

# Attachment to Parents, Social Anxiety, and Close Relationships of Female Students over the Transition to College

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**Abstract** The current study examined the process by which attachment to parents influences satisfaction with and ease in forming friendships at college. One hundred seventy-two female college freshmen completed a measure of parental attachment security the summer before their first semester of college (July 2006) and measures to assess satisfaction with and ease in forming close relationships at the end of their first semester (December 2006). Students ranged in age from 18 to 20 years ( $M = 18.09$ ,  $SD = 0.33$ ) and were diverse in their racial makeup (30% racial minority). Consistent with predictions derived from attachment theory, secure attachment to parents was positively associated with ease in forming friendships among racial minority and white participants and satisfaction with friendships among minority participants. Moreover, indirect effects of parental attachment security on relationship outcomes through social anxiety were significant for minority participants but not for white participants. Findings may be useful in the development of retention programs targeted at incoming university freshmen, particularly minority students.

**Keywords** Attachment · Friendship · Social anxiety · College

## Introduction

Previous research has demonstrated that positive close relationships with peers are related to adaptation to college, academic achievement, college retention rates, and well-being among college students (Abby et al. 1985; Brooks and DuBois 1995; Fass and Tubman 2002; Zea et al. 1995). Thus, it is important to identify precursors of positive friendships among college students. Bowlby (1969) postulated that children whose needs for safety and protection are consistently met by their parents develop a secure attachment to their parents that would be linked to the quality of subsequent close relationships, and recent evidence supports this view (Roisman et al. 2005). However, the process by which attachment to parents influences other relationships is not fully understood. Previous research indicates that parental attachment security is linked to social anxiety (Papini et al. 1991), which in turn is linked to relationship quality (La Greca and Lopez 1998). Thus, the purpose of this study was to examine social anxiety as a mediator of the relationship between attachment to parents prior to college and satisfaction with and ease in forming close relationships at the end of the first semester.

The transition to college is a particularly interesting time to examine predictors of relationship quality for several reasons. First, developmentally this transition marks the beginning of the transition from adolescence to adulthood among college students. Second, the quality of relationships during adolescence and young adulthood predict current and future well-being and achievement (Brooks and DuBois 1995; Fass and Tubman 2002), demonstrating the short-term and long-term importance of relationships during this period. Finally, developmental transitions are thought to be times in individuals' lives when the

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attachment system is particularly salient (Ainsworth et al. 1978), and consistent with research documenting that securely attached adolescents are most likely to leave home in a timely manner (Seiffe-Krenke 2006), students with a secure attachment and more positive relationship with their parents likely feel more comfortable leaving their home to explore this new college environment and develop new relationships in part because they know that they can rely on their parents for support and because they have a general expectation that others will respond positively to their social bids. This expectation likely promotes the use of socially competent behaviors, which in turn elicit more positive responses from peers than would be the case for students with an insecure attachment to parents. Finally, because the attachment system is thought to be activated during times of stress (Ainsworth et al. 1978) and because the transition to college is a stressful time for students (Lu 1994), it is particularly important to examine the role of attachment security in the development and quality of new friendships during this transition.

### Attachment and Close Relationships

Bowlby (1969) postulated that the manner in which caregivers respond to children's bids for safety and protection contributes to children's internal working models, or schemas, which influence how they view themselves and the world around them. When parents are supportive and reliable, children develop a secure attachment to their parents, characterized by internal working models of themselves as competent and appreciated and of others as trustworthy and dependable. If parents are unreliable or rejecting, children develop an insecure attachment to their parents, characterized by internal working models of themselves as incompetent and unappreciated and of others as untrustworthy and not dependable (Bretherton and Munholland 1999). These early experiences with parents and their related schema are postulated to drive expectations for and behavior within future close relationships (Bretherton and Munholland).

