement than were insecure participants, $F(1, 189) = 21.53$, $p < .01$. Follow-up contrasts revealed that secure participants reported higher need for achievement than did avoidant participants, $F(1, 190) = 18.32$, $p < .01$, and anxious/ambivalent participants, $F(1, 190) = 17.14$, $p < .01$. Regressing fear of failure on the orthogonal contrasts indicated that secure participants were lower in fear of failure than were insecure participants, $F(1, 189) = 9.18$, $p < .01$. Follow-up contrasts revealed that secure participants tended to report lower fear of failure than did avoidant participants, $F(1, 189) = 3.50$, $p = .06$, and anxious/ambivalent participants, $F(1, 189) = 10.96$, $p < .01$.

³ Mastery-avoidance goals, a recent addition to the literature, were incorporated into our research in Study 3, and are discussed at that time.

⁴ The data for this study, and for Studies 2–4, were collected in the context of a larger project (Study 1, see Elliot & Church, 1997; Study 2, see Elliot & McGregor, 1999, Study 2; Studies 3 and 4, see Elliot & Thrash, 2002, Studies 2 and 5, respectively). None of the analyses or findings reported in the present research have been reported in any prior work.

⁵ In this and all subsequent studies, degrees of freedom vary somewhat across analyses because of occasional missing data.

The regression of mastery-approach goals on the orthogonal contrasts indicated that secure participants were more likely to adopt mastery-approach goals than were insecure participants, $F(1, 181) = 4.17, p < .05$. Women ($\hat{Y} = 32.43$) were also more likely to adopt mastery-approach goals than were men ($\hat{Y} = 27.57$), $F(1, 181) = 9.04, p < .01$. Follow-up contrasts revealed that secure participants reported more mastery-approach goals than did avoidant participants, $F(1, 182) = 6.30, p < .05$, but not anxious/ambivalent participants. The regression of performance-approach goals on the orthogonal contrasts revealed no significant relationships. The regression of performance-avoidance goals on the orthogonal contrasts indicated that secure participants were less likely to adopt performance-avoidance goals than were insecure participants, $F(1, 182) = 4.03, p < .05$. Follow-up contrasts revealed that secure participants reported fewer performance-avoidance goals than did anxious/ambivalent participants, $F(1, 183) = 5.57, p < .05$, but not avoidant participants.

The regression of approach (relative to avoidance) personal achievement goals on the orthogonal contrasts indicated that secure participants listed more approach goals than did insecure participants, $F(1, 134) = 11.56, p < .01$. The follow-up contrasts revealed that secure participants listed more approach goals than did avoidant participants, $F(1, 135) = 11.77, p < .01$, and anxious/ambivalent participants $F(1, 135) = 8.53, p < .01$. Table 1 presents the predicted values for each achievement motivation variable by attachment category.

In sum, the results supported our predictions. Securely attached participants were higher in need for achievement, lower in fear of failure, and adopted more approach (relative to avoidance) personal achievement goals than did insecure participants, both avoidant and anxious/ambivalent. Secure participants adopted more mastery-approach goals than avoidant participants, and adopted fewer performance-avoidance goals than anxious/ambivalent participants. These findings indicate that although avoidant and anxious/ambivalent attachment are linked to the same under-

lying motivational tendencies, they may lead to different forms of strategic goal pursuit in actual achievement settings. Null findings were obtained for performance-approach goals.

Study 2

In Study 2, we sought to extend the Study 1 findings by incorporating several modifications. First, we used a continuous measure of attachment rather than a categorical measure. Categorical measures have been critiqued on several grounds (see Fraley & Waller, 1998), and their use in Study 1 did not allow us to determine which specific attachment variable was responsible for the observed results (e.g., whether the mastery-approach findings were driven by secure attachment, avoidant attachment, or both). A continuous measure that maps onto the tripartite attachment categorization should yield information regarding the precise nature of the associations in question. Second, in this and all following studies, we used college grade point average (GPA) and Scholastic Aptitude Test (SAT) scores as covariates to determine whether the observed results were affected by participants' general level of ability. Third, in Study 1 we assessed attachment after achievement motivation. This is not a problem when examining the relationship between attachment and achievement motives, because both types of dispositional variables tend to be highly stable over time and, furthermore, have similar developmental roots (Elliot & Thrash, 2003). However, we view attachment as having a prospective influence on achievement goal adoption, which suggests that it would be optimal to assess attachment prior to the time at which participants adopted their goals. We attended to this matter in the present study.

Method

Participants and Procedure

One hundred ninety-eight (77 male, 121 female) university undergraduates participated for extra credit. Data were collected in two large group sessions and in an individual take-home session. Participants were informed that they would be completing different personality-relevant measures in the different sessions.

In the first session, held during the first week of the semester, participants completed achievement motive measures. One week later, they completed an attachment measure. Three weeks later, and 1 week prior to their first exam, participants reported their achievement goals for the upcoming exam. Participants' GPA and SAT scores were obtained from university records.

Measures

Attachment. Attachment styles were assessed as continuous variables using Mikulincer, Florian, and Tolmacz's (1990) 15-item questionnaire; five items assess each style (secure: e.g., "I find it relatively easy to get close to others"; avoidant: e.g., "Often love partners want me to be more intimate than I am comfortable being"; anxious/ambivalent: e.g., "I often worry that my partner won't stay with me"). Participants responded on 1 (*not at all*) to 7 (*very much*) scales. Reliability and validity are reported in Mikulincer et al. (1990). Responses were summed to form the secure ($\alpha = .70$), avoidant ($\alpha = .78$), and anxious/ambivalent ($\alpha = .80$) measures.

Achievement motives. The same achievement motive measures used in Study 1 were also used in this study ($\alpha = .84$ and $.86$ for need for achievement and fear of failure, respectively).

