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ATTACHMENT

Do automatic reactions elicited by thoughts of romantic partner, mother, and self relate to
adult romantic attachment?

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Abstract

The expectation, derived from Bowlby (1969), that automatic reactions elicited by the mental representations of specific attachment figures and self relate to adult romantic attachment has not received clear support. Three studies examined this question using the Implicit Association Test (IAT), a measure of individual differences in automatic reactions. Studies 1 and 2 showed that stronger automatic positive reactions to one's romantic partner, but not to self, were related to a secure adult attachment style assessed at a specific (i.e., within one's current romantic relationship) and general level (i.e., across all romantic relationships). Automatic positive reactions to one's partner were also related to relationship outcomes. Studies 2 and 3 showed that stronger automatic supportive associations with one's mother were related to a secure (general) attachment style. These findings are consistent with the hypothesis that automatic reactions to attachment figures are key aspects underlying adult romantic attachment.

Key words: Automatic Evaluations, Implicit Measures, Attachment Style, Romantic Relationships

Bowlby's (1969) attachment theory has had and continues to have a profound effect on the study of adult close relationships. Among Bowlby's contributions is the proposition that automatic evaluative processes play a key role in attachment-related feelings, thoughts, and behaviors. Such processes, he argued, enable individuals to quickly and effortlessly evaluate aspects of their environments as good or bad, pleasant or unpleasant, likeable or unlikeable. In contrast to feelings and other evaluations of which a person is consciously aware, these moment-to-moment, continuously occurring "appraising processes may or may not be felt..." (1969, p. 105). A central aim of the present research was to assess the automatic reactions elicited by mental representations of specific attachment figures, such as one's romantic partner and mother, as well as self, and to examine whether individual differences in such automatic processes relate to adult romantic attachment. For example, does a person characterized by a secure attachment style automatically evaluate her partner more positively than a person characterized by an insecure attachment style? Does a person characterized by a secure attachment style automatically evaluate her mother as more supportive than a person characterized by an insecure attachment style? To assess the automatic associations with, and reactions elicited by, mental representations of one's partner, mother, and self, the present studies used the Implicit Association Test (IAT) (Greenwald, McGhee, & Schwartz, 1998).

Adult Romantic Attachment and Automatic Processes

According to Bowlby (1969), infants develop internal working models of others and self that function as schemata or "maps" that help them regulate emotions and social behaviors to maintain proximity to the caregiver. Specifically, he proposed an "environmental model" and an "organismic model," which, in more contemporary social cognitive parlance, are akin to mental representations of others and self, respectively. He posited that aspects of internal working models are shaped by the quality of the early parent-child interactions. Bowlby further hypothesized that, once formed, these generalized representations remain relatively stable and unchanged over the lifespan,

serving as “templates” or “prototypes” from which individuals develop more specific representations of others and self within subsequent relationships (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969). Moreover, Bowlby proposed that, for the most part, important aspects of such representations operate automatically, effortlessly, and without awareness.

Extending Bowlby’s propositions, researchers interested in the study of adult close relationships have hypothesized that representations of others and self underlie differences in how people characteristically feel, think, and behave within adult close relationships (e.g., Bartholomew & Horowitz, 1991; Brennan, Clark, & Shaver, 1998; Hazan & Shaver, 1987). More recently, research has focused on the automatic activation of attachment-related thoughts, affects, and behaviors that occur at various levels of awareness (e.g., reviewed in Shaver & Mikulincer, 2002). These studies have shown that many aspects of the attachment system, such as reactions to psychological threat (Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer, Gillath, & Shaver, 2002) and interpersonal expectancies (Baldwin, Fehr, Keedian, Seidel, & Thomson, 1993) operate automatically. Furthermore, at least under certain conditions, there may be individual differences. That is, some of these automatic processes have been shown to vary as a function of individual differences in adult attachment (Baldwin, et al., 1993; Mikulincer, et al., 2000, 2002).

Adult Romantic Attachment and Automatic Evaluative Reactions

A hypothesis derived from Bowlby’s (1969) theory is that automatic reactions to specific attachment figures and self are shaped by the quality of the infant-mother relationship. For example, individuals who have had relationships characterized by support, warmth, and responsiveness are expected to develop internal working models that consist of strong positive reactions to attachment figures and self. In contrast, individuals who have had relationships characterized by rejection, coldness, and indifference are expected to develop internal working models characterized by less

positive reactions. Although research has shown that aspects of the attachment system in adulthood operate automatically (e.g., interpersonal expectations), the specific issue of whether automatic reactions to others, particularly specific attachment figures and self, relate to individual differences in adult romantic attachment has not received direct and clear support.

Bartholomew and Horowitz (1991) showed that, consistent with their four-category model of adult attachment styles, a secure or preoccupied attachment style is more strongly related to positive evaluations of others than is a dismissing or fearful attachment style, and that a secure or dismissing attachment style is more strongly related to positive evaluations of self than is a preoccupied or fearful attachment style. However, Bartholomew and Horowitz used explicit self- and peer-reports to assess evaluations of others and self. Thus, they did not directly assess the automatic evaluative reactions described in Bowlby's (1969) original hypothesis.

Most relevant to the question of whether automatic reactions are related to individual differences in adult attachment is research by Banse (1999, 2001), who used affective priming techniques to capture the evaluative reactions automatically elicited by significant persons. Names and photos of self (2001; Experiment 1) and significant persons (e.g., relationship partners and friends) (1999, 2001) automatically elicited positive reactions, providing partial support for Bowlby's hypothesis. However, with regard to individual differences, Banse found either no relation between adult attachment style and automatic reactions (1999) or theoretically unexpected relations (2001) (e.g., dismissing attachment style was related to stronger automatic positive reactions to one's romantic partner).

Examining a related question, Mikulincer, Hirschberger, Nachmias, and Gillath (2001) suggested that mental representations of significant persons, such as the ones assessed by Banse (1999), are not necessarily equivalent to representations of attachment figures (i.e., persons who serve attachment functions). They, therefore, assessed the

automatic reactions elicited by generic attachment representations (e.g., a Picasso drawing of a mother and child, a picture of an old couple) in six of seven studies. One of the seven studies (Experiment 4), however, was more directly relevant to the present hypothesis regarding the automatic reactions elicited by the mental representation of specific attachment figures and self. Similar to Banse's (1999, 2001) findings, the name of a specific attachment figure elicited automatic positive reactions, but individual differences in automatic reactions were not related to adult attachment. Thus, to summarize, although specific attachment figures have been shown to automatically activate positive reactions, individual differences in such reactions have not been related to individual differences in adult attachment.

Present Studies

The main goal of the present studies was to revisit the question of whether individual differences in adult romantic attachment relate to automatic reactions, as predicted by Bowlby (1969). Support for this predicted relation has been difficult for at least two reasons. First, both Banse (1999) and Mikulincer et al. (2001) suggested that this difficulty might be caused by the poor stability of the affective priming techniques used to assess automatic reactions. Although affective priming techniques may be suitable for assessing typical reactions by people in general, their low test-retest reliability ($r = .02-.26$) (Bosson, Swann, & Pennebaker, 2000) makes them less suitable for assessing individual differences in automatic reactions.

A second reason for the difficulty in detecting the predicted relation between automatic reactions and adult attachment may be the level at which adult attachment is assessed. For most individuals, attachment-related thoughts, affects, and behaviors are likely to differ depending on the relationship partner (e.g., Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Collins & Read, 1994). Thus, a person's experiences with a specific romantic partner may differ from that person's experiences with romantic partners in general. For example, at a general level, a person may be characterized by an

insecure attachment pattern reflecting a person's history of negative interactions with attachment figures. Within a specific current relationship, however, the same individual may be characterized by a secure attachment pattern as a result of positive interactions with the partner (Baldwin, et al., 1996; Collins & Read, 1994). Therefore, it is possible that Bowlby's (1969) predicted relation between automatic reactions and adult romantic attachment may depend, in part, on the level at which adult attachment is assessed.

