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ATTACHMENT RELATIONSHIPS AND HEALTH BEHAVIOR: THE MEDIATIONAL ROLE OF SELF-ESTEEM

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Many young adults exhibit poor preventive health behavior (e.g., exercise, diet), thereby increasing their long-term risk to health. Recent research has focused on factors related to the development of health behavior in an effort to design effective early interventions. The present study evaluates how attachment styles are related to health behavior in young adults, and the potential mediational role of self-esteem. University students ($N = 793$) completed surveys assessing attachment style, self-esteem, and health behavior. Results showed that those with secure attachment styles participated in healthier preventive health behavior and had higher self-esteem than those with insecure styles (all ps < 0.05). Self-esteem partially mediated the relation between attachment styles and health behavior ($p < 0.01$). These results suggest that the development of self-esteem may represent a pathway by which individual styles of interaction with significant others, acquired early in life, can significantly impact key long-term preventive health behaviors.

Keywords: Self-esteem; Health behavior; Attachment

The director-general of the World Health Organization, Gro Harlem Brundtland, declared in 2002 that the most important risks to wealthy societies are "high blood pressure and high cholesterol, tobacco and excessive alcohol consumption, obesity and physical inactivity" (World Health Organization, 2002). Indeed, these and other preventive health issues are putting the general American public in health jeopardy. Adult smoking is prevalent at 23.5% (CDC, 2001a). Seven out of ten American adults are not active in their leisure time. Sleep deprivation is a widespread problem associated with automobile fatalities (Dement and Mitler, 1993) and exacerbating morbidity (Pollak and Perlick, 1991). Most adults (76%) do not eat the USDA's minimum daily-recommended intake of fruits and vegetables

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(CDC, 2001b; Food Guide Pyramid, 2002). Over half (54.3%) of Americans are over weight, and 19.1% are obese (CDC, 2002a).

Based on the National College Health Risk Behavior Survey (CDC, 2002b) and other studies, many poor health behavior patterns are evident during adolescence and the early years of adulthood, potentially creating the base for long-term poor health behavior habits. The survey found that a large number of college-age adults smoke cigarettes (28.8%) and engage in episodic heavy drinking (41.5%). Three-quarters of the young adults surveyed (73.7%) did not eat five or more servings of fruits and vegetables a day. Only (37.6%) engaged in vigorous physical activity at recommended levels. A related CDC study showed that 13.0% of 18–24 years old are obese (CDC, 2002a). Also, 14% of teens do not wear seatbelts on a regular basis (CDC, 2001c).

Identifying the factors that lead to health behavior patterns could decrease the prevalence of poor health behaviors in adolescents and young adults. Past research has established several important variables related to these decisions. One component includes socioeconomic status: better-educated people and those with parents of higher socioeconomic status tend to engage in better health behavior (Leganger and Kraft, 2003; Huurre *et al*., 2003). An internal locus of control and personal goals may also maintain positive health behavior action (Wallston *et al*., 1978; Eiser and Gentle, 1988).

Several current models of health behavior focus on social and environmental factors. The Health Belief Model (HBM) explains behavior through subjective perceptions of a harmful condition and any corresponding reactions (Becker and Rosenstock, 1984; Rosenstock, 1990). The Theory of Planned Behavior (TPB) predicts performance of a behavior based on attitudes about the behavior, subjective norms, and perceptions of control over the behavior (Ajzen, 1985; 1991). The TPB has been used to study such health behaviors as condom use, exercise behavior, binge drinking, and drunk driving (Armitage *et al*., 2002; Johnston and White, 2003; Rivis and Sheeran, 2003). Social relationships with significant others may also impact health behavior (Broman, 1993). The modeling of preventive health behavior by friends and parents may influence individuals' beliefs and behaviors regarding preventive health behavior (Lau *et al*., 1990). However, the personal ways individuals generally interact with significant others, and the influence on health behavior, are not fully understood.