Table 1
Study 1: Predicted Values for Achievement Motivation Variables by Attachment Category

Achievement motivation variable	Attachment category		
	Secure	Avoidant	Anxious/ambivalent
Need for achievement	117.54 ^a	109.55 ^b	108.79 ^b
Fear of failure	70.88 ^a	72.92 ^b	74.82 ^b
Mastery-approach goals	30.51 ^a	28.53 ^b	28.76 ^{ab}
Performance-approach goals	26.08 ^a	25.82 ^a	26.86 ^a
Performance-avoidance goals	20.67 ^a	22.34 ^{ab}	23.54 ^b
Approach (relative to avoidance) personal achievement goals	6.60 ^a	5.68 ^b	5.74 ^b

Note. Tabled values are predicted values from the regression equations. Within each dependent measure, values not sharing common superscripts are significantly different from each other ($p < .05$ at minimum), except for the secure-avoidant contrast for fear of failure, which is $p = .06$. Need for achievement scores ranged from 74 to 151 ($SD = 11.83$); fear of failure scores ranged from 41 to 108 ($SD = 13.26$); mastery-approach goal scores ranged from 19 to 42 ($SD = 5.56$); performance-approach goal scores ranged from 6 to 42 ($SD = 8.36$); performance-avoidance goal scores ranged from 6 to 38 ($SD = 6.97$); approach (relative to avoidance) personal achievement goal scores ranged from 3 to 8 ($SD = 1.48$).

Achievement goals. The same achievement goal measures used in Study 1 were also used in this study (α s = .90, .91, and .83 for mastery, performance-approach, and performance-avoidance goals, respectively).

Results

Overview of Analyses

Simultaneous regression analyses were conducted to examine the relationship between attachment and the achievement motivation variables. Each regression equation was comprised of the three attachment variables and the interactions among them (interactions were examined with centered variables in this and all studies that follow; Aiken & West, 1991). The same procedure used to examine gender in Study 1 was used here to examine gender, GPA, and SAT scores.

Analyses

The need for achievement regression revealed that secure attachment was positively related to need for achievement, $F(1, 189) = 6.41, p < .05$ ($\beta = .22$). GPA was also positively related to need for achievement ($\beta = .31, p < .01$). In the fear of failure regression, avoidant attachment, $F(1, 190) = 11.39, p < .01$ ($\beta = .27$), and anxious/ambivalent attachment, $F(1, 190) = 5.83, p < .05$ ($\beta = .18$), were positively related to fear of failure.

The mastery-approach goals regression indicated that secure attachment was a positive predictor of mastery-approach goals, $F(1, 180) = 5.51, p < .05$ ($\beta = .20$). Gender was also positively associated with mastery-approach goals, $F(1, 180) = 5.96, p < .05$, indicating that women ($\hat{Y} = 26.87$) were more likely to adopt mastery-approach goals than were men ($\hat{Y} = 23.09$). As in Study 1, no significant findings were obtained for performance-approach goals except for a positive relationship with GPA ($\beta = .17, p < .05$). In the performance-avoidance goals regression, anxious/ambivalent attachment was a positive predictor of performance-avoidance goals, $F(1, 163) = 9.89, p < .01$ ($\beta = .25$). SAT scores were negatively related to performance-avoidance goals ($\beta = -.23, p < .01$). See Table 2 for an overview of these results.

In sum, assessing attachment styles with continuous measures yielded results consistent with our predictions and with Study 1. Secure attachment was positively related to need for achievement and mastery-approach goals. Avoidant attachment was positively related to fear of failure. Anxious/ambivalent attachment was positively related to fear of failure and performance-avoidance goals. Again, null findings were obtained for performance-approach goals. Thus, it may be inferred that secure attachment was responsible for the need for achievement findings in Study 1, and that insecure attachment, both avoidant and anxious/ambivalent, was responsible for the fear of failure findings in that study. Likewise, it appears that secure attachment was responsible for the mastery-approach goal results in Study 1, and that anxious/ambivalent attachment was responsible for the performance-avoidance goal results in that study.⁶

Study 3

In this study, we sought to extend the preceding findings in several ways. First, we followed the recent trend of operationalizing attachment in terms of two continuous process dimensions—avoidance and anxiety (e.g., Crowell et al., 1999; Fraley & Waller,

Table 2
Study 2: Standardized Coefficients for Achievement Motivation Variables by Attachment Variable

Achievement motivation variable	Attachment variable		
	Secure	Avoidant	Anxious/ambivalent
Need for achievement	.22*	.06	-.09
Fear of failure	.06	.27**	.18*
Mastery-approach goals	.20*	.04	.00
Performance-approach goals	.08	.14	.14
Performance-avoidance goals	-.08	.13	.25**

Note. Tabled values are standardized coefficients from the regression equations. Secure attachment scores ranged from 5 to 35 ($SD = 5.86$); avoidant attachment scores ranged from 5 to 35 ($SD = 6.35$); anxious/ambivalent attachment scores ranged from 5 to 35 ($SD = 7.26$). Need for achievement scores ranged from 84 to 142 ($SD = 11.05$); fear of failure scores ranged from 35 to 110 ($SD = 12.66$); mastery-approach goal scores ranged from 13 to 42 ($SD = 5.67$); performance-approach goal scores ranged from 6 to 42 ($SD = 9.13$); performance-avoidance goal scores ranged from 6 to 42 ($SD = 8.23$).

* $p < .05$. ** $p < .01$.