The present studies sought to address both of these concerns by using a more sensitive measure of automatic reactions and by assessing adult romantic attachment at two levels of specificity. Specifically, automatic reactions elicited by the mental representation of one's romantic partner, mother, and self were assessed using the Implicit Association Test (IAT) (Greenwald, et al., 1998). In comparison to affective priming techniques, the IAT has shown stronger test-retest reliabilities ($r=.65-69$) and larger effect sizes (Bosson, et al., 2000; Greenwald et al., 1998). It is therefore a promising measure of individual differences in automatic cognition and may be sensitive enough to evaluate the hypothesized relation between automatic reactions and adult romantic attachment. The present studies also assessed individual differences in adult romantic attachment at both a specific level (i.e., within one's current romantic relationship) and at a general level (i.e., across all romantic relationships).

Study 1

The main goal of the present study was to examine whether individual differences in automatic evaluative reactions relate to adult romantic attachment. To assess the automatic evaluative reactions elicited by, respectively, their romantic partner and self, participants performed two Implicit Association Tests (IAT). Participants also completed four adult attachment measures. Although romantic partner and self were both expected to elicit generally positive reactions (e.g., Banse, 1999/2001; Mikulincer, et al., 2001; Hazan & Shaver, 1987), the degree to which such automatic reactions relate to adult romantic attachment is still not known.

Method

Participants

Students enrolled in an introduction to psychology course at the University of Washington completed a three adult attachment measures and a short questionnaire about their relationship status as part of the university's mass testing procedure. Individuals who were involved in a romantic relationship were preselected to take part in the experimental sessions. Because insecure attachment styles represent relatively small portions of the population (Hazan & Shaver, 1987) participants were also preselected based on the attachment style descriptor (Bartholomew & Horowitz, 1991) they had chosen as most applicable to themselves (see Procedures and Measures). Two experimental sessions were conducted. Of the individuals invited to participate, 74 (54 women and 20 men) completed the first session, and 58 (44 women and 14 men) returned for the second session. To ensure comparability across analyses, only the results for the 58 participants (15 dismissing, 12 fearful, 16 preoccupied, and 15 secure) who completed all measures in both sessions are reported below. The median age of the 58-person sample was 18 yrs ($SD=1.51$ yrs), and the median duration of participants' romantic relationship was 44 weeks ($M=65.74$ weeks, $SD=62.58$ weeks).

Apparatus

The IATs in Studies 1 through 3 were all administered on IBM-compatible desktop computers with a Windows 95 operating system using the Farnham Implicit Association Test (FIAT) software (Farnham, 1997). Participants gave responses by pressing the A key with their left forefinger and the 5 key (on the right-side numeric keypad) with their right forefinger.

Procedures and Measures

Study 1 consisted of a prescreening session and two experimental sessions. Participants took part in the experimental sessions individually. At each experimental session, participants first performed one IAT and then completed self-report

questionnaires. This study was part of a larger project (Zayas, 2003), and only the questionnaires relevant to this study are discussed below.

Implicit Association Test. The procedures for the Partner-IAT and Self-IAT were identical. Thus, for brevity, the description that follows applies to both (unless otherwise noted). The phrase target person is used to refer to each participant's partner in the Partner-IAT and self in the Self-IAT.

The IAT method is a reaction-time measure that uses a series of discrimination tasks to assess the degree to which two concepts are differentially associated with two attributes. Before performing the standard 7-block IAT procedure (Greenwald et al., 1998), participants generated stimulus words for the target concept (described below). During the IAT, participants performed three types of discrimination tasks (i.e., target concept, attribute, and combined) in which they were presented with one word at a time in the middle of a computer screen and classified the presented word as quickly and as accurately as possible by pressing one of two computer keys (left or right). Because the critical components of the IAT method are the two combined discrimination tasks used for data collection (i.e., Blocks 4 and 7; Table 1), the following discussion focuses on these. Table 1 describes the discrimination tasks used to prepare participants for performing the combined discrimination tasks, as well as the order that the blocks were performed, number of trials per block, and sample items.

Table 1

The IAT assesses the strength of association between target concepts and attributes by examining differences in the ease, reflected by response latencies, with which individuals perform the two combined discrimination tasks. When a target concept and an attribute are strongly associated with each other and mapped onto the same response key (e.g., partner+positive), the categorization task should be relatively easy to perform (reflected

by faster response latencies). In contrast, when a target concept and an attribute are not, or only weakly, associated with each other and mapped onto the same response key (e.g., partner+negative), the categorization task is performed with more difficulty (reflected by slower response latencies). The IAT effect is the difference between the average response latency for the two combined discrimination tasks (i.e., partner+negative – partner+positive). Larger IAT effects reflect stronger positive associations with the target person.

Generating Stimuli Idiographically. For the attribute terms, all participants were presented with the same set of pleasant (e.g., success, health, peace) and unpleasant words (e.g., bomb, rotten, disaster), whose valences have been validated (Bellezza, Greenwald, & Banaji, 1986). For the target concept terms, participants generated stimuli idiographically. Adapting Greenwald and Farnham's (2000) approach, before performing the actual IAT discrimination tasks, participants were prompted through a series of questions to generate a list of uniquely descriptive words (e.g., target person's first name, nickname, hair color, city of birth) and a second list of non-descriptive words (e.g., name, hair color not associated with the target person). For the Partner-IAT, the name that participants used to refer to their partner appeared on the computer screen as labels to remind participants of the concept associated with the response key. For example, if participants referred to their partner as "John", then the target concept labels that appeared on the screen were "John" and "not John." Following Greenwald and Farnham (2000), for the Self-IAT, "me" and "not me" were the generic labels used. The present study used "not" target person as the contrast category because it was expected to be less likely to elicit affective reactions on its own, unlike concepts such as stranger and other (Fiske, 1981). Moreover, automatic reactions to stranger and others may be related to individual differences in adult romantic attachment (e.g., Berlin & Cassidy, 1999), making it difficult to interpret the meaning of the IAT effect.

Adult attachment measures. Adult romantic attachment was assessed using four different measures. For brevity, the measures are referred to as RQ-general, RQ-%, RQ-specific, and multi-item-general. The RQ-general, a modified version of the Relationship Questionnaire (RQ) (Bartholomew & Horowitz, 1991), assessed adult attachment style across all of the participants' romantic relationships. Participants ranked (from most to least descriptive) and rated (on an 8-point scale) how well four attachment style descriptors (i.e., paragraphs describing thoughts and feelings typically experienced within relationships by individuals with one of the four adult attachment styles) characterized their experiences within romantic relationships. Participants completed the RQ-general at the prescreening session and again at the first experimental session. The ranking version of the RQ-general was used to preselect participants. However, based on the recommendations of Fraley and Waller (1998), results for continuous measures are reported in the text and tables whenever possible. Because the attachment ratings of the two administrations of the RQ-general were related ($r_s = .50-.65$), mean scores (i.e., one for each of the four attachment scales) were computed. If a participant was missing a response to one of the two measures, the composite score for the scale was based on the available response. Cronbach's alphas (α) for the four RQ-general composite variables were as follows: dismissing: .78, fearful: .81, preoccupied: .72, and secure: .66. Only the results for the composite variables are reported.