Much empirical support has been found to support this view, particularly with regard to peer relations in childhood (Cohn 1990; Rydell et al. 2005). More recently, researchers have demonstrated associations between parent-child attachment security and the qualities of peer relationships among adolescents. For example, college students who are more securely attached to their parents tend to report more social support from their peers (Kobak and Sceery 1988) as well as higher quality daily interactions with their peers and less loneliness (Kerns and Stevens 1996). Additionally, adolescents who are more securely attached to their parents tend to be more accepted by their peers (Allen et al. 1998)

and experience more positive friendship qualities (security, help, and closeness) and lower friendship conflict (Lieberman et al. 1999). Furthermore, adolescents classified as secure based on the Adult Attachment Interview (George et al. 1984) have been found to have greater capacity for intimacy in both their friendships and romantic relationships (Scharf et al. 2004) and to engage in less disruptive behaviors in their friendships (Zimmermann et al. 2001) than adolescents classified as insecure. More recently in a meta-analysis of 53 studies investigating the association between parental attachment security and peer relationships in adolescence, Benson et al. (2006) found moderate effect sizes for attachment security predicting social competence (the average effect size was 0.48) as well as attachment security predicting best friend relationship quality (the average effect size was 0.58). Effect sizes were somewhat larger for studies that utilized the Inventory of Parent and Peer Attachment (IPPA; Armsden and Greenberg 1987), which is the measure of parental attachment security employed in the current study. The authors who conducted this meta-analysis attributed the higher effect sizes for the IPPA to the higher reliability estimates associated with this measure as compared to others.

### Mediating Effect of Social Anxiety

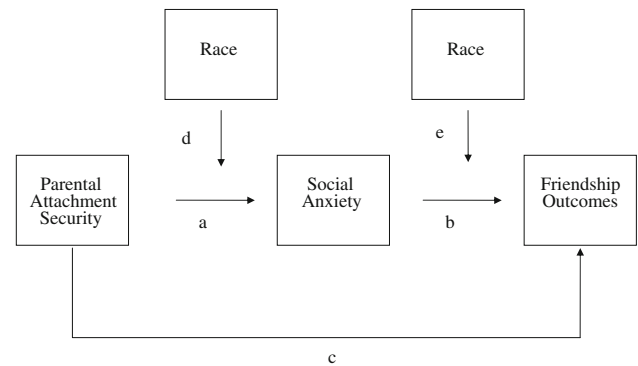
Although previous research has demonstrated links between attachment to parents and characteristics of other close relationships in adolescence and early adulthood, the process by which attachment predicts other close relationship characteristics is not fully understood. Bowlby (1973, 1980) argued that children's attachment to their primary caregivers influences their psychological well-being. In particular, children whose needs are not consistently met, and who as a result feel negatively about themselves and others, may be prone to a negative attribution bias, which increases negative emotional arousal. Individuals with a negative attribution bias likely perceive interactions with others more negatively and may experience more anxiety in social situations as a result (Lucock and Salkovskis 1988; Taylor and Wald 2003).

Social anxiety, which is characterized by fear of social situations and of embarrassment or humiliation in social situations (American Psychiatric Association 2000), is prevalent among college students with research consistently demonstrating that 19–33% of students experience high or clinical levels of social anxiety (Beidel et al. 1989; Strahan 2003; Strahan and Conger 1998). Adolescents who are more securely attached to their parents tend to report less social anxiety (Papini et al. 1991) and more generally, secure attachment to parents has been found to be related to lower levels of anxiety among children, adolescents, and

college students (Armsden and Greenberg 1987; Brown and Whiteside 2008). Social anxiety is particularly important during the transition to college as it influences the development of new relationships. Adolescent girls with higher levels of social anxiety report having fewer friendships and less support in their close relationships (La Greca and Lopez 1998). These results suggest that social anxiety undermines the ability to form relationships and the quality of relationships that are formed. In sum, prior research demonstrates direct associations between attachment to parents and relationship outcomes, attachment to parents and social anxiety, and social anxiety and the development and quality of relationships. Thus, it is plausible that the association between attachment to parents and relationship outcomes is mediated by social anxiety.