Attachment theory is one way to study and understand interactions with significant others, both in infancy and throughout life (Bowlby, 1969, 1973, 1980; Hazen and Shaver, 1987). Attachment theory focuses on a personal characteristic rather than an active process as is incorporated in the HBM or the TPB. Ainsworth and colleagues (1978) proposed a three-group attachment model among infants. The groups include *secure* attachment, characterized by a positive emotional relationship with the caretaker, *ambivalent*, typically displaying distress and helplessness towards the caregiver, and *avoidant*, marked by little affect and avoiding contact with the caregiver (Wicks-Nelson and Israel, 2000). Hazen and Shaver (1987) demonstrated a connection between a person's working model of self and relationships and that person's attachment style in childhood. Further studies support that attachment dimensions are relatively stable throughout life and are good predictors of relationship quality (Shaver and Brennan, 1992; Feeney *et al*., 1994).

Bartholomew (1990) proposed a forced-choice, four-category attachment style model. Secure and ambivalent (alternatively termed "preoccupied") styles were included, but the avoidant attachment style was divided into fearful-avoidant and dismissive-avoidant, based on the belief that attachment style can be determined by the person's model of self (positive or negative) and model of others (positive or negative). Those with fearful or dismissive attachment styles are alike in avoiding intimate relationships, but differ in that people with dismissive attachment styles rely less on other's acceptance to keep a positive self-image (Bartholomew and Horowitz, 1991).

Feeney (2000) argues that because "attachment styles are thought to reflect generalized responses to distress, they . . . may hence be linked with other variables [that] previous research has implicated in health behavior". Research has primarily focused on substance use, suggesting that secure attachment is associated with better health behavior than avoidant and preoccupied attachment styles, including drinking to cope, general drinking behavior, drug use, and number of sexual partners (Walsh, 1992; Brennan and Shaver, 1995). However, the lack of research with all four attachment styles precludes a distinction between the impact of dismissive and fearful styles on health behavior.

Little is known about potential mediators of the relation between attachment style and health behavior. Self-esteem as a mediator seems especially promising given studies finding differences in self-esteem between attachment style groups. Though groups with secure attachment styles consistently score higher on self-esteem than those with preoccupied attachment styles, the relation between self-esteem and avoidant attachment style relative to secure or preoccupied styles is unclear (e.g., Bylsma *et al.*, 1997; Brennan and Bosson, 1998; Man and Hamid, 1998). This is perhaps due to the failure to distinguish fearful and dismissive styles. Indeed, individuals with a dismissive attachment style have been shown to have higher self-esteem than those with fearful attachment style (Shaver *et al.*, 1996; Bylsma *et al.*, 1997). Self-esteem's relation to health behavior has been extensively studied. High self-esteem has been found to predict positive health practices in general (Yarcheski *et al.*, 1997) as well as healthy food consumption and exercise (Ma, 2000). Low self-esteem has been associated with unhealthy food consumption (Ma, 2000) and frequency of alcohol use (Gerrard *et al.*, 2000). Given the well-established relation between self-esteem and health behavior, the impact of attachment style on health behavior may be mediated by self-esteem differences between attachment style groups.

There were three purposes to the current study. The first was to provide a current description of key health behaviors in our young adult sample. Though this is not an epidemiological study, this information is useful for comparison to the CDC and other studies of health behavior in young adult populations. Second, we evaluated the relations among attachment style, self-esteem, and a composite score of health behavior. We hypothesized that people with secure and dismissive attachment styles would have higher self-esteem and better health behavior than those with fearful and preoccupied styles. We also expected to show a positive correlation between self-esteem and health behavior. Finally, we conducted mediational analyses in order to evaluate self-esteem as a mediator between attachment style and health behavior (see Fig. 1). We predicted that when self-esteem was controlled, the relation between attachment style and health behavior would significantly weaken, providing evidence for partial mediation.