RQ-% (Baldwin et al., 1996) (administered at the prescreening session), also a modified version of the original RQ, requires participants to estimate the percentage of their past and current romantic relationships that corresponded to each attachment style descriptor (Bartholomew & Horowitz, 1991). Finally, at the experimental session in which the Self-IAT was performed, participants completed the RQ-specific, in which they ranked (but did not rate) the four attachment style descriptors based on how well it described their thoughts and feelings within their specific romantic relationship.

Multi-item–general measure of adult romantic attachment (Brennan, Clark, & Shaver, 1998) consists of an 18-item avoidance scale that assesses discomfort with comfort and dependency and an 18-item anxiety scale that corresponds to vigilance concerning rejection and abandonment. These two dimensions are also assumed to correspond with a view of other and of self, respectively (Fraley & Shaver, 2000). At the prescreening session, participants rated how well (on a 7-point scale) each statement characterized their feelings and thoughts across all of their past romantic relationships.

Procedural Variables

All participants performed the Self-IAT in the first experimental session and the Partner-IAT in the second. For the Self-IAT and Partner-IAT, all participants also performed the target person+positive combined discrimination task first and the target person+negative combined discrimination task second. Because the order of the tasks has been shown to influence IAT effects (Greenwald, et al., 1998), and because the main goal of the present study involved examining individual differences, only relative differences among individuals in their IAT effects will be interpreted substantively. (Studies 2 and 3, in which the task order was counterbalanced, confirmed that the results involving individual differences were not influenced by these procedural variables.)

Data Reduction

Response latencies (in ms) and accuracy were recorded for each trial. Standard statistical procedures for dealing with data resulting from timed tests were followed (Greenwald et al., 1998). Specifically, data from the first two trials of each combined discrimination block and response latencies outside the normal range of time needed to categorize a single trial (<150 ms or >4999 ms) were excluded from further analysis. Response latencies less than 300 ms and greater than 3000 ms were recoded to 300 ms and 3000 ms, respectively. Latencies were then log-transformed. Finally, the IAT effect was computed by taking the difference in the average log-transformed latency for the two blocks used for data collection. All statistical significance tests and effect sizes were computed

using the log-transformed latencies. The average log-transformed latencies for each block were transformed back to milliseconds and are reported in the text and tables for illustrative purposes. For all the IATs reported in Studies 1 through 3, the error rates were low (range=3–11%) in the combined discrimination tasks used to compute the IAT effect. Furthermore, for all IATs, participants had more errors in the target person+negative combined discrimination task compared to the target person+positive combined discrimination task, indicating that faster response latencies were not caused by an increase in error rates.

Results

Main Effects: Automatic Reactions to Romantic Partner and Self

Although the central aim of the present research was to examine individual differences, a brief summary of the main effects is provided below for descriptive purposes. The top section of Table 2 reports the mean response latencies for the combined discrimination tasks and the computed IAT effects. As shown, participants found it more difficult to perform the combined discrimination task when the target person (partner, self) and negative were mapped onto the same response key (target person+negative) than when the target person and positive were mapped onto the same response key (target person+positive). When the target person was a participant's romantic partner, the difference between the two combined discrimination tasks (Partner-IAT effect) was +322.27 ms ($d=2.36$, $t(57)=15.11$, $p<10^{-20}$).² When the target person was self (Self-IAT effect), the difference was +383.15 ms ($d=2.64$, $t(57)=19.98$, $p<10^{-26}$). The correlation between Partner-IAT and Self-IAT was $r(58)=.42$ ($p<.001$). There were no significant sex differences on any of the IATs, and relations between adult attachment and IATs reported below did not depend (i.e., interact with) on participant's sex.

Table 2

Individual Differences in Relationship-Relevant Variables and Automatic Reactions

From the prescreening session to the time of the first experimental session, 13 of the 58 participants had broken up with their romantic partner. By the time of the second experimental session, 8 more participants had ended their relationship. The breakup rate was surprisingly high, which may reflect that most participants were in their first quarter in college and were involved in relationships that had probably formed before they came to college. This relatively large group made it possible to examine differences between automatic reactions elicited by current partners and ex-partners. Partner-IAT effects were larger for current partners than for ex-partners ($t(56)=2.19$, $p<.05$), indicating that current partners elicited stronger automatic positive reactions than ex-partners. Because individuals performed the Partner-IAT after they had broken up with their partner, future research is needed to determine whether this difference in positive reactions preceded and may have contributed to the breakup or whether it resulted from the breakup. Nonetheless, the results support the construct validity of the Partner-IAT. Finally, the relations between adult romantic attachment and IATs reported below did not depend on (i.e. interact with) whether or not individuals remained involved in their current romantic relationship.

Individual Differences in Adult Romantic Attachment and Automatic Reactions

Relations among measures of adult romantic attachment. Because the relationship between automatic reactions (IATs) and adult romantic attachment may depend on the level (specific vs. general) at which adult attachment was assessed and/or the particular measure used (RQ vs. multi-item-general), correlations among the different measures of adult romantic attachment (available at <http://shodalab.psych.washington/Zayas&Shoda2004.html>) were examined.

Correlation coefficients among RQs assessing the same attachment style should be large to the extent that measures assess the same aspects of a person's attachment network. RQ-general and RQ-% were expected to show relatively strong correspondence

given that they both assess a person's adult attachment style at a general level.

Coefficients should be small or moderate to the extent that RQs assess different aspects of a person's attachment network. RQ-specific was expected to show less correspondence with RQ-general and RQ-%, because it assesses adult attachment style with regard to one's specific partner and RQ-general and RQ-% assess adult attachment style at a general level. Consistent with these expectations, RQ-general and RQ-% showed the strongest correspondence (average coefficient of the four attachment scales=.60), followed by RQ-specific and RQ-general (average coefficient=.43), and lastly by RQ-specific and RQ-% (average coefficient=.35). Overall, the pattern of correlations is consistent with the expectation that adult attachment assessed at a general and specific level may differ within a person.

Although some of the correlations between the multi-item-general and the three RQs were as predicted (Fraley & Shaver, 2000), several correlations were not in the expected direction. The avoidance dimension was positively correlated with the dismissing and fearful attachment style as assessed by the RQ-% and RQ-general, but the fearful style as measured by RQ-specific was not ($r=.09$, ns). The avoidance dimension was also negatively correlated with the secure adult attachment style as assessed by the RQ-% and RQ-general, but not as assessed by the RQ-specific ($r=-.03$, ns). Contrary to expectations, the avoidance dimension was not negatively correlated with the preoccupied attachment style, except as assessed by the RQ-specific ($r=-.29$, $p<.05$). The anxiety dimension, as expected, was positively correlated with fearful and preoccupied attachment styles and negatively correlated with dismissing and secure attachment styles. Interestingly, the anxiety dimension was more strongly (in a positive direction) correlated with the preoccupied attachment style than with the fearful attachment style. Given that these correlations were not completely as expected, the analyses here report the results for the four paragraph ratings separately instead of combining them to form two dimensions as recommended by Fraley and Shaver (2000). In addition, that the RQ-

specific appeared to correlate with the multi-item-general in different ways than the RQ-general and RQ-%, also suggests that adult attachment assessed at a general and specific level differ to some degree.

Partner-IAT. Table 3 reports the correlations between the four adult attachment measures (listed in column 1) and Partner-IAT (column 2) and Self-IAT (column 3).² For each adult attachment measure, differences in the magnitude of two correlations were tested using McNemar's test and statistically significant differences at $p < .05$ are indicated by different subscripts.

