

Within-Person Variation in Security of Attachment: A Self-Determination Theory Perspective on Attachment, Need Fulfillment, and Well-Being

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Attachment research has traditionally focused on individual differences in global patterns of attachment to important others. The current research instead focuses primarily on within-person variability in attachments across relational partners. It was predicted that within-person variability would be substantial, even among primary attachment figures of mother, father, romantic partner, and best friend. The prediction was supported in three studies. Furthermore, in line with self-determination theory, multilevel modeling and regression analyses showed that, at the relationship level, individuals' experience of fulfillment of the basic needs for autonomy, competence, and relatedness positively predicted overall attachment security, model of self, and model of other. Relations of both attachment and need satisfaction to well-being were also explored.

From the time of Bowlby's earliest observations of children, researchers have attempted to characterize human attachments and the processes through which they are formed. The resulting literature is vast, with much of the research focused on attachment styles as individual differences theorized to develop initially through interactions with primary caregivers (Ainsworth, Blehar, Waters, & Wall, 1978).

The focus on global attachment styles as a between-person construct is derived in part from Bowlby's (1973, 1980) emphasis on the continuity of early attachment patterns into adult life, suggesting that the functions and dynamic processes of attachment that develop with primary caretakers have a significant degree of stability over time and across relationships. Thus, early attachment relationships are expected to influence the way people regulate their subsequent interpersonal behaviors and emotions. Research has provided support for this view, demonstrating stability in classifications over time (Crittenden, 1990; Elicker, Englund, & Sroufe, 1992) and even across multiple generations within families (Benoit & Parker, 1994; Fonagy, Steele, & Steele, 1991; Main, Kaplan, & Cassidy, 1985). Additionally, in school-age children, attachments to parents have been found to generalize to other figures, such as teachers and peers (Ryan, Stiller, & Lynch, 1994).

In adults, researchers have assessed individuals' predominant working models of relationships using questionnaires (see Simpson & Rholes, 1998) and interview methods (e.g., Bartholomew & Horowitz, 1991; Main, 1991). Currently, most of the research in

social and personality psychology uses questionnaire measures, such as those developed by Hazan and Shaver (1987), Bartholomew and Horowitz (1991), and Collins and Read (1990). The resulting literature on adult attachment styles strongly attests to the importance of secure attachments for well-being and interpersonal functioning. Studies have shown that individuals classified as securely attached displayed less emotional distress and negative affect (Simpson, 1990), fewer physical symptoms (Hazan & Shaver, 1990), and lower fear of death (Mikulincer, Florian, & Tolmacz, 1990). With respect to interpersonal functioning, people who report more secure attachments have been found to be more willing to seek support when needed (Butzel & Ryan, 1997; Florian, Mikulincer, & Bucholtz, 1995; Shaver & Hazan, 1993) and to have relationships characterized by more positive affect (Simpson, 1990), greater longevity (Feeney & Noller, 1990; Hazan & Shaver, 1987), and more stability (Collins & Read, 1990; Kirkpatrick & Hazan, 1994) as well as by greater trust, commitment, satisfaction, and interdependence (Collins & Read, 1990; Feeney & Noller, 1990; Mikulincer, 1998; Shaver & Hazan, 1993; Simpson, 1990). Indeed, the benefits of attachment security among adults are so widespread that Mikulincer and Florian (1998) consider it a general resilience factor across the life span.

The majority of studies of adult attachment have classified individuals according to their predominant style. Thus, for example, an individual would be categorized as secure, avoidant, or anxious-ambivalent on the basis of Hazan and Shaver's (1987) approach or as secure, dismissive, preoccupied, or fearful on the basis of Bartholomew and Horowitz's (1991) approach. However, because individuals can have some degree of each style in their global attachment, researchers have recently argued that it is preferable to use continuous-variable ratings of the different attachment styles (e.g., Scharfe & Bartholomew, 1994) or different attachment dimensions such as model of *self* and model of *other* (Bartholomew, 1990), or what is often referred to as the *anxiety dimension* and the *avoidance dimension* (Brennan, Clark, & Shaver, 1998). Using the continuous-variable approach, participants have a score on each style or dimension. Regardless of the

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method used, the results have indicated that greater security in people's general attachment has been associated with greater well-being and more satisfying relationships.

Despite the high yield of studies of between-person differences in attachment styles, there is a growing interest in within-person variations in attachment (Lewis, 1994; Shaver, Collins, & Clark, 1996). From this perspective, attachment may be a transactional process (Cummings & Cicchetti, 1990), such that a person's attachment to a particular other could be a function not only of his or her general working model but also of his or her experience of that individual at that particular time (e.g., Kobak, 1994). Such a view would allow for the possibility that not only could people's attachments with a particular other vary over time but also that people could have different attachment styles with different relationship partners.

Within-Person Variability in Attachments

Evidence for significant within-person variability in attachment came initially from work on infant attachments which showed that many children demonstrated different attachment styles with their mothers versus their fathers (Bretherton, 1985; Bridges, Connell, & Belsky, 1988; Fox, Kimmerly, & Schafer, 1991; Lamb, 1977; Main & Weston, 1981). In adults, Baldwin, Keelan, Fehr, Enns, and Koh-Rangarajoo (1996) found that when participants described their 10 most significant relationships, 88% of them endorsed at least two of Hazan and Shaver's adult attachment styles (i.e., secure, avoidant, anxious-ambivalent), and 47% of participants reported all three. These studies indicate that people do not always enact the same relational style and do not experience the same sense of security with each partner.

An important question arises, however, concerning whether targeted relationships represent "true" attachments. For example, because Baldwin et al. (1996) used 10 attachment figures, the variability in attachment styles reported for those figures could have come largely from the more distant or less important relationships. Therefore, one of the primary aims of the present research was to examine whether there is systematic within-person variability in attachment security when considering fewer, more central relationships.

Cook (2000) recently examined attachment security within four-person families and concluded that the security of people's attachment with members of their family does vary across those specific relationships. In the present study we extended Cook's findings by examining relationships not only with family members but also with significant others, such as best friends and romantic partners. Even more importantly, we explored whether the variability that exists across relationships can be systematically explained by differences in specific nutrients or supports experienced in those different relationships (Ryan, 1993, 1995).

Predicting Within-Person Variability in Attachment

Classically, attachment theorists have proposed that security of attachment is a function of primary caregivers' *sensitivity* and *responsiveness* (e.g., Bowlby, 1969/1982; Bretherton, 1985; Sroufe, 1990). One might extend this classic formulation to suggest that the quality or responsiveness of particular relationship

partners, even those initially encountered much later in life, could actually affect the degree to which people are securely attached within those particular relationships, thus allowing for within-person variation.

The Nutrients of Secure Attachments

Sensitive caregivers or relational partners display timely and appropriate responsiveness to the initiations, signals, and needs of the target individual. Within self-determination theory (e.g., Deci & Ryan, 1991; Grolnick, Deci, & Ryan, 1997; Ryan & Deci, 2000) the general concept of sensitivity or responsiveness has been differentiated with respect to the three psychological needs for autonomy, competence, and relatedness, which are theorized to be innate. From this perspective, sensitive relational partners are ones who respond in ways that promote a person's experienced satisfaction of these basic psychological needs. This implies that the person will gravitate toward relationships and will experience well-being within them to the extent that the relationships provide opportunities for basic need fulfillment.

Autonomy concerns people's feelings of volition, agency, and initiative (e.g., deCharms, 1968; Deci & Ryan, 1985). The descriptions of sensitivity by Bretherton (1987) and Sroufe and Waters (1977), for example, are wholly consistent with the idea of supporting children's sense of self-initiation and agentic action. *Competence* concerns people's feelings of curiosity, challenge, and efficacy (Deci, 1975; White, 1959). Sroufe and Waters (1977) argued that appropriate responsiveness to infants' activity supports their effectance and self-confidence, which are encompassed by the concept of competence as first presented by White (1959). Finally, *relatedness* concerns feeling connected with and cared for by another (Baumeister & Leary, 1995; Connell & Thompson, 1986; Ryan, 1993). Sensitive parenting is often characterized as warm, loving, and nurturant, which implies supports for relatedness. Thus, sensitive parents who respond to initiatives, encourage exploration, and provide noncontingent positive regard for their developing children are supporting their children's basic psychological needs.

In adult relationships, we suggest that sensitive responding can also be understood as supports for others' needs for relatedness, autonomy, and competence. The idea that sensitivity and responsiveness represent supports for one's relatedness need is quite straightforward. Furthermore, the idea that support for autonomy is also important for secure attachments can be derived from object relations psychology (see J. R. Greenberg & Mitchell, 1983), which considers healthy adult relationships to be characterized by mutuality of autonomy; that is, maturation into adulthood and ego synthesis requires the renunciation of merger components of attachments in favor of relationships based on differentiation and exchange. Thus, for healthy adult functioning, each partner must support the autonomy of the other. Support for efficacy as an important aspect of sensitive responding may, however, be a bit less straightforward. People are unlikely to develop close relationships with others who continually criticize their performance or interfere with their competent engagement, so naturally we would not expect a person to develop secure attachments with others who thwart their need for competence. On the other hand, people often find routes to efficacy satisfaction that are not within their primary

relationships—routes such as work, school, or leisure pursuit. As such, they may not need a great deal of support for competence from a relational partner in order to feel secure in that relationship. Thus, satisfaction of the competence need within relationships is likely to be less important for predicting attachment security than satisfaction of the relatedness and autonomy needs. As such, we predicted that the degree to which a person experiences need fulfillment (especially relatedness and autonomy fulfillment) within particular relationships will predict security of attachment with those specific relational partners.

