

Models of the Self and Other: Fundamental Dimensions Underlying Measures of Adult Attachment

Dale Griffin and Kim Bartholomew

Three studies assessed the construct validity of the self- and other-model dimensions underlying the 4-category model of adult attachment (Bartholomew, 1990). Five methods were used to assess the hypothesized dimensions: self-reports, friend-reports, romantic partner reports, trained judges' ratings of peer attachment, and trained judges' ratings of family attachment. In each study, the convergent and discriminant validity of the dimensions were assessed by multitrait-multimethod matrices and by confirmatory factor analysis. Study 2 related the latent attachment dimensions to theoretically relevant outcome latent variables. As predicted, individuals' self models converged with direct measures of the positivity of their self-concepts, and individuals' other models converged with direct measures of the positivity of their interpersonal orientations. Study 3 related the latent attachment dimensions to 3 alternate self-report measures of adult attachment and showed that the 2 dimensions serve as an organizing framework for the different measurement approaches.

Attachment theory, as developed by John Bowlby (1973, 1980, 1982), conceptualizes the universal human need to form close affectional bonds. It serves both as a normative theory of how the inborn "attachment system" functions in all humans and as an individual-difference theory of the attachment strategies that are adopted in response to different life experiences (Hazan & Shaver, 1994). Since Hazan and Shaver (1987) introduced their three-category measure of adult attachment as an adult analog to Mary Ainsworth's classification of infants (Ainsworth, Blehar, Waters, & Wall, 1978), research on adult attachment has been focused almost exclusively on the correlates of individual differences in attachment (for an exception, see Hazan & Hutt, 1991). This has been a fruitful endeavor, as different attachment strategies have been related to (among other things) jealousy, parental drinking, well-being, relationship satisfaction, support seeking, self-disclosure, and religiosity (see Shaver & Hazan, 1993, for a comprehensive review).

Dale Griffin, Department of Psychology, University of Waterloo, Waterloo, Ontario, Canada; Kim Bartholomew, Department of Psychology, Simon Fraser University, Burnaby, British Columbia, Canada.

Preparation of this article was supported by Social Science and Humanities Research Council of Canada research grants to Dale Griffin and Kim Bartholomew and a sabbatical leave granted by the University of Waterloo to Dale Griffin.

We are grateful to Elaine Scharfe for her help in the collection and analysis of the data in Study 3, and to the Department of Psychology, University of British Columbia, for the use of their facilities during Dale Griffin's sabbatical leave.

Correspondence concerning this article can be addressed to either Dale Griffin, Department of Psychology, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1 or Kim Bartholomew, Department of Psychology, Simon Fraser University, Burnaby, British Columbia, Canada V5A 1S6.

Despite this impressive evidence for the predictive validity of attachment strategies in general, there has been little attention paid to basic measurement issues. Attachment patterns or strategies have variously been assessed by three-category and four-category interview procedures (e.g., Bartholomew & Horowitz, 1991; Main, Kaplan, & Cassidy, 1985), three-category and four-category self-report measures (Bartholomew & Horowitz, 1991; Hazan & Shaver, 1987), and multi-item scales that form either two (Simpson, Rholes, & Nelligan, 1992) or three (Collins & Read, 1990) empirically derived factors. However, adult attachment research has lacked an integrated approach to measurement.

In this article, we take a theory-based or top-down look at the measurement of adult attachment. First, we briefly review one measurement model (Bartholomew, 1990; Bartholomew & Horowitz, 1991) that is derived directly from Bowlby's theoretical propositions. This two-dimensional model of adult attachment provides a promising framework for organizing the work of a variety of investigators. In the first two empirical sections, we assess the construct validity of this two-dimensional model. In the third and final section, we relate this model to three alternate measures of adult attachment and show that it serves to integrate much of the empirical work currently carried on in this area.

A Two-Dimensional Model of Adult Attachment

Bowlby proposed that the quality of childhood relationships with caregivers results in internal representations or "working models" of the self and others that provide the prototypes for later social relations (Bowlby, 1973, 1980, 1982). Building on the initial work applying an attachment perspective to adults (e.g., Hazan & Shaver, 1987; Main et al., 1985), Bartholomew

has systematized Bowlby's definition of internal working models in a four-category classification of adult attachment (Bartholomew, 1990). Four prototypic attachment patterns are defined in terms of the intersection of two underlying dimensions—the positivity of a person's model of the self and the positivity of a person's model of hypothetical others. The positivity of the self model indicates the degree to which individuals have internalized a sense of their own self-worth and therefore expect others to respond to them positively; thus, the self model is associated with the degree of anxiety and dependency experienced in close relationships. The positivity of the other model indicates the degree to which others are generally expected to be available and supportive; thus, the other model is associated with the tendency to seek out or avoid closeness in relationships.

The self and other models represent general expectations about the worthiness of the self and the availability of others; in contrast, the four attachment patterns are conceptualized as prototypic strategies for regulating felt security in close relationships. This conceptualization departs from earlier work by differentiating two patterns marked by a hesitancy to become intimate with others: a fearful pattern defined by a negative self and other model (high anxiety and high avoidance) and a dismissing pattern defined by a positive self model and negative other model (low anxiety and high avoidance). In contrast, the secure pattern is defined by positive self and other models (low anxiety and low avoidance) and the preoccupied pattern by negative self and positive other models (high anxiety and low avoidance). The four patterns and their relation to the underlying dimensions are illustrated in Figure 1. Each of these patterns is characterized by a distinct pattern of emotional regulation and interpersonal behavior. Fearful individuals are highly dependent on others for the validation of their self-worth; however, because of their negative expectations of others, they shun intimacy to avoid the pain of potential loss or rejection. Dismissing individuals also avoid closeness with others because of negative expectations; however, they maintain their high sense of self-worth by defensively denying the value of close relationships and stressing

the importance of independence. Preoccupied individuals, like fearful individuals, have a deep-seated sense of unworthiness. However, their positive other model motivates them to validate their precarious self-worth through excessive closeness in personal relationships, leaving them vulnerable to extreme distress when their intimacy needs are not met. Finally, secure individuals are characterized both by an internalized sense of self-worth and comfort with intimacy in close relationships. See Bartholomew (1990) for discussion of the hypothesized developmental antecedents of the four patterns.

Previous work has demonstrated the utility of the four attachment categories in organizing and understanding individual differences in self-concept and interpersonal functioning (Bartholomew & Horowitz, 1991). However, the construct validity of the two dimensions hypothesized to underlie the four attachment patterns has not been examined explicitly. Can the two general models associated with the attachment patterns be reliably measured? Do the models of self and other derived from attachment measures correspond to more direct measures of an individual's self-evaluation and motivation to seek out others? Finally, how do these dimensions relate to other approaches to assessing adult attachment?

There is a growing body of evidence that two dimensions underlie adult attachment patterns and that these two dimensions are consistent with the dimensions proposed by the four-category model (for a review, see Shaver & Hazan, 1993). Some researchers have obtained attachment dimensions that appear to correspond directly to the self and other dimensions (e.g., Simpson et al.'s, 1992, avoidance and anxiety dimensions and Collins & Read's, 1990, comfort with closeness and anxiety dimensions). Other researchers have obtained dimensions that appear to correspond to the diagonals of the four-category model, that is, a 45° rotation from the self and other model dimensions (e.g., Brennan, Shaver, & Tobey's, 1991, secure vs. avoidant and high vs. low anxious-ambivalent dimensions, and Kobak's secure vs. insecure and dismissing vs. preoccupied dimensions; Kobak, Cole, Ferenz-Gillies, Fleming, & Gamble, 1991).

The purpose of this article is to validate the two dimensions underlying the four-category model and thereby to provide an underlying theoretical framework for the field of adult attachment. In contrast to exploratory work in this area that has been based on the descriptive use of correlational and factor-analytic methods, we take a confirmatory approach to construct validation. In particular, we use confirmatory factor analysis (CFA) and structural equation modeling to establish that the hypothesized underlying dimensions can be measured reliably and that they do validly represent the constructs of self and other models. Previous studies have either relied on a single method of assessing adult attachment (e.g., Hazan & Shaver, 1987; Kobak & Hazan, 1991), or, where multiple measures of adult attachment have been included (e.g., Bartholomew & Horowitz, 1991; Brennan et al., 1991), there has been no attempt to model underlying latent variables. In the present studies, we use a latent variable modeling approach that relies on multiple measures of each construct, including self-reports, friend reports, romantic partner reports, and trained judges' ratings.

Advantages of a Confirmatory Latent-Variable Approach

The advantages of a structural-modeling approach fall into two general classes: correction for measurement error and a for-

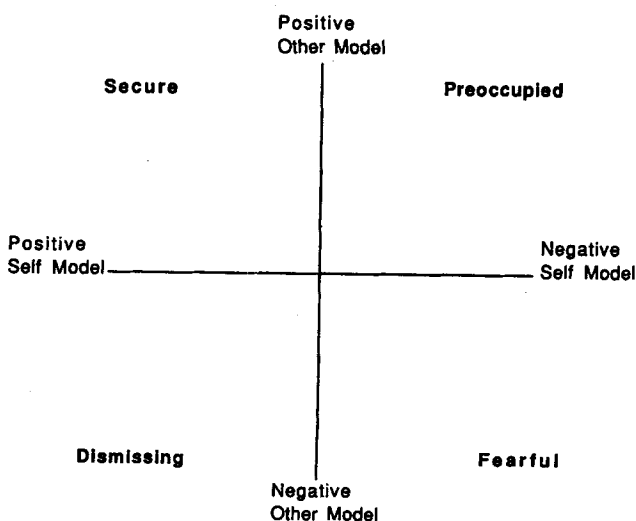


Figure 1. Four-category model of adult attachment.

mal test of how well the observed data fit a hypothesized model. When constructs are measured by single indicators, correlations between variables may be attenuated by random error or exaggerated by shared method variance. Structural equation modeling using multiple measures of each latent construct allows the researcher to simultaneously examine the (un)reliability of each measured variable and to correct for the biasing effects of this unreliability. When each measure of a construct is assessed by a different method, as in the current studies, the relations between the latent variables are freed of the contaminating effects of both random and systematic error. That is, the obtained paths between the latent variables represent the relations between hypothetical "true scores" or "perfectly measured" constructs. In addition, structural equation modeling with multiple measures provides a test of the convergent and discriminant validity of the underlying latent constructs by formally testing the fit of the hypothesized measurement model, the model that specifies which observed variables should load on each latent construct. Finally, structural equation modeling allows the test of the hypothesized structural model, the model that specifies the interrelations among the latent variables. We should note that the use of these techniques for "causal modeling" has been the subject of considerable controversy (e.g., Cliff, 1983; Freedman, 1987); however, the tests of construct validity presented here do not depend on any particular causal interpretation. (For further discussion of the merits of structural equation modeling and several examples of its use, see Connell & Tanaka, 1987.)