### Moderating Effect of Race

Most previous research has examined the influence of attachment security on characteristics of friendships among college students utilizing samples with limited racial diversity. Importantly, there is some evidence that racial differences in attachment security (Montague et al. 2003) and close relationship outcomes (Broman 1993) exist. Racial differences have also been found to exist in the experience of social anxiety among college students (LeSure-Lester and King 2004; Okazaki 1997). Beyond mean-level differences in the variables of interest across race, the possibility of racial differences in the structural relations among these variables (i.e., race as a moderator) remains an important question in developmental research (Steinberg and Fletcher 1998). Importantly, race has been demonstrated to moderate links between parenting/discipline styles and adolescent externalizing behaviors (Lansford et al. 2004) as well as family process variables and child internalizing behaviors (Vendlinski et al. 2006). Furthermore, because activation of the attachment system is thought to occur during times of stress (Ainsworth et al. 1978), and because racial minority students report experiencing racism at college (Bynum et al. 2007) in addition to the typical stressors associated with the transition to college, it is possible that the attachment system may be more salient to minority students during this time and therefore alter the nature of associations between attachment and subsequent relationship characteristics. Thus, we examine race as a moderator by testing moderated mediation as illustrated in Fig. 1. That is, we explore the possibility that the indirect effect of parental attachment security on each relationship outcome variable differs based on race, and more specifically, whether race moderates the path from parental attachment security to social anxiety (depicted as path d in Fig. 1) and/or the path from social anxiety to each



**Fig. 1** Race as a moderator of the mediated pathway from parental attachment security to friendship outcomes

relationship outcome variable (depicted as path e in Fig. 1). Given the absence of prior data relevant to this question, we tentatively propose that attachment to parents will be a stronger predictor of relationship outcomes among minority participants due to greater activation of the attachment system as a function of racism-related stress. Gaining a better understanding of the experiences of racial minority students over the transition to college is a particular strength of this study given evidence that college retention rates are lower among minority students compared to white students (Peltier et al. 1999), and minority students are more likely to report feelings of alienation and isolation at college than white students, contributing to intentions to withdraw from college (Loo and Rolison 1986).

### Hypotheses

Three features of the present study distinguish it from previous research. First, we examine a potential process by which attachment to parents affects subsequent relationships by examining social anxiety as a mediator. Second, we examine race as a moderator rather than simply controlling for it. Finally, this is a short-term longitudinal study in which parental attachment security was measured prior to entry to college and both social anxiety and relationship outcomes were measured at the end of the first semester. Based on theory and previous research, we hypothesized that students who are more securely attached to their parents prior to the first semester of college will report greater ease forming friendships and more satisfaction in their friendships at the end of the first semester of college. It was also expected that the positive association between parental attachment security and satisfaction with and ease in forming friendships will be mediated by social anxiety. Finally, the role of race will be examined by considering race as a moderator of the mediational model.

## Method

### Participants

Data were collected from 385 college freshmen at a large university in the southeastern United States the summer before their first semester of college (July 2006; wave one). Incoming students who had recently graduated from high school and had not previously attended any other college or university were recruited through e-mail with a link to an online survey with the assistance of the university's Office of Institutional Research, which had the contact information of all participants available to them. Twenty percent of eligible incoming freshmen ( $N = 385$ ) completed the first wave of data collection in July. Of these, 199 also completed measures at the end of their first semester of college (December 2006; wave two). There were two primary reasons for attrition: (1) the student was no longer enrolled in the university (9% of the freshmen class did not return for the spring semester) and (2) the student declined to participate in the study again. Eligible participants who completed measures at wave one but did not return at wave two were more likely to be male ( $\chi^2(1) = 4.02, p < 0.05$ ). There were no other differences between eligible participants who did and did not complete measures at wave two on other demographic variables or the measure of parental attachment security. Of the 199 participants who completed wave two, only 27 were male, thus they were excluded from analyses. Thus, the analyses reported here are based on a sample of 172 female participants who had data at both waves. Seventy percent of participants were White, 18% were Black, 5% were Asian–American, 3% were Hispanic non-White, and 4% indicated their race as "other". Race was dichotomized to distinguish minority participants ( $n = 52$ ) and white participants ( $n = 120$ ) for the present analyses. Participants ranged in age from 18 to 20 years ( $M = 18.09, SD = 0.33$ ). Less than half of the participants had mothers (40.4%) or fathers (42.8%) who had received a Bachelors degree and there was no difference between white and minority participants based on parental education.