When adult attachment was assessed by the RQ-general, Partner-IAT was positively correlated ($r = .30$, $p < .05$) with a secure adult attachment style. This correlation was greater than ($p < .05$) the weak, negative correlation between Partner-IAT and the dismissing attachment style, greater than ($p < .05$) the weak, negative correlation between Partner-IAT and the preoccupied attachment style, and greater than the correlation between Partner-IAT and the fearful attachment style (but not significant at $p < .05$).

Table 3

When adult attachment was assessed by the RQ-%, which showed high correspondence with the RQ-general, Partner-IAT was positively correlated ($r = .34$, $p < .05$) with a secure adult attachment style. Moreover, this correlation was greater than ($p < .05$) the correlation between Partner-IAT and the dismissing attachment style, greater than ($p < .05$) the negative correlation ($r = -.27$, $p < .05$) between Partner-IAT and the preoccupied attachment style, and greater than (although not significant at $p < .05$) the correlation between the fearful attachment style and Partner-IAT.

When adult attachment was assessed by the RQ-specific, Partner-IAT was positively correlated ($r = .28$, $p < .05$) with a secure adult attachment style. This correlation was greater than ($p < .05$) the correlation between Partner-IAT and the dismissing

attachment style, and greater than ($p < .05$) the correlation between Partner-IAT and the fearful attachment style. It was also greater than (although not significant at $p < .05$) the correlation between Partner-IAT and the preoccupied attachment style.

Finally, when adult attachment was assessed by the multi-item-general, Partner-IAT was negatively correlated ($r = -.33$, $p = .01$) with the avoidance dimension, but not significantly correlated with the anxiety dimension. Regression analysis revealed no significant interaction between avoidance and anxiety.

Self-IAT. As shown in Table 3 (column 2), automatic evaluative reactions to self showed no clear relations with measures of adult romantic attachment. The one exception was when adult attachment was assessed by the RQ-general: The correlation between Self-IAT and secure adult attachment style ($r = .21$, ns) was greater than ($p < .05$) the correlation between Self-IAT and the preoccupied attachment style ($r = -.23$, $p < .10$).

Discussion

The results of Study 1 showed that adult romantic attachment was related to automatic positive reactions to one's partner as assessed by the IAT. Specifically, a secure adult attachment style, assessed at both specific and general levels, was strongly related to automatic positive reactions to one's partner. In contrast, the insecure adult attachment styles (i.e., fearful, dismissing, and preoccupied) were not related to stronger positive reactions to one's partner. These results provide support for Bowlby's conceptualization of internal working models and the importance of automatic evaluative reactions.

With regard to the relationship between automatic evaluative reactions to self and adult romantic attachment, the results were not as expected. Although automatic evaluative reactions to self are hypothesized to play a central role in internal working models (Bowlby, 1969; Bartholomew & Horowitz, 1991), the present study did not show significant relations between evaluative reactions to self and measures of the adult

attachment. These null findings, however, may be a result of the small sample size ($N=58$). For this reason, this question was reexamined in Studies 2 and 3.

Might the relationship between Partner-IAT and adult romantic attachment be the result of a methodological artifact rather than differences in the automatic reactions elicited by one's partner? For example, could there be individual differences in how people responded to the "not" target person contrast category? This possibility seems unlikely. The pattern of correlations suggests that the results are specific to the Partner-IAT and caused by individual differences in reactions to the partner descriptive words. That is, Self-IAT and Partner-IAT were identical, except for the words referring to the target person. Despite the similarity in design, only Partner-IAT was related to adult romantic attachment (and continued involvement in current relationship).

Study 2

The results of Study 1 showed that adult romantic attachment was related to the extent to which the mental representation of one's romantic partner automatically elicited positive reactions but was not related to automatic reactions elicited by mental representation of self. Study 2 assessed the replicability of these findings, and also examined the relation between adult romantic attachment and the degree to which the mental representation of one's mother is automatically associated with supportiveness. According to Bowlby's (1969) original conceptualization of attachment theory, attachment representations formed in early life as a result of repeated interactions with one's primary caregiver, particularly one's mother (Main, Kaplan, & Cassidy, 1985), influence the attachment representations that develop in later life within adult close relationships. Moreover, Bowlby stressed the importance of automatic evaluative reactions in such representations. The more recent conceptualization of adult attachment theory also proposes that patterns of adult romantic attachment develop, in part, from infant-caregiver interactions (Hazan & Shaver, 1987; Bartholomew & Horowitz, 1991) and emphasizes the importance of automatic processes (Shaver & Mikulincer, 2002).

Although past research has found moderate concurrent associations between representations of early life relationships and adult romantic relationships using a variety of methodologies (for a review see Crowell, Fraley, & Shaver, 1999; Fraley & Shaver, 2000), no study has examined the degree to which individual differences in adult romantic attachment are related to automatic supportive associations with one's mother as assessed by measures of automatic cognition such as the IAT.

Method

Participants

Using the University of Washington's mass testing procedure, participants were selected to take part in the experimental sessions based on the preselection criteria described in Study 1. Three experimental sessions were conducted. Of the individuals invited to participate, 139 completed the first session, 126 returned for the second session, and 85 participants (63 women and 22 men) completed all three sessions. To ensure comparability across analyses, the results below are based only on the 85 participants (23 dismissing, 16 fearful, 19 preoccupied, and 27 secure) who completed all measures. The median age of the sample was 19 yrs ($SD=3.53$ yrs), and the median duration of participants' romantic relationship was 38 weeks ($M=62.1$ weeks, $SD=73.3$ weeks).

Procedures and Measures

Participants completed procedures similar to those administered in Study 1 (Partner-IAT, Self-IAT, and adult attachment measures). As in Study 1, the RQ-general administered at prescreening was related to the RQ-general administered at the experimental session ($r_s=.46-.69$). Thus, mean scores (i.e., one for each of the four attachment scales) were computed (α s were as follows: dismissing: .76, fearful: .74, preoccupied: .81, secure: .63). In addition to the procedures described in Study 1, participants in Study 2 took part in a third session, in which they completed the Mother-IAT and additional self-report measures.

Mother-IAT. The procedures used to assess the extent to which self automatically elicits positive reactions were similar to those used for the Partner-IAT and Self-IAT (see Study 1: Procedures and Measures, and Table 1). The key difference in design between the Mother-IAT and Partner- and Self-IATs was the nature of the attribute discrimination task. For the Mother-IAT, the attribute discrimination task involved classifying stimulus words that were supportive (e.g., caring, giving, loving) and rejecting (e.g., cold, distant, critical), and for the Partner-IAT and Self-IAT, in order to replicate the results of Study 1, the attribute discrimination task remained classifying stimulus words that were pleasant and unpleasant. The supportive and rejecting words used as stimuli were validated in an independent sample (Zayas & Shoda, 2004). “Supportive” and “Rejecting” were the labels that appeared on the computer screen as a reminder of the attribute associated with each response key. In a separate study, the test-retest reliability of Mother-IAT using supportive versus rejecting as the attribute discrimination task was $r(26) = .68$, $p < .001$ ($\alpha = .81$) (Zayas & Shoda, 2004).

RQ-specific (Bartholomew & Horowitz, 1991). At the experimental session in which the Self-IAT was performed, participants rated, as well as ranked, how well each descriptor characterized their thoughts, feelings and behaviors within their current romantic relationship on a scale from 1 (not at all) to 8 (extremely well).

Relationship-relevant questions (Kasian & Painter, 1992; Spanier, 1976) (administered at the prescreening session) assessed length of relationship, level of emotional commitment, expectations that the relationship would last one year, that it would last five years, and feelings about the future of the relationship.

Social Desirability Responding (Paulhus, 1991). Participants completed a 20-item scale designed to assess self-deception (i.e., the tendency to give favorably biased but honestly held self-descriptions) and another 20-item scale designed to assess impression management (i.e., the tendency to give favorable self-descriptions to others).