Overview of the Studies

In each of three studies, the two dimensions hypothesized to underlie adult attachment were assessed by three different methods. In each study, we constructed a multitrait-multimethod matrix to examine the convergent and discriminant validity of the self-model dimension and other-model dimension. Each study also included a CFA to formally test the fit of the attachment measurement model. To assess the construct validity of the self- and other-model dimensions, Study 2 related the latent dimensions to theoretically relevant outcome latent variables (positivity of self-concept and interpersonal orientation). Study 3 related the latent attachment dimensions to three alternate self-report measures of adult attachment.

Study 1

This study presents a reanalysis of data originally presented in Study 2 of Bartholomew and Horowitz (1991). The attachment patterns of university students were assessed by three methods: self-reports, interviews on peer relationships, and interviews on family relationships. For each of the methods, two dimensions were derived from ratings of the four attachment patterns. A multitrait-multimethod matrix was constructed to examine the convergent and discriminant validity of the two dimensions. We hypothesized that correlations between different methods of measuring the same dimension would correlate more highly (convergent validity) than correlations between the same method of measuring different dimensions (discriminant validity.) A CFA was performed to demonstrate that a two-di-

mensional structure was an appropriate representation of the observed correlations.

Method

Procedure

Subjects were 69 undergraduate students (mean age 19.5 years) who participated for course credit. In a first session, subjects participated in two half-hour interviews (the Family Attachment Interview and the Peer Attachment Interview), both of which were audiotaped. One to two weeks later, subjects rated their own attachment patterns using the Relationship Questionnaire (RQ).

Family Attachment Interview (Bartholomew & Horowitz, 1991). The Family Attachment Interview is a semistructured interview exploring subjects' memories and evaluations of their experiences growing up in their families of origin. Participants are asked to describe their relationships with each parent, in particular their experiences of acceptance or rejection, to recount their experiences of separation and loss in childhood, to interpret their parents' behaviors and intentions, and to explain how their family experiences have shaped their adult personality. Two independent raters coded each interview for the individual's fit with each of the four attachment prototypes, and the final attachment ratings consisted of the mean of the two ratings for each of the four patterns (alphas ranged from .75 to .86).

Peer Attachment Interview (Bartholomew & Horowitz, 1991). The Peer Attachment Interview is a semistructured interview exploring subjects' past and present close friendships and romantic relationships. Participants are asked to describe the quality of their relationships, in particular their experiences of acceptance and rejection, their experiences of gaining and giving support, their responses to conflict and the threat of separation, and their expectations for the future. Two independent raters coded each interview in a manner parallel to that of the Family Interview (alphas ranged from .74 to .88).

Relationship Questionnaire. The RQ (Bartholomew & Horowitz, 1991) is made up of four short paragraphs, each describing a prototypical attachment pattern as it applies to close relationships in general. Participants are asked to rate their degree of correspondence to each prototype on a 7-point scale. For example, the dismissing prototype reads as follows "I am comfortable without close relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me."

For each of the three methods of measurement, two attachment dimensions were derived from the four pattern ratings. The self-model dimension was obtained by summing the ratings of the two attachment patterns with positive self models (secure and dismissing) and subtracting the ratings of the two patterns with negative self models (preoccupied and fearful). The other-model dimension rating was obtained by summing the ratings of the two attachment patterns with positive other models (secure and preoccupied) and subtracting the ratings of the two patterns with negative other models (dismissing and fearful).¹

Data Analysis

Pearson product-moment correlations were computed among the six derived dimension variables (self-report, peer interview, and family in-

¹ To control for differential variances of the four ratings, we also computed dimension scores based on standardized attachment ratings (cf. Simpson, 1990). In addition, to control for individual differences in scale use, we computed dimension scores based on ipsatized attachment ratings (Cronbach, 1949). Because none of these "correction factors" had an appreciable effect on the results, we have chosen to present the results using the simpler unit-weighting procedure.

Table 1
Multitrait-Multimethod Matrix for Adult Attachment
Dimensions: Study 1

Variable	1	2	3	4	5	6
Attachment self model						
1 Self-report	—					
2 Family Interview	.34	—				
3 Peer Interview	.39	.50	—			
Attachment other model						
4 Self-report	.03	-.18	-.10	—		
5 Family Interview	.18	-.09	-.15	.39	—	
6 Peer Interview	.10	-.26	-.21	.50	.45	—

Note. Correlations in triangles are within-dimension correlations (convergent validity), and circled correlations (on the diagonal) are within-method correlations (discriminant validity).

terview ratings for self-model and other-model dimensions) and submitted to a CFA using the EzPATH program (Steiger, 1989). In addition to the standard maximum likelihood estimation procedures and statistical tests available on other structural equation modeling programs (e.g., LISREL, Jöreskog & Sörbom, 1986), EzPATH provides additional goodness of fit indices as well as confidence intervals for these statistics. Such confidence intervals are useful for assessing the fit of a hypothesized model when sample sizes are relatively small.

In cases of small sample sizes, the chi-square goodness of fit test has limited power to detect a poorly fitting model. Therefore, it is important to examine additional sample indices that are either independent of sample size or take the sample size into consideration. One commonly used index is the Jöreskog-Sörbom Adjusted Goodness of Fit Index (AGFI). Two additional indices recommended by Steiger (1989) are the Steiger-Lind Adjusted Root Mean Square Index (R^*) and the Adjusted Population Gamma Index (Γ^2). Values of the Steiger-Lind Adjusted Root Mean Square Index less than .10 indicate a good fit and values less than .05 indicate an excellent fit. The Adjusted Population Gamma Index is a coefficient of model determination, adjusted for model complexity. Values of the Adjusted Population Gamma Index above .90 indicate a good fit, and values above .95 indicate an excellent fit. Confidence intervals around these indices provide an estimate of the power of the analysis to test the hypothesized model. Narrow confidence intervals indicate high precision of the goodness of fit estimates.

Results and Discussion

Table 1 presents a multitrait-multimethod matrix (Campbell & Fiske, 1959) for the six derived attachment variables. Inspection of the matrix reveals clear evidence of both convergent and discriminant validity. Convergent validity is demonstrated by the moderately high correlations within each attachment dimension across methods (the correlations within triangles). Discriminant validity is indicated by the relatively small correlations between attachment dimensions within methods (the circled correlations). The average within-dimension correlation was .43, whereas the average within-method correlation was -.09. (Note, here and elsewhere in the article, averages were computed on Fisher z-transformed correlations, and these averages were then transformed back to the raw correlation scale.)

A CFA of the six attachment variables verified the hypothesized two-dimensional structure underlying adult attachment patterns. As illustrated in Figure 2, the measurement model consisted of two factors (represented by the large circles and corresponding to the two hypothesized dimensions), each measured by three methods (represented by the three rectangles associated with each circle in the figure). We estimated the correlation between the factors (the double-headed arrow between the two circles), even though we expected them to be close to independent.² We first fit a preliminary model that included correlated errors between the three pairs of measures that shared method variance (e.g., the self-report measures of self-model and other-model). None of the correlated errors approached statistical significance, and so we proceeded to fit a model with no correlated errors of measurement. Figure 2 displays this model and the obtained parameter estimates. As expected, the three measures of each dimension loaded moderately to highly on the appropriate dimensions. This indicates that both latent constructs were reliably measured by the observed variables. In addition, there was a modest (nonsignificant) negative correlation between the two latent variables.

Overall, the model fit the data well, $\chi^2(8, N = 69) = 10.10, p > .25$. The AGFI value of .88 indicated a good fit between model and data. The Steiger-Lind index was .06, with a 90% confidence interval of .00 to .16. The Adjusted Population Gamma Index was .98, with a 90% confidence interval of .84 to 1.00. Both the Steiger-Lind Index and Adjusted Population Gamma Index values indicate a good fit, and the relatively narrow confidence intervals around these values confirm that the fit of the model to the data is not simply a result of inadequate power.

These statistics indicate that a two-dimensional structure in which each indicator is associated with only one of the underlying attachment dimensions is sufficient to explain the observed correlations. However, it is also important to demonstrate that both dimensions are necessary to explain the observed pattern of data. Thus, we compared the two-dimensional model with a simpler model in which all six indicators loaded on a single underlying factor or dimension. This model showed a poor fit with the data, $\chi^2(9, N = 69) = 36.23, p < .001$, and the test of the difference in fit between the two competing models revealed that the hypothesized two-dimensional structure gave a significantly better fit, $\chi^2(1, N = 69) = 26.13, p < .001$.

Study 2

Study 1 demonstrated the convergent and discriminant validity of the two hypothesized attachment dimensions. This is the

² It is informative to examine the covariance between the two component scores (self model [S] and other model [O]) in terms of the variances (VARs) and covariances (COVs) of the original variables: $COV_{S,O} = [VAR_{sec} + VAR_{fear} - VAR_{dis} - VAR_{pre}] + 2COV_{dis,pre} - 2COV_{sec,fear}$, where sec = secure rating, fear = fearful rating, dis = dismissing rating, and pre = preoccupied rating. Assuming that the variances of the four pattern ratings are approximately equal (which is generally true), this expression is a simple function of $r_{dis,pre} - r_{sec,fear}$. Thus, the covariance (and hence the correlation) between the two dimensions is a function of two aspects of the pattern ratings: the equality or inequality of the variances and the relative sizes of the correlations between the two "opposing" patterns. In general, we have no reason to expect either one of these inequalities to be large, and hence we do not expect large correlations between the dimensions.