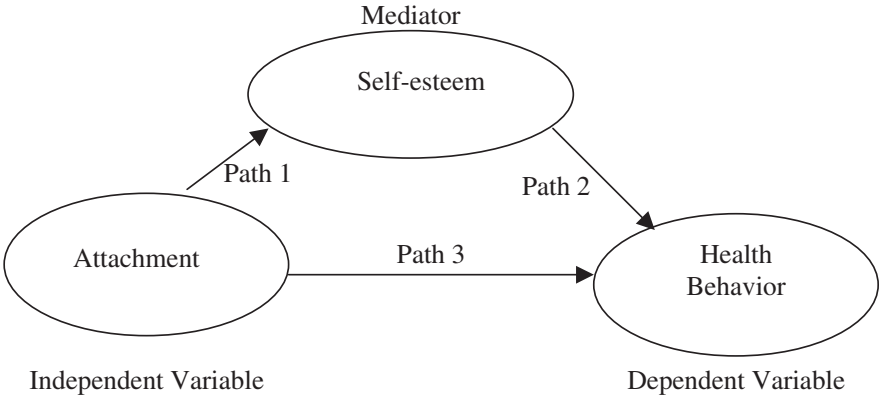

FIGURE 1 Conceptual mediation model.

METHODS

Participants and Procedure

Data were provided by 793 students enrolled in Introductory Psychology courses at Arizona State University (Tempe, AZ, USA). The age range was 18–35 years old with a mean age of 19.4 ($SD = 1.8$ years). The sample was 61% female and was 74% white non-Hispanic, 9% Hispanic, 5% Asian-American, and 12% of other or mixed ethnicity. Participants completed a battery of questionnaires contributed by several independent researchers during their regular class hour. In order to limit questionnaire packets to an amount that could be completed in one class session, each participant was only given a random subset of questionnaires. Of 2533 enrolled students, 2233 took the survey during their class hour. Eight hundred and eighty nine (889) students received the subset of questionnaires for the current study, however of these, 96 were invalid or incomplete, resulting in the final sample size of 793.

Measures

Attachment

Bartholomew and Horowitz's (1991) Relationship Questionnaire (RQ) was used to document attachment style. This questionnaire has the advantage among other attachment measure techniques by distinguishing between dismissive and fearful styles. Participants were asked to choose which of the four paragraphs, each prototypical of an attachment style, best represented them (see Table I). This four-group model was preferred to a three-group model (e.g., Hazen and Shaver 1987) because it distinguishes the categories of dismissive and fearful from avoidant, which was integral for our study. As opposed to a continuous variable measure, a categorical measure was highly suited to compare discrete attachment styles, which was fundamental to our hypothesis concerning differences among people with certain attachment styles. Previous studies have documented the reliability and validity of forced-choice measures of attachment style (Sperling *et al.*, 1996; Reese *et al.*, 2002). Specific to the questionnaire used in the current study, Stein *et al.* (2002) demonstrated that the RQ showed acceptable reliability.

TABLE I Attachment group classifications

Secure	It is easy for me to become emotionally close to others. I am comfortable depending on others and having others depend on me. I don't worry about being alone or having others not accept me.
Dismissive	I am comfortable without close emotional relationships. It is very important for me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.
Fearful	I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.
Preoccupied	I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

Further supporting reliability, the proportion of attachment style representation in the current sample was comparable to other studies (e.g., Griffin and Bartholomew, 1994; Man and Hamid, 1998) and included Secure (39%), Dismissive (19%), Fearful (26%), and Preoccupied (16%).

Self-esteem

Rosenberg's (1965) 10-item Self-esteem Scale was completed. Responses on a nine-point scale ranged from "strongly agree" to "strongly disagree". A sample question is "I feel that I am a person of worth, at least on an equal basis with others". The self-esteem measure's reliability for this sample was good, Chronbach's $\alpha = 0.88$.

Health Behavior

A modified 22-item form (to better suit a college sample) of the Center for Disease Control and Prevention's Behavioral Risk Factor Questionnaire (CDC, 1996) gauged the daily, weekly, monthly, and yearly activities of the informant, including aerobic exercise, smoking and chewing tobacco, alcohol consumption, nutrition intake, frequency of sleep deprivation, and seatbelt use (see Table II). Although we closely reproduced the CDC's questionnaire for comparison purposes, several pertinent questions were added regarding unhealthy eating habits like fast food and "junk food" consumption. Response types were multiple-choice. The scale was divided into six categories for initial data analysis: cigarette use (2 items), quality of diet (Chronbach's $\alpha = 0.66$), alcohol consumption ($\alpha = 0.86$), regular exercise ($\alpha = 0.68$), seatbelt use (single item), and sleep deprivation (single item). Items within the categories were recoded so that higher numbers reflect better health behavior. Intra-category items were summed and converted into a single z-score for each category. Because we were interested in a composite score reflecting overall health behavior, the six categorical z-scores were summed to produce a Total Health Behavior Score (THBS; $\alpha = 0.64$).