Research on Nutriments of Secure Attachments

We know of no previous research that has tested this specific hypothesis. However, there are two small bodies of research on general attachment security, which, when taken together, provide indirect evidence. First, research with infants, children, and adolescents supports the view that satisfaction of the three basic needs does affect global attachment security. Second, research examining global attachment security has found not only that it changes over time but also that factors in particular relationships can explain a significant amount of the change. We consider these two bodies of research in turn.

In infants, Frodi, Bridges, and Grolnick (1985) found that when mothers were supportive of their infants' autonomy, the infants' attachment either remained secure or became secure over a 1-year period. In a study of elementary-age children, Avery and Ryan (1988) found that when children experienced their parents as supporting their autonomy and relatedness needs, the children developed working models of attachment figures that were secure. Ryan and Lynch (1989) found that adolescents who experienced their parents as high in autonomy support, acceptance, and warmth were more willing to be close to and rely on their parents. Although all of these results were found at the between-person level, they are consistent with the current hypothesis of a positive relation between perceived satisfaction of basic psychological needs and attachment security.

A few recent studies have examined variability in global attachment security over time. Davila, Burge, and Hammen (1997), for example, used Hazan and Shaver's (1987) measure to study longitudinally the attachment styles of late-adolescent women. The researchers found that over a 6-month period 28% of the women had changed attachment categories, and over a 2-year period 34% of the women had changed categories. Comparable results have been found by other researchers (e.g., Kirkpatrick & Hazan, 1994).

Subsequent research found that variability in attachment style over time can, to some extent, be explained by social-contextual (i.e., relationship) factors. For example, in a study of newlywed husbands and wives, using Collins and Read's (1990) measure, Davila, Karney, and Bradbury (1999) found that spouses showed significant increases in their general attachment security during the first 2 years of marriage and that a significant amount of this variance was accounted for by social-contextual factors (viz., factors in the relationship, such as security of the partners' attachment).

Aron, Melinat, Aron, Vallone, and Bator (1997) examined this issue in the laboratory. They experimentally manipulated "sustained, escalating, reciprocal, personalistic self-disclosure . . . between

strangers" (p. 364) and found, using the self and other dimensions from Bartholomew and Horowitz's (1991) measure, that interacting with a relative stranger in a specified way for a period of less than 1 hr had a significant positive effect on people's global scores on the other dimension, although not on the self dimension of attachment. They suggested that relational experiences can yield at least a temporary modification of people's global attachment styles.

These studies concern within-person variability in global attachment over time as influenced by variables in a particular relationship, rather than within-person variability in attachment to various others. Nonetheless, the results suggest that there is meaningful within-person variability in global attachment over time and that this can be explained by relational factors. One possible interpretation of this is that factors in a particular relationship affect people's attachment to that relational partner and that global attachment represents a kind of implicit averaging across important attachments. In this way, factors in one relationship could affect a person's global attachment.

In sum, research has indicated that satisfaction of the basic psychological needs for competence, autonomy, and relatedness does represent a reasonable interpretation of what is meant by *responsivity* of relational partners and that experiences with a relational partner with respect to these needs can affect people's overall attachment security at the between-person level of analysis. In the current studies we were concerned primarily with variability in people's attachments across relationships (i.e., the within-person level of analysis) and secondarily with their global attachment (i.e., the between-person level of analysis). Thus, our primary analyses examined the degree to which variability in the security of attachment to different relational partners can be explained by differences in satisfaction of the basic psychological needs with those specific relational partners. We then focus on the impact of need satisfaction and attachment on well-being at the between-person level.

Relation of Attachment to Well-Being at the Between-Person Level

As noted earlier, there is considerable support in the attachment literature for the hypothesis that overall security of attachment relates positively to well-being at the between-person level, and we expected to replicate that result in the current research. As also noted, research in the self-determination tradition suggests strongly that satisfaction of the innate psychological needs for autonomy, competence, and relatedness predicts well-being. The self-determination perspective further suggests that need satisfaction will predict not only well-being but also attachment security at the between-person level. So, in the current research, we expected to find that need satisfaction is related both to greater security of attachment and to enhanced well-being. Moreover, the theory suggests that the primary reason attachment security relates to well-being is that people are able to satisfy their basic psychological needs within secure relationships. As such, we predicted that need satisfaction will mediate the relation between attachment security and well-being. We compared the fit of this mediational model with the fit of an alternative model in which attachment security mediates the path between need satisfaction and well-being. Thus, although the current research is primarily about

within-person variability in attachments, we used the data to examine these between-person mediational processes in the prediction of well-being. In so doing, we examined the shared versus independent variance in attachment and need satisfaction as predictors of well-being.

Relation of Within-Person Variation in Attachment to Well-Being

Although numerous studies have examined the relation of mean level (i.e., global) attachment security to people's well-being, no study has examined the relation of within-person variability in attachment across relationships to people's well-being. Following the recent line of research that has examined whether variability in personality characteristics across roles, time, and relationships relates to well-being (e.g., Donahue, Robins, Roberts, & John, 1993; Gable & Nezlek, 1998; Kernis, Cornell, Sun, Berry, & Harlow, 1993; Linville, 1987; Sheldon, Ryan, Rawsthorne, & Ilardi, 1997), we examined in the current research whether within-person variability in attachment security across relationships relates to well-being. Some researchers have argued that variability reflects flexibility and that flexibility buffers the effects of stress and protects well-being (Linville, 1987), whereas others have claimed that variability reflects a fragmented self that conduces toward ill-being (Donahue et al., 1993). In general, although variability may serve some buffering effect, research has tended to show that within-person variability in traits is negatively related to well-being. For example, in a study investigating the Big Five personality traits across various life roles, Sheldon et al. (1997) found that greater within-person variability in personality characteristics across roles was associated with ill-being, even after removing variance attributed to inauthenticity within roles.

In the present studies we examined the relation of variation in attachment across relationships to well-being. One might extrapolate from Sheldon et al.'s (1997) study to predict that greater variation in attachment would relate to ill-being. However, from a within-person perspective the concept of attachment seems quite different from that of personality traits. Specifically, because we expect a person's degree of attachment security with a particular partner to be a function of experienced need fulfillment with that partner, having some variability in the degree of security among partners need not be maladaptive. Indeed, it may be an appropriate response to the differing degrees to which the person is able to experience need fulfillment with the different relational partners. Thus, within-person variability in attachments across relationships could reflect appropriate selectivity with respect to environmental affordances. As such, in the present research we expected that variability in attachment would not negatively predict well-being.

Multilevel Modeling

In all analyses we examined attachment in terms of continuous-variable scores rather than categorizing individuals or relationships into a single style. In our studies the data are hierarchically nested because participants rate multiple relationship partners on various measures. Thus, relationships are not independent, so there would undoubtedly be shared variance across relationships on the various measures. Indeed, with respect to attachment, the extent to which

early attachments to primary caregivers affect adult attachments to other figures would appear as shared variance across attachment figures. Therefore, it is important and necessary to account for this nonindependence in conceptualization and analysis by considering and simultaneously controlling for both the between- and within-person variance.

Techniques of multilevel modeling, such as hierarchical linear modeling (HLM), account for this nonindependence and allow researchers to link within-person variability across relationships, contexts, and time to contextual, dispositional, and well-being variables (e.g., Gable & Reis, 1999). In the current research we used HLM (Bryk & Raudenbush, 1992) to estimate the degree of within-person variability relative to the between-person variability in attachment, and we predicted attachment from basic need fulfillment.

First, we conducted a preliminary study simply to examine the major issues herein raised, namely, whether there would be substantial within-person variance in attachments, whether that variance could be accounted for by need satisfaction within relationships, and whether mean level of attachment security across relationships and variability across relationships would relate to well-being. We assessed attachments to mother, father, romantic partner, and friends, using M. T. Greenberg's (1982) measure of felt security. We subsequently conducted two primary studies in which we employed one of the more widely used measures of attachment (viz., Bartholomew & Horowitz, 1991), repeating the analyses of Study 1 but also elaborating them to examine additional issues. In Study 2 we considered attachments to mother, father, romantic partner, best friend, roommate, and another significant adult (e.g., a teacher or employer), and in Study 3 we considered attachments only to mother, father, romantic partner, and best friend. In all studies, we examined the hypothesis that satisfaction of the needs for autonomy, competence, and relatedness with respect to particular relationships would predict attachment within those relationships. Because satisfaction of the relatedness need is conceptually similar to attachment security, we repeated all analyses in all studies with only satisfaction of the autonomy and competence needs, thus removing the potential confound of relatedness and attachment.

Study 1

Method

Participants and Procedure

Participants were 136 University of Rochester undergraduates (89 women and 47 men) who received extra course credit for participating. Measures were administered by paper and pencil in group sessions. Participants were told that if they did not currently have a particular relationship (e.g., they did not have a romantic partner or a parent was deceased) they should not respond to the questions regarding that relationship. The exception was if they had a nontraditional or substitute mother or father figure (e.g., a stepfather), in which case they should respond in terms of that figure.