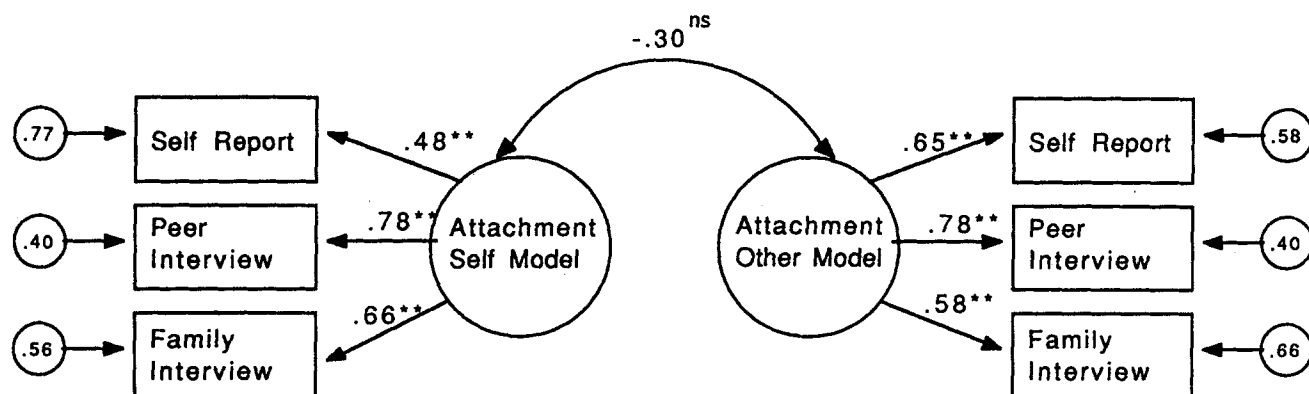


Figure 2. Measurement model of adult attachment dimensions: Study 1. (* $p < .05$. ** $p < .01$.)

first step in testing the construct validity of the two-dimensional model. In the current study, the measurement model of our first study was replicated on a new sample using a different set of methods for assessing adult attachment patterns (self-report ratings, interview ratings of peer relationships, and friend-ratings). Once again, CFA was used to test the appropriateness of the measurement model. Study 2 presents a reanalysis of data originally presented in Study 1 of Bartholomew and Horowitz (1991).

In addition to confirming the convergent and discriminant validity of the two-dimensional model, we assessed its construct validity by relating each latent attachment dimension to a theoretically dictated outcome variable. Recall that measures of the self- and other-model dimensions are derived by combining ratings of the four attachment prototypes, thus yielding indirect measures of the two dimensions. Furthermore, recall that the prototypes themselves are assessed in the context of individuals' close relationships. In the current study, we relate these indirect measures of the two general models to variables hypothesized to be direct measures of the same general models. Direct measures of the self-model dimension, which represents an individual's sense of self-worth ("positive self-concept"), were provided by self-report measures of self-esteem, subjective distress, and self-acceptance. Direct measures of the other-model dimension, which represents an individual's desire to seek or avoid closeness ("positive interpersonal orientation") were provided by self- and friend-reports of sociability and the warmth versus coldness dimension of the Interpersonal Circle. CFA was used to demonstrate the convergent and discriminant validity of these outcome variables. A full structural equation model then related the two attachment latent variables to the two latent variables representing the direct measures of the self and other models. We hypothesized that the attachment self model would largely correspond to the self-concept latent variable and be unrelated to interpersonal orientation; conversely, we hypothesized that the attachment other model would correspond to interpersonal orientation and be unrelated to self-concept. Finally, separate structural models were analyzed for each method of measuring attachment dimensions (i.e., self-report, friend-report, and interview) to determine whether the same pattern would be found at the level of individual measures.

Method

Procedure

Target subjects were 77 undergraduate students (mean age 19.6 years) who participated for course credit. Each target subject was accompanied by a same-sex friend who was paid for his or her participation. In a first session, target subjects and their friends completed a series of questionnaires assessing, among other things, self-reports of the target subjects' attachment patterns, self-concepts, and interpersonal styles, and friend-reports of the target subjects' attachment patterns and interpersonal styles. One to two weeks later, target subjects were administered the Peer Attachment Interview.

Measures

Attachment measures. We assessed attachment patterns using an hour-long version of the Peer Attachment Interview, rated by three independent coders (alphas ranged from .87 to .95), and self-reports and friend-reports on the RQ. The friend-report version of the RQ was directly parallel to the self-report version with appropriate changes in wording. For example, the friend version of the dismissing prototype was "F is comfortable without close relationships. It is very important to F to feel independent and self-sufficient, and F prefers not to depend on others or have others depend on him or her." For each of the three methods of measurement, the two attachment dimensions of self and other models were derived as in Study 1.

Self-concept measures. Three self-report measures of self-concept were included. Self-esteem was assessed by the 10-item Rosenberg Self-Esteem Inventory (Rosenberg, 1965). A typical item is "I feel that I have a number of good qualities." ($\alpha = .85$; note that this value and all subsequent alphas were calculated on the current data set). Self-acceptance was assessed by the 20-item Fey Self Acceptance Scale (Fey, 1955; $\alpha = .86$). A typical item is "I'm pretty satisfied with the way I am." Subjective distress was assessed by a three-item scale measuring subjects' experienced depression, anxiety, and unhappiness ($\alpha = .68$).

Interpersonal orientation measures. Two self-report and two friend-report measures of interpersonal orientation were included. Both self-reports and friend-reports of sociability were assessed by appropriately worded versions of the five-item Sociability Scale (Cheek & Buss, 1981; self-report $\alpha = .74$; friend-report $\alpha = .78$). A typical item is "I like to be with people." Self-reports and friend-reports of interpersonal warmth were assessed by appropriately worded versions of the Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg, Baer, Ureno, & Villaseñor, 1988). Eight-item subscales of the IIP were created to correspond

Table 2
Multitrait-Multimethod Matrix for Adult Attachment
Dimensions: Study 2

Variable	1	2	3	4	5	6
Attachment self model						
1 Self-report						
2 Peer Interview	.41					
3 Friend-report	.34	.21				
Attachment other model						
4 Self-report	.12	.05	.19			
5 Peer Interview	.12	-.05	.17	.48		
6 Friend-report	.05	-.21	.20	.42	.37	

Note. Correlations in triangles are within-dimension correlations (convergent validity), and circled correlations (on the diagonal) are within-method correlations (discriminant validity).

with the eight octants of the Interpersonal Circle (Alden, Wiggins, & Pincus, 1990; subscale alphas ranged from .66 to .89) and were combined to calculate a mean rating of interpersonal warmth according to the procedure described by Wiggins, Phillips, and Trapnell (1989). This score represents the degree to which reported interpersonal problems correspond to the warmth dimension of the Interpersonal Circle, a model that conceptualizes interpersonal behavior in terms of two fundamental dimensions: Warmth versus Coldness and Dominance versus Submissiveness. Example items from the Overly Nurturant subscale include "F tries to please other people too much" (friend-report version) and "I put other people's needs before my own too much" (self-report version).

Results and Discussion

Measurement Model of Attachment Variables

Table 2 presents a multitrait-multimethod matrix for the six derived attachment variables. Once again, the matrix reveals evidence of both convergent validity (i.e., correlations within the triangles are moderately high) and discriminant validity (i.e., correlations within circles are relatively small). The average within-dimension correlation was .38, whereas the average within-method correlation was .09. These summary values are very similar to those obtained in Study 1. However, in this study, the correlation between two of the self-model measures, self- and friend-reports, was relatively small ($r = .21$). This discrepancy will be analyzed further below.

As illustrated in Figure 3, a CFA verified the hypothesized two-dimensional structure underlying the six attachment measures. As in Study 1, we first examined a model that included three correlated errors among the measured variables sharing a common method of measurement. None of the correlated errors approached significance, so we fit the simpler model presented in Figure 3. Once again, the three measures of each dimension loaded moderately to highly on the hypothesized dimensions, indicating that both latent constructs were reliably measured. In this study, there was a nonsignificant, positive correlation between the two latent variables.³

As in Study 1, the model fit the data well, $\chi^2(8, N = 77) = 10.76, p > .20$, with an AGFI value of .89. The Steiger-Lind Index was .07, with a 90% confidence interval of .00 to .16, and the Adjusted Population Gamma Index was .97 with a 90% confidence interval of .84 to 1.00. Again, the Steiger-Lind Index and Adjusted Population Gamma Index indicate good to excellent fit, and their confidence intervals confirm that the analysis had adequate power to reject an ill-fitting model. Again, the simpler unidimensional model was resoundingly rejected, $\chi^2(9, N = 77) = 29.21, p < .001$, and the hypothesized two-dimensional structure gave a significantly better fit, $\chi^2(1, N = 77) = 18.45, p < .001$.

Measurement Model of Outcome Variables

Correlations among the seven outcome variables are presented in Appendix A. Inspection of the correlation matrix reveals that the three self-concept measures intercorrelated highly, and the four interpersonal orientation measures intercorrelated at a moderate level. Between-construct correlations were generally low except for self-reported self-esteem and self-reported sociability ($r = .34, p < .01$). Given that the content of these two measures does not overlap, we assumed that this correlation represented a common response bias, and therefore our CFA on the outcome variables included a correlated error term between self-esteem and self-reported sociability.⁴

Figure 4 presents the results of this analysis on the seven outcome measures. As expected, the three self-concept measures loaded highly on the latent variable of positive self-concept, and the four interpersonal measures loaded highly on the latent variable of positive interpersonal orientation. There was no correlation between the two latent variables. The correlated error between self-esteem and self-reported sociability was large and significant, indicating that the two variables shared a substantial amount of method variance. The two-construct model fit this data well: $\chi^2(12, N = 77) = 14.82, p > .25$, AGFI = .89, $R^2 = .05$, with a 90% confidence interval from 0 to .13; and $\Gamma^2 = .98$, with a 90% confidence interval from .87 to 1.0. Again, a simpler unidimensional model failed to fit the data, $\chi^2(13, N = 77) = 63.27, p < .001$.