1998)—using the measure developed by Brennan et al. (1998). In that work, security is represented by the low end of both attachment dimensions. Accordingly, and on the basis of the results of the preceding studies, we predicted that the avoidance dimension would be negatively related to need for achievement and positively related to fear of failure, and that it would be a negative predictor of mastery-approach goals. We did not anticipate any relationship between attachment avoidance and either performance-approach or performance-avoidance goals, because Study 1 exhibited no significant difference between the secure and avoidant groups on these measures, and Study 2 showed no significant relationship between the avoidant scale and either of these goals. The attachment anxiety dimension was hypothesized to be negatively related

⁶ In addition to the simultaneous regression analyses reported in the text, we reanalyzed the data using two different approaches. Both of these approaches yielded results quite similar to those obtained in the original analyses. First, we examined each attachment style separately, rather than simultaneously. These analyses yielded the same results as those reported in the text, with the exception that secure attachment was negatively related to performance-avoidance goals ($\beta = -.17, p < .05$) and avoidant attachment was positively related to performance-avoidance goals ($\beta = .20, p < .05$). Second, given the current popularity of two-dimensional models of attachment, we conducted a principal-components factor analysis with an orthogonal rotation that forced a two-factor solution. Of interest, the first factor in this analysis consisted of nine items assessing comfort with closeness and willingness to depend on others from the Collins and Read (1990) attachment measure; the other factor consisted of the six anxiety items from the Collins and Read measure. We then examined the relationship between each of the two components and the focal variables. The comfort with closeness-dependability factor was associated with achievement-related outcomes as follows: need for achievement, $\beta = .15, p \leq .05$; fear of failure, $\beta = -.21, p < .05$; mastery-approach goals, $\beta = .14, p < .05$; performance-approach goals, $\beta = -.09, ns$; performance-avoidance goals, $\beta = -.20, p < .05$. The anxiety factor was associated as follows: need for achievement, $\beta = -.16, p < .05$; fear of failure, $\beta = .26, p < .05$; mastery-approach goals, $\beta = .11, ns$; performance-approach goals, $\beta = .12, ns$; performance-avoidance goals, $\beta = .27, p < .01$.

to need for achievement and positively related to fear of failure, and was expected to be a positive predictor of performance-avoidance goals. We did not anticipate any relationship between attachment anxiety and either mastery-approach or performance-approach goals, because Study 1 exhibited no significant difference between the secure and anxious/ambivalent groups on these measures, and Study 2 showed no significant relationship between the anxious/ambivalence scale and either of these goals.

Second, in Study 3 we measured achievement motives using a semiprojective rather than a self-report assessment procedure. Conceptually replicating the results from the preceding studies with this semiprojective procedure would minimize the likelihood that the obtained results were simply due to shared method (i.e., self-report) variance. Third, we assessed an additional type of achievement goal that has only recently received attention in the achievement motivation literature—mastery-avoidance goals. To date, the empirical profile for mastery-avoidance goals has been comparable with that for performance-avoidance goals; we therefore anticipated that mastery-avoidance goals would be positively related to attachment anxiety, but unrelated to attachment avoidance. Fourth, we further addressed the issue of response bias by assessing and controlling for social desirability (Berant, Mikulincer, & Florian, 2001). Response bias can be examined most rigorously by assessing all variables concurrently, which allows both temporarily activated and chronic biases to affect both the measures of theoretical interest and the measures of social desirability. Accordingly, all measures were completed concurrently in this study.

Method

Participants and Procedure

One hundred sixty-five (44 male, 121 female) university undergraduates participated for extra credit. Data were collected in a single large group session. Participants were informed that they would be completing a questionnaire packet that contained several different personality-relevant measures. The attachment, motive, goal, and social desirability measures were interspersed throughout the packet; participants reported their GPA and SAT information at the end of the session.

Measures

Attachment. Brennan et al.'s (1998) Experiences in Close Relationships measure was used to assess the avoidance (18 items; e.g., "I prefer not to be too close to romantic partners") and anxiety (18 items; e.g., "I worry that romantic partners won't care about me as much as I care about them") dimensions of attachment. Participants responded on 1 (*disagree strongly*) to 7 (*agree strongly*) scales. Reliability and validity information are reported in Brennan et al. (1998). Responses to the items for each dimension were summed to form the avoidance ($\alpha = .94$) and anxiety ($\alpha = .91$) indexes.

Achievement motives. Schmalt's (2002) Achievement Motive Grid-Short (AMG-S) was used to assess need for achievement and fear of failure. In this semiprojective assessment, participants view a series of ambiguous pictures and answer "no" or "yes" to a set of questions for each picture. The AMG-S consists of six pictures, with three items per picture for need for achievement (e.g., "She thinks: 'I'm proud of myself because I can do that'") and three items per picture for each of two types of fear of failure: fear of failure I (passive; e.g., "She thinks she can't do that") and fear of failure II (active; e.g., "She thinks: 'I wonder if anything is wrong?'"). Reliability and validity information for the measure are reported in Schmalt (2002). Participants' "yes" responses in the present

research were summed to form the AMG-S need for achievement ($\alpha = .81$), AMG-S fear of failure I ($\alpha = .80$), and AMG-S fear of failure II ($\alpha = .82$) indexes.

Achievement goals. Elliot and McGregor's (2001) achievement goals questionnaire was used to assess mastery-approach (e.g., "It is important for me to understand the content of this course as thoroughly as possible"), performance-approach (e.g., "It is important for me to do well compared to others in this class"), mastery-avoidance (e.g., "I am often concerned that I may not learn all that there is to learn in this class"), and performance-avoidance (e.g., "I just want to avoid doing poorly in this class") goals for the course. Each goal measure has three items, and each has been shown to be reliable and valid (Elliot & McGregor, 2001). Responses on 1 (*not at all true of me*) to 7 (*very true of me*) scales were summed to form the mastery-approach ($\alpha = .77$), performance-approach ($\alpha = .90$), mastery-avoidance ($\alpha = .74$), and performance-avoidance ($\alpha = .77$) goal indexes.

Response bias. Paulhus's (1991) Balanced Inventory of Desirable Responding was used to assess impression management (20 items, e.g., "I always obey laws, even if I'm unlikely to get caught"), self-deceptive enhancement (20 items, e.g., "I always know why I like things"), and overall social desirability (the sum of the individual measures). These scales have been shown to be reliable and valid (Paulhus, 1991). Participants responded using 1 (*not true*) to 7 (*very true*) scales. After appropriate reverse scoring, 1 point was given for each extreme (6 or 7) response, and these points were summed to form the impression management ($\alpha = .70$), self-deceptive enhancement ($\alpha = .64$), and overall social desirability ($\alpha = .78$) indexes.