Procedural Variables

From each attachment style (based on RQ-general administered for prescreening), an approximately equal number were randomly assigned to one of four experimental conditions that controlled for the following two procedural variables: Order in which the combined discrimination tasks were performed within each IAT, and order in which the Partner- and Self- IATs were performed (all participants performed the Mother-IAT in the last session). There was no significant main effect for order of combined discrimination task on any of the IATs, nor did it interact with any of the relevant variables. Order of experimental session also had no significant main effect on Partner-IAT or Mother-IAT and did not interact with other relevant variables. Order of experimental session did have a significant effect on Self-IAT ($d=.93$, $t(83)=4.30$, $p<.001$); Self-IAT effects were larger when performed in the first session ($M=408.94$ ms) than in the second session ($M=332.20$ ms). However, because relations between adult attachment and IATs did not depend (i.e., interact with) order of experimental session, the results are reported for the combined sample.

Results

Main Effects: Automatic Reactions to Romantic Partner, Self, and Mother

Partner-IAT effects and Self-IAT effects were large ($d=1.91$ and $d=2.68$, respectively) and in a positive direction (middle section of Table 2). In the Mother-IAT, participants found it more difficult to perform the combined discrimination task when “Mother” and “Rejecting” were mapped onto the same response key ($M=953.71$ ms) than when “Mother” and “Supportive” were mapped onto the same response key ($M=679.28$ ms). The difference between these two combined discrimination tasks (Mother-IAT effect) was $+274.43$ ms ($d=1.77$, $t(84)=16.28$, $p<10^{-26}$).

In the Partner-IAT, men had significantly greater IAT effects than women ($d=.58$, $t(83)=2.32$, $p<.05$), but there was no significant sex difference in either the Self-IAT or Mother-IAT. Moreover, there were no significant interactions as a function of sex on any of the IATs. The relations among the IATs were as follows: Partner-IAT was strongly

correlated with Mother-IAT ($r=.45$, $p<.0001$), Mother-IAT was moderately correlated with Self-IAT ($r=.26$, $p<.05$), and Self-IAT was moderately correlated with Partner-IAT ($r=.23$, $p<.05$).

Individual Differences in Relationship-Relevant Variables and Automatic Reactions

In contrast to Study 1, only four participants had broken up with their romantic partner by the third experimental session. Thus, it was not possible to reliably evaluate whether IAT effects were related to whether participants remained involved with their romantic partner. Partner-IAT, however, was correlated with length of relationship ($r=.34$, $p<.001$), level of emotional commitment ($r=.25$, $p<.05$), and expectations about the future of the relationship ($r=.36$, $p<.001$). With the exception that Self-IAT was also correlated with length of the relationship ($r=.22$, $p<.05$), neither Self-IAT nor Mother-IAT correlated with dyadic characteristics.

Individual Differences in Adult Romantic Attachment and Automatic Reactions

Relations among measures of adult romantic attachment. The pattern of correlations among the measures of adult romantic attachment (available at <http://shodalab.psych.washington/Zayas&Shoda2004.html>) was highly similar to those found in Study 1.

Partner-IAT and Self-IAT. Table 4 reports the correlations between the four adult attachment measures (listed in column 1) and Partner-IAT (column 2), Self-IAT (column 3), and Mother-IAT (column 4). The pattern of results replicates the findings of Study 1. Adult romantic attachment was related to automatic positive associations with one's romantic partner, but did not show a clear relation to automatic associations with one's self. Because none of the correlations involving Self-IAT were statistically significant, results involving Self-IAT are not discussed further here.

When adult attachment was assessed by the RQ-general, Partner-IAT was positively correlated ($r=.27$, $p<.05$) with the secure adult attachment style. This correlation was greater than ($p<.05$) the negative, marginally significant correlation ($r=-$

.20, $p < .10$) between Partner-IAT and the dismissing attachment style, greater than ($p < .05$) the correlation between Partner-IAT and the fearful attachment style, and greater than (although not significant at $p < .05$) the correlation between Partner-IAT and the preoccupied attachment style.

Table 4

When adult attachment was assessed by the RQ-%, Partner-IAT was positively correlated ($r = .23$, $p < .05$) with the secure adult attachment style. This correlation was greater than ($p < .05$) the correlation between Partner-IAT and the dismissing adult attachment style. Although not significant at $p < .05$, the correlation between Partner-IAT and the secure adult attachment style was also greater than the correlations between Partner-IAT and both fearful and preoccupied attachment styles.

When adult attachment was assessed by the RQ-specific, the correlation between Partner-IAT and the secure adult attachment style was slightly, but nonsignificantly, positive ($r = .13$, ns). Although this correlation was greater than the correlations between Partner-IAT and both dismissing ($r = -.16$, ns) and fearful ($r = -.28$, $p < .05$) attachment styles, these differences in correlations were not statistically significant. The correlation between Partner-IAT and the preoccupied attachment style was slightly, but nonsignificantly, positive ($r = .15$, ns) and this correlation was greater than ($p < .05$) the correlations between Partner-IAT and both fearful and dismissing adult attachment styles.

Finally, Partner-IAT was negatively correlated with the avoidance dimension of the multi-item-general measure ($r = -.31$, $p < .01$), and not significantly related to the anxiety dimension. In addition, regression analysis revealed no significant interaction between avoidance and anxiety.

Mother-IAT. As shown in Table 4, when adult attachment was assessed by the RQ-general, Mother-IAT was positively correlated with the secure adult attachment style

($r=.23$, $p<.05$), but was not correlated with the dismissing, fearful, and preoccupied adult attachment styles. In addition, the avoidance dimension of the multi-item–general attachment measure was negatively related to Mother-IAT as predicted ($r=-.21$, $p<.05$). When adult attachment was assessed using the RQ-% or RQ-specific, none of the correlations between Mother-IAT and adult attachment styles were significant.

Relations among Social Desirability Responding, Automatic Reactions, and Adult Romantic Attachment

The IAT is assumed to be relatively immune to tendencies for self deception and impression management (Greenwald, et al., 1998). Consistent with this expectation, the three IATs were only weakly and nonsignificantly correlated with the self-deception and impression management scales ($r=-.08-.10$). In contrast, adult attachment measures were moderately correlated with the self-deception and impression management scales ($r=-.36-.35$). Results controlling for self deception and impression management the results were highly consistent with those reported here.

Discussion

The results of Study 2 replicated the main findings of Study 1. A secure adult attachment style assessed at a general level was associated with stronger automatic positive reactions to one's romantic partner. In addition, as observed in Study 1, no significant relations were found between any of the adult romantic attachment measures and automatic evaluative reactions to self. These null findings are addressed in more detail in the General Discussion.

A main goal of Study 2 was to examine the theoretically expected relationship between adult romantic attachment and the extent to which the mental representation of one's mother is automatically associated with supportiveness. A secure adult attachment style was associated with stronger automatic supportive associations with one's mother than were the three insecure adult attachment styles. This relation, however, was found only when adult attachment was assessed at a general level (i.e., across all romantic

relationships) and did not occur when adult attachment was assessed in relation to one's specific romantic partner or based on the percentage of different attachment experiences. The finding that automatic supportive associations with one's mother are related to adult attachment assessed at a general, but not specific level, is consistent with Collins and Read's (1994) notion of an attachment network hierarchy. Within this framework, thoughts and affects of one's mother, the basis from which generalized representations of others and self form, are expected to be central in a person's mental network. Thus, such cognitions and affects are highly accessible and readily applied to a majority of a person's relationships. With the increased applicability, however, comes a loss of specificity. That is, although such thoughts and feelings may apply to many relationships, they are less likely to accurately reflect or "fit" specific relationships.