³ This small positive correlation between the two latent dimensions contrasts with the moderate negative correlation found in Study 1. In fact, the two correlations differ significantly at the .05 level. We have no explanation for this discrepancy, except that peer reports replaced the Family Attachment Interview in Study 2. However, given that the two parallel correlations obtained in Study 3 are both small and positive, we assume that the negative correlation found in Study 1 is due to random fluctuation.

⁴ According to standard measurement theory, the variance in an observed measure comes from three sources: common variance shared with other measures of the same construct, systematic error that may represent a response bias shared with other measures of the same type, and random error that is unrelated to any other measure. In this case, a significant correlated error means that some of the unique variance in self-reported sociability (that is, that part of this measure that is unrelated to any other interpersonal orientation measures) is related to some unique variance in self-reported self-esteem (that is, that part of this measure that is unrelated to any other self-concept measures).

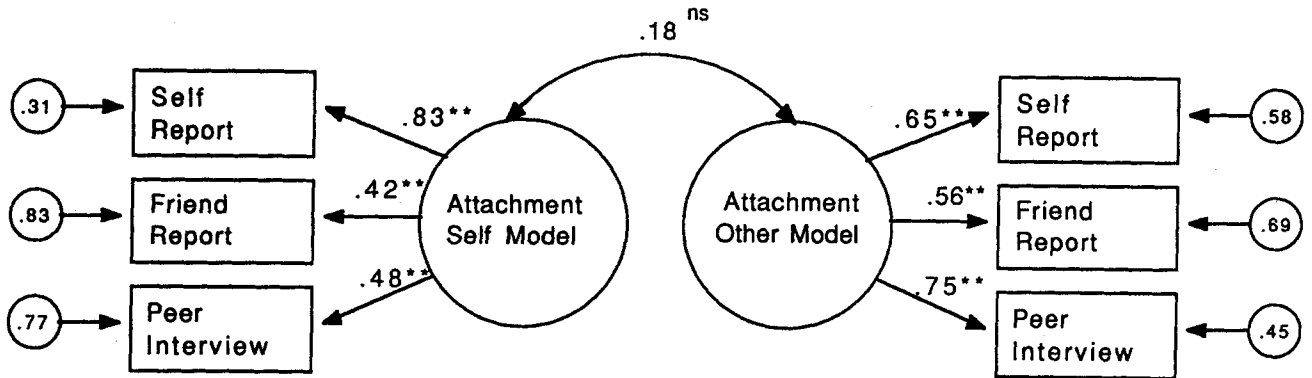


Figure 3. Measurement model of adult attachment dimensions: Study 2. (* $p < .05$. ** $p < .01$.)

Structural Model

Figure 5 displays the full structural model relating the attachment latent variables to the outcome latent variables. The causal model being tested implies that the attachment dimensions lead to the outcome variables. (Note that equivalent goodness of fit estimates would be obtained by reversing the direction of the so-called *causal paths*. See MacCallum, Wegener, Uchino, & Fabrigar, 1993). To enable the program to converge on a stable solution, it was necessary to specify two correlated errors between measures of the attachment other model and the interpersonal orientation measures. One correlated error was added between the self-reported attachment other model and self-reported interpersonal warmth. The other was added between the friend-reported attachment other model and friend-reported interpersonal warmth. These two correlated errors,

like that between self-reported self-esteem and self-reported sociability identified above, represent common method variance and thus are theoretically plausible. Because the analysis of the attachment measurement model found a small, nonsignificant correlation between the latent factors, this correlation was set to zero in the structural equation.

The standardized parameter estimates given in Figure 5 support the construct validity of the two-dimensional model. That is, the structural coefficient between each attachment dimension and its hypothesized outcome was very high (.96 and .93), whereas the coefficient between each attachment dimension and the noncorresponding outcome latent variable was virtually zero (.00 and .01). In fact, neither of the structural coefficients between the attachment latent variables and the corresponding outcome latent variables was significantly different from 1.0, indicating that the latent outcome variables (i.e., the

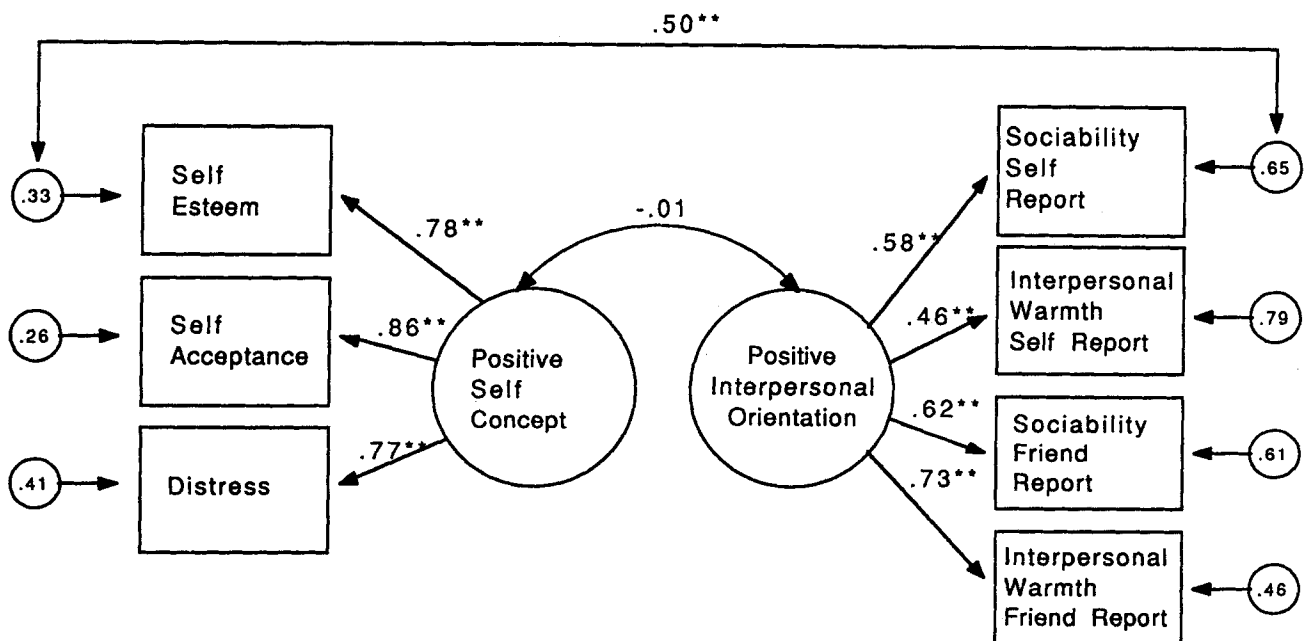


Figure 4. Measurement model of outcome dimensions: Study 2. (* $p < .05$. ** $p < .01$.)

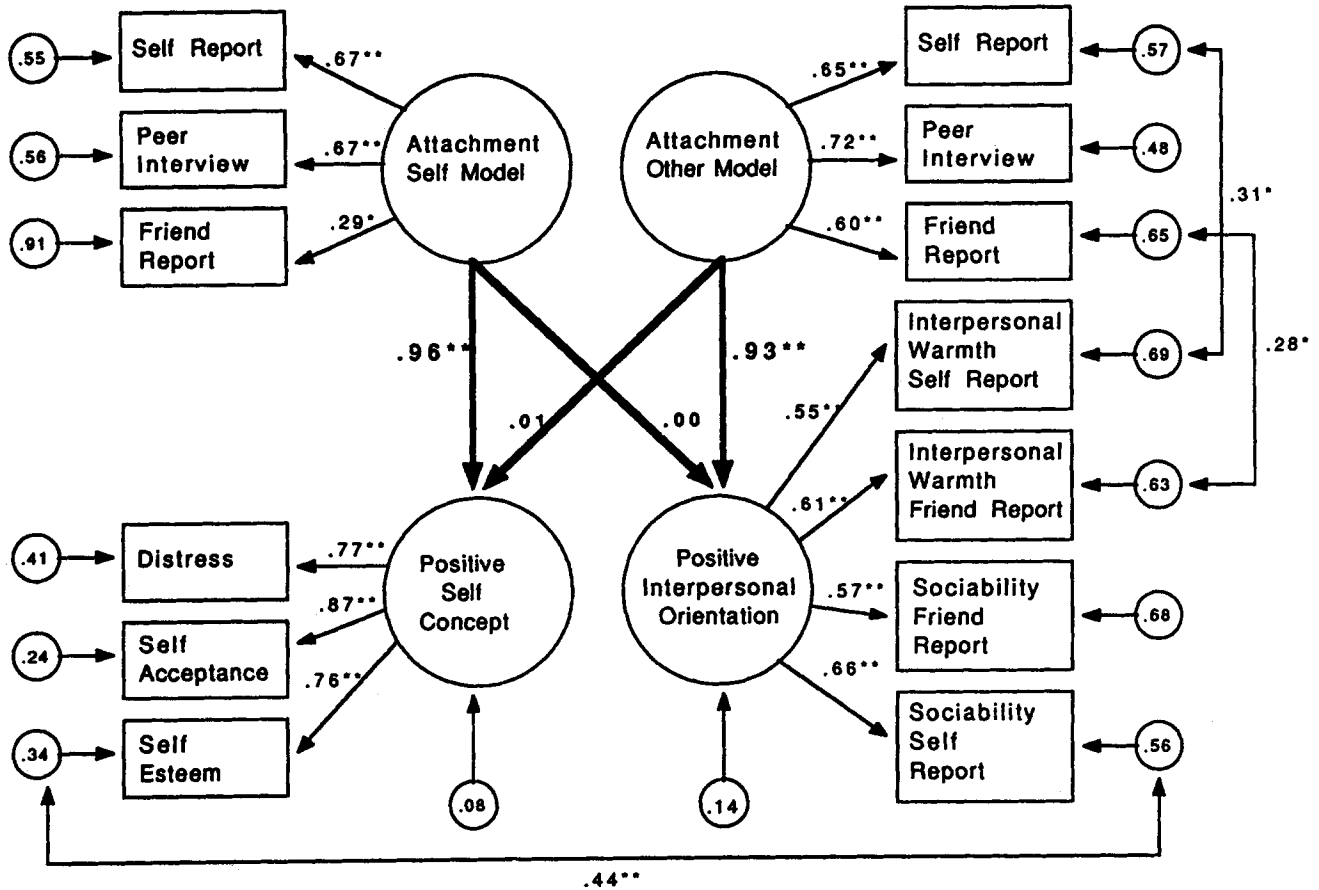


Figure 5. Structural model relating attachment dimensions to outcome variables. ($N = 77$, $p > .13$. * $p < .05$. ** $p < .01$.)