Measures

Inventory of Adolescent Attachments (adapted). The Inventory of Adolescent Attachments (M. T. Greenberg, 1982; M. T. Greenberg, Siegel, & Leitch, 1983), an early self-report measure of attachment, consists of two

dimensions—felt security and emotional utilization—only the first of which was used in this study because it best represents attachment security. The measure, which asks questions specific to relationships with parents and peers, has been shown to have adequate reliability and has been used successfully in various studies of attachment (e.g., Ryan et al., 1994). We adapted it to include ratings specific to each of four relationships: mother, father, romantic partner, and friends.¹ We created the felt-security score for each relational partner by taking the mean of the five items for that figure; ratings were made on a 9-point Likert-type scale. Items include “Although I trust my mother, sometimes I have my doubts” and “I wish I had a different mother” (both reverse scored). Cronbach’s alphas for the items within target are: mother, .77; father, .79; romantic partner, .72; and friends, .69.

Need satisfaction. The need-satisfaction measure, developed specifically for this study, consists of 15 items, rated on a 9-point Likert-type scale, and concerns the degree to which participants feel support for their autonomy, competence, and relatedness needs from each target figure. Total scale scores are derived for each relationship by calculating the mean of the 15 items pertaining to each individual relationship. Reliabilities for mother, father, romantic partner, and friends were .92, .92, .92, and .90, respectively. Sample items include “My mother allows me to decide things for myself” (autonomy), “My mother puts time and energy into helping me” (competence), and “My mother accepts me and likes me as I am” (relatedness).

Well-being. Psychological well-being scores were derived from five well-validated instruments. Risk for depression was assessed with the 20-item Center for Epidemiological Studies—Depression Scale (CES-D; Radloff, 1977). Items concerned how participants had felt during the previous month, including “I felt everything I did was an effort” and “I enjoyed life” (reverse scored) and were rated on a 9-point Likert-type scale ranging from *rarely* to *almost all the time*. The mean of the 20 items constituted the risk-for-depression scale score. The Anxiety and Physical Symptoms subscales from the Hopkins Symptom Checklist also were used (Derogatis & Cleary, 1977). The Anxiety subscale included 7 items, such as “worrying or stewing about things” and “heart pounding or racing,” whereas the Physical Symptoms subscale included 12 items, such as “hot or cold spells” and “headaches.” Ratings were made on a 9-point Likert-type scale that ranged from *not at all* to *extremely*, to indicate participants’ experience of these conditions during the past month. Means of the items on each scale served as the scale scores. We measured participants’ level of self-actualization with the Self-Actualization Scale (Jones & Crandall, 1986), which includes 15 items, rated on a 9-point Likert-type scale. Sample items include “I do not feel ashamed of any of my emotions” and “It is better to be yourself than to be popular.” The mean of the 15 items was the scale score. Vitality (Ryan & Frederick, 1997) was assessed with a 7-item scale focused on feelings of physical and mental aliveness and vigor. The scale, which included items such as “I nearly always feel alert and awake” and “In general, I do not feel very energetic” (reversed) was calculated by taking the mean of the 7 items. Finally, we measured life satisfaction with the 5-item questionnaire developed by Diener, Emmons, Larson, and Griffin (1985), which includes items such as “In most ways, my life is close to my ideal” and “If I could live my life over, I would change almost nothing.” This scale score was the mean of the five items.

A principal-components factor analysis of the well-being constructs yielded a single factor accounting for 54% of the variance, with each factor loading attaining an absolute value greater than .65. Thus, we created a unit-weighted well-being composite from standardized scores for each scale and used it to index well-being. We were interested in well-being as a general concept, and our intent in assessing the five constructs was to show that the attachment and need-satisfaction variables related similarly to all the well-being indicators. However, given the results of the factor analysis it was more parsimonious to create a composite and treat it as the general indicator of psychological well-being.

Results and Discussion

The multilevel modeling approach simultaneously addresses between- and within-person analyses (Kenny, Kashy, & Bolger, 1998). Person-level analyses concern between-person variance controlling for within-person effects, whereas relationship-level analyses examine within-person variance across relationships controlling for the between-person effects. HLM treats person as a random effect rather than a fixed effect, thus allowing for the possibility that within-person slopes for the relations between need satisfaction and attachment may differ from person to person. Also, HLM analyses include individuals who provide data on all target relationships as well as those who provide data on fewer by weighting the slope estimations both by the number of relationships each person has and by the reliability of the estimates between need satisfaction and attachment across each person’s relationships.

First we estimated, using HLM, the degree of within-person variance in felt security relative to the between-person variance. The results indicated that 44% of the variance in felt security was at the between-person level, whereas 56% of the variance was at the within-person level. Although some of the within-person variance represents error, these data indicate that a substantial amount of the variance was embedded within persons (across relationships), beyond that represented by between-person differences. The important question for us is whether this within-person variance is systematic and can be explained by need fulfillment within relationships.

To examine this question, we constructed a relationship-level HLM equation. The equation, shown below, predicts felt security within each relationship from need satisfaction within the corresponding relationship, controlling for the effects of relationship type with dummy codes:

$$\text{felt security} = \beta_{0j} + \beta_{1j}(\text{need satisfaction}_{ij}) + \beta_{2j}(D1) \\ + \beta_{3j}(D2) + \beta_{4j}(D3) + r_{ij}$$

where β_{0j} refers to the intercept, β_{1j} represents the maximum likelihood estimate of the population slopes for the relation between need satisfaction and felt security, need satisfaction_{ij} represents the mean importance of need satisfaction in each target relationship (*i*) for each participant (*j*), β_{2j} to β_{4j} represent the dummy codes for relationship type, and r_{ij} represents error. Need satisfaction was centered around the person’s own mean need satisfaction across relationships. Each person had a maximum of 4 relationships, although some had fewer, yielding a total of 531 relationships nested within 136 people.

Person-level equations were created where γ_{00} represents the average intercept across persons. For each β_{0j} in the relationship-level equation, a corresponding component in the person-level model was created where γ_{nj} represents the average slope across persons and u_{nj} represents random error. Five equations were generated in the person-level model because one intercept and four

¹ The ratings in each study were done for mother, father, romantic partner, and friend, in that order. In Study 2, roommate and other adult figure were added, in that order.

slopes were being predicted in the relationship-level model. The person-level equations are as follows:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

$$\beta_{2j} = \gamma_{20}$$

$$\beta_{3j} = \gamma_{30}$$

$$\beta_{4j} = \gamma_{40}$$

The intercept and need-satisfaction effects in the person-level equations were treated as random (u_{nj}), and dummy coded effects were fixed. Thus, the random difference between persons (u_{nj}) was included for the estimates of both the intercept and the need-satisfaction slope.

Results of the within-person HLM analyses are in the top section of Table 1. The relationship-level model indicated a significant effect of need satisfaction such that greater need satisfaction predicted greater felt security. Specifically, with satisfaction of all three needs taken into account, the slope predicting felt security from need satisfaction shows that rating a particular relationship's need satisfaction one unit higher than the person's average need-satisfaction rating is associated with an average gain of .81 in felt security. When relatedness was removed from the calculation of need satisfaction, the slope became .79, indicating that satisfaction of the autonomy and competence needs still strongly predicted felt security.²

Next we examined both the relation of overall felt security to well-being and the relation of within-person variability in felt security to well-being. To do this, we adapted the procedure used by Kernis et al. (1993). First, we calculated the mean and the standard deviation of people's overall felt security across attachment figures and then centered the two distributions. The mean represents people's overall level of felt security with attachment

figures, and the standard deviation represents their within-person variability in felt security across relationships. We simultaneously regressed the well-being composite onto the centered felt security and the centered standard deviation for felt security in Step 1 and then onto the interaction in Step 2. The results indicated that the level of felt security across relationships was positively related to well-being, $\beta = .60$, $F(1, 131) = 54.8$, $p < .001$. Furthermore, neither the standard deviation nor the interaction of the mean and standard deviation was significant ($\beta = .09$ and $\beta = .06$, respectively). Thus, as expected, the results suggest that people's overall level of felt security with attachment figures does relate positively to well-being but that variability in felt security across figures does not detract from their well-being.

To summarize, Study 1 provided preliminary evidence that there is both generality and variability in felt security among individuals' attachment relationships and that variability in felt security among relationships can be significantly accounted for by the degree to which the participants experience satisfaction of the basic needs for autonomy, competence, and relatedness within relationships. Furthermore, at the between-person level, the extent to which individuals felt securely attached to their partners predicted their general well-being, and within-person variability in attachment across relationships did not negatively affect their well-being. As such, it appears that feeling more securely attached to some figures than others may be an adaptive response to feeling differentially able to get one's needs satisfied within those relationships.