Study 3

The results of Study 2 showed that individual differences in adult romantic attachment were related to the degree to which the mental representation of one's mother was automatically associated with supportiveness. In Study 3, the replicability of this finding was examined by administering the Mother-IAT to a group of men. Furthermore, to obtain stable estimates of the magnitude of the relations between adult attachment and automatic reactions elicited by the mental representation of one's partner, mother, and self, Study 3 reports the results of meta-analyses performed on the data from Studies 1 through 3. Finally, it was predicted that the relations between adult romantic attachment and automatic reactions as assessed by the IATs would be strongest for attachment-schematic individuals. Participants were, therefore, classified as attachment-schematic if they showed agreement between their specific and general adult attachment styles and the meta-analytic procedures were performed a second time using data from only these individuals.

Method

Participants

Participants were 112 male students attending the University of Washington who were participating in a separate study in exchange for extra credit toward their introductory psychology class. Five participants had average response latencies of over 2000 ms (greater than the average response latencies expected on IAT tasks, Greenwald et al., 1998) and/or had incorrectly classified more than 25% of the trials, so they were excluded from analyses. Three other men did not complete the self-report measures and were also excluded from analyses. Of the remaining 104 participants, 59 were and 45 were not involved in a romantic relationship at the time of the first experimental session. There was no main effect for involvement in a current relationship or significant interactions with the relevant variables. The median age of participants was 19 years ($SD=1.23$).

Procedures and Measures

Because participants were taking part in a separate study that was designed to develop men's descriptions of themselves in the form of personal ads (Zayas, 2003), only the questionnaires and procedures relevant to the present study are reported here. Participants took part in the university's mass testing procedure, in which they completed the categorical version of the RQ-general (17 dismissing, 15 fearful, 22 preoccupied, 47 secure, and 3 unspecified). Participants returned for two experimental sessions, in which they performed the Mother-IAT and another RQ-general (categorical and continuous versions) (see Study 1 Procedures and Measures). The experimental sessions were held in rooms equipped with 24-26 IBM-compatible computers.

Procedural Variables

For each attachment style (based on RQ-general at prescreening), an approximately equal number of participants were randomly assigned to one of the two conditions that controlled for the order in which the combined discrimination tasks were performed within the Mother-IAT. The Mother-IAT effect was larger ($t(102)=2.59$, $p<.05$) when the mother+supportive task was performed first ($M=479.08$ ms) than when

the mother+rejecting task was performed first ($M=363.60$ ms). However, because the relations between Mother-IAT and adult romantic attachment, which was the main focus of this study, were highly similar in both conditions, the results for the entire sample combined are reported here.

Results and Discussion

Mother-IAT

The Mother-IAT effect was large and in a positive direction ($M=419.03$ ms, $d=2.52$, $t(103)=25.74$, $p<10^{-17}$; bottom section of Table 2). More central to Study 3's aims, the pattern of results using the all-male sample replicated the results of Study 2: A secure adult attachment style was more positively correlated with stronger automatic supportive associations with one's mother than were any of the three insecure adult attachment styles (i.e., fearful, dismissing, and preoccupied). Table 5 shows the correlations between individual differences in Mother-IAT effects and adult attachment style as assessed by the RQ-general.

Table 5

Meta-Analyses of Effect Sizes

To obtain more stable estimates of the magnitude of the relations between adult romantic attachment and Partner-IAT (obtained in Studies 1 and 2), as well as between adult romantic attachment and Mother-IAT (obtained in Studies 2 and 3), meta-analyses were used to combine the data from the individual studies (Field, 2001; Hedges & Olkin, 1985; Hedges & Vevea, 1998), as follows. Correlations (a measure of effect size) within each study were converted to z scores using Fisher's r to z transformation. Transformed correlations were then weighted as a function of the accuracy of the effect size (i.e., based on the sample size) and averaged across relevant studies. The significance value for this average effect size was computed by dividing it by the standard error, based on Hedges

and Vevea's (1998) formula. The estimates across studies for the difference between two correlations were also computed. Specifically, the t test value obtained from McNemar's test of two correlations and the degrees of freedom ($N - 3$) were used to compute the effect size within each study. Using the meta-analytic procedures described above, the average effect sizes across studies, representing the average difference between correlations, were obtained.³ These results are consistent with the results of the individual studies and our interpretation of the results so far (Table 6).

Table 6

Next, the meta-analysis was repeated using only the data from individuals who showed agreement between their specific and general attachment styles in Studies 1 and 2 (Because Study 3 assessed adult romantic attachment only at a general level, data from Study 3 were not included in this analyses.). Using the categorical versions of the RQ-specific and RQ-general administered, respectively, at the experimental and prescreening sessions, participants who indicated the same attachment style on both measures were classified as attachment-schematic. The estimates of the effect sizes for the 63 attachment-schematic participants (dismissing 7, fearful 9, preoccupied 11, and secure 36) are shown in Table 7. As expected, the relations between adult romantic attachment and Partner-IAT were stronger than those observed for the entire sample. Self-IAT, on the other hand, continued to be unrelated to measures of adult romantic attachment. Finally, the correlation coefficients between Mother-IAT and measures of adult romantic attachment did not increase when the analysis was limited to attachment-schematic participants. However, these coefficients were based on the data from one sample (i.e., only Study 2 had Mother-IAT and specific and general measures of adult romantic attachment).

Table 7

General Discussion

Consistent with Bowlby's (1969) theoretical emphasis on the importance of automatic evaluative processes in internal working models, the present studies support the hypothesis that automatic reactions elicited by the mental representation of romantic partners and mothers are related to attachment-related thoughts and feelings in adult romantic relationships. Specifically, a secure adult attachment style was positively and highly significantly ($p < .001$) related to the extent to which one's romantic partner automatically elicited positive reactions, and these correlations were more positive than those observed with each of the three insecure adult attachment styles (i.e., dismissing, fearful, and preoccupied) (Table 6). Moreover, participants who were classified as attachment-schematic (i.e., indicating the same specific and general attachment styles) showed stronger relations between automatic reactions to partner and adult romantic attachment (Table 7).

Given that the present studies assessed individual differences in attachment patterns with regard to adult romantic relationships, it makes sense that adult romantic attachment was related to the extent that the mental representation of one's partner elicited automatic positive reactions. These studies, however, also showed that a secure adult attachment style assessed at a general level was positively and highly significantly ($p < .001$) related to automatic supportive associations with one's mother ($p < .001$) (Table 6). Furthermore, consistent with theoretical predictions, the correlation between a secure attachment style and automatic associations with mother were significantly more positive than those found for each of the three insecure adult attachment styles.

Could Partner- and Mother-IAT be assessing the extent to which people in general (rather than partner and mother specifically) elicit positive reactions? Some evidence

suggesting that this may not be the case comes from Study 2, which showed that Partner- and Mother-IAT did not simply correlate with the same measures. Specifically, automatic positive reactions to one's current romantic partner were strongly correlated with characteristics of individuals' current romantic relationships (e.g., emotional commitment and satisfaction), but automatic associations with mother (and self) were not. In addition, Partner-IAT was associated with adult attachment assessed at a specific level and at a general level whereas Mother-IAT was only associated with adult attachment assessed at a general level. Taken together, these results suggest that the IAT is assessing automatic reactions to specific persons rather than simply assessing automatic reactions to all people (although it may do so in part).