“direct” measures of self-concept and interpersonal functioning) were not statistically distinguishable from the parallel latent attachment variables (i.e., the “indirect” measures of the self- and other-model dimensions). The implications of this remarkable finding are considered in the General Discussion. Goodness of fit statistics are presented in Figure 5.

All factor loadings were at least moderately high, except that for the friend-reported attachment self model, indicating that friend report is not a highly reliable measure of the self model.⁵ To further explore potential differences between methods of measuring the attachment dimensions, we then examined a separate structural equation model for each of the methods. For example, for self-report, the structural model consists of self-reported self model and self-reported other model, each predicting a corresponding outcome latent variable and a noncorresponding outcome latent variable. The parameter estimates for each of the three simplified structural models can be found in Table 3. Although goodness of fit values indicated that these simplified models fit the data adequately, the results are presented for descriptive purposes, and so the associated significance tests are not reported.

Inspection of Table 3 reveals two notable results. First, as suggested by the overall structural equation model, self-reports and interview ratings conform to the hypothesized model more

closely than do friend-reports. In particular, friend-reports of the self-model dimension showed only modest predictive validity, whereas friend-reports of the other-model dimension were highly predictive of the target subjects’ interpersonal orientations. This finding may reflect the fact that observers are generally more accurate in judging observable characteristics such as extroversion or sociability than in judging less observable characteristics such as neuroticism or self-esteem (Kenrick & Funder, 1988). Second, the predictive validity of the interview ratings was comparable with that of the self-report ratings for both attachment dimensions and with the friend-reports for the other-model dimension. This finding is impressive because the latter two measurement methods shared common method vari-

⁵ The factor loadings change from the CFA of the measurement model (Figure 3) to the complete structural model (Figure 5) because the program finds the set of parameters that leads to the best fit of the entire correlation (or covariance) matrix. Thus, whereas the factor loadings of the attachment variables in Figure 3 reflect only the interrelations among the attachment indicator variables, the factor loadings of the attachment variables in Figure 5 reflect both the interrelations among the attachment indicator variables and the relations between the attachment indicator variables and the outcome indicator variables.

ance with the outcome measures, whereas the interview ratings did not.

Summary of Results

Study 2 replicated the measurement model tested in Study 1 with a different set of measurement methods. It showed that the two-dimensional model was both reliable, as demonstrated by CFA of the measurement model, and valid, as demonstrated by the structural equation relating the attachment latent variables to the outcome latent variables. As hypothesized, the self-model attachment dimension was strongly related to the latent self-concept variable and was unrelated to the latent interpersonal orientation variable. In contrast, the other-model dimension was strongly related to the latent interpersonal orientation variable and was unrelated to the latent self-concept variable. In separate analyses, this overall structure was also found for self-report and interview ratings of attachment. However, friends' reports of attachment showed greater construct validity for the other-model dimension than for the self-model dimension.

Study 3

In Study 3, the structure of the two-dimensional model was again tested with a different set of methods of assessing attachment (self-reports, romantic partner reports, and interview ratings) on a different population (committed couples). Unlike the previous two studies, the structure was tested separately for women and men. We hypothesized that the two-dimensional model would be appropriate for both women and men. In addition, three established self-report methods for assessing adult attachment that are not explicitly based on the two-dimensional model were related to the self-model and other-model dimensions. These methods are a multiple-item measure of Hazan's three attachment patterns (e.g., Mikulincer, Florian, & Tolmacz, 1990; Mikulincer & Nachshon, 1991; Simpson, 1990), Simpson's two attachment subscales (Simpson et al., 1992; see also Feeney, Noller, & Callan, 1994, for very similar scales), and Collins' three attachment subscales (Collins & Read, 1990).

The predictions for Simpson's and Collins' measures are relatively straightforward because both measures were originally conceptualized in dimensional terms. Simpson's two subscales of anxiety and avoidance were expected to correspond to the self- and other-model dimensions. Collins and Read (1990) identified three attachment subscales: anxiety, comfort with closeness, and comfort with depending on others. The first two are very similar to Simpson's two subscales and therefore were also expected to be predicted by the self-model and other-model dimensions, respectively. The dependence subscale appears to contain elements of both underlying attachment dimensions, although because of its correlation with the comfort with closeness subscale, it was expected to be most highly related to the other model dimension.

Our predictions for the measure of Hazan's three attachment patterns are less certain because the three categories are not explicitly defined in terms of attachment dimensions. Because Hazan's secure pattern is defined in terms of a lack of anxiety in close relationships and comfort with intimacy, we expected the secure subscale to be positively predicted by both the self-

and other-model latent variables. Similarly, because Hazan's anxious-ambivalent pattern is defined in terms of a high degree of anxiety coupled with a desire for intimacy, we expected the ambivalent subscale to be negatively associated with the self-model dimension and positively associated with the other-model dimension. An examination of the items composing the avoidant subscale led us to expect that this subscale would be predicted primarily by the other model dimension. However, Brennan et al.'s (1991) comparison of self-report measures of the three- and four-category models of attachment suggested that Hazan's avoidant pattern may also contain a component of anxiety that might be negatively related to the self-model dimension.

Method

Subjects

The sample consisted of 78 heterosexual couples who were part of a longitudinal study. Four women and six men were deleted from the analysis because of missing data on at least one variable. The criteria for inclusion in the study were minimum relationship length of 2 years, at least one partner aged 35 years or less, and both partners without children. The subjects' average age was 24.5 years; 28% were married, 44% were unmarried but cohabiting, and 28% were living separately. Subjects were recruited from a variety of university classes and from advertisements in the campus newspaper and elsewhere. Approximately 75% of the subjects were students. Each subject received \$10 for participation as well as a chance to win a portion of \$450 in lottery prizes.

Procedure

In a first session, couples arrived together and separately completed a packet of questionnaires including measures of their own and their partner's attachment patterns. All subjects filled out self-reports and partner-reports on the RQ and then filled out self-reports on the Relationship Scales Questionnaire (RSQ; Griffin & Bartholomew, 1994). In a second session conducted within 2 weeks of the first, partners were individually administered the Peer Attachment Interview.

Measures

Attachment patterns were assessed by the Peer Attachment Interview and self-reports and partner-reports on the RQ. For each of the three

Table 3
Structural Relations (Standardized Coefficients) Between Individual Measures of Attachment Dimensions and Outcome Latent Variables: Study 2

Method of measuring attachment dimensions	Outcome latent variables	
	Positive self-concept	Positive interpersonal orientation
Self-report		
Self model	.64	.06
Other model	.06	.69
Friend-report		
Self model	.27	.02
Other model	.21	.67
Peer Interview		
Self model	.65	-.06
Other model	.09	.67

methods of measurement, the two attachment dimensions were derived as in the previous two studies.

The RSQ is a 30-item self-report measure designed to yield a variety of attachment subscales. Included are items corresponding to the phrases in Hazan and Shaver's (1987) three-category attachment measure, Bartholomew and Horowitz's (1991) four-category attachment measure, as well as additional items used by Collins and Read (1990). In cases where items from different sources essentially overlapped, only one of the (conceptually identical) items was included in the RSQ. Each item is scored on a 5-point scale ranging from *not at all like me* to *very much like me*.

Measures of each of the three attachment styles identified by Hazan and Shaver (1987) were created by summing items derived from the corresponding prototypic description (see, e.g., Mikulincer et al., 1990; Mikulincer & Nachshon, 1991; and Simpson, 1990). The secure scale was composed of 5 items (e.g., "I find it relatively easy to get close to others"; $\alpha = .50$ for both women and men), the avoidance scale was composed of 4 items (e.g., "I am nervous when anyone gets too close to me"; $\alpha = .72$ for women and $.74$ for men), and the ambivalence scale was composed of 4 items (e.g., "I find that others are reluctant to get as close as I would like"; $\alpha = .77$ for women and $.69$ for men). The intercorrelations of the three scales were consistent with those reported by previous researchers: secure and avoidance scores correlated $-.59$ for women and $-.60$ for men, secure and ambivalence scores correlated $-.06$ for women and $-.23$ for men, and avoidance and ambivalence scores correlated $.23$ for women and $.25$ for men.

The three attachment subscales of closeness, anxiety, and dependence were created following the procedure of Collins and Read (1990). Each scale was composed of six items and all showed acceptable internal consistency (alphas ranged from $.73$ to $.78$). The intercorrelations among the three subscales were consistent with those reported by Collins and Read (1990): Closeness and anxiety were correlated $.11$ for women and $-.03$ for men, closeness and dependence were correlated $.62$ for women and $.52$ for men, and anxiety and dependence were correlated $-.27$ for women and $-.21$ for men. Finally, the two attachment subscales of anxiety and avoidance were created following the procedure of Simpson et al. (1992). The avoidance and anxiety scales were composed of eight and five items, respectively, and both showed acceptable internal consistency (alphas ranged from $.75$ to $.82$). The intercorrelations between the two scales were consistent with those reported by Simpson et al. (1992): $-.05$ for women and $-.20$ for men.

Table 4
Multitrait-Multimethod Matrix for Adult Attachment
Dimensions: Study 3 Women

Variable	1	2	3	4	5	6
Attachment self model						
1 Self-report	—					
2 Peer Interview	.50	—				
3 Partner-report	.49	.40	—			
Attachment other model						
4 Self-report	.14	-.06	.05	—		
5 Peer Interview	.25	.08	.09	.47	—	
6 Partner-report	.00	-.12	.07	.37	.39	—

Note. Correlations in triangles are within-dimension correlations (convergent validity), and circled correlations (on the diagonal) are within-method correlations (discriminant validity).