Study 2

In light of the very promising results of Study 1, Study 2 was designed to replicate the results using more refined measures, to do more elaborate analyses, and to examine additional important issues. First, we employed a newer, more widely used measure of attachment, developed by Bartholomew and Horowitz (1991), as well as an improved measure of need satisfaction that we developed in other studies. This attachment measure was an important improvement in that we could further differentiate that concept of attachment into self and other dimensions (also referred to as anxiety and avoidance dimensions), which is one of the ways the current literature defines attachment. This differentiation was not possible with the Greenberg measure, so this change in measure allowed more detailed analyses in this study than in Study 1. Second, we changed the attachment category of friends to best friend in order to focus on particular individuals, and we added two more distal relationships, namely, roommate and an additional adult figure (e.g., an important teacher or employer). This allowed us to examine whether the results of our analyses would be similar when done with the four "true" attachments and with an expanded list of six figures. Concerning the issue of the number of true attachment relations people may have, some investigators have argued that people tend to have true attachment relationships with only their parents and romantic partners (Hazan & Zeifman, 1994),

Table 1

Hierarchical Linear Modeling Analyses at the Within-Person Level Predicting Overall Attachment Security, and the Self and Other Dimensions, From Need Satisfaction in All Three Studies

Attachment effects	Need satisfaction	
	All needs	Autonomy and competence
Study 1: Overall	0.81***	0.79***
Study 2		
Overall	4.54***	4.11***
Self	1.27***	1.24***
Other	1.90***	1.67***
Study 3		
Overall	5.23***	4.31***
Self	1.59***	1.53***
Other	2.03***	1.73***

Note. All numbers are coefficients that are slope estimations weighted by both the number of relationships each person has and by the reliability of the estimates between the specific need satisfaction and attachment variables across relationships.

*** $p < .001$.

² All analyses were first performed with gender in the person-level model moderating the intercept and need-satisfaction effects. These analyses indicated that neither the intercepts nor the need-satisfaction slopes were significantly different for men and women, regardless of whether the need for relatedness was not included.

whereas others, such as Trinke and Bartholomew (1997), have taken a more expansive position, presenting evidence that, on average, participants had 5.38 relationships that qualified as attachments. In the present study we treated four attachment figures as primary (mother, father, romantic partner, best friend) from the expanded group of six.

We hypothesized that differential need fulfillment experienced in different relationships would predict attachment in those relationships. We conducted all analyses first on all six figures and then on just the four primary attachments.

Method

Participants and Procedure

Participants were 152 University of Rochester students (119 women and 33 men) who received extra course credit for participating. The procedure was the same as in Study 1.

Measures

Attachment. Bartholomew and Horowitz's (1991) Relationship Questionnaire is a measure of adult attachment that asks participants to rate themselves on four mutually exclusive descriptions of how they feel in relationships. The descriptions reflect the secure, dismissive, preoccupied, and fearful styles of attachment. We asked participants to rate, on a 7-point Likert-type scale, how well each attachment style pertains to their relationships with each of six targets: mother, father, romantic partner, best friend, roommate, and another significant adult (e.g., teacher or employer). Thus, there were potentially 4 ratings per target, or 24 possible ratings total. From these ratings we created three variables: overall security, model of self, and model of other. Overall security involved subtracting the average of the three insecure scores from the secure score, the model-of-self dimension involved subtracting the sum of preoccupied and fearful scores from the sum of secure and dismissive scores, and the model-of-other dimension involved subtracting the sum of dismissive and fearful scores from the sum of secure and preoccupied scores. According to Brennan et al. (1998), model of self concerns a positive view of self versus feeling anxious about abandonment, and model of other concerns a positive view of other versus a tendency to avoid the other. In this sense these dimensions of self and other are complementary to the dimensions of anxiety and avoidance frequently used by researchers to characterize attachments (e.g., Ainsworth et al., 1978; Brennan et al., 1998). We conducted all analyses first for overall security, then for the self dimension, and then for the other dimension.

Need satisfaction. The need-satisfaction scale was a revision of the scale used in Study 1 based on additional research not reported in this article. It includes three items each for autonomy, competence, and relatedness, with total need satisfaction assessed as the average of the nine items (see Appendix). Participants rated on a 7-point Likert scale how well their basic needs are met when they are with specific target figures—namely, mother, father, romantic partner, best friend, roommate, and a significant adult. Reliabilities for ratings of the six attachment figures for overall need satisfaction were .91, .94, .88, .85, .90, and .90, respectively. We created an additional need-satisfaction score by removing all relatedness items to ensure that the relatedness items did not represent a confound due to conceptual overlap with attachment security. All analyses were run first with all items and then with only the autonomy and competence composite.

We performed a confirmatory factor analysis to ensure that the items loaded on the three factors as expected. A three-factor solution provided an adequate fit to the data, with a root mean square error of approximation of .10 and a comparative fit index of .96. Chi-square analyses showed that the

three-factor model was significantly better than a one-factor model or any of the three possible two-factor models.

Well-being. Risk for depression (Radloff, 1977) and vitality (Ryan & Frederick, 1997) were measured as in Study 1. As in Study 1, anxiety was also assessed, but this time with Spielberger, Gorsuch, and Lushene's (1970) 14-item State-Trait Anxiety Inventory, and physical symptoms were also assessed, this time with Emmons's (1991) 9-item checklist, which includes items such as headaches, shortness of breath, and stomach ache/pain. Finally, we assessed general self-esteem with the 10-item General Self-Esteem subscale of the Multidimensional Self-Esteem Inventory (O'Brien & Epstein, 1988). A principal-components factor analysis revealed a single well-being factor, accounting for 59% of the variance, with each factor loading having an absolute value greater than .47. A well-being composite was formed from the five standardized scores, and the alpha for the composite was .81.

Results and Discussion

Preliminary Analyses

First we considered the correlations between need satisfaction and overall attachment security and the two attachment dimensions (collapsed across relationships), as well as the correlations between each of these variables and well-being. As expected, overall need satisfaction was highly correlated with the three attachment variables ($r_s = .65, .46, \text{ and } .52$ for overall, self, and other, respectively; $n = 152, p_s < .001$). When relatedness was removed from the calculation of need satisfaction, all relations remained significant ($r_s = .53, .36, \text{ and } .40, p_s < .001$). The correlation between overall need satisfaction and the well-being composite was significant ($r = .48, n = 152, p < .001$) and remained significant after relatedness items were removed from the need-satisfaction scale ($r = .43, n = 150, p < .001$). Correlations between the three attachment variables and well-being were .50, .46, and .31, respectively, with $n = 152$ and $p < .001$ in each case.

To examine possible gender effects, we performed t tests to compare scores on all measures between men and women. The relatively few significant findings were that men had a more positive view of self with roommates and romantic partners, greater relatedness to roommates, and greater overall well-being than did women. In contrast, women felt greater overall security with their best friends than did men.

Next we examined whether participants demonstrated different degrees of attachment security to different figures, that is, whether variability existed across relationships. We performed a repeated-measures analysis of variance (ANOVA) with relationships serving as the repeated measure. The analysis revealed a significant effect when all six figures were used, $F(5, 555) = 21.59, p < .001$, as well as when considering only the four primary figures, $F(3, 390) = 24.22, p < .001$, indicating that individuals do experience significantly different degrees of attachment security in their relationships. For the self dimension, significant variability was found across the six relationships, $F(5, 555) = 9.33, p < .001$, as well as when only four were examined, $F(3, 390) = 14.17, p < .001$. This was also the case for the other dimension: For all relationships, $F(5, 555) = 22.70, p < .001$, and for four relationships, $F(3, 390) = 17.09, p < .001$. We then used the same method to examine whether need satisfaction differed across people's relationships. These analyses also revealed significant effects when all six figures were used, $F(5, 555) = 37.63, p < .001$, as well as when only four figures were used, $F(3, 384) = 35.83, p < .001$,

Table 2
Means for Overall Security of Attachment and for Need Satisfaction in Studies 2 and 3

Relationship type	Study 2				Study 3			
	Overall security		Need satisfaction		Overall security		Need satisfaction	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Mother	10.81 _a	7.80	5.94 _c	1.14	9.19 _{a,b}	8.17	5.90 _d	1.10
Father	5.32 _b	8.36	5.14 _d	1.56	5.85 _c	8.32	5.56	1.11
Romantic partner	7.84	7.71	6.05 _c	.94	7.52 _{a,c}	7.90	5.92 _d	.97
Best friend	10.87 _a	6.71	6.23 _c	.79	11.28 _b	6.29	6.23	.73
Roommate	4.93 _b	7.75	5.36 _d	1.17				
Adult figure	4.95 _b	7.02	4.78	1.21				

Note. Higher numbers indicate more of a given construct. Within each specific study, means within a column differ significantly if they do not share a subscript.

and were consistent when considering only autonomy and competence needs in the composite, indicating that individuals do have different patterns of need satisfaction across relationships.³

To clarify the nature of this within-person variability, means for both overall attachment security and need satisfaction within relationships are presented in Table 2. It is interesting that these college students reported their greatest overall attachment security with their best friends, then successively with their mothers, romantic partners, and fathers. They were not significantly more secure with their fathers than with their roommates or other adult figures, and they also tended to show more variability in their attachments to fathers than to other figures. On the basis of theoretical considerations we had included both parents as primary attachments, and the current data support our decision to have included best friends and romantic partners as primary attachments. It is interesting that security with romantic partners, typically thought of as the primary attachment in adults, was significantly lower than security with best friends. This is likely due to the fact that many college students have multiple, short-term romantic relationships rather than single, longer term committed ones.

In sum, the preliminary analyses indicated that there was significant variability in attachment and need satisfaction across relationships. We then turned to multilevel modeling, using HLM, to determine the relative amounts of between-person and within-person variance in the attachment variables and to examine the within-person relation of need satisfaction to attachment.