### Procedure

Incoming freshmen were e-mailed an invitation to participate in the study the summer before their first semester of college. Interested students affirmed their consent to participate and were then linked to the online survey that included a measure of parental attachment security and a demographic questionnaire. Students who completed the online survey were entered into a drawing for a gift certificate to the University Bookstore. Wave one participants were sent an email inviting them to complete a second

online survey near the end of their first semester. Participants completed measures to assess ease at forming friendships at college, satisfaction with friends at college, and social anxiety. Students who completed the second online survey were entered into a drawing for a gift certificate to the University Bookstore.

### Measures

#### *Parental Attachment Security*

The Inventory of Parent and Peer Attachment, parent subscale (IPPA; Armsden and Greenberg 1987) is a 28-item measure that assesses the quality of adolescents' attachments to their parents by tapping into affective and cognitive experiences that reflect the extent to which respondents perceive their parents to be accessible and responsive versus unresponsive or inconsistently responsive to their needs. A previous factor analysis of the items indicated three subscales: trust (e.g., "I trust my parents"), communication (e.g., "I can count on my parents when I need to get something off my chest"), and alienation (e.g., "I feel angry with my parents") (Armsden and Greenberg). Responses are made on a five-point Likert scale ranging from 1 (*almost always or always true*) to 5 (*almost never or never true*). To compute scores for parental attachment security, appropriate items are reverse scored and the alienation score is subtracted from the sum of the trust and communication scores resulting in a score for parental attachment. Higher scores indicate more secure attachment to parents.

The IPPA parent subscale has a 3-week test-retest reliability of 0.93 and convergent validity has been demonstrated with George et al. (1984) Adult Attachment Interview (Armsden and Greenberg; Maier et al. 2004). In the current sample, internal consistency reliability for the trust, communication, and alienation subscales was 0.90, 0.92, and 0.91 for minority students and 0.91, 0.90, and 0.86 for white students, respectively.

In this study, participants were instructed to respond to the items separately for each parent. Mother and father IPPA scores were significantly correlated ( $r(157) = 0.73, p < 0.01$ ) among respondents who reported on both parents ( $n = 159$ ). In an effort to identify the primary attachment figure, participants were asked to indicate which parent they felt played a greater role in parenting them. The IPPA score corresponding to the parent with the greatest perceived role for each participant served as our measure of *parental attachment security* based on the view that the relationship with the primary attachment figure has a greater developmental impact (Bretherton 1985). One hundred and forty-four participants indicated that their mothers were their primary attachment figure and 28

participants indicated that their fathers were their primary attachment figure. Chi square and *t*-tests revealed no significant differences in any demographic and primary variables between these two groups of participants.

#### *Ease Forming Friendships*

The Interpersonal Competence Questionnaire, initiation subscale (ICQ; Buhrmester et al. 1988) is an eight-item measure that assesses interpersonal competence in forming relationships. It was administered during wave two to assess ease forming friendships at college. Participants were asked to think about a specific interpersonal situation and to indicate their level of comfort and competence when handling it by responding on a five-point Likert scale from 1 (*I'm poor at this; I'd feel so uncomfortable and unable to handle this situation*) to 5 (*I'm extremely good at this; I'd feel very comfortable and could handle this situation very well*). Examples of situations presented to participants included “Asking or suggesting to someone new that you get together and do something, e.g., go out together” and “Presenting good first impressions to people you might like to become friends with”. The ICQ initiation subscale has previously demonstrated discriminate validity with the other ICQ subscales (Buhrmester et al. 1988).

Participants were instructed to respond to the eight items for their comfort in handling situations with a friend. Items on the ICQ initiation subscale were averaged to yield a score for *ease at forming close friendships* with higher scores indicating greater competence initiating friendships. Internal consistent reliability for ICQ initiation subscale was 0.95 for minority students and 0.90 for white students.

#### *Satisfaction With Friends*

The Relationship Assessment Scale (RAS; Hendrick 1988) is a seven-item measure originally designed to assess romantic relationship satisfaction. This scale is unidimensional and can be modified to assess satisfaction in non-romantic relationships. Example items include “In general, how satisfied are you with your relationship?” and “Are there many problems in your relationship?” Individuals are asked to respond to each item using a five-point Likert scale, with differing response options for each item. Convergent validity of the RAS has been found with the satisfaction subscale of Spanier's (1976) Dyadic Adjustment Scale (Hendrick).