Table 5
Multitrait-Multimethod Matrix for Adult Attachment
Dimensions: Study 3 Men

Variable	1	2	3	4	5	6
Attachment self model						
1 Self-report	—					
2 Peer Interview	.24	—				
3 Partner-report	-.03	.19	—			
Attachment other model						
4 Self-report	.20	.02	-.08	—		
5 Peer Interview	.02	.17	.01	.34	—	
6 Partner-report	-.02	-.03	.08	.32	.37	—

Note. Correlations in triangles are within-dimension correlations (convergent validity), and circled correlations (on the diagonal) are within-method correlations (discriminant validity).

Results and Discussion

Measurement Model of Attachment Dimensions

Tables 4 and 5 contain two multitrait-multimethod matrices for the six derived attachment variables, one each for women and men. Inspection of the correlations for women reveals strong evidence of both convergent and discriminant validity. The within-dimension correlation was $.44$, and the average within-method correlation was $.10$. These values are comparable with those found with mixed-sex samples in the previous two studies. The correlation matrix for men, however, indicates that only the other-model dimension was reliably assessed by the three measures. Although the mean within-dimension correlation for the other-model dimension was a respectable $.35$, the mean within-dimension correlation for the self-model dimension was only $.13$, falling below the mean within-method correlation of $.15$.

Separate CFAs were conducted for women and men and are presented in Figures 6 and 7. For women, the results conformed closely to the hypothesized structure: The three measures of each dimension loaded moderately to highly on the appropriate attachment dimensions. Again, the two-dimensional model fit the data well (see Figure 6 for the goodness of fit statistics). For men, because partner-reports were uncorrelated with self-reports for the self-model dimensions, partner-reports of the self-model dimensions could not be included in the analysis. With only two variables available to define the self-model dimension, it was necessary to constrain both loadings to be equal to identify the model. As shown in Figure 7, this five-variable measurement model did fit the data for the men.

Using mixed-sex samples in the two previous studies may have obscured any existing sex differences in the fit of the measurement model. To examine this possibility, we computed separate multitrait-multimethod matrices for men and women for each study. A comparison of these matrices revealed that although the average within-self-model dimension correlations

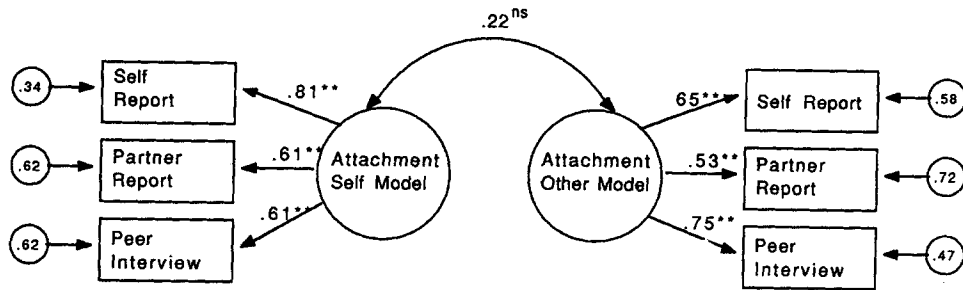


Figure 6. Measurement model of adult attachment measures: Study 3 women. ($N = 74$, $p > .40$.
 $*p < .05$. $**p < .01$.)

for men were consistently (although nonsignificantly) lower than those for women (.34 vs. .48 in Study 1 and .27 vs. .36 in Study 2), both sexes showed adequate convergent validity. Correlations among measures of the other-model dimension showed no consistent ordering between sexes (.50 for men and .38 for women in Study 1, and .30 for men and .53 for women in Study 2). Thus, it appears that the difficulty in assessing the men's self-model dimension was restricted to Study 3.

To further explore this issue, we related each measure of the self-model dimension to the one relevant outcome measure that was available in this data set, a measure of self-esteem that was collected at a follow-up session conducted 8 months after the attachment measures were completed (the Rosenberg Self-Esteem Inventory, Rosenberg, 1965). For men, both the interview and self-report measures of the self-model dimension significantly predicted self-esteem 8 months later, $r(68) = .38$, $p < .001$, and $r(68) = .31$, $p < .01$, whereas partner-report was unrelated, $r(68) = -.05$, ns . These results hardly changed when partial correlations were computed representing the unique relations between each separate attachment measure and self-esteem, interview $r(66) = .36$, $p < .01$; self-report $r(66) = .25$, $p < .05$; partner-report $r(66) = -.11$, ns . There are two notable aspects of these results. First, the interview ratings predicted later self-esteem at least as strongly as did self-report ratings of attachment, despite the interview ratings sharing no method variance with the self-esteem inventory. Second, the interview ratings and the self-reports of attachment independently predicted later self-esteem. Thus, although there was limited convergent validity among measures of the self-model dimension

for men, both the interview and the self-report measures showed predictive validity.

For women, in contrast, all three self-model measures significantly predicted later self-esteem, interview $r(68) = .36$, $p < .01$; self-report $r(68) = .32$, $p < .01$; partner-report $r(68) = .30$, $p < .05$. When partial correlations were computed, only the interview rating showed any unique relationship with self-esteem, $r(66) = .23$, $p = .06$. (Other partial r s $< .15$, ns .) The small unique relationships compared with the moderate zero-order correlations are consistent with the high convergent validity of the different self model measures for women.

Overall, the results for women conformed closely to expectations. For men, there were two unexpected findings. First, partner-reports on the self-model dimension lacked both convergent and predictive validity. Note that partner-reports are fundamentally different from the peer-reports used in Study 2: In this study, reports came from opposite-sex, romantic partners, whereas in the prior study, reports came from same-sex, platonic friends. Romantic partners differ from same-sex peers on a number of dimensions such as time spent together, the contexts in which they observe their partner or friend, as well as the depth of emotional investment in the relationship and the concomitant motivation to idealize (or derogate) their partner or friend. Second, the interview and self-report measures of the self-model dimension were only modestly correlated for men, and both independently predicted later self-esteem. It is not clear why this pattern was found only in Study 3, although there are a number of differences between this sample and those used in the previous studies. All subjects in this study were involved

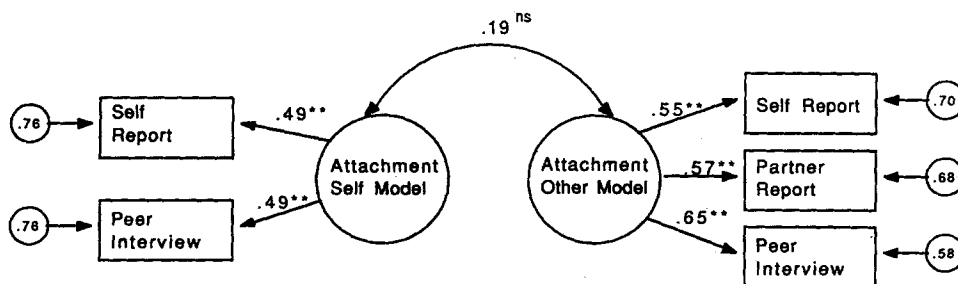


Figure 7. Measurement model of adult attachment measures: Study 3 men. ($N = 72$, $p > .25$.
 $*p < .05$. $**p < .01$.)

Table 6
Structural Relations (Standardized Coefficients) Between Latent Attachment Dimensions and Adult Attachment Subscales: Study 3 Women

Continuous attachment measures	Attachment latent variables	
	Positive self model	Positive other model
Hazan & Shaver (1987)		
Secure	.25*	.63**
Avoidant	-.27**	-.67**
Ambivalent	-.80**	-.18
Collins & Read (1990)		
Closeness	.09	.79**
Anxiety	-.77**	-.27*
Comfort with Dependence	.47**	.63**
Simpson et al. (1992)		
Avoidance	-.15	-.69**
Anxiety	-.80**	-.20

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

in long-term romantic relationships; they were about 6 years older, on average, than those sampled previously; and they participated in the context of a couples' study. Replications of these findings are necessary before substantive conclusions can be drawn.

Relations With Other Attachment Dimensions

We next related the latent attachment dimensions to each of the three self-report measures of attachment defined above. Separate analyses were conducted for men and women, with all analyses for men omitting the partner reports for the self-model dimension. Tables 6 and 7 present the results of the structural models predicting the three subscales derived from Hazan and Shaver's three-category model (1987). The results for men and women were remarkably consistent. For both samples, the Secure subscale was strongly predicted by the other-model dimension and only modestly related to the self-model dimension. The Avoidant subscale was strongly and inversely predicted by the other-model dimension and was also modestly negatively related to the self-model dimension. Finally, the Ambivalence subscale was primarily predicted by the self-model dimension (negatively), but there was a small negative relation between the Ambivalence scale and the other-model dimension for women only. To summarize, the other-model dimension seemed to underlie both the Secure and Avoidant subscales, whereas the self-model dimension seemed to underlie the Ambivalence subscale. Thus, although we hypothesized that the Secure and Ambivalence subscales would be associated with both attachment dimensions, our results indicate a simpler structure, that is, that the subscales roughly correspond to the dimensions rather than spanning them at a 45° angle.

Next, we examined how Collins and Read's three attachment subscales of Closeness, Anxiety, and Comfort With Dependence related to the self-model and other-model dimensions. As shown in Tables 6 and 7, the results were generally consistent with our hypotheses and were comparable for men and women.

The Anxiety subscale was strongly (and inversely) predicted by the self-model dimension, and the Comfort With Closeness subscale was strongly predicted by the other-model dimension. For men, there was a significant nonhypothesized path from the self model to the Closeness subscale, and for women there was a significant nonhypothesized path from the other model to the Anxiety subscale. However, these apparent sex differences were nonsignificant when the relevant paths for men and women were directly compared. In both samples, the Comfort With Dependence subscale was moderately related to both of the attachment latent variables.