Primary Analyses

When considering all six target figures in the analyses, 21% of the variance in participants' overall security of attachment was between-person and 79% was within-person. Between-person variance for the self dimension was 28% and for the other dimension was 19%; thus, 72% of the variance in model of self and 81% of the variance in model of other were within-person. On repeating the analyses with only the four primary relationships, these estimates were essentially the same. Thus, across analyses, results suggest that approximately three times as much variance in the three attachment-security variables is within person relative to

between person. Of course, some of the within-person variance is error, so it is important to show that the within-person variance is systematic by explaining significant amounts of this variance by within-relationship variables such as need satisfaction.

We thus examined whether the within-person variability in attachment could be explained by need satisfaction within relationships, controlling for relationship type.⁴ In analyses with all six figures, each participant had a maximum of 6 relationships, although some had fewer, yielding a total of 866 relationships nested within 152 people. For analyses with just primary figures, there were 587 relationships nested within 152 people.

As shown in Table 1, when considering all attachment figures, need satisfaction was significantly related to overall attachment security at the within-person level, such that greater need satisfaction was predictive of greater attachment security. The results of these models remained consistent even when the relatedness need was not included.⁵ Analyses with only the primary figures were also similar to those with six figures.

We then examined the relations of need satisfaction to the self and other dimensions. Both the self and other dimensions were significantly predicted by need satisfaction within person when the need-satisfaction composite included all three needs or only satisfaction of the autonomy and competence needs. When all analyses were repeated for the self and other dimensions using only primary relationships, coefficients were similar to what they had been with six relationships. Thus, all analyses indicated that need satisfaction

³ In all ANOVAs in Studies 2 and 3, we adjusted the level of significance for sphericity using the Greenhouse-Geisser epsilon.

⁴ We used the same HLM equations as in Study 1, except that, when analyzing for all six relationships, there were two additional dummy codes for relationships and thus two additional person-level equations.

⁵ As in Study 1, we examined gender within the HLM analyses and found that neither overall security nor the relation between need satisfaction and overall security was moderated by gender for either the six figures or the four.

Table 3
Beta Coefficients When Attachment Residuals Were Regressed Onto Need Satisfaction Residuals for Each Unique Attachment Relationship in Studies 2 and 3

Relationship type	Study 2			Study 3		
	Overall security	Self	Other	Overall security	Self	Other
Mother	.79***	.53***	.76***	.75***	.57***	.62***
Father	.72***	.56***	.57***	.67***	.42***	.53***
Romantic partner	.67***	.42***	.49***	.65***	.40***	.43***
Best friend	.63*** ^a	.47***	.41***	.60*** ^a	.40***	.48***
Roommate	.73***	.45***	.62***			
Adult figure	.59***	.28***	.56***			

Note. Residuals are calculated by removing the mean across relationships for the specified variable from the value for the specific relationship.

^a Controlling for main effect of gender.

*** $p < .001$.

did relate to attachment within person, controlling for relationship type.

Relations of need satisfaction to attachment within specific relationships. HLM allows us to examine whether the hypothesized relations between need satisfaction and the attachment variables are significant within participants, across relationships, but it does not provide a means for examining whether the hypothesized relation is significant with respect to any particular attachment figure. Thus, we used regressions to explore whether the degree of need satisfaction experienced within a specific relationship was predictive of attachment with that relational partner. We adapted a procedure used by Kasser and Ryan (1996) in which we regressed a participant's mean on need satisfaction across attachment figures out of his or her need-satisfaction score for each of the figures.⁶ The residual score represents a person's overall need satisfaction with one partner relative to that person's mean level of need satisfaction across all partners. We also used this method to form residuals for each separate need and for each of the attachment variables. We then examined whether the residual need satisfaction for a particular partner predicted the residual attachment for that particular partner.⁷ In so doing, between-person variance in both attachment and need satisfaction were controlled for when considering the relation between need satisfaction and attachment for specific relationships. We conducted the analyses for variables concerning each of the six relationships relative to the mean of all six relationships and then for each of the four primary relationships relative to the mean of the four.

As shown in Table 3, significant results appeared in all six regressions for the overall-security variable, indicating that relationship-specific need satisfaction did predict relationship-specific overall attachment security within each of the six relationships. The beta coefficients show that the greater the need satisfaction a person felt within a relationship, the more secure was his or her security of attachment with that partner.

As shown in Table 3, for the self and other dimensions, with all six figures included, all 12 regressions were significant and indicated that greater need satisfaction was predictive of more positive models of self and other within relationships. Results for all

attachment variables were similar when analyses were repeated with only the primary figures. Furthermore, when relatedness was removed from the need-satisfaction composite, all relations were similar, and all remained highly significant.

We then assessed the unique contributions of each of the three needs to the attachment variables within relationships. Analyses were performed in two steps for each of the three attachment variables. The attachment residual was first regressed simultaneously onto all three need-satisfaction residuals. Then, because we were concerned about the close conceptual relation between satisfaction of the relatedness need and attachment security, we repeated the analyses with only the autonomy and competence needs in the analyses.

For 18 multiple regressions (3 attachment dimensions \times 6 relationships), when all three needs were considered simultaneously, the relatedness need was the strongest predictor of the attachment variables in 15 of the cases. The 3 instances where this was not the case were overall security and the self dimension for romantic partner, in which satisfaction of the autonomy need was the strongest predictor, and the self dimension for adult figure, which was the only case in which none of the three needs was a significant independent predictor.

We then repeated the 18 analyses without the relatedness need, and the results are shown in the top half of Table 4. With the exception of the self dimension for best friend, the autonomy need

⁶ Participants were included in the calculations of average attachment and overall need satisfaction only if they reported data for at least four of the six target relationships.

⁷ Gender was entered first in all residualizing equations. In each case where it was significant, we controlled for gender in all subsequent analyses using those variables. Because there were relatively few significant effects in these analyses, we report them here rather than in the text. When using the three needs together, a significant gender effect emerged for overall security with best friend and for the other dimension with romantic partner. When the three needs were considered separately, the same two significant gender effects emerged.

Table 4
Relations Between Satisfaction of Needs for Both Autonomy and Competence and Attachment Variables Specific to Each Attachment Relationship in Studies 2 and 3

Relationship type	Overall security		Self		Other	
	Autonomy	Competence	Autonomy	Competence	Autonomy	Competence
Study 2						
Mother	.35***	.42***	.28**	.23*	.36***	.39***
Father	.47***	.26**	.32**	.26*	.46***	.12
Romantic partner	.55***	.13	.31**	.13	.37*** ^a	.13 ^a
Best friend	.35*** ^a	.20** ^a	.16	.30**	.32**	.02
Roommate	.52***	.09	.34**	.10	.51***	-.03
Adult figure	.41***	.14	.20*	.11	.38***	.14
Study 3						
Mother	.51***	.24**	.36***	.24*	.49***	.14
Father	.43***	.18	.29**	.08	.34***	.15
Romantic partner	.44***	.16	.28*	.11	.31**	.04
Best friend	.40*** ^a	.18** ^a	.26**	.19*	.29**	.14

Note. All numbers are beta coefficients. Autonomy and competence needs were entered simultaneously when predicting each of the attachment variables.

^a Controlling for main effect of gender.

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

significantly predicted the attachment variables in all the analyses. Furthermore, in 7 of the 18 cases competence also contributed significant independent variance to the prediction of the attachment variables. In these 18 analyses, when the autonomy and competence needs were competing for variance, autonomy was a stronger predictor in 15 of the equations.

Finally, in separate sets of analyses, we regressed the attachment residuals onto each need residual alone, to determine whether satisfaction of each of the three needs would significantly predict attachment security when it was not competing for variance with satisfaction of the others. In every case, for each of the three needs, the results were significant, indicating that satisfaction of each of the three needs does significantly predict the attachment variables. In sum, although the three needs—for autonomy, competence, and relatedness—were all significant predictors of attachment, when they competed for variance the relatedness need was most predictive, the autonomy need was next, and the competence need was least predictive.

Relation of attachment to well-being. Next, we used the same general method used in Study 1 to examine whether the mean level of the attachment variables, as well as the amount of variability in the attachment variables across relationships, were predictive of well-being. We expected level of attachment (i.e., the mean across relationships) to be positively related to well-being and variability in attachment (i.e., the standard deviation among relationships) not to be negatively related to well-being.

For overall security, considering all six figures, people's mean level of security across relationships was positively related to well-being, $\beta = .45$, $F(1, 149) = 38.78$, $p < .001$, and the within-person variability across relationships was significantly negatively related, $\beta = -.15$, $F(1, 149) = 4.45$, $p < .05$. The interaction was not significant ($\beta = .06$). When the analyses were repeated with just the primary attachment figures, the significant positive relation between the mean of overall security and well-

being remained, but the relation between the within-person variability in overall security and well-being became nonsignificant, $\beta = -.09$, $F(1, 149) = 1.04$. The interaction was again nonsignificant.