The RAS was administered during wave two to assess satisfaction in friendships at college. For the present study, participants were asked to respond to each item with respect to their closest group of friends. Items on the RAS were averaged after reverse scoring appropriate items to yield a score of *satisfaction with friends* at college, with

higher scores indicating greater relationship satisfaction. Internal consistent reliability for RAS was 0.89 for minority students and 0.85 for white students.

#### *Social Anxiety*

The Social Interaction Anxiety Scale (SIAS; Mattick and Clarke 1998) is a 20-item measure that assesses fears of social interaction (e.g., “I have difficulty talking with other people” and “I am tense mixing in a group”). Responses are made on a five-point Likert scale ranging from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). Convergent validity has been demonstrated with the Watson and Friend's (1969) Social Avoidance and Distress Scale (Mattick and Clarke) and the SIAS has been found to predict state anxiety in social challenges (Gore et al. 2002). Items on the SIAS were averaged after reverse scoring appropriate items, with higher scores indicating more symptoms of social anxiety. Internal consistent reliability for the SIAS was 0.94 for minority students and 0.92 for white students. This measure was administered during wave two.

## Results

### Preliminary Analyses: Treatment of Outliers and Missing Data

Prior to conducting analyses, variables were inspected for outliers, and significant univariate outliers (one to three per measure) were adjusted following procedures outlined by Tabachnick and Fidell (1996); no multivariate outliers were identified. Next, variables were examined for missing values. Because 10% of data was missing overall, multiple imputation, a procedure for generating multiple simulated values for each missing data point, was preferred to listwise deletion for treating missing values (Schafer 1999a). Thus, three complete data sets were constructed using the NORM software program (Schafer 1999b), which uses an Expectation-Maximization (EM) algorithm to generate start values for the replacement of missing data. The efficiency associated with three imputed data sets is high given 10% missingness (Rubin 1987), therefore, three imputations were sufficient for these data. Demographic variables, predictor variables, and dependent variables were all included in the imputation model in order to preserve relationships among the focal variables in our substantive analyses. Each substantive analysis was then conducted separately with each imputed data set, and results were combined by computing the average across the three data sets.



### Preliminary Analyses: Descriptives

Descriptive statistics and simple correlations among the primary study variables were calculated and are displayed in Table 1 for the full sample, and separately by minority status group in Table 2. To examine whether there are mean differences based on minority status for the study variables, *t*-tests were conducted. White participants reported more friendship satisfaction than minority participants ( $t [170] = 2.50, p < 0.05$ ). There were no other significant differences.

### Substantive Analyses: Moderated Mediation

To test for moderated mediation, we used multiple regression and a bootstrapping procedure described by Preacher et al. (2007) along with the SPSS macro provided by the authors. More specifically, we tested if race moderates the path from parental attachment security to social anxiety (depicted as path d in Fig. 1) and/or the path from social anxiety to each relationship outcome variable (depicted as path e in Fig. 1). First, in Table 3, we present the results for three multiple regressions. The first regression was of the mediator (social anxiety) variable on the independent (parental attachment security) and moderator (race) variables. Results indicated that parental attachment security was negatively associated with social anxiety and that this effect was moderated by race. The second and third regressions were of the two outcome variables, ease

forming friendships and satisfaction with friends, on the independent, moderator, and mediator variables. Results for the second regression illustrates that parental attachment security was positively associated with ease forming friendships and social anxiety was negatively associated with ease forming friendships. The third demonstrates that social anxiety was negatively associated with satisfaction with friends and that this effect was also moderated by race. Therefore, path a was moderated by race, while path b was moderated by race only in the prediction of satisfaction with friends.

In order to probe the significant interactions, we used a bootstrapping procedure to test the significance of the direct and indirect effects separately for each racial group. The bootstrap procedure has been found to be superior to other methods, such as the Sobel test which has relatively low statistical power (MacKinnon et al. 2002). In the bootstrap procedure *k* samples (usually 1,000 or greater) of *N* units are drawn from the original sample of *N* units, with replacement, and the coefficients (paths a–e in Fig. 1) are calculated for each of the *k* samples. The average coefficients are then calculated as the mean across the *k* samples. Conditional indirect effects are calculated as the product of the unstandardized regression weight for the path from the predictor to the mediator and the unstandardized regression weight for the path from the mediator to the outcome variable (i.e., coefficient for path a  $\times$  path b) separately across levels of the moderator (race in this study). The average indirect effect and the 95% bias-corrected