The structural models relating the two subscales of Avoidance and Anxiety (Simpson et al., 1992) to the self-model and other model latent variables are also presented in Tables 6 and 7. The results were again consistent across samples. As hypothesized, the Anxiety subscale corresponded closely (and inversely) to the self-model dimension, whereas the Avoidance subscale corresponded closely to the other-model dimension. In addition, for men there was one significant—though modest—path from the self-model dimension to the Avoidance subscale (again, this path was not significantly larger than the corresponding path for women). Not surprisingly, the results for the two attachment subscales (Anxiety and Avoidance) were very similar to those for the corresponding subscales of Collins and Read (Anxiety and Closeness). The items making up these measures are largely overlapping. Thus, the two anxiety scales were correlated .86 for women and .82 for men, and the avoidance and closeness scales were correlated .98 for women and .96 for men.

In sum, Collins' and Simpson's dimensional measures were strongly predicted by the self- and other-model latent variables as expected. However, contrary to expectations, the dimensions underlying the multi-item measure of Hazan's three patterns also corresponded roughly to the self- and other-model latent variables. Researchers using these subscales may want to consider the implications of these findings when interpreting their own results. We should note, however, that the results obtained

Table 7
Structural Relations (Standardized Coefficients) Between Latent Attachment Dimensions and Adult Attachment Subscales: Study 3 Men

Continuous attachment measures	Attachment latent variables	
	Positive self model	Positive other model
Hazan & Shaver (1987)		
Secure	.31**	.67**
Avoidant	-.38**	-.63**
Ambivalent	-.79**	-.10
Collins & Read (1990)		
Closeness	.29**	.86**
Anxiety	-.67**	-.20
Comfort with Dependence	.35**	.46**
Simpson et al. (1992)		
Avoidance	-.29**	-.86**
Anxiety	-.78**	-.10

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

with these multi-item subscales may not hold with the single-item categorical measures originally developed by Hazan and Shaver (1987).

General Discussion

In three studies, using five different methods of assessment (self-reports, friend reports, romantic partner reports, trained judges' ratings of peer attachment, and trained judges' ratings of family attachment), we found strong support for the construct validity of the self- and other model attachment dimensions. Across studies, the two attachment dimensions showed both discriminant validity—that is, measures of different constructs were essentially independent—and convergent validity—that is, different measures of a given construct were highly related. In addition, Study 2 demonstrated the predictive validity of the two hypothesized dimensions: At the level of latent variables, the positivity of an individual's attachment self-model was highly (in fact, almost perfectly) related to the positivity of her or his self-concept, and the positivity of an individual's attachment other model was highly (again, almost perfectly) related to the positivity of her or his interpersonal orientation.

Study 2 also examined the predictive validity of the different methods of measuring the attachment dimensions. Results indicated that both self-report and interview measures were highly predictive of the corresponding latent outcome variables. However, for friend reports only, the self-model dimension showed rather poor predictive validity. Given that every one of the outcome measures was either a self-report or a friend-report, it was particularly striking that the interview-based attachment ratings predicted the outcome latent variables at least as well as self-reported and friend-reported attachment. Such high correlations across methods of measurement give an assurance that the results are not an artifact of the assessment procedures (Bank, Dishion, Skinner, & Patterson, 1990).

Study 2 provided the most dramatic example of the advantages of using multiple indicators in assessing constructs such as attachment. The standard strategy in the field of adult attachment has been to look at the associations between single indicators of attachment and outcome variables. Often, both sets of measures also share a common method (typically, self-reports). Thus, the resulting associations are confounded with common method variance and with random measurement error: Depending on the situation, shared method variance may exaggerate or attenuate the apparent relation between two variables, and unreliability of either indicator may substantially attenuate the observed correlations (Green, Goldman, & Salovey, 1993). The present approach avoids both of these problems. For example, the simple correlation between self-reports of the self-model dimension and self-reported self-esteem was approximately .5, and the correlation between self-reports of the self-model dimension and sociability was approximately .2. However, according to the structural equation model, the true correlation between the latent self-model dimension and the latent self-concept variable was .96 and the true correlation between the self-model dimension and the latent interpersonal orientation variable was zero.

In our final study, three continuous measures of adult attachment were examined, and all were shown to be measuring con-

structs similar to the self- and other-model latent dimensions underlying Bartholomew's four-category model. Study 3 also revealed the one anomalous finding in the measurement models presented here: Although men were able to reliably assess both their partners' self and other models, women seemed to be unreliable reporters of their partners' self models. At this point, we have no explanation for this finding and are hesitant to draw any conclusions until it has been replicated. It may represent random fluctuation, a systematic bias in women's perceptions of their romantic partners, or the failure of male partners to disclose their own self-evaluations. It offers an intriguing avenue for further investigation.

The conclusions from these studies are qualified somewhat by the relatively small samples used. However, the consistency of the results across studies, measures, and populations gives us confidence that these results are not just sample specific.

From our point of view, the greatest advantage of using confirmatory models with multiple indicators is the discipline imposed by such an approach (Connell, 1987). Researchers are forced to make explicit both their theoretical assumptions and their substantive predictions. Before any statistical programs can be run, the researcher must have a model that specifies the relations between measured variables and underlying constructs, and between the underlying constructs themselves. This process can yield valuable insights even before the computer is switched on. We therefore recommend this approach not just for the statistical power it yields, but for the conceptual clarity it imposes on the entire research enterprise.

These findings do not address the question of the relative merits of assessing attachment patterns versus the dimensions underlying these patterns. Our working hypothesis is that underlying all adult attachment measures are the two fundamental dimensions identified by Bowlby—the positivity of the self model and the positivity of the other model. This hypothesis gained considerable support from the finding in Study 2 that the indirect, attachment-related measures of these general models converged almost perfectly with subjects' direct self-reports of their affective and behavioral tendencies. At the same time, there are both theoretical and empirical reasons to believe that attachment styles are more than simply the sum of the underlying dimensions (see Griffin & Bartholomew, 1994, for an extended discussion). The models of self and other described by Bowlby are characterized by globally positive (or negative) expectations and evaluations, whereas the specific patterns identified by Ainsworth et al. (1978), Hazan and Shaver (1987), and others (e.g., Bartholomew, 1990; Main et al., 1985) are characterized by distinct strategies or approaches to maintaining felt security. Thus, these styles have configural meaning in terms of their prototypical patterns of emotional response and interpersonal behavior. For example, Bartholomew and Horowitz (1991) demonstrated that each attachment pattern is associated with a unique profile of interpersonal problems. That is, secure individuals function qualitatively differently than dismissing individuals in a way that could not be predicted merely from a linear combination of their respective self model and other model scores.

In general, measures of the self- and other-model dimensions will be adequate when the outcome measures are expected to

correspond with one or both of these dimensions. For example, symptom reporting would be expected to line up with the self-model dimension. However, in many domains, a dimensional approach may oversimplify the relation between adult attachment and interpersonal functioning. For example, interpersonal problems with coldness are highly negatively related to the other-model dimension and unrelated to the self-model dimension. These dimensional results fail to communicate that coldness is uniquely related to ratings of the dismissing prototype (Griffin & Bartholomew, 1994). Thus, although the results presented in the current studies support the construct validity of the two dimensions hypothesized to underlie attachment patterns—a crucial step in validating Bartholomew's (1990) model—we do not recommend that researchers abandon attachment patterns in favor of dimensional measures.

An important conclusion of these studies is that the two underlying attachment dimensions can be reliably assessed by self-report measures. For both theoretical and empirical reasons, we are considerably less confident that the individual attachment patterns can be reliably assessed by this method. Theoretically, these patterns are not necessarily conscious or open to introspection. Furthermore, multitrait-multimethod matrices and CFAs of attachment pattern ratings consistently fail to show convergent and discriminant validity (Griffin & Bartholomew, 1991). In some cases, ratings of theoretically "opposite" patterns such as secure and fearful correlated more highly (although negatively) than did ratings of the same patterns obtained by different methods. Therefore, we believe that results based on self-report ratings of attachment patterns should be validated by interview ratings whenever possible and that the development of a valid self-report measure of attachment patterns—preferably an implicit measure that does not directly ask for self-classification but instead offers socially desirable alternatives characteristic of each pattern—should be a priority for future research.

The results presented should not be taken to imply that measures of self-esteem and sociability are equivalent to measures of the attachment self- and other-model dimensions. Instead, self-esteem is one marker variable of the self-model dimension. The dimensions cannot be uniquely defined by any one of the direct measures of the underlying models: It is the (theoretically relevant) variables in combination that identify the construct. Similarly, it may be tempting to associate the two underlying attachment dimensions with the most popular organizing structure in personality psychology, the five-factor model of personality, commonly referred to as the *Big Five* (e.g., Digman, 1990; McCrae & Costa, 1987). The *Big Five* personality traits are five dimensions that commonly appear in factor analyses of both natural language trait terms and personality scale items. Might the attachment dimensions correspond to the "Big Two" traits: Neuroticism and Extraversion? Again, theoretical and empirical analysis reveals that this temptation should be avoided. Although Neuroticism is highly negatively related to self-esteem and therefore could serve as a marker for the self-model dimension, Extraversion is focused primarily on activation and surgency and fails to adequately capture the warm sociability and comfort with intimacy characteristic of a positive other model. Griffin and Bartholomew (1994) found that 48% of the

variance in the latent self-model dimension was explained by using all five factors, and 27% of the variance in the latent other-model dimension was explained by the *Big Five*. Furthermore, they found that the attachment dimensions uniquely predicted self-reported interpersonal dependency even after the five factors had been taken into account. Thus, the fundamental attachment dimensions do not seem to be reducible to the fundamental personality dimensions. (See Shaver & Brennan, 1992, for a similar analysis in terms of attachment patterns.)

A pressing question in the field of adult attachment is the degree of continuity between childhood and adult attachment patterns. Our analysis does not assume continuity, but focuses directly on how to conceptualize individual differences in adult attachment patterns. Nor does our analysis make any assumptions about the etiology of the attachment dimensions identified. However, an important direction for future work should be to examine the stability over time of the self- and other-model dimensions (Scharfe & Bartholomew, 1994) and to explore the degree to which various factors (e.g., temperament, early experiences, and other socialization experiences) are predictive of these dimensions underlying adult attachment.