For the self dimension, the mean level of self ratings across relationships was positively related to well-being, $\beta = .42$, $F(1, 149) = 20.89$, $p < .001$. Neither the standard deviation nor the interaction of the mean and standard deviation was significant ($\beta = -.07$ and $\beta = -.02$, respectively). For the other dimension, the within-person mean level of other ratings across relationships was significantly positively related to well-being, $\beta = .26$, $F(1, 149) = 11.33$, $p < .001$, and the standard deviation was significantly negatively related, $\beta = -.20$, $F(1, 149) = 6.72$, $p < .05$. The interaction was not significant ($\beta = .02$). When these two analyses were repeated for just the primary relationships, the pattern of results remained.

In these analyses there was consistent conceptual replication of mean attachment level being positively related to mental health. Concerning the relation between the variability in attachment to well-being, the results were mixed. With all six figures included, there was evidence that greater variability in overall security was negatively related to well-being, but when the data for the more distal relationships were removed the effect disappeared. Furthermore, when there was more variability in the level of people's views of others, well-being seemed to be lower. In short, there was some indication that too much variability in people's attachments bodes poorly in terms of well-being, especially for variability involving more distal relational partners.

Relations among need satisfaction, attachment, and well-being. In the beginning of this article we hypothesized that need satisfaction would mediate the relation between attachment security and well-being at the between-person level. Following methods

outlined by Judd and Kenny (1981), we tested this model.⁸ First we found that the direct path of attachment security to well-being was significant, $\beta = .50$, $F(1, 149) = 52.20$, $p < .001$, suggesting that greater overall attachment security predicts greater well-being, thus replicating a frequently reported relation. Next, need satisfaction was regressed onto attachment security, and the result was significant, $\beta = .65$, $F(1, 149) = 111.19$, $p < .001$, suggesting that attachment security was positively associated with need satisfaction in relationships. Finally, well-being was regressed onto overall need satisfaction, controlling for attachment security, and this effect was significant, $\beta = .25$, $F(1, 148) = 8.05$, $p < .01$. The direct relation of attachment security to well-being remained significant with overall need satisfaction in the equation, but there was a decrease in the beta coefficient for this effect from .50 to .34. Following the procedure outlined by Kenny et al. (1998), we used Sobel's (1982) test, which indicated that the drop was significant ($z = 2.74$, $n = 152$, $p < .01$), a finding that suggests partial mediation.

To test the alternative model in which attachment security mediates the relation of need satisfaction to well-being, we first regressed well-being onto overall need satisfaction to establish the direct effect. Need satisfaction did significantly predict well-being, $\beta = .47$, $F(1, 149) = 44.82$, $p < .001$, suggesting that greater overall need satisfaction was associated with greater well-being. The relation of overall attachment security and need satisfaction was the same as reported for the previous model. Finally, we regressed well-being onto overall attachment security, controlling for need satisfaction, and this effect was significant, $\beta = .34$, $F(1, 148) = 13.99$, $p < .001$. The direct effect of need satisfaction on well-being still remained significant with attachment security in the equation, but there was a decrease in the beta coefficient for this effect, from .47 to .25. The Sobel test indicated that the drop was significant ($z = 3.53$, $n = 152$, $p < .001$), also consistent with partial mediation.

To summarize, the mediation analyses suggest that well-being is significantly predicted by the shared variance between attachment security and need satisfaction and that each variable also makes a unique contribution to the prediction of well-being.

Summary of Study 2 Results

The results of Study 2 indicated, first, that approximately three times as much of the variability in attachment was accounted for at the within-person level as at the between-person level, although some of the within-person variability is error. Second, significant amounts of the within-person variability in overall security and in the self and other attachment dimensions were explained by the degree to which people perceived their relationship partners as providing satisfaction of their basic psychological needs, with greater need satisfaction predicting greater security of attachment as well as more positive views of self and other. Third, within specific relationships, satisfaction of the need for relatedness was the strongest predictor of the attachment variables when the three needs were considered simultaneously. When only the autonomy and competence needs were examined simultaneously, support for autonomy was generally the stronger predictor of the attachment variables. Fourth, concerning well-being, we replicated the finding at the between-person level that overall security of attachment is

associated with greater well-being. Variability in overall security of attachment to the primary relational partners did not relate negatively to well-being, but it did when all six figures were considered. Greater variability in people's model of self did not relate negatively to well-being, but greater variability in people's model of others was negatively related to well-being. Fifth, mediational analyses concerning well-being at the between-person level were consistent both with need satisfaction partially mediating the relation between attachment and well-being and with attachment partially mediating the relation between need satisfaction and well-being.

Study 3

In general, the results of Study 2 replicated those of Study 1 and provided a much more detailed analysis of the relations among the important variables. The studies showed, using two different measures of attachment security, that less than half the variance in attachment was accounted for by between-person differences, with the rest being within-person differences and error. Significant amounts of this within-person variance was accounted for by the degree to which relational partners provided satisfaction of individuals' needs for autonomy, competence, and relatedness. In Study 3 we intended to replicate the results of Study 2 in another sample, using only the primary relationships of mother, father, romantic partner, and best friend. In this study we also examined attachment as a predictor of outcomes at the within-person (as well as the between-person) level. Specifically, we examined whether attachment security within particular relationships would predict the relationship-specific concepts of relationship satisfaction and willingness to rely on a relational partner in emotionally charged situations.

Method

The methods of Study 3 differed from those of Study 2 in only three ways. First, in Study 3 we included only the four primary attachment figures used in Study 2 (viz., mother, father, romantic partner, and best friend). Second, the well-being composite substituted the life satisfaction measure (Diener et al., 1985) used in Study 1 for the physical symptoms measure (Emmons, 1991) used in Study 2. The alpha for the well-being composite with these components was .90. Finally, we included the relationship-specific measures of relationship satisfaction and willingness to rely on the relational partner.

Participants

One hundred sixty University of Rochester undergraduates (105 women and 55 men) participated in this study to earn extra course credit in psychology courses.

Measures

In addition to the measures already described, we used a 1-item assessment of relationship satisfaction, namely, "In general, how satisfied are you in your current relationship with your _____?", to which participants

⁸ All regressions in the mediational analyses controlled for the effects of gender because men were significantly higher than women on the well-being composite. Also, all reported results for the mediational analyses in Study 2 apply to all six figures. When we repeated the Study 2 analyses using only four figures, the results were very similar.

responded on a 7-point scale ranging from *not at all satisfied* to *very satisfied* for each of the four target relationships. Participants also completed the Emotional Reliance Questionnaire (Solky & Ryan, 1995) with respect to each of the four relational partners. This 10-item measure assesses individuals' willingness to rely on each partner in situations charged with either negative or positive emotions. Participants responded on a 7-point Likert-type scale ranging from *strongly disagree* to *strongly agree* to items such as "If I were feeling frustrated or angry, I would be willing to turn to my _____" and "If I were feeling proud of my accomplishments, I would be willing to turn to my _____." Emotional-reliance scores for each relationship were calculated as the average of participants' ratings on the 10 items for that relationship. Cronbach's alphas in college student samples for a variety of target figures have ranged from .91 to .97.

Results and Discussion

Preliminary Analyses

Overall need satisfaction was highly correlated with the three attachment variables (all variables collapsed across relationships; $r_s = .64, .55, \text{ and } .50$, for overall, self, and other respectively; $n = 156, p_s < .001$). When relatedness was removed from the calculation of need satisfaction, all relations remained significant ($r_s = .56, .52, \text{ and } .41$). The correlation between overall need satisfaction and the well-being composite was significant ($r = .47, n = 158, p < .001$) and remained comparable after relatedness items were removed from the need-satisfaction scale. Correlations between the three attachment variables and well-being were $.33, .32, \text{ and } .23$ for the overall, self, and other variables, respectively ($n = 156, p_s < .01$).

To explore gender effects, we performed *t* tests for scores of men versus women on all measures, and again there were relatively few significant effects. Women were more willing to rely on their fathers, romantic partners, and best friends than were men, and women also showed greater overall security and greater relatedness with their best friends than did men. The only result that replicated those of Study 2 was that women were more securely attached to their best friends than were men.

To determine if there was evidence of within-person variability, we conducted a repeated-measures ANOVA on overall security, with relationships serving as the repeated measure, which revealed a significant effect, $F(3, 351) = 16.87, p < .001$, suggesting that people do feel different degrees of attachment security in their different relationships. Significant variability was also found across relationships for the self dimension, $F(3, 351) = 13.81, p < .001$, as well as the other dimension, $F(3, 351) = 11.11, p < .001$. Need satisfaction also differed significantly across people's relationships, $F(3, 375) = 16.28, p < .001$. Finally, repeated-measures ANOVAs for the relationship-quality variables showed a significant effect of emotional reliance, $F(3, 339) = 13.28, p < .001$, and a significant effect of relationship satisfaction, $F(3, 351) = 10.42, p < .001$, indicating that people are willing to rely on, and are satisfied with, their primary relational partners to differing degrees.

Means for overall attachment security and need satisfaction within relationships were calculated, and they appear in Table 2. In this sample, as in the Study 2 sample, college students reported the greatest attachment security with their best friends, then successively with their mothers, romantic partners, and fathers.

Primary Analyses

HLM analyses indicated that 37% of the variance in participants' overall security of attachment was between-person and that 63% was either systematic within-person variance or error. Between-person variance for the self dimension was 36%; for the other dimension it was 28%. These results are similar to those of Study 2.

Next, we used HLM to examine whether the within-person variability in security of attachment, model of self, and model of other could be predicted by need satisfaction at the within-person level, after controlling for relationship type. There was a total of 594 relationships nested within 160 people.