Results

Overview of Analyses

Simultaneous regression analyses were conducted to examine the relationship between attachment and achievement motivation. Each regression equation included the two attachment variables and their interaction. The treatment of gender, GPA, and SAT scores was the same as in the prior study.

Analyses

The AMG-S need for achievement regression revealed that avoidance was negatively related to need for achievement, $F(1, 160) = 3.83, p \leq .05 (\beta = -.15)$. In the AMG-S fear of failure I regression, higher levels of both avoidance, $F(1, 159) = 13.48, p < .01 (\beta = .27)$, and anxiety, $F(1, 159) = 4.96, p < .05 (\beta = .17)$, predicted greater fear of failure. For AMG-S fear of failure II, only anxiety exhibited this positive relationship, $F(1, 161) = 3.97, p < .05 (\beta = .16)$.

In the achievement goal regressions, avoidance was a negative predictor of mastery-approach goal adoption, $F(142) = 4.68, p < .05 (\beta = -.18)$. GPA was positively associated with mastery-approach goals ($\beta = .20, p < .05$). Attachment anxiety was a positive predictor of adopting mastery-avoidance, $F(1, 160) = 3.69, p = .057 (\beta = .15)$, and performance-avoidance, $F(1, 153) = 16.81, p < .001 (\beta = .31)$, goals. SAT scores were negatively associated with performance-avoidance goals ($\beta = -.20, p < .05$). Once again, no significant findings were obtained for performance-approach goals.

To control for the possibility of response bias, we repeated the above analyses twice, once controlling for impression management and self-deception, and a second time controlling for overall social desirability. The results were essentially identical. In one case (the avoidance-AMG-S fear of failure II relationship), a coefficient significant at $p < .05$ became a trend at $p < .10$ (although the beta

only changed from .16 to .14/.15); in another case (anxiety predicting mastery-avoidance goals), a coefficient that was $p = .057$ became significant at $p < .05$ (the beta changed from .15 to .18/.17). These results clearly indicate that response bias was not a concern. An overview of these results is provided in Table 3.

In sum, the results supported our predictions and extended the findings from the prior studies. Using semiprojective motive measures, attachment avoidance was negatively related to need for achievement and positively related to fear of failure; attachment anxiety was positively related to fear of failure. Attachment avoidance was a negative predictor of mastery-approach goals, whereas attachment anxiety was a positive predictor of both mastery-avoidance and performance-avoidance goals. Null findings were obtained for performance-approach goals. One prediction did not receive support: The attachment anxiety dimension was not significantly related to need for achievement. We defer discussion of this issue to the General Discussion. The observed relationships were essentially unchanged when controlling for response bias.

Study 4

In Study 4 we sought to extend the findings of the preceding studies by examining the processes that account for goal adoption. We focused on three appraisal variables—challenge construal, threat construal, and competence valuation—as potential mediators of the documented attachment-achievement goal relationships. Challenge construal represents the perception that an achievement context offers an opportunity for mastery, growth, or gain, whereas threat construal represents a perceived potential for harm or loss (Lazarus, 1991; McGregor & Elliot, 2002). Competence valuation represents the degree to which an individual believes that competence on a task is important (Harackiewicz, 1989). Attachment relations are hypothesized to alter the meaning of achievement situations as reflected in these appraisal variables, and these appraisals, in turn, are hypothesized to directly impact goal adoption.

Specifically, with regard to the observed negative relationship between attachment avoidance and mastery-approach goals, we identified challenge construal as a potential mediator. The positive relationship between secure attachment and mastery-approach goals in Study 2, in conjunction with the negative relationship between attachment avoidance and mastery-approach goals in Study 3, clearly indicates that it is the security aspect of the avoidance dimension that promotes mastery-approach goal adoption. These security-based attachment representations should allow individuals to fully focus on the competence-relevant possibilities present in the situation, and to therefore construe the achievement task as a positive challenge to be met. This challenge construal would likely prompt the adoption of mastery-approach goals, given that both focus on positive competence-relevant possibilities. Thus, we hypothesized that the negative relationship between attachment avoidance and the adoption of mastery-approach goals would be mediated by challenge construal.

With regard to the observed positive relationship between attachment anxiety and mastery-avoidance goals, we identified threat construal and competence valuation as likely mediators. Attachment anxiety entails worry and preoccupation about the potential relational implications of exploration, which may lead individuals to construe achievement tasks as a potential threat. Threat construal would likely prompt the adoption of mastery-avoidance goals, given the shared focus on the negative possibilities represented by achievement tasks. The worry and relational preoccupation engendered by attachment anxiety may also lead individuals to overemphasize the importance of competence, because love and acceptance by attachment figures is perceived to be dependent on demonstrations of one's worthiness. Competence valuation has been shown to be a positive predictor of all achievement goals because achievement goal adoption of any sort indicates that the individual cares about competence (Elliot & McGregor, 2001). Thus, we hypothesized that the positive relationship between attachment anxiety and mastery-avoidance goals

Table 3
Study 3: Standardized Coefficients for Achievement Motivation Variables by Attachment Dimension

Achievement motivation variable	Attachment dimension	
	Avoidance	Anxiety
AMG-S need for achievement	-.15*/-.17*/-.17*	.03/.02/.02
AMG-S fear of failure I	.27**/.29**/.29**	.17*/.20*/.18*
AMG-S fear of failure II	-.03/-.04/-.04	.16*/.14/.15†
Mastery-approach goals	-.18*/-.17*/-.18*	-.12/-.05/-.03
Mastery-avoidance goals	.00/-.02/-.01	.15†/.18*/.17*
Performance-approach goals	.02/.01/.01	.08/.03/.01
Performance-avoidance goals	-.09/-.11/-.11	.31**/.25**/.26**

Note. Tabled values are standardized coefficients from the regression equations. For each column and variable, the first value is from the initial analysis not controlling for response bias, the second value is from the analysis controlling for impression management and self-deception, and the third value is from the analysis controlling for overall social desirability. Avoidance scores ranged from 18 to 106 ($SD = 19.98$); anxiety scores ranged from 18 to 115 ($SD = 19.42$). AMG-S need for achievement scores ranged from 20 to 36 ($SD = 3.94$); AMG-S fear of failure I scores ranged from 18 to 31 ($SD = 3.03$); AMG-S fear of failure II scores ranged from 18 to 36 ($SD = 3.96$); mastery-approach goal scores ranged from 9 to 21 ($SD = 2.83$); mastery-avoidance goal scores ranged from 3 to 20 ($SD = 3.43$); performance-approach goal scores ranged from 3 to 21 ($SD = 4.36$); performance-avoidance goal scores ranged from 3 to 21 ($SD = 3.99$). AMG-S = Achievement Motive Grid-Short.