Data Analysis

The relation between attachment styles and health behavior was assessed with analysis of variance (ANOVA), with THBS as the dependent variable and attachment group

TABLE II Percentage of sample engaging in health behavior-related activities

Alcohol	%
Consumed at least 1 alcoholic beverage in last month	66.1
Non-abstainers who drank less than one day a month	8.0
Non-abstainers who drank 1–3 days a month	31.9
Non-abstainers who drank 1–2 times a week	34.2
Non-abstainers who drank 3–4 times a week	18.0
Non-abstainers who drank 5–6 days a week	5.9
Non-abstainers who drank daily	2.0
Non-abstainers who averaged 1 drink per occasion	9.3
Non-abstainers who averaged 2–3 drink per occasion	29.3
Non-abstainers who averaged 4–5 drinks per occasion	28.8
Non-abstainers who averaged 6–7 drinks per occasion	18.8
Non-abstainers who averaged 8–10 drinks per occasion	9.0
Non-abstainers who averaged 11 or more drinks per occasion	4.8
Binge drank once or not at all in the last month	63.1
Binge drank 2–5 times in the last month	19.5
Binge drank 6 times or more in the last month	17.4
Did not drive last month when they had too much to drink	84.2
Drove once last month when they had too much to drink	7.8
Drove more than once last month when they had too much to drink	8.0
Tobacco	
Have not smoked at least 5 packs in their life	75.4
Smokers who still smoke	20.5
Smokers who smoke everyday	11.7
Tried smokeless tobacco	18.9
Currently use smokeless tobacco	2.4
Exercise	
Participated in physical activity in the last month	92.8
Exercised 3 or more times a week on average	44.5
Diet	
Met "Food Guide Pyramid's" recommendation for vegetables	8.0
Met "Food Guide Pyramid's" recommendation for fruits	24.8
Ate fast food 1–2 times a week	32.8
Ate fast food three times a week or more	32.8
Seatbelt use	
Always or nearly always wore a seatbelt when in a car	89.3
Sometimes wore a seatbelt when in a car	4.7
Seldom or never wore a seatbelt when in a car	5.7
Never drive or ride in a car	0.3
Sleep deprivation (in the last month)	
Five days or less	37.4
Six to fourteen days	34.6
Fifteen days or more	28.0

as the independent variable. Similarly, the relation between attachment style and self-esteem was evaluated using ANOVA, with self-esteem as the dependent variable. For both analyses, planned contrasts compared secure and dismissive groups to preoccupied and fearful groups. Pearson correlation analyses evaluated the relation of THBS to self-esteem.

Mediation analyses were conducted following the guidelines of MacKinnon and colleagues (1993; 2002). A statistical model with three orthogonal contrasts between attachment style groups as independent variables, and self-esteem as the dependent variable was conducted (see Fig. 2). The first contrast (X1) coded the comparison of secure and dismissive attachment styles to preoccupied and fearful, the second (X2)