**Table 1** Descriptive statistics and correlations among major variables

Variables	Raw		Imputed		Correlations			
	<i>M</i> (SD)	<i>N</i>	<i>M</i> (SD)	<i>N</i>	1	2	3	4
1. Parental attachment security	58.17 (21.06)	171	58.05 (21.06)	172	–			
2. Social anxiety	1.45 (0.71)	156	1.44 (0.71)	172	–0.25**	–		
3. Ease forming friendships	3.73 (0.85)	162	3.72 (0.85)	172	0.33**	–0.62**	–	
4. Satisfaction with friends	3.83 (0.79)	164	3.83 (0.79)	172	0.23**	–0.29**	0.38**	–

Note: *N* = 172 for correlations

\*\*  $p < 0.01$  (two-tailed)

**Table 2** Descriptive statistics and correlations among major variables split by race

Variables	Minority	White	Correlations			
	<i>M</i> (SD)	<i>M</i> (SD)	1	2	3	4
1. Parental attachment security	54.08 (22.90)	59.77 (20.07)	–	–0.49**	0.50**	0.31*
2. Social anxiety	1.44 (0.72)	1.44 (0.71)	–0.13	–	–0.75**	–0.48**
3. Ease forming friendships	3.76 (0.99)	3.71 (0.80)	0.22*	–0.57**	–	0.54**
4. Satisfaction with friends	3.89 (0.84)	4.30 (0.64)	0.16 <sup>†</sup>	–0.20*	0.30**	–

<sup>†</sup>  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ . Correlations for minority students appear above the diagonal,  $n = 52$ ; Correlations for white students appear below the diagonal,  $n = 120$

**Table 3** Test of moderated mediation

Predictors	B (SE)	$\beta$
<i>Mediator variable model (predicting social anxiety)</i>		
Race	-0.06 (0.11)	-0.04
Attachment	0.00 (0.00)	-0.14
Attachment $\times$ race	-0.01 (0.01)	-0.19*
R <sup>2</sup>		0.09
<i>Dependent variable model (predicting ease forming friendships)</i>		
Race	0.09 (0.11)	0.05
Attachment	0.01 (0.00)	0.17*
Attachment $\times$ race	0.00 (0.01)	0.01
Social anxiety	-0.76 (0.08)	-0.61**
Social anxiety $\times$ race	-0.32 (0.17)	-0.15
R <sup>2</sup>		0.44
<i>Dependent variable model (predicting satisfaction with friends)</i>		
Race	-0.30 (0.12)	-0.17*
Attachment	0.00 (0.00)	0.13
Attachment $\times$ race	0.00 (0.01)	-0.02
Social anxiety	-0.19 (0.10)	-0.17*
Social anxiety $\times$ race	-0.34 (0.19)	-0.17*
R <sup>2</sup>		0.17

Note: N = 172

\*  $p < 0.05$ ; \*\*  $p < 0.01$  (two-tailed)

confidence interval are calculated as the mean across the  $k$  samples. The indirect effect is significant if the confidence interval does not contain zero (Preacher et al.). For the present study, this method was repeated using each of the three imputed data sets, and results were averaged as is typically done when multiple imputation is used to handle missing data.

For the present analyses, 5,000 bootstrap samples were drawn, with replacement, and as displayed in Table 4, the

negative association between parental attachment security and social anxiety (path a) was significant for minority participants but not white participants. The negative association between social anxiety and ease forming friendships (path b) was significant for both white and minority participants, with no significant difference between the two groups. In contrast, the negative association between social anxiety and satisfaction with friends (path b) was also significant for both white and minority participants, but the association was stronger for minority participants. Conditional indirect effects (path a  $\times$  path b) for each of the outcome variables are displayed in Table 4. The indirect effect of parental attachment security on ease forming relationships and satisfaction with friends through social anxiety were both significant for minority participants but not for white participants.