† $p < .10$. * $p < .05$. ** $p < .01$.

would be mediated by threat construal and competence valuation. We anticipated the same mediational processes to be operative for both types of avoidance goal adoption—mastery-avoidance and performance-avoidance—given that earlier research has indicated that these two forms of avoidance goals operate according to a similar set of motivational processes (Elliot & McGregor, 2001).

Method

Participants and Procedure

One hundred eighty-one (62 male, 119 female) university undergraduates participated for extra credit. Data were collected in two large group sessions. Participants were informed that they would be completing different personality-relevant measures in the two sessions.

In the first session, held the second week of the semester, participants completed an attachment measure. In the second session, 4 weeks later and 1 week prior to their first exam, participants reported their challenge construal, threat construal, and competence valuation for the upcoming exam, and then reported their achievement goals for the exam. Participants provided their GPA and SAT information during the first week of class.

Measures

Attachment. The same attachment measure used in Study 3 was also used in this study ($\alpha = .92$ for avoidance and $.91$ for anxiety).

Challenge and threat construals. Two-item versions of McGregor and Elliot's (2002) task construal measures were used to assess challenge construal ("I view this exam as a positive challenge" and "I think this exam represents a positive challenge to me") and threat construal ("I view this exam as a threat" and "I think this exam represents a threat to me") of the exam. Participants responded on 1 (*not at all true of me*) to 7 (*very true of me*) scales. The items were selected a priori as the highest loaders on their respective factors in McGregor and Elliot (2002); these brief measures afford a more efficient and face valid assessment of the constructs than the original measures. Pilot work with an independent sample yielded factor analytic and internal consistency data strongly supporting the utility of these brief measures. Responses were summed to form the challenge ($\alpha = .92$) and threat ($\alpha = .92$) construal indexes.

Competence valuation. Elliot and McGregor's (2001) two-item measure was used to assess competence valuation ("It is important for me to do well on the exam" and "I care very much about how well I do on the exam"). This measure has been shown to be reliable and valid (Elliot & McGregor, 2001). Responses on the 1 (*not at all true of me*) to 7 (*very true of me*) scales were summed to form the competence valuation index ($\alpha = .79$).

Achievement goals. The same achievement goal measure used in Study 3 was also used in this study (α s = $.89$, $.95$, $.85$, and $.85$ for mastery-approach, performance-approach, mastery-avoidance, and performance-avoidance goals, respectively).

Results

Overview of Analyses

Simultaneous regression analyses were conducted to examine the direct relationship between attachment and the achievement goal and mediation variables. Each regression equation included the two attachment variables and their interaction. The mediational analyses are described in detail below. The treatment of gender, GPA, and SAT scores was the same as in the prior studies.

Direct Relationships

In the achievement goal regressions, avoidance was a negative predictor of mastery-approach goals, $F(1, 176) = 6.15, p < .05$

($\beta = -.18$). Anxiety was a positive predictor of mastery-avoidance goals, $F(1, 177) = 7.43, p < .01$ ($\beta = .20$), and performance-avoidance goals, $F(1, 153) = 10.04, p < .01$ ($\beta = .25$). GPA was negatively related to performance-avoidance goals ($\beta = -.17, p < .05$), as were SAT scores ($\beta = -.22, p < .01$). The performance-approach goals regression yielded no significant findings for attachment, although men ($\hat{Y} = 16.91$) were more likely to adopt performance-approach goals than were women ($\hat{Y} = 12.95$), $F(1, 176) = 6.50, p < .05$. These achievement goal results fully replicate those obtained in Study 3.

In the challenge and threat construal regressions, avoidance was a negative predictor of challenge construal, $F(1, 176) = 7.33, p < .01$ ($\beta = -.20$), and a positive predictor of threat construal, $F(1, 177) = 4.14, p < .05$ ($\beta = .15$); anxiety was a positive predictor of threat construal only, $F(1, 177) = 8.63, p < .01$ ($\beta = .22$). The competence valuation regression revealed that anxiety was a positive predictor of competence valuation, $F(1, 177) = 8.15, p < .01$ ($\beta = .21$). Table 4 displays the results from these analyses.

Tests of Mediation

We tested our mediational hypotheses using two methods recently recommended by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002).⁷ The first method involves dividing the mediated, or indirect, effect (which is the product of the two regression coefficients involved in the effect) by its standard error, and comparing this value to critical values derived from this product term's empirical sampling distribution.⁸ The coefficients and standard errors used in this test are obtained from two regression analyses, one in which the mediator variable is regressed on the predictor variables, and the other in which the outcome variable is regressed on the mediator variable with the predictor variables included in the equation. A significant indirect effect is analogous to showing that the direct effect is significantly reduced when the mediator is included in the equation.

First, we tested challenge construal as a mediator of the relationship between attachment avoidance and mastery-approach goals. Challenge construal indeed significantly mediated the pathway between avoidance and mastery-approach goals ($z' = 2.27$,

⁷ MacKinnon et al. (2002) empirically compared the power and Type I error rate accuracy of 14 different methods for establishing the statistical significance of an intervening (mediator) variable effect. Their results indicated that the approach commonly used in social-personality psychology, the so-called "causal steps" procedure using a modified Sobel's significance test (Baron & Kenny, 1986), has very low statistical power. They recommend two procedures that have the greatest statistical power and the most accurate Type I error rates, which we used in the present research.