As shown in Table 1, analyses indicated that need satisfaction was significantly positively predictive of overall attachment security at the within-person level. The model of self was also significantly predicted by need satisfaction for all three needs, as was the model of other.⁹ Results were similar for all analyses when relatedness was removed from the need-satisfaction composite.

Relations of need satisfaction to attachment within specific relationships. As in Study 2, we used Kasser and Ryan's (1996) residualizing approach to examine whether the degree of need satisfaction experienced within each specific relationship predicted the attachment variables within that relationship.¹⁰ As shown in Table 3, for overall security, significant results appeared in all four regressions, indicating that relationship-specific need satisfaction did positively predict relationship-specific overall attachment security. For the self and other dimensions, as also shown in Table 3, all eight regressions were significant and indicate that greater need satisfaction was predictive of greater self and other views within relationships. When only the autonomy and competence needs were included in the composite, the results were similar, with all effects continuing to be highly significant.

Finally, we used this approach to assess the contributions of each of the three needs to the attachment variables, as we had done in Study 2. The relatedness need emerged as the strongest predictor of the attachment variables in 9 of the 12 analyses involving all three needs. In the other 3 instances—namely, the self and other dimensions with mother and the self dimension with best friend—the autonomy need was a stronger predictor than the relatedness need. We repeated the 12 analyses without the relatedness need, and the results, which are shown in Table 4, indicate that satisfaction of the autonomy need significantly predicted every attachment variable. In 4 of the 12 cases competence also contributed significantly to predicting attachment.¹¹ Thus, the overall pattern of effects is much like it was in Study 2, although satisfaction of the competence need was a slightly weaker predictor in this study than in Study 2.

⁹ Gender did not moderate the relation between need satisfaction and any of the attachment variables in Study 3.

¹⁰ As in Study 2, a significant gender effect emerged in analyses of overall security with best friend; thus, we controlled for gender in analyses for best friend.

¹¹ As in Study 2, we performed three additional sets of analyses in which we regressed the attachment variables onto gender and then separately onto satisfaction of each of the needs. Again, every result for each of the three needs was significant, indicating that satisfaction of each of the three needs does significantly predict the attachment variables for men and women.

Relation of attachment to well-being. Next we examined whether the level of attachment as well as the amount of variability in attachment across relationships was predictive of well-being. People's mean level of overall security across relationships was positively related to their well-being, $\beta = .30$, $F(1, 153) = 11.93$, $p < .001$. Furthermore, neither the standard deviation nor the interaction of the mean and standard deviation was significant ($\beta = -.07$ and $\beta = -.02$, respectively), suggesting that variability in overall attachment security across figures has little relation to participants' well-being. People's mean level of the self-dimension across relationships was also positively related to their well-being, $\beta = .31$, $F(1, 153) = 13.30$, $p < .001$, and neither the standard deviation nor the interaction of the mean and standard deviation was significant ($\beta = -.03$ and $\beta = -.03$, respectively), suggesting that variability in the self dimension across figures also had little relation to participants' well-being. Finally, people's mean level of other ratings across relationships was also significantly related to well-being, $\beta = .20$, $F(1, 153) = 5.47$, $p < .05$, and the standard deviation and the interaction of the mean and standard deviation were not significant ($\beta_s = -.08$ and $-.05$, respectively).

In sum, in Study 3, as in Study 2, when only the four figures were used, variability in overall security and in self views were not significantly related to well-being. In Study 2, variability in model of others was related negatively to well-being, but this effect was not replicated in Study 3.

Relations among need satisfaction, attachment, and well-being. As in Study 2, we first tested the hypothesized model that need satisfaction mediates the relationship of attachment security to well-being. The direct path of attachment security to well-being was significant, $\beta = .33$, $F(1, 154) = 18.31$, $p < .001$. Next, need satisfaction was regressed onto attachment security and was significant, $\beta = .64$, $F(1, 154) = 106.33$, $p < .001$, suggesting that greater overall need satisfaction was associated with greater overall attachment security. Then, well-being was regressed onto overall need satisfaction, controlling for attachment security, and this effect was significant, $\beta = .43$, $F(1, 153) = 21.32$, $p < .001$. However, the path from attachment security to well-being was no longer significant with overall need satisfaction in the equation. The Sobel test revealed that the decrease in the beta coefficient from .33 to .05 was significant ($z = 4.21$, $n = 160$, $p < .001$) and, because the coefficient .05 was itself not significant, $F(1, 153) = 0.30$, the results are consistent with an explanation of full mediation. This is notably different from the results of Study 2, which suggested only partial mediation. It appears from these analyses that, as hypothesized, a primary reason why attachment security relates to well-being is that people are able to satisfy their innate psychological needs for autonomy, competence, and relatedness within their secure relationships.

To test the alternative model that overall attachment security would mediate the relationship of overall need satisfaction to well-being, we first tested the direct path, by regressing well-being onto need satisfaction, and found a significant result, $\beta = .46$, $F(1, 154) = 41.94$, $p < .001$. The path between need satisfaction and attachment security was the same as in the previous model. Finally, well-being was regressed onto overall attachment security, controlling for need satisfaction, and the effect was not significant, $\beta = .05$, $F(1, 153) = 0.30$. The need-satisfaction-to-well-being relation, after removing overall attachment security, was still sig-

nificant, $\beta = .43$, $F(1, 153) = 21.32$, $p < .001$, and the drop in beta from .46 to .43 was not significant ($z = .55$, $n = 160$). In sum, need satisfaction predicted both attachment security and well-being, as specified by self-determination theory, and analyses suggested that attachment security did not significantly mediate the relation of need satisfaction to well-being.

Within-person relations of attachment to quality-of-relationship variables. Finally, we examined whether relationship satisfaction and willingness to rely on relational partners for emotional concerns would be predicted by attachment variables at the within-person level. We performed HLM analyses using equations parallel to those used for predicting attachment security from need satisfaction, although in this case we predicted first relationship satisfaction and then emotional reliance from the attachment variables. Thus, there were six analyses (three for relationship satisfaction and three for emotional reliance), with attachment security, model of self, and model of other serving as predictors in the separate analyses.

First, consider relationship satisfaction. In all three analyses at the within-person level there was a significant positive relation between the attachment variables and relationship satisfaction: For overall security, model of self, and model of other, the coefficients were .14, .22, and .18, respectively ($ps < .001$), thus indicating that greater overall security and more positive views of self and other were associated with greater relationship satisfaction.

Next, consider willingness to rely on relational partners in emotional situations. The predictions of emotional reliance from overall security, from self model, and from other model were all significant, with coefficients of .09, .10, and .15, respectively ($ps < .001$). Thus, greater overall security and more positive views of self and other were predictive of greater willingness to rely on relational partners. Just as the three attachment variables were positively related to well-being at the between-person level, these analyses indicate that the three attachment variables were positively related to the quality of relationships at the within-person level.

Summary of Study 3 Results

First, in Study 3, the within-person level, consisting of systematic within-person variability and error, accounted for approximately twice as much variance in each of the three attachment variables as the between-person level. Thus, the percentage of variance at the within-person level fell between those reported in Study 1 and Study 2. Second, significant amounts of within-person variability in overall security and in the models of self and other were explained by the degree to which people perceived their relationship partners as providing satisfaction of their basic psychological needs. This replicated the results of Study 2 and conceptually replicated the results of Study 1. Thus, greater need satisfaction predicted greater attachment security at the within-person level. Third, within specific relationships, each of the three needs significantly predicted attachment when the needs were considered separately. When they were considered simultaneously, satisfaction of the need for relatedness was the strongest predictor of the attachment variables, and when only the autonomy and competence needs were entered simultaneously, the autonomy need was generally a stronger predictor than the competence need.

Across Studies 2 and 3, when the needs competed for variance, satisfaction of the competence need consistently contributed independent variance to the prediction of overall security of attachment to mothers and best friends, but not to the other partners. Fourth, concerning well-being, we again replicated the finding that overall security of attachment is associated with greater well-being at the between-person level. Variability in attachment security across partners did not significantly negatively affect well-being for any attachment variable. Thus, whereas some indication of a negative relation between variability in attachment and well-being was found in Study 2, that relation was not significant in this study, as it had not been in Study 1. Fifth, mediational analyses were consistent with an explanation of need satisfaction fully mediating the relation between attachment security and well-being, suggesting that the reason attachment security is related to well-being is that people are able to satisfy their basic needs within secure relationships. The alternative model—that attachment would mediate the relation between need satisfaction and well-being—was not supported statistically. Thus, whereas Study 2 suggested partial mediation of the relation of attachment security to well-being by need satisfaction, this relation was consistent with full mediation in Study 3. In contrast, partial mediation of the need-satisfaction-to-well-being relation by attachment security that was suggested in Study 2 did not receive statistical support in Study 3. Finally, we found that the overall attachment security to different partners, as well as views of self and other for each partner, positively predicted people's experience of the quality of those relationships.