As displayed in Table 4, the direct effect of parental attachment security (path c) on ease forming friendships and satisfaction with friends was not significant among minority or white participants. The total effect (indirect effect + direct effect) was significant among minority participants for both ease forming friendships and satisfaction with friends but was only significant among white participants for ease forming friendships. Among minority participants, the indirect effect accounted for 66% of the total effect of ease forming friendships and 70% of the total effect of satisfaction with friends. Although it was not significant, the indirect effect accounted for 33% of the total effect of ease forming friendships among white participants. There was no effect of parental attachment security on satisfaction with friends for white participants. For both ease forming friendships and satisfaction with friends, the total effect of parental attachment security was more than double for minority participants compared to white participants.

**Table 4** Bootstrap results for moderated mediation

	Att $\rightarrow$ Soc anx (path a) B (SE)	Soc anx $\rightarrow$ out (path b) B (SE)	Indirect effect (a $\times$ b) B (SE)	Direct effect att $\rightarrow$ out (c) B (SE)	Total effect (indirect + direct effect) B (SE)
<i>Ease forming friendships</i>					
Minority only (CI)	-0.0153** (0.0039)	-0.9250** (0.1449)	<b>0.0148</b> (0.0050) (0.0070, 0.0270)	0.0073 (0.0046)	0.0221** (0.0053)
White only (CI)	-0.0047 (0.0032)	-0.6186** (0.0855)	0.0029 (0.0020) (-0.0007, 0.0070)	0.0059 (0.0030)	0.0088* (0.0035)
<i>Satisfaction with friends</i>					
Minority only (CI)	-0.0153** (0.0039)	-0.5302** (0.1747)	<b>0.0086</b> (0.0040) (0.0029, 0.0193)	0.0036 (0.0055)	0.0122* (0.0052)
White only (CI)	-0.0047 (0.0032)	-0.1908* (0.0938)	0.0009 (0.0008) (-0.000, 0.0031)	0.0048 (0.0033)	0.0057 (0.0003)

Note: CI = 95% confidence interval for indirect effect; if CI does not include zero indirect effect is considered statistically significant and is displayed in bold.  $n = 52$  for minority participants,  $n = 120$  for white participants. \*  $p < 0.05$ . \*\*  $p < 0.01$

The moderated mediation models accounted for 44% of the variance in ease forming friendships and 17% of the variance in relationship satisfaction with friends. Effect sizes for the total effect of attachment predicting ease forming friendships were 0.49 for minority participants and 0.20 for white participants. For the total effect of attachment predicting satisfaction within friendships effect sizes were 0.26 for minority participants and 0.12 for white participants.

## Discussion

Consistent with the hypotheses, college students who were more securely attached to their parents at the beginning of their freshman year generally reported better friendship outcomes at the end of their first semester of college. Moreover, indirect effects of parental attachment security through social anxiety were significant for minority participants. These findings are consistent with Bowlby's (1969, 1973, 1980) proposition that attachment security influences vulnerability to psychopathology as well as expectations for and experiences in other close relationships.

Consistent with predictions, attachment security predicted ease forming new relationships among both minority and white participants. Students who were more securely attached to their parents experienced greater ease forming friendships likely because their positive prior experiences in close relationships made them comfortable in seeking out new relationships. Attachment security also predicted satisfaction within friends among minority participants. It is possible that students with secure relationships with their parents behave in ways that elicit positive responses from their peers, thus enhancing the quality of their friendships and their evaluations of those relationships. Surprisingly, attachment security did not predict satisfaction within friendships among white participants.

That attachment security was a significant predictor of social anxiety and satisfaction within friendships for minority but not white students warrants explanation. Because the university from which data was collected is predominantly white (approximately 74% of the undergraduate population), and perceived racism at predominantly white universities has been consistently documented (McCormack 1995; Sailes 1993), minority students in the current sample of college students may have experienced heightened levels of stress during this transition (Bynum et al. 2007). This heightened stress may have activated the attachment system more strongly for minority students explaining why parental attachment security was a more salient predictor of both social anxiety and satisfaction within friendships for minority as compared to white students. Unfortunately, no measures of perceived stress or

racism are available to directly test this proposition. That the total effect of attachment security on ease in forming and satisfaction within friendships was more than double for minority participants compared to white participants is evidence of this heightened activation of the attachment system for minority participants.