⁸ This test produces a value MacKinnon et al. (2002) refer to as z' . The notation z' is used because the critical value of this statistic is smaller than that of the standard z test. (The product of independent variables has a different sampling distribution than does the standard normal distribution.) For tables of critical values, we relied on MacKinnon et al.'s Web site, www.public.asu.edu/~davidpm/ripl/mediate.htm. All mediation tests were conducted with unstandardized regression coefficients. However, for ease of comparison, standardized regression coefficients are displayed in Figure 1. The equation for this test is

$$z' = \frac{\alpha\beta}{\sqrt{\alpha^2\sigma_\beta^2 + \beta^2\sigma_\alpha^2}}$$

Table 4
Study 4: Standardized Coefficients for Achievement Motivation and Mediator Variables by Attachment Dimension

Variable	Attachment dimension	
	Avoidance	Anxiety
Mastery-approach goals	-.18*	.08
Mastery-avoidance goals	.06	.20*
Performance-approach goals	.13	.01
Performance-avoidance goals	.11	.25**
Challenge construal	-.20**	.04
Threat construal	.15*	.22**
Competence valuation	-.11	.21**

Note. Tabled values are standardized coefficients from the regression equations. Avoidance scores ranged from 18 to 98 (*SD* = 17.58); anxiety scores ranged from 24 to 116 (*SD* = 20.38). Mastery-approach goal scores ranged from 5 to 21 (*SD* = 3.13); mastery-avoidance goal scores ranged from 3 to 21 (*SD* = 3.61); performance-approach goal scores ranged from 3 to 21 (*SD* = 5.03); performance-avoidance goal scores ranged from 3 to 21 (*SD* = 4.41).
 * $p < .05$. ** $p < .01$.

$p < .01$). It is also the case that when the mediator—challenge construal—was included in the equation, the direct relationship between avoidance and mastery-approach goals was no longer significant. The paths involved in this mediation are presented in Figure 1a.

Next, we tested threat construal and competence valuation as mediators of the relationship between attachment anxiety and mastery-avoidance goals. Threat construal was validated as a mediator of the anxiety to mastery-avoidance goals effect ($z' = 2.42, p < .01$), as was competence valuation ($z' = 1.83, p < .01$). It is also the case that when the mediators were included in the equation, the direct relationship between anxiety and mastery-avoidance goals was no longer significant. The paths involved in this mediation are displayed in Figure 1b.

Last, we tested threat construal and competence valuation as mediators of the relationship between attachment anxiety and performance-avoidance goals. In accord with the mediational findings for mastery-avoidance goals, both threat construal ($z' = 2.62, p < .01$) and competence valuation ($z' = 2.18, p < .01$) were validated as mediators of the anxiety to performance-avoidance goals relationship. Once again, it is also the case that when the

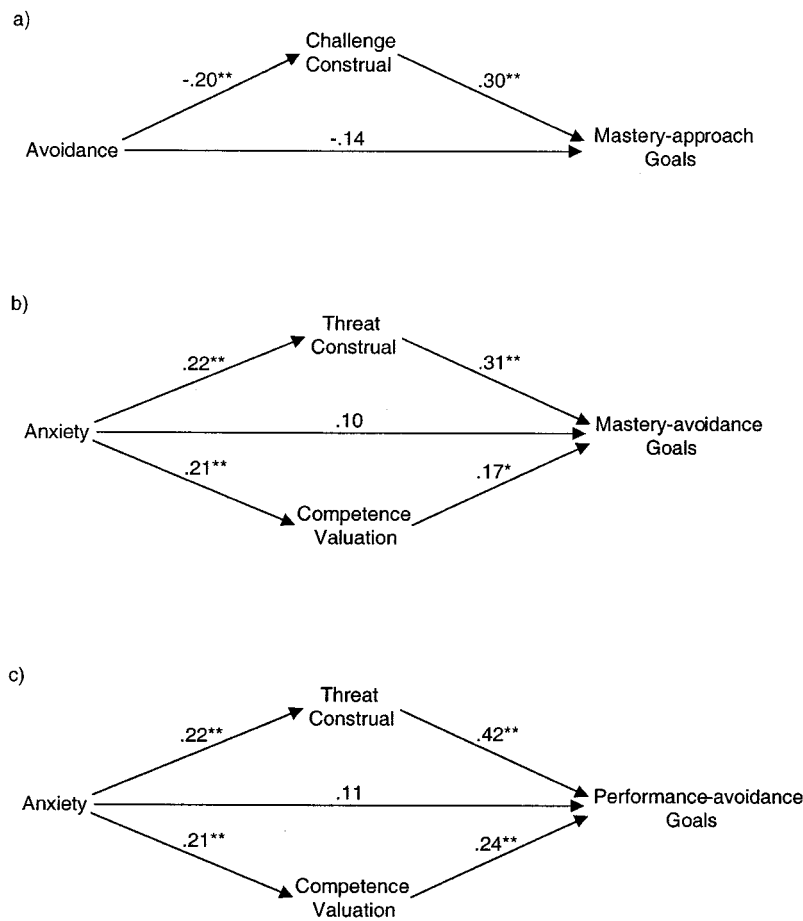


Figure 1. Results of mediation tests in Study 4: a) The mediational model for the relationship between avoidance and mastery-approach goals. b) The mediational model for the relationship between anxiety and mastery-avoidance goals. c) The mediational model for the relationship between anxiety and performance-avoidance goals. Path coefficients are standardized regression coefficients from the regression analyses. For presentation clarity, only theoretically central variables are included in the diagrams. * $p < .05$. ** $p < .01$.

mediators were included in the equation, the direct relationship between anxiety and performance-avoidance goals was no longer significant. The paths involved in this mediation are shown in Figure 1c.

The second method recommended by MacKinnon et al. (2002) involves converting each regression coefficient in an indirect (mediated) effect to z scores by dividing the regression coefficient by its standard error, then multiplying the z s, and comparing this value (labeled a P statistic) to critical values in the sampling distribution of the product of two random variables (obtained from Springer & Thompson, 1966). The coefficients used in this analysis were identical to those used in the first method. The results obtained using this method were the same as those obtained using the first method (all mediational findings were significant at $p < .01$).