General Discussion

In three studies we examined the associations among need satisfaction, attachment, and well-being within-individuals, across relationships. First we estimated the variance in attachment at the between- and within-person levels. In Study 1 we used M. T. Greenberg's (1982; M. T. Greenberg et al., 1983) felt-security measure, whereas in Studies 2 and 3 we used overall security as well as the models of self and other from Bartholomew and Horowitz's (1991) measure. We know of one other study (Cook, 2000) in which this issue was examined with Collins and Read's (1990) adult attachment measure. Across these four studies, using three different measures, the results showed, as predicted by attachment theory, that the between-person level explained significant amounts of variance in attachment security, ranging from 19% to 44%.¹² Thus, the remainder, consisting of systematic within-person variance and error, was quite substantial.

Although the amount of between-person variance, which is essentially a reflection of enduring working models of attachment relationships, may vary as a function of the assessment device or relationship constellation, it is noteworthy that in all cases the individual differences in attachment accounted for less than half the variance. Thus, although the traditional approach of studying attachment in terms of individual differences in working models is important, the current findings suggest strongly that systematic differences in attachment across relationships also need to be considered. It is interesting in this regard that, recently, Smith, Murphy, and Coats (1999) advocated use of the attachment paradigm for examining people's relationships to groups, suggesting that people may have different mental models of their relationships to different groups, as they do to different individuals.

In all three of our studies we found that within-person variance in security of attachment was significantly predicted by the degree to which various partners satisfy innate psychological needs for autonomy, competence, and relatedness (Deci & Ryan, in press), thereby supporting the view that the within-person variance is indeed systematic. This was true when all relationships were considered together and when individual relationships were considered separately. In Studies 2 and 3 need satisfaction also predicted the self and other dimensions of attachment. In analyses where satisfaction of the three needs competed for variance in predicting the attachment variables, the relatedness need was the strongest predictor (as would be expected), autonomy was next strongest, and competence was the least strong. Thus, although additional analyses showed that each need individually, and all three needs together, strongly predicted the attachment variables, the three needs do seem to be differentially critical in predicting attachment. As we suggested in the beginning of this article, people's need for competence is often fulfilled outside close interpersonal relationships (e.g., at work), so it makes sense that it would be less important than relatedness and autonomy for promoting security in attachments. In fact, the data showed that it does reliably explain significant independent variance in attachments to mothers and best friends but not to the other figures. There were very few gender differences in these analyses, suggesting that the needs are not differentially important for predicting attachment of men versus women. Thus, in line with attachment theory, the degree of perceived sensitivity of various partners does seem to predict level of attachment within relationships and, in line with self-determination theory, the degree of perceived sensitivity of responding seems to be well understood in terms of supports for the autonomy, competence, and relatedness needs (Ryan, 1993). Attachment security seems to go hand in hand with psychological need fulfillment.

In all three studies we examined whether greater variability in attachment across relationships would relate negatively to well-being. Only in Study 2 did we find any indication of this negative relation. For overall security, there was a negative relation between variability in attachment security and well-being when six figures were considered, but not when only four were considered. We meta-analytically combined the results for overall attachment security for the three studies, calculating effect sizes from the *F* statistic and then adjusting it for sample size. We used the *F* statistic based on six figures in Study 2 to have a more stringent test. Results of the meta-analysis showed a composite effect size of $d = -0.12$ (confidence interval [CI] = -0.31 to 0.07), indicating that across the studies there was not a significant negative relation between variability in overall attachment security and well-being. Still, it appeared that greater variability in model of others—particularly when more than the primary relationships are taken into account—might have a negative relation to well being, so we also examined this meta-analytically across Studies 2 and 3. The composite effect size was $d = -0.28$ (CI = -0.51 to -0.06), indicating that across the two studies greater variability in model of other across relationships does appear to relate to poorer well-being.

¹² Although the Cook article did not actually report this percentage, our estimate from the data provided indicates that it was less than 44%.

This set of findings, which gives only a slight indication of a negative relation between variability in attachment and well-being, may appear to be contrary to findings from Donahue et al. (1993) and Sheldon et al. (1997) that show a stronger negative relation between variability and well-being. However, we noted earlier that the previous research dealt with personality traits across roles, whereas this research dealt with attachment across relationships. Considerable variability of a person's self-concept across roles may represent a fragmented self, but variability of attachment across relationships that provide varying degrees of need satisfaction may not be a maladaptive response to the ambient circumstances. In other words, this variability may reflect instability in people's views of others, or it might instead represent their reasonable assessment of whether others are appropriate attachment figures. Because this represents the first investigation of this issue, additional empirical attention is warranted.

In all three studies we also found that individual differences in level of attachment security were related to well-being, thus replicating many previous findings in the attachment literature. In Studies 2 and 3 we examined the issue of well-being in greater depth. First, in between-person analyses we found, in line with previous self-determination theory research, that level of overall need satisfaction related positively to well-being.

We then examined the hypothesis that need satisfaction, which predicted both attachment security and well-being, would mediate the relation between these two variables. Results of the mediational analyses provided substantial support for this reasoning. Specifically, in Study 2, the relation between attachment and well-being dropped significantly when need satisfaction was added to the equation, although attachment remained a significant predictor of well-being, thus suggesting partial mediation by need satisfaction. In Study 3, the beta for the attachment-to-well-being relation also dropped significantly when need satisfaction was added, but this relation between attachment and well-being with need satisfaction removed was not itself significant, thus suggesting full mediation by need satisfaction. To determine whether the data from the two studies were more consistent with a partial- versus full-mediation interpretation, we meta-analyzed the results from the two studies. The critical issue is whether, across studies, the relation of attachment to well-being was significant after need satisfaction was removed. The composite effect size from the two studies for the attachment-to-well-being relation with need satisfaction removed ($\beta_s = .34$ and $.05$, respectively) was $d = .34$ ($CI = 0.11$ to 0.57), indicating that the effect was significant. Thus, the data are consistent with only a partial-mediation interpretation, indicating that part of the reason that attachment security relates to well-being is that secure attachments provide an arena within which people are able to satisfy their basic psychological needs.

The alternative model—that attachment security would mediate the need-satisfaction-to-well-being path—received partial support in Study 2, but in Study 3 the results failed to support even partial mediation. To determine whether there was greater support for partial mediation versus a lack of mediation, we also meta-analyzed the results from the two studies. The critical issue here is whether, across studies, the size of the drop in the beta for the need-satisfaction-to-well-being relation from before to after attachment was added to the equation (represented by a z score) is significant. The composite effect size, combining the z values of 3.53 and 0.55, was $d = 0.33$ ($CI = 0.10$ to 0.55), indicating that

across the two studies the drop was significant and suggesting that attachment security does partially mediate the relation of need satisfaction to well-being.

Together, the results of the mediational analyses suggest that attachment security and basic psychological need satisfaction have substantial shared variance when predicting well-being and that each variable also makes a unique contribution to well-being. Additional studies seem warranted to further examine these shared and unique effects.

Finally, in Study 3 we performed within-person analyses to predict relationship quality variables (viz., relationship satisfaction and emotional reliance) from the attachment variables. These analyses demonstrated that meaningful relationship outcomes can be predicted by attachment variables at the within-person level. Overall attachment security, as well as models of self and other within relationships, positively predicted relationship quality, in the form of relationship satisfaction and willingness to rely on the other.

It is worth noting that in all three studies we used samples of college undergraduates, so it will be important to replicate this research with participants of different ages. Similarly, like most studies of adult attachment, these were done primarily with North American participants, so there are limitations to the work both in terms of the age range covered and the cultural context considered. Although the data in the current studies were all cross-sectional, we used an analytic strategy that suggests causation. We did that to test the general theoretical proposition derived from self-determination theory that secure attachments are a function of basic need satisfaction, and the results were consistent with our theoretical reasoning. Still, these studies do not allow any conclusions about the direction of causation and, as we also argued, people undoubtedly derive greater need satisfaction from partners to whom they are more securely attached. Indeed, we believe that the relation is bidirectional, that people report greater security of attachment in relationships in which they experience need satisfaction and that people experience greater need satisfaction with people to whom they are securely attached. Furthermore, it is possible that yet other variables could affect both attachment security and need satisfaction. Gaining a fuller understanding of these processes will require a longitudinal examination of the issues.

In conclusion, these studies support the view that, although significant variance in adult attachments exists as individual differences in working models, there is a substantial amount of variability in people's security of attachments from one relational partner to another. It seems important for the field of adult attachment research to give greater attention to within-person variability, as well as to between-person variability, in attachment processes. The studies further suggest that satisfaction of the fundamental psychological needs for autonomy, competence, and relatedness plays a very important role in the formation and maintenance of secure attachments to others and that research on attachment would be enhanced by giving greater consideration to the concept of psychological needs in both the between-person and within-person analyses.

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Appendix

Need Satisfaction Scale

1. When I am with my _____, I feel free to be who I am.
2. When I am with my _____, I feel like a competent person.
3. When I am with my _____, I feel loved and cared about.
4. When I am with my _____, I often feel inadequate or incompetent. (R)
5. When I am with my _____, I have a say in what happens and can voice my opinion.
6. When I am with my _____, I often feel a lot of distance in our relationship. (R)
7. When I am with my _____, I feel very capable and effective.
8. When I am with my _____, I feel a lot of closeness and intimacy.
9. When I am with my _____, I feel controlled and pressured to be certain ways. (R)

Note. R = the item is reverse scored. Items 1, 5, and 9 pertain to autonomy; 2, 4, and 7 pertain to competence; and 3, 6, and 8 pertain to relatedness.

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