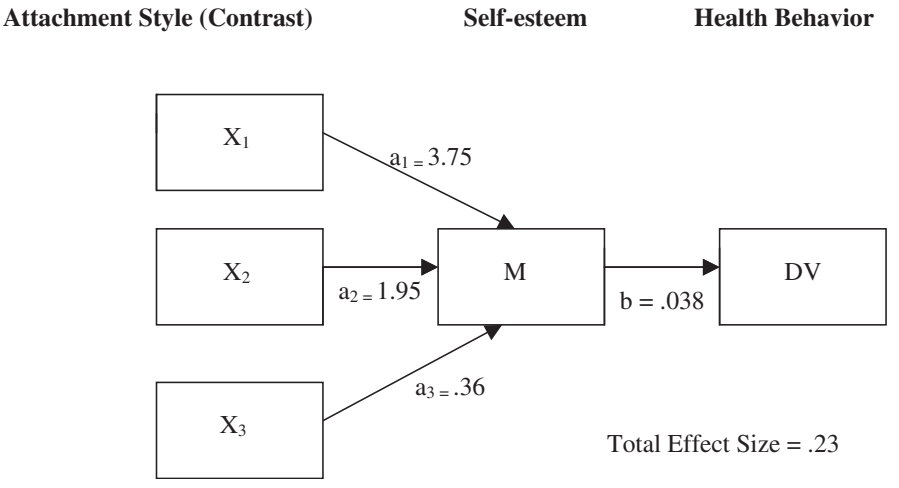

FIGURE 2 Mediation analysis model.

coded the comparison of secure to dismissive styles, and the third (X3) coded the comparison of preoccupied to fearful styles. The effect for each orthogonal contrast was quantified by unstandardized β-coefficients (paths a_1–a_3) relating attachment style to self-esteem. A second statistical model with the three attachment style contrasts (independent variable) and self-esteem (mediator) with THBS as the dependent variable estimated the relation (β-coefficient) between self-esteem and THBS (path b). Multiplying the coefficient for path b by the coefficients for paths a_1–a_3 and summing the results equaled the total mediated effect. The mediated effect was tested for significance by dividing it by its standard error. A resulting z-score greater than 1.96 is considered significant at $\alpha = 0.05$.

RESULTS

Health Behavior Prevalences

Table II shows the prevalence of health behaviors in our sample. Our findings are similar to those found by the NCHRBS (CDC, 2002b; shown in italics). Many of the young adults reported smoking cigarettes (20.5, *28.8*) and engaging in episodic heavy drinking (36.9, *41.5*). Very few students are eating at least five fruits and vegetables a day (11.9, *26.3*).

Relations among Attachment Style, Self-esteem, and Health Behavior

We hypothesized that individuals with secure or dismissive attachment styles would report healthier health behavior than those with fearful or preoccupied styles. The overall ANOVA was significant, $F(3, 681) = 3.84$, $p = 0.01$. The contrast between secure (mean $= 0.45$, $SD = 2.3$) and dismissive (mean $= -0.17$, $SD = 2.5$) *vs.* fearful (mean $= -0.31$, $SD = 2.5$) and preoccupied (mean $= -0.05$, $SD = 2.9$) was not significant. Those with secure styles had better health behavior scores relative to all other

groups ($F(1, 681) = 9.5$, $p < 0.01$), but no significant differences were found between all nonsecure groups.

We also predicted those with secure or dismissive attachment styles would have higher self-esteem than people with fearful or preoccupied attachment styles. The overall ANOVA of self-esteem by attachment style was significant, $F(3, 789) = 29.46$, $p < 0.001$. People with secure (mean = 65.93, $SD = 10.64$) or dismissive (mean = 62.03, $SD = 13.95$) attachment styles had significantly higher self-esteem than those with fearful (mean = 56.84, $SD = 12.91$) or preoccupied (mean = 56.12, $SD = 15.39$) attachment styles, $F(1, 789) = 60.81$, $p < 0.001$). Those with secure styles had significantly higher self-esteem than those with dismissive attachment styles ($F(1, 789) = 9.55$, $p < 0.01$), and those with dismissive styles were significantly higher than those with fearful ($F(1, 789) = 14.30$, $p < 0.001$) or preoccupied ($F(1, 789) = 14.53$, $p < 0.001$) styles. Next, we evaluated the relation between self-esteem and health behavior. As predicted, health behavior and self-esteem were significantly correlated with each other, $r(685) = 0.21$, $p < 0.001$.

Mediational Analyses

The coefficients coding the relation between attachment style and self-esteem, self-esteem and THBS, and the total mediated effect are shown in Fig. 2. A total mediated effect of 0.23 was calculated, indicating that the effect of attachment style through self-esteem was equal to 0.23 units on the health behavior z-score. The standard error of the mediated effect was 0.053, and the z-score of 4.34 was highly significant ($p < 0.001$). The 95% confidence limit interval was between 0.13 and 0.33.