In sum, the results supported our predictions regarding mediation. Challenge construal mediated the relationship between attachment avoidance and mastery-approach goal adoption. Threat construal and competence valuation jointly mediated the relationship between attachment anxiety and both mastery-avoidance and performance-avoidance goal adoption.

General Discussion

The results from the present research provided clear and consistent evidence for the hypothesized link between attachment and achievement motivation in adulthood. In general, across several studies, levels of analysis, and operationalizations of attachment, secure attachment was linked to high need for achievement and low fear of failure, it was a positive predictor of approach personal goals and mastery-approach goals, and it was a negative predictor of mastery-avoidance and performance-avoidance goals. Insecure attachment, however, was linked to low need for achievement and high fear of failure, it was a positive predictor of mastery-avoidance and performance-avoidance goals, and it was a negative predictor of approach personal goals and mastery-approach goals. Thus, secure attachment evidenced an appetitive, effectance-like achievement motivation profile, whereas insecure attachment evidenced an avoidance-oriented achievement motivation profile.

Our use of focused contrasts and continuous and dimensional measures of attachment afforded a more precise analysis of these general patterns, by indicating which aspects of attachment were responsible for the various findings. The results were highly consistent across the different studies, and revealed the following specific relationships: Attachment security (specifically, those aspects of security captured by the low end of the avoidance dimension) was positively related to need for achievement and was a positive predictor of mastery-approach goals, attachment avoidance was positively related to fear of failure, and attachment anxiety was positively related to fear of failure and was a positive predictor of mastery-avoidance and performance-avoidance goals. Thus, avoidance-based insecurity and anxiety-based insecurity appear to share a common motivational foundation—fear of failure—but diverge in terms of the strategic way in which this fear of failure is regulated. Anxiety-based insecurity prompts the use of avoidance goals in achievement settings, whereas avoidance-based insecurity does not.

Attachment predicted each of the motive and goal constructs examined in the present work with the exception of performance-approach goals, which, in four studies, consistently yielded null

results. Performance-approach goals are difficult to investigate empirically, because they often become entangled with diverse motivational concerns beyond competence per se (e.g., self-presentation, self-validation; Elliot, 1999). Achievement settings such as the college classroom (where each of the present studies was conducted) may be particularly likely to produce such “sullied” performance-approach goal complexes (Elliot & Thrash, 2001); purer (i.e., exclusively competence-oriented) forms of performance-approach goal pursuit may be found in other achievement contexts (e.g., avocations). It is possible that attachment variables may predict these purer instantiations of performance-approach goals, much as attachment security is a positive predictor of the other appetitive achievement goal—mastery-approach.

In the two studies that used dimensional measures of attachment, we did not observe any negative relationships between attachment anxiety and the approach-based measures of achievement motivation (e.g., need for achievement, mastery-approach goals). These results may indicate that the security aspect of the anxiety dimension, in contrast to the security aspect of the avoidance dimension, is not applicable to appetitive achievement motivation. That is, it may be the case that the closeness and dependability elements of security are instrumental in facilitating appetitive achievement motivation, whereas the acceptance-based elements of security are not. Alternatively, the null findings for the anxiety dimension may reflect the nature of the items comprising the anxiety measure that we used. The items in Brennan et al.’s (1998) anxiety scale focus on the presence of anxiety (16 of the 18 items; e.g., “I worry a lot about my relationships”) or the absence of anxiety (2 of the 18 items; e.g., “I do not often worry about being abandoned”), but not on the positive qualities of security that, conceptually, comprise the low end of the anxiety dimension. This observation is borne out in psychometric studies of the various attachment scales in the literature, which indicate that the prototype of secure attachment is better captured by the low end of the avoidance dimension than by the low end of the anxiety dimension in the Brennan et al. measure (see Tables 3.3 and 3.4 in Brennan et al., 1998). In other words, although security is commonly (and, in our view, appropriately) conceptualized in the literature in terms of low scores on both the avoidance and anxiety dimensions, the avoidance dimension of Brennan et al.’s measure (and similar measures) seems to more fully capture an avoidance-security continuum, whereas the anxiety dimension of their measure (and similar measures) seems to more closely represent a presence-absence of anxiety continuum. Clearly, additional work is needed to attend to this fundamentally important issue.

Mediational analyses indicated that challenge construal, threat construal, and competence valuation accounted for the observed goal adoption findings. These results are important, because they suggest that attachment relations lead individuals to imbue achievement settings with diverse personal meanings, which then impact how persons self-regulate in such settings. In one mediational model, attachment avoidance (more precisely, the security aspect of the avoidance dimension) predicted challenge construal which, in turn, predicted the adoption of mastery-approach goals. In the other model, attachment anxiety predicted threat construal and competence valuation which, in turn, jointly predicted mastery-avoidance and performance-avoidance goal adoption. Thus, attachment security facilitates optimal achievement motivation because it enables individuals to view achievement contexts in terms of potential gains, and to fully focus on effectance pursuits.

In contrast, anxious attachment undermines optimal achievement motivation because it impels individuals to view achievement tasks in terms of potential losses and to feel a heightened sense of needing to do well, both of which produce a defensive focus on avoiding negative outcomes.

In sum, the results of the present research strongly support our general hypotheses that secure attachment in adulthood affords unimpeded, appetitive exploration in achievement settings, and that insecure attachment in adulthood interferes with exploration in achievement settings by evoking avoidance motivation. It is important to note that our methods were designed to minimize the possibility that self-report consistency and similar artifacts could explain our findings. Our assessments of attachment and achievement motivation were always separated by at least a week (except in Study 3, in which the tests for response bias required simultaneous measurement), thereby ruling out mood and memory artifacts. Also, we used diverse measures of all constructs—attachment (categorical, continuous, and dimensional), motives (self-report and semi-projective), and goals (nomothetic and idiographic)—and established that the results were not a function of response bias. These precautions make it highly unlikely that self-report artifacts were responsible for our findings. We further note that the goals on which participants reported in our studies were their achievement goals for an actual college course. Thus, our findings are clearly directly applicable to important “real world” achievement settings.