Because of the concurrent assessment of automatic associations with mother and measures of adult romantic attachment, the results do not address whether automatic associations were formed in early life and shaped adult attachment styles or whether experiences in adult romantic relationships shaped aspects of representations formed earlier. Future research using longitudinal designs may help to distinguish between these two possibilities. Nonetheless, to the extent that the IAT reflects "introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action towards social objects" (Greenwald & Banaji, 1995, p. 8), it suggests a concurrent link between mental representations of primary caregivers and mental representations of adult romantic partners. Moreover, because the IAT and measures of adult attachment are distinct with regard to format, the relation between adult romantic attachment and automatic supportive associations with one's mother is less likely to be the result of self-reporting tendencies or a shared method factor. Thus, the results provide support for the construct validity of measures of adult romantic attachment, which have been criticized for their weak correspondence with non self-report measures designed to capture aspects of attachment representations of parents (Crowell, Fraley, & Shaver, 1999).

One implication of these studies involves the cognitive-affective processes associated with a preoccupied adult attachment style. As discussed earlier, the four-category model (Bartholomew & Horowitz, 1991) conceptualizes adult attachment styles in terms of explicit evaluations of others and self. Within this framework, a preoccupied attachment style is associated with a positive view of others. However, the present studies showed that, when adult attachment style was assessed at a general level or based on the percentage-of-relationships measure (RQ-%), the evaluative reactions associated with a preoccupied attachment style were more similar to fearful and dismissing adult attachment styles than to the secure adult attachment style (Table 6 and 7). These findings suggest that a preoccupied attachment style may correspond with less positive reactions at an automatic, implicit level.

Finally, the results of Studies 1 and 2 and the meta-analyses show that automatic reactions of self as assessed by IAT were not related to adult romantic attachment (Table 6) even among attachment-schematic individuals, who were expected to show the strongest relations (Table 7). This lack of a clear correspondence is intriguing, because evaluations to self, both explicit and automatic, are assumed to underlie differences in adult romantic attachment (Bartholomew & Horowitz, 1991; Brennan et al., 1998). One possibility is that individual differences in automatic evaluative reactions of self, as assessed in relatively neutral contexts, are not predictive of individual differences in adult romantic attachment. This is consistent with the suggestion made by Fraley and Waller (1998) that “the dimension of Anxiety captures variation in physiological and emotional parameters rather than cognitive knowledge structures, whereas Avoidance captures variation in the organization of knowledge structures rather than emotional thresholds” (p. 107). If the anxiety dimension underlying adult romantic attachment corresponds to anxiety and vigilance concerning rejection and abandonment (Brennan et al., 1998), perhaps cues that activate thoughts of rejection or abandonment are needed to elicit anxiety and to observe the expected individual differences in automatic evaluative

reactions of self. This possibility seems reasonable, given that the Self-IAT is predictive of reactions to stressor events such as success and failure (Greenwald & Farnham, 2000).

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Footnotes

- ¹ All statistical tests and effect sizes are computed using log-transformed latencies. However, response latencies are reported in untransformed milliseconds (i.e., mean log-transformed latencies for each block of trials transformed back to milliseconds).
- ² In both Studies 1 and 2, controlling for length of romantic relationship produced results that were highly consistent with those reported in the text and tables.
- ³ Because persons with insecure attachment styles represent relatively small portions of the population, participants in all three studies were preselected based on their responses to adult attachment measures (Studies 1, 2, and 3), as well as their involvement in a romantic relationship (Studies 1 and 2). To the extent that characteristics of the present samples differ from those of the population, the magnitude of the effect size estimates may not be representative of the population values.

Table 1

Example of 7-Block Implicit Association Test (IAT) Used to Assess Automatic Reactions Elicited by the Mental Representations of a Target Person (Partner, Mother, Self)

Block	No. Trials	Discrimination task	Task Description	Response key mapping for target concept and attribute ^a		Example of stimulus words to be classified ^b
				LEFT	RIGHT	
1	20	Attribute	Classified attribute terms as either unpleasant or pleasant	unpleasant	pleasant	•bomb sunshine•
2	20	Target concept	Classified target concept terms as either descriptive or non-descriptive of target person	John	not John	•Johnny Steve•
3 & 4 ^c	20 & 40	Combined	Attribute (block 1) and target concept (block 2) discrimination tasks combined	John or unpleasant	Not John or pleasant	•Johnny •bomb Steve• sunshine•
5	20	Target concept	Same as block 2, but with response key assignments reversed	not John	John	Johnny• •Steve

6 & 7 ^d	20 & 40	Combined	Attribute (block 1) and target concept with key assignments reversed (block 5) discrimination tasks combined	not John or unpleasant	John or pleasant	Johnny• bomb• •Steve •sunshine
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Note. In the example above, the name of the target person is John. The discrimination tasks are listed from top to bottom in the order performed by participants. The IAT effect is computed by taking the mean difference in reaction time between the two combined tasks used for data collection. Specifically, IAT effect = mean reaction time for the target person+unpleasant combined task (Block 7) – mean reaction time for the target person+pleasant combined task (Block 4).

^a These words also appeared on the upper left and right corners of the computer screen as labels to remind participants of the response key assignments. For the Mother-IAT, the attribute labels were “Supportive” and “Rejecting”. ^b Words to be classified are presented one at a time in the center of the computer screen. Dots placed to the left of the stimulus words listed below indicate that correct classification of the stimulus involves a left key press. Dots placed to the right of the stimulus word indicate that correct classification of the stimulus involves a right key press. ^c Block 3 consisted of 20 practice trials not used for data collection. Block 4 was identical to block 3, except that it consisted of 40 trials used for data collection. ^d Block 6 consisted of 20 practice trials not used for data collection. Block 7 was identical to block 6, except that it consisted of 40 trials used for data collection.

Table 2

Mean (Standard Deviations in Parenthesis) Response Latencies (in ms) for Combined Discrimination Tasks and Computed IAT Effects for IATs from Studies 1, 2, and 3

	Combined Discrimination Task		
Target person	Target person	Target Person	IAT Effect ^a
	+Negative	+Positive	
Study 1 (N=58)			
Partner	1023.77 (207.14)	701.50 (114.90)	322.27*** (162.48)
Self	1053.21 (209.74)	670.07 (109.11)	383.15*** (174.07)
Study 2 (N=85)			
Partner	1075.96 (226.01)	705.84 (109.17)	370.12*** (194.03)
Self	980.79 (194.90)	640.84 (86.95)	339.96*** (155.25)
Mother ^b	953.71 (197.05)	679.28 (109.11)	274.43*** (176.26)
Study 3 (N=104)			
Mother ^b	1201.03 (228.12)	783.80 (134.39)	417.22*** (193.97)

Note. Response latencies are reported in untransformed milliseconds (i.e., mean log-transformed latencies for each block of trials transformed back to milliseconds). All statistical tests and effect sizes, however, are computed using log-transformed latencies.

^a IAT effect = mean response latency for the target person+unpleasant combined task – mean response latency for the target person+pleasant combined task. Larger IAT effects reflect stronger positive associations with target person. ^b For the Mother-IAT, the words used as stimuli for the attribute were supportive and rejecting.