DISCUSSION

The purposes of the current study were three-fold: To provide a current description of key health behaviors in a young adult sample at an American university; to show the relations among attachment style, self-esteem, and preventive health behavior; and to evaluate self-esteem as a mediator between attachment style and health behavior. Our findings regarding health behavior prevalence among our sample are similar to those reported by the CDC, and suggest that many young adults are making poor health decisions. For example, the current sample appears to exercise even less than the NCHRBS sample (only 44.5% averaged at least 3 physical activities a week as compared to 57.1% in the NCHRBS sample). The consequences of these behaviors for current and long-term psychological and physical health are considerable. However, until the factors impacting health behavior patterns are fully understood, it will be difficult to create effective interventions to combat poor health behaviors.

Our prediction that those with secure or dismissive attachment styles would have significantly better health behavior and higher self-esteem than those with fearful or preoccupied attachment styles was largely supported by the data. Individuals with a secure style of attachment had higher self-esteem and reported better health behaviors than all other groups, and those with dismissive attachment had higher self-esteem than other insecure groups. However, in contrast to our hypotheses, there were no differences in health behavior among all insecure groups. These findings are supportive of research showing that satisfying relationships are internalized and manifest

into positive self-regard (Tafarodi and Swann, 1995). In the absence of satisfying relationships, avoiding relationships, and achieving self-esteem through other means may potentially maintain higher self-esteem. Surprising, the higher self-esteem of those with dismissive styles did not translate into better health behavior. This reinforces previous research showing the benefits of positive social or romantic relationships for health behavior. Individuals with fearful and preoccupied styles of attachment had the lowest self-esteem of the attachment style groups and poor health behaviors, suggesting that a high dependence on relationships to maintain self-esteem, combined with unsatisfying relationships, may be particularly damaging. As expected, self-esteem was positively correlated with positive health behavior. This finding is consistent with previous studies (e.g., Yarcheski *et al*., 1997; Ma, 2000) and shows the importance of self-esteem in understanding health behavior.

Previous studies have provided preliminary evidence for the relations among self-esteem, attachment style, and health behavior. A unique contribution of the current study was the evaluation of a mediational role of self-esteem in the adoption of positive health behaviors. As we hypothesized, self-esteem was a highly significant mediator of the relation between attachment style and health behavior. These results suggest that the tendency of those with secure attachment styles to have higher self-esteem may at least partially account for their practice of better health behaviors than those with insecure attachment styles.

There were several limitations to this study. First, because our participants were university students, results may not generalize to other populations. Young adults are an important population to study, however, as behaviors developed during adolescence and young adulthood may provide the foundation for health practices throughout the lifespan. More importantly, due to the correlational nature of the study, cause and effect relations cannot be determined. It is possible that health behavior causally effects self-esteem. For example, exercise has been shown to affect levels of self-esteem (McAuley *et al*., 2002). Third, although the four-group categorical measure used in the current study has been used successfully in a large number of studies and its use here was appropriate given the stated hypotheses, some argue that measurement along a continuous scale may provide a more precise picture of the participants' attachment (Feeney *et al*., 1994). Finally, several potentially important health behaviors were not measured in this study, including ultraviolet ray exposure, drug abuse, and high-risk sexual behaviors. It will be important to conduct further studies with a broad range of health behaviors relevant to a young adult population.

This study illuminated the relation of attachment style to health behavior, suggesting that individuals with a secure style of interaction with loved ones have higher self-esteem and participate in healthier health behavior than those with other styles. We also found that self-esteem partially mediated the relation between attachment style and health behavior. In this way, self-esteem helps explain why people with secure relations behave in a manner more conducive to positive health. These findings support the importance of a focus on self-esteem and improved social relationships in the development of health behavior interventions. Specifically, health behavior interventions might benefit from a particular focus on individuals' styles of attachment to significant others with the hope of developing more secure attachments. Building emotionally healthier perceptions of how one can relate to romantic partners could bolster self-esteem and increase motivation for practicing good health behaviors.

There have been many suggestions for why poor health behaviors are so prevalent, including environmental factors such as the increased availability of unhealthy food and a culture of television. The current findings also suggest that more underlying associations such as styles of attachment, developed early in life, and their effects on self-esteem may impact future health behavior.

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