Using Gifford and O'Connor's (1987) cartographic metaphor, we suggest that the self- and other-model dimensions may represent the basic compass points orienting research in adult attachment. At the very least, we suggest that researchers in this area should consider the implications of whether their measures line up north-south, east-west along these dimensions or on the northwest-southeast, northeast-southwest diagonals. Such rotational distinctions define, for example, the difference between dimensions of personality defined by the interpersonal circle versus those defined by measures of the *Big Five* traits (McCrae & Costa, 1989; Trapnell & Wiggins, 1990). Although our findings do not address all the measures of adult attachment currently in use, they do suggest that the self and other dimensions may serve as a unifying theoretical framework to help organize research in the area of adult attachment.

References

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the Strange Situation*. Hillsdale, NJ: Erlbaum.
- Alden, L. E., Wiggins, J. S., & Pincus, A. L. (1990). Construction of circumplex scales for the Inventory of Interpersonal Problems. *Journal of Personality Assessment*, 55, 521-536.
- Bank, L., Dishion, T., Skinner, M., & Patterson, G. R. (1990). Method variance in structural equation modeling: Living with "glop." In G. R. Patterson (Ed.), *Depression and aggression in family interaction* (pp. 247-279). Hillsdale, NJ: Erlbaum.
- Bartholomew, K. (1990). Avoidance of intimacy: An attachment perspective. *Journal of Social and Personal Relationships*, 7, 147-178.
- Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology*, 61, 226-244.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation: Anxiety and anger*. New York: Basic Books.
- Bowlby, J. (1980). *Attachment and loss: Vol. 3. Loss: Sadness and depression*. New York: Basic Books.
- Bowlby, J. (1982). *Attachment and loss: Vol. 1. Attachment* (2nd ed.). New York: Basic Books. (Original work published 1969)
- Brennan, K. A., Shaver, P. R., & Tobey, A. E. (1991). Attachment styles,

- gender, and parental problem drinking. *Journal of Social and Personal Relationships*, 8, 451-466.
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56, 81-105.
- Cheek, J. M., & Buss, A. H. (1981). Shyness and sociability. *Journal of Personality and Social Psychology*, 41, 330-339.
- Cliff, N. (1983). Some cautions concerning the application of causal modeling methods. *Multivariate Behavioral Research*, 18, 115-126.
- Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology*, 58, 644-663.
- Connell, J. P. (1987). Structural equation modeling and the study of child development: A question of goodness of fit. *Child Development*, 58, 167-175.
- Connell, J. P., & Tanaka, J. S. (1987). Introduction to the special section on structural equation modeling. *Child Development*, 58, 2-3.
- Cronbach, L. J. (1949). Statistical methods applied to Rorschach scores: A review. *Psychological Bulletin*, 46, 393-429.
- Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, 41, 417-440.
- Feeney, J. A., Noller, P., & Callan, V. J. (1994). Attachment style, communication and satisfaction in the early years of marriage. In K. Bartholomew & D. Perlman (Eds.), *Advances in personal relationships: Vol. 5. Attachment processes in adulthood* (pp. 269-308). London: Jessica Kingsley.
- Fey, W. F. (1955). Acceptance by others and its relation to acceptance of self and others: A revaluation. *Journal of Abnormal and Social Psychology*, 50, 274-276.
- Freedman, D. A. (1987). As others see us: A case study in path analysis. *Journal of Educational Statistics*, 12, 101-128.
- Gifford, R., & O'Connor, B. (1987). The interpersonal circumplex as a behavior map. *Journal of Personality and Social Psychology*, 52, 1019-1026.
- Green, D. P., Goldman, S. L., & Salovey, P. (1993). Measurement error masks bipolarity in affect ratings. *Journal of Personality and Social Psychology*, 64, 1029-1041.
- Griffin, D., & Bartholomew, K. (1991, August). *A structural equation analysis of adult attachment styles*. Paper presented at the 99th Convention of the American Psychological Association, San Francisco.
- Griffin, D. W., & Bartholomew, K. (1994). The metaphysics of measurement: The case of adult attachment. In K. Bartholomew & D. Perlman (Eds.), *Advances in personal relationships: Vol. 5. Attachment processes in adulthood* (pp. 17-52). London: Jessica Kingsley.
- Hazan, C., & Hutt, M. J. (1991). *From parents to peers: Transitions in attachment*. Unpublished manuscript, Department of Human Development, Cornell University.
- Hazan, C., & Shaver, P. (1987). Conceptualizing romantic love as an attachment process. *Journal of Personality and Social Psychology*, 52, 511-524.
- Hazan, C., & Shaver, P. R. (1994). Attachment as an organizational framework for research on close relationships. *Psychological Inquiry*, 5, 1-22.
- Horowitz, L. M., Rosenberg, S. E., Baer, B. A., Ureno, G., & Villasenor, V. S. (1988). Inventory of Interpersonal Problems: Psychometric properties and clinical applications. *Journal of Consulting and Clinical Psychology*, 56, 885-892.
- Jöreskog, K. G., & Sörbom, D. (1986). *LISREL VI: Analysis of linear structural relationships by maximum likelihood, instrumental variables, and least squares methods* (4th ed.). Mooresville, IN: Scientific Software.
- Kenrick, D. T., & Funder, D. C. (1988). Lessons from the person-situation debate. *American Psychologist*, 43, 23-34.
- Kobak, R. R., Cole, H. E., Ferenz-Gillies, R., Fleming, W., & Gamble, W. (1991). *A dimensional analysis of adolescent attachment strategies*. Unpublished manuscript, Department of Psychology, University of Delaware, Newark.
- Kobak, R. R., & Hazan, C. (1991). Attachment in marriage: The effects of security and accuracy of working models. *Journal of Personality and Social Psychology*, 60, 861-869.
- MacCallum, R. C., Wegener, D. T., Uchino, B. N., & Fabrigar, L. R. (1993). The problem of equivalent models in applications of covariance structural analysis. *Psychological Bulletin*, 114, 185-199.
- McCrae, R. R., & Costa, P. T., Jr. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, 52, 81-90.
- McCrae, R. R., & Costa, P. T. (1989). The structure of interpersonal traits: Wiggins's circumplex and the five-factor model. *Journal of Personality and Social Psychology*, 56, 586-595.
- Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. In I. Bretherton & E. Waters (Eds.), *Growing points in attachment theory and research [Monograph]*. *Monographs of the Society for Research in Child Development*, 50, 66-106.
- Mikulincer, M., Florian, V., & Tolmacz, R. (1990). Attachment styles and fear of personal death: A case study of affect regulation. *Journal of Personality and Social Psychology*, 58, 273-280.
- Mikulincer, M., & Nachshon, O. (1991). Attachment styles and patterns of self-disclosure. *Journal of Personality and Social Psychology*, 61, 321-331.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Scharfe, E., & Bartholomew, K. (1994). Reliability and stability of adult attachment patterns. *Personal Relationships*, 1, 23-43.
- Shaver, P. R., & Brennan, K. A. (1992). Attachment styles and the "Big Five" personality traits: Their connections with each other and with romantic relationship outcomes. *Personality and Social Psychology Bulletin*, 18, 536-545.
- Shaver, P. R., & Hazan, C. (1993). Adult romantic attachment: Theory and evidence. In D. Perlman & W. Jones (Eds.), *Advances in personal relationships* (Vol. 4, pp. 29-70). London: Jessica Kingsley.
- Simpson, J. A. (1990). The influence of attachment styles on romantic relationships. *Journal of Personality and Social Psychology*, 59, 971-980.
- Simpson, J. A., Rholes, W. S., & Nelligan, J. S. (1992). Support seeking and support giving within couples in an anxiety-provoking situation. *Journal of Personality and Social Psychology*, 62, 434-446.
- Steiger, J. H. (1989). *EzPath: A supplementary module for SYSTAT and SYGRAPH*. Evanston, IL: SYSTAT.
- Trapnell, P. D., & Wiggins, J. S. (1990). Extension of the Interpersonal Adjective Scales to include the Big Five dimensions of personality. *Journal of Personality and Social Psychology*, 59, 781-790.
- Wiggins, J. S., Phillips, N., & Trapnell, P. (1989). Circular reasoning about interpersonal behavior: Evidence concerning some untested assumptions underlying diagnostic classifications. *Journal of Personality and Social Psychology*, 56, 296-305.

Appendix A

Multitrait-Multimethod Matrix for Outcome Variables: Study 2

Variable	1	2	3	4	5	6	7
Positive self-concept							
1 Distress	—						
2 Self-esteem	-.63	—					
3 Self-acceptance	.66	-.72	—				
Positive interpersonal orientation							
4 Sociability self-report	-.16	.34	-.13	—			
5 Sociability friend report	-.05	-.02	.10	.37	—		
6 Warmth self-report	.15	-.02	.10	.38	.20	—	
7 Warmth friend report	-.10	-.00	.05	.39	.49	.34	—

Note. Correlations in triangles are within-dimension correlations (convergent validity).

Received November 13, 1992

Revision received September 14, 1993

Accepted November 18, 1993 ■

New *Publication Manual* for Preparation of Manuscripts

APA has just published the fourth edition of the *Publication Manual of the American Psychological Association*. The new manual updates APA policies and procedures and incorporates changes in editorial style and practice since 1983. Main changes cover biased language, presentation of statistics, ethics of scientific publishing, and typing instructions. Sections on references, table preparation, and figure preparation have been refined. (See the June 1994 issue of the *APA Monitor* for more on the fourth edition.)

All manuscripts to be published in the 1995 volumes of APA's journals will be copyedited according to the fourth edition of the *Publication Manual*. This means that manuscripts now in preparation should follow the guidelines in the fourth edition.

The fourth edition of the *Publication Manual* is available in softcover for \$19.95 or in hardcover for \$23.95 (members) or \$29.95 (nonmembers). Orders must be prepaid, and a charge of \$3.50 (U.S.) or \$5 (non-U.S.) is required for shipping and handling. To order the fourth edition, write to the APA Book Order Department, P.O. Box 2710, Hyattsville, MD 20784-0710, or call 1-800-374-2721.