Attachment and Exploration: Further Considerations

We examined achievement motivation in an academic setting in the present research, but we presume that the issues that we addressed apply equally well to other achievement contexts, such as sport and occupational settings.⁹ For example, anxious attachment, and the preoccupation with acceptance and rejection that it engenders, may heighten fears about the interpersonal implications of failure on any task that involves the possibility of success and failure, leading individuals to focus primarily on the avoidance of failure. Attachment security, however, may allow individuals to focus directly on the challenges inherent in the task, and to immerse themselves in the activity, free from concerns about the broader implications of success and failure. Thus, it is not only the case that a difficult day at the workplace may be easier to withstand if one has an available, accepting, and responsive partner to return to at day's end, but, more proactively, the availability of a supportive attachment figure may also facilitate appetitive engagement in the work itself. Future research would do well to examine the generalizability of the findings documented herein to other achievement contexts. Of interest, whereas prior research has documented the impact of stressful work circumstances on subsequent interpersonal relations (e.g., Repetti, 1989), the reverse pathway is seldom investigated.

In the present research, we focused on adult attachment, but it is important to note that our conceptual analysis of the exploration system is meant to apply across the life span. That is, just as romantic attachment is linked to achievement motivation in adulthood, parent-child attachment may be presumed to be connected to developmentally appropriate forms of achievement motivation in young children. Research has shown that young children who are securely attached to their caregiver(s) engage in longer bouts of exploratory play, exhibit greater endurance and persistence on a

variety of tasks, and evidence more task absorption and affective enjoyment during exploration (Cassidy & Berlin, 1994; Grossmann et al., 1999). We presume that these findings reflect the operation of rudimentary forms of appetitive achievement motivation, much as the high degrees of cognitive curiosity and optimal work attitudes shown by securely attached adults (Hazan & Shaver, 1990; Mikulincer, 1997) are presumed to reflect more mature forms of appetitive achievement motivation. Although achievement motivation is notoriously difficult to assess at early ages (Maslin-Cole, Bretherton, & Morgan, 1993; Risken-Walraven, Meij, van Roozendaal, & Koks, 1993), we view the empirical investigation of the attachment-achievement motivation relationship in young children as a high priority for future research.

Although we see parallels in the attachment-exploration link between early childhood and adulthood, we do not suggest that this connection is necessarily the same regardless of age. Indeed, whereas in developmental research the child is given the opportunity to use a particular person—the child's primary caregiver—as a secure base from which to explore the environment, in research with adults (e.g., the present four studies) attachment is usually conceptualized and measured in terms of general mental representations of romantic partners. To some extent, this distinction reflects a developmental progression that is central to attachment theory: As the individual matures, representations of specific attachment figures become internalized as working models (i.e., expectations, beliefs, and emotions) describing the availability and supportiveness of caregivers in general. Thus, our conceptualization assumes that adult exploration, in the form of achievement motives and goals, is impacted by a generalized set of mental representations about attachment figures. These generalized mental representations undoubtedly have both dispositional (i.e., trait-like) and partner-specific (i.e., reflecting the person's experience with particular partners) components (Reis, Capobianco, & Tsai, 2002; Shaver, Collins, & Clark, 1996).

Our work demonstrates how attachment and approach-avoidance motivation are linked in the achievement domain, but we suspect that this connection applies more broadly as well. Secure attachment is likely to facilitate approach-oriented motivational processes in all spheres of functioning, as the individual feels free to fully and appetitively engage in daily life with the confidence that support, care, and acceptance are readily available if needed (see Waters, Crowell, Elliott, Corcoran, & Treboux's, 2002, discussion of the deeper meaning of the “secure base” construct). Insecure forms of attachment, however, are likely to evoke avoidance-oriented motivational processes across life domains, as the person vigilantly seeks to evade negative possibilities that could put him or her in danger of rejection or abandonment. Several research findings seem consistent with these suggestions.

⁹ The achievement motivation literature focuses primarily on academic, sport, and occupational settings in which competence—doing well or poorly at something—is clearly relevant. However, it is important to highlight that competence concerns pervade daily life outside of these commonly recognized settings—for example, a backyard gardener seeking to grow an excellent batch of tomatoes is engaging in a competence pursuit. Likewise, and less intuitively, a person on a date striving to be a good conversationalist is also involved in a competence pursuit. We presume that the conceptual analysis presented herein is equally applicable to all situations involving competence concerns, in that these competence concerns are presumed to implicate the exploration system.

For example, insecure attachment has been linked to negative affect, fear of death, avoidant coping, shame experiences, fear of negative evaluation, and outgroup prejudice (e.g., Belsky, Spritz, & Crnic, 1996; Elliot & Church, 2002; Greenfield & Teevan, 1986; Mikulincer & Florian, 1995, 1998; see Mikulincer & Shaver, in press, for an overview).

In a recent overview and evaluation of the attachment literature, Mary Main (1999) called for the forging of integrative links between attachment theory and other fields of psychological inquiry. Although at first glance the attachment and achievement motivation literatures may seem to offer little in the way of integrative possibilities, the present research documents theoretical and empirical connections that we believe make an important contribution to both literatures. For the attachment literature, the present work provides a broader, more theoretically grounded conceptualization of the exploration system than heretofore available. For the achievement motivation literature, the present work helps explain how competence motivation can go awry in the context of significant relationships.

The relationship and competence domains, arguably the two most central domains of daily life, are usually studied in isolation from each other. Our research illustrates that these two important life domains, and the regulatory processes they entail, are systematically and meaningfully commingled. Although the vast majority of investigations of attachment processes limit their focus to the domain of interpersonal relations, attachment theory was clearly intended to provide a broader account of human behavior. We encourage other researchers and theorists to attend to Main's (1999) appeal for integrative work, as we believe such work is the key to fully realizing the potential of the attachment theory perspective.

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