*** $p < 10^{-15}$

Table 3

Correlations between IAT effects (Partner and Self) and Measures of Adult Romantic Attachment (N=58)

	Target Person	
	Partner-IAT	Self-IAT
<u>Adult Attachment Measure</u>		
<u>RQ-General Attachment Style</u>		
Dismissing	-.14 _a	.20 _{a, b}
Fearful	-.11 _{a, b}	-.01 _{a, b}
Preoccupied	-.13 _a	-.23 [†] _a
Secure	.30* _b	.21 _b
<u>RQ-Percentage of Different Attachment Experiences</u>		
Dismissing	-.11 _a	-.02 _a
Fearful	.00 _{a, b}	.12 _a
Preoccupied	-.27* _a	-.15 _a
Secure	.34** _b	-.09 _a
<u>RQ-Attachment Style Specific to Partner</u>		
Dismissing	-.21 _a	-.14 _a
Fearful	-.11 _{a, b}	-.04 _a
Preoccupied	.07 _{a, b}	.00 _a
Secure	.28* _b	.19 _a
<u>Multi-item-General Attachment Style</u>		
Avoidance	-.33* _a	-.06 _a
Anxiety	-.19 _a	-.17 _a

Note. Within each column and for each adult attachment measure, correlations with different subscripts differ significantly at $p < .05$ using McNemar's test of two

correlations. For the RQ-specific, participants ranked the four attachment paragraphs from most to least descriptive. These four ordinal attachment scales were recoded (e.g., a ranking of 4 identified the most descriptive paragraph and a ranking of 1 identified the least descriptive paragraph) in order to make the interpretation of the correlation coefficients consistent with those obtained using the other attachment measures.

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

Table 4

Correlations between IAT Effects (Partner, Self, and Mother) and Measures of Adult Romantic Attachment (N=85)

	Target Person		
	Partner-IAT	Self-IAT	Mother-IAT
<u>Adult Attachment Measure</u>			
<u>RQ-General Attachment Style</u>			
Dismissing	-.20 [†] _a	.08 _a	-.07 _a
Fearful	-.18 _a	-.17 _a	-.09 _a
Preoccupied	.10 _{a, b}	-.02 _a	.07 _a
Secure	.27* _b	-.02 _a	.23* _a
<u>RQ-Percentage of Relationships</u>			
Dismissing	-.13 _a	.15 _a	-.11 _a
Fearful	-.01 _{a, b}	-.12 _a	-.09 _a
Preoccupied	.04 _{a, b}	-.07 _a	.05 _a
Secure	.23* _b	.14 _a	.11 _a
<u>RQ-Attachment Style Specific to Partner</u>			
Dismissing	-.16 _a	.11 _a	-.05 _a
Fearful	-.28* _a	-.11 _a	-.12 _a
Preoccupied	.15 _b	.01 _a	-.03 _a
Secure	.13 _{a, b}	-.10 _a	.08 _a
<u>Multi-item-General Attachment Style</u>			
Avoidance	-.31*** _a	-.03 _a	-.21* _a
Anxiety	.00 _b	-.10 _a	.03 _a

Note. Within each column and for each adult attachment measure, correlations with different subscripts differ significantly at $p < .05$ using McNemar's test of two correlations.

*** $p < .005$. ** $p < .01$. * $p < .05$. [†] $p < .10$.

Table 5

Correlations between Mother-IAT Effects and Measures of Adult Romantic AttachmentN=104

	Mother-IAT
<u>Adult Attachment Measure</u>	
<u>RQ-General Attachment Style</u>	
Dismissing	-.10 _a
Fearful	-.08 _{a, b}
Preoccupied	-.10 _a
Secure	.24* _b

Note. Correlations with different subscripts differ significantly at $p < .05$ using McNemar's test of two correlations.

* $p < .05$.

Table 6

Average Correlation Coefficients Between IAT Effects and Measures of Adult Romantic Attachment from Meta-Analyses of Studies 1, 2, and 3

	Target Person		
	Partner-IAT	Self-IAT	Mother-IAT
	(<u>N</u> = 143)	(<u>N</u> = 143)	(<u>N</u> = 189) ^A
Adult Attachment Measure			
<u>RQ-General Attachment Style</u>			
Dismissing	-.18* _a	.13 _a	-.09 _a
Fearful	-.15 [†] _a	-.11 _a	-.09 _a
Preoccupied	.01 _a	-.11 _a	-.03 _a
Secure	.29*** _b	.07 _a	.24*** _b
<u>RQ-Percentage of Relationships</u>			
Dismissing	-.12 _a	.08 _a	-.11 _a
Fearful	-.01 _a	-.02 _a	-.09 _a
Preoccupied	-.09 _a	-.10 _a	.05 _a
Secure	.28*** _b	.05 _a	.11 _a
<u>RQ-Attachment Style Specific to Partner</u>			
Dismissing	-.18* _a	.01 _a	-.05 _a
Fearful	-.22* _a	-.08 _a	-.12 _a
Preoccupied	.12 [†] _b	.01 _a	-.03 _a
Secure	.20* _b	.02 _a	.08 _a
<u>Multi-item-General Attachment Style</u>			
Avoidance	-.33*** _a	-.04 _a	-.21* _a
Anxiety	-.08 _b	-.13 _a	.03 _a

Note. Columns 1 and 2 are based on data from Studies 1 and 2. Column 3 are based on data from Studies 2 and 3. Within each column and for each adult attachment measure, correlations with different subscripts differ significantly at $p < .05$ or greater. The estimates of the difference between two correlations were obtained by converting the t

statistic for the difference of correlations (based on McNemar's procedure) into an \underline{r} and then using meta-analytic procedures to aggregate the data from the relevant studies.

^A Study 3 assessed adult attachment style using only the RQ-general. Thus, the correlations involving Mother-IAT (Column 3) and RQ-general are based only on the adult attachment measures that were administered in both Studies 2 and 3 and the correlations involving Mother-IAT and RQ-%, RQ-specific, and multi-item-general are based on Study 2 data.

*** $p < .001$. ** $p < .01$. * $p < .05$. [†] $p < .10$.

Table 7

Average Correlation Coefficients between IATs and Measures of Adult Romantic Attachment from Meta-Analyses of Studies 1, 2, and 3 for Attachment-Schematic Participants Only.

	Target Person		
	Partner-IAT	Self-IAT	Mother-IAT
	(<u>n</u> = 63)	(<u>n</u> = 63)	(<u>n</u> = 38) [^]
Adult Attachment Measure			
<u>RQ-General Attachment Style</u>			
Dismissing	-.48**** _a	-.20 _a	-.15 _a
Fearful	-.34** _a	-.12 _a	-.20 _a
Preoccupied	.02 _b	.03 _a	-.07 _a
Secure	.38*** _b	.15 _a	.26 _a
<u>RQ-Percentage of Relationships</u>			
Dismissing	-.29* _{a, b}	-.20 _a	-.30 [†] _a
Fearful	-.17 _a	-.18 _a	-.29 [†] _a
Preoccupied	-.04 _{b, c}	-.13 _a	-.05 _a
Secure	.34** _c	.14 _a	.07 _a
<u>RQ-Attachment Style Specific to Partner</u>			
Dismissing	-.40*** _a	-.12 _a	-.25 _a
Fearful	-.40*** _a	.05 _a	-.27 [†] _a
Preoccupied	-.03 _b	-.13 _a	-.19 _a
Secure	.22 [†] _b	-.08 _a	.15 _a
<u>Multi-item-General Attachment Style</u>			
Avoidance	-.49**** _a	-.20 _a	-.29 [†] _a
Anxiety	-.06 _b	-.15 _a	-.04 _a

Note: Attachment-schematic individuals were those who indicated the same general and specific adult attachment style. Within each column and for each adult attachment measure, correlations with different subscripts differ significantly at $p < .05$ or greater. The

estimates of the difference between two correlations were obtained by converting the t statistic for the difference of correlations (based on McNemar's procedure) into an r and then using meta-analytic procedures to aggregate the data from the relevant studies.^A Because Mother-IAT was not administered in Study 1, the correlation coefficients are based on data from Study 2 only ($n=38$).

**** $p<.001$. *** $p<.005$. ** $p<.01$. * $p<.05$. † $p<.10$.