In contrast, the hypothesized negative association between social anxiety and ease forming friendships and satisfaction in friendships was apparent for both minority and white students. This supports our view that social anxiety may undermine students' confidence and willingness to introduce themselves to possible peers, and contribute to difficulties engaging with their peers appropriately. Furthermore, students with heightened social anxiety may also evaluate their relationships more negatively than students who do not experience social anxiety.

Because attachment security was a significant predictor of social anxiety for minority students only, the effect of parental attachment security on ease in forming friendships and satisfaction with close friendships at college was mediated by social anxiety for minority students but not white students. For minority students, more positive relationships with parents was associated with less social anxiety, which in turn was associated with greater success initiating new relationships and more satisfaction within those relationships at college. For white students, the effect of the quality and security of the relationship with parents on the development of close friendships was direct and not mediated by social anxiety. These findings are consistent with the attachment theory perspective that attachment security influences both psychological well-being and experiences developing other subsequent close relationships (Bowlby 1969, 1973, 1980). The differential pathways for white and minority participants underscore the importance of considering the impact of race and context in future research.

In addition to being consistent with Bowlby's propositions, findings from the current study are mainly consistent with previous research demonstrating links between parental attachment security and other close relationships. More specifically, attachment security has previously been found to predict both social competence and friendship quality (Benson et al. 2006). The effect size for attachment predicting social competence in Benson et al.'s meta analysis was 0.48, which is similar to the effect size for the total effect of attachment on the ease of forming friendships for minority participants in the current study (0.49) but was much larger than the effect size for white participants in the current study (0.20). Effect sizes for attachment security predicting satisfaction in friendships were smaller in the current study than they were in Benson et al.'s meta analysis investigating attachment as a predictor of best friend relationship quality. That attachment



security was not a significant predictor of satisfaction within friendships among white participants in the current study is inconsistent with this literature. A number of other studies have demonstrated the association between parental attachment security and social anxiety (Papini et al. 1991) and social anxiety and relationship outcomes (La Greca and Lopez 1998), but this study was the first to demonstrate social anxiety as a mediator of parental attachment security and friendship outcomes and to examine race as a moderator of this effect.

Although this study addressed an important gap in the literature by examining the role of social anxiety in the relation between parental attachment security and friendship outcomes, due to the limitations of the current study a number of important questions remain. First, given that the treatment of minority status as a dichotomous variable is a limitation of the current study, conclusions cannot be made regarding the role of social anxiety in the relationship between parental attachment security and friendship outcomes for specific racial minority groups. Therefore, it will be important for future researchers to investigate the role of race in samples with a larger percentage of minority students so that specific racial groups can be examined individually rather than being collapsed into a single group reflecting minority status. Second, to better understand the role of context in explaining the different pattern of results for minority versus white students, it may be important to collect data from college students at universities that vary in their racial composition (e.g., predominantly white, predominantly black). Future research should consider the influence of pre-college friendships on close relationships at college. Students who have more experience initiating relationships and higher quality relationships prior to attending college may report greater ease navigating new close relationships during the transition to college. To address these propositions, future research should follow students from high school over the transition to college. Future research should also attempt to replicate these findings with samples including male students, as the process by which attachment security influences close relationship outcomes may differ between males and females and the exclusively female sample employed in the current study could not examine these possible gender differences. Finally, because all measures were self-report, shared method variance may have inflated associations between the variables, thus future research should attempt to replicate findings from the study utilizing other methods of assessment such as observational or interview methods and should assess attachment to parents using methods such as the Adult Attachment Interview (George et al. 1984).

Despite these limitations, findings from the current study have important implications for both theory and practice. First, this study may inform the development of screening

tools to identify students who are at risk for difficulties initiating new relationships and who may become less satisfied in their relationships once they are developed. Second, this study suggests that developing interventions that address social anxiety may be effective in reducing relationship problems. Such an approach may be more feasible than changing the nature of the parent–child relationship or the manner in which students think about their childhood experiences with their parents in an effort to modify attachment security. However, to the extent that some parents provide their children with support during the college transition (Mounts et al. 2006), it may also be useful to provide parents with information about the stressful nature of this transition and suggestions about how to encourage and support their children in their efforts to make new friends. It is clear from the current study that attachment to parents plays an important role in the close relationships of female college students.

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