Attachment Insecurities and the Processing of Threat-Related Information: Studying the Schemas Involved in Insecure People's Coping Strategies
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Attachment Insecurities and the Processing of Threat-Related Information: Studying the Schemas Involved in Insecure People’s Coping Strategies

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In 6 studies we examined procedural, scriptlike knowledge associated with 2 different kinds of attachment insecurity: anxiety and avoidance. The studies examined associations between attachment insecurities, the cognitive accessibility of sentinel and rapid fight-flight schemas, and the extent to which these schemas guide the processing of threat-related information and actual behavior during an experimentally induced threatening event. Anxious attachment was associated with (a) greater accessibility of the sentinel schema in narratives of threatening events; (b) faster, deeper, and more schema-biased processing of information about components of the sentinel schema; and (c) quicker detection of a threat. Avoidant attachment was associated with greater accessibility of the rapid fight-flight schema in narratives of threatening events and faster, deeper, and more schema-biased processing of information about components of the schema. We discuss implications of the findings for understanding the cognitive aspects of insecure people’s coping strategies in threatening situations, as well as the potential benefits of these strategies to the people who enact them and to the groups to which they belong.

Keywords: attachment, social defense theory, anxiety, avoidance, inclusive fitness

Attachment Theory and Research

According to Bowlby (1982), the attachment behavioral system emerged as an adaptation over the course of mammalian evolution because it increased the likelihood of survival during infancy, a crucial period for protection and support given that humans are born with immature capacities for locomotion, feeding, and defense. Because infants require a long period of care and protection, they are born with a repertoire of behaviors that maintain proximity to others who help them cope with threats and regulate distress. Although the attachment system is crucial during the early years of life, Bowlby (1988) assumed that it is active over the entire life span and is manifested in adults’ tendencies to seek proximity and support when threatened or distressed (Hazan & Zeifman, 1999). Many studies have shown that the system is indeed active during adulthood and affects many aspects of psychological and social functioning (see relevant chapters in Cassidy & Shaver, 2008, and the integrative book by Mikulincer & Shaver, 2007a). For instance, research has indicated that actual or symbolic threats cause adults to seek physical proximity to close others or to activate mental representations of attachment figures and that activating security-related mental representations has a soothing, calming effect (see e.g., Fraley & Shaver, 1998; Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer, Gillath, & Shaver, 2002; Mikulincer, Hirschberger, Nachmias, & Gillath, 2001).

Bowlby (1973) also proposed that an individual’s attachment behavioral system is gradually shaped by experiences with attach-
ment figures and the memories of these experiences in the form of working models of self and others. These models eventually result in a fairly stable attachment “style” or orientation—a person’s characteristic pattern of relational expectations, emotions, and behaviors (Fraley & Shaver, 2000).

Research—beginning with Ainsworth, Blehar, Waters, and Wall (1978) and continuing through longitudinal studies of children and adolescents and social psychological studies of adults (reviewed by Mikulincer & Shaver, 2003, 2007a)—has indicated that people’s attachment orientations can be measured along two roughly orthogonal dimensions: attachment-related anxiety and avoidance (Brennan, Clark, & Shaver, 1998). A person’s position on the attachment anxiety dimension indicates the degree to which he or she worries that a partner will not be available and supportive in times of need, which heightens efforts to maintain closeness to relationship partners. A person’s position on the avoidance dimension indicates the extent to which he or she distrusts relationship partners’ goodwill and capacity to help, which heightens efforts to maintain a safe degree of independence and self-reliance. People who score low on these two dimensions are said to have a secure attachment orientation or to be secure with respect to attachment.

Individual differences in attachment anxiety and avoidance reflect both a person’s internal working models and the ways in which he or she typically deals with stress and distress (Mikulincer & Shaver, 2003, 2007a). People who score low on these dimensions possess well-developed working models of comforting attachment figures that sustain a sense of attachment security, positive self-regard, and confidence in proximity-seeking strategies for coping with threats and regulating distress. Those who score high on either attachment anxiety or avoidance possess working models of unavailable, unreliable, frustrating, or rejecting attachment figures. These insecure people rely on what Main (1990) and Mikulincer and Shaver (2003) called secondary attachment strategies, which involve either deactivating or hyperactivating the attachment system as a way to cope with insecurities and worries. High scores on attachment anxiety are associated with hyperactivating strategies—energetic attempts to attain greater proximity, support, and love combined with lack of confidence that they will be provided. High scores on avoidant attachment are associated with deactivating strategies—inhibition of proximity seeking while attempting to handle stress and distress oneself.

A substantial body of research has supported the claim that adult attachment orientations are implicated in coping with stress, distress regulation, and adjustment. For example, people who score low on both attachment anxiety and avoidance (i.e., those who are relatively secure) hold optimistic attitudes about coping with life’s hardships (see e.g., Shorey, Snyder, Yang, & Lewin, 2003), possess a strong sense of self-efficacy with respect to coping with stress (see e.g., Rice, Cunningham, & Young, 1997), appraise threatening events in a relatively optimistic way (see e.g., Mikulincer & Florian, 1995; Mikulincer, Florian, & Weller, 1993), effectively rely on support seeking as a means of coping with threats (see e.g., Mikulincer & Florian, 1995, 1998), and remain emotionally stable when coping with stress (see Mikulincer, Shaver, & Pereg, 2003, for a review).

According to Mikulincer and Shaver (2007b), these appraisals and action tendencies are shaped by interactions with warm, loving, and supportive attachment figures and are embodied in a relational if–then script, which Waters, Rodrigues, and Ridgeway (1998) called a secure-base script. This script is thought to include something like the following if–then propositions: “If I encounter an obstacle and/or become distressed, then I can approach a significant other for help, he or she is likely to be available and supportive, I will experience relief and comfort as a result of proximity to this person, and I can then return to other activities.”

Activation of this script can, by itself, mitigate distress, promote optimism and hope, and help generally secure people cope well with stress (Mikulincer & Shaver, 2007b; Mikulincer et al., 2009; Waters & Waters, 2006).

Adult attachment researchers have also found that anxious people’s tendency to hyperactivate the attachment system is reflected in the ways in which they appraise threats and cope with stress and distress. For example, people who score high on attachment anxiety tend to appraise threats as extreme and their own coping resources as deficient, to ruminate on disturbing thoughts, and to report high levels of distress during and after stressful events (see e.g., Alexander, Feeney, Hohaus, & Noller, 2001; Birnbaum, Orr, Mikulincer, & Florian, 1997; Mikulincer & Florian, 1995, 1998). Anxiously attached people also tend to be vigilant regarding potential threats and dangers, to think they see signs of threat in what other people would consider benign events, and to exaggerate the potential for negative outcomes (see e.g., Cassidy & Kobak, 1988; Mikulincer et al., 2000; Shaver & Mikulincer, 2002). Research has also indicated that these anxious individuals react to perceived threats by seeking closer contact with others and expressing their intense needs and worries (see e.g., J. A. Feeney & Noller, 1990; Mikulincer, Orbach, & Iavnieli, 1998).

According to Mikulincer and Shaver (2007a), anxious, hyperactivating coping strategies emerge from interactions with attachment figures who are sometimes responsive but only unreliably so, which subjects a person to a partial reinforcement schedule that the person interprets as encouraging energetic, noisy bids for proximity and support, because these tactics sometimes, but not always, succeed. People with this kind of experience do not easily give up on proximity seeking.

We hypothesize that reacting to such a partial reinforcement schedule also contributes to the formation and consolidation of a particular kind of schema regarding ways to cope with threats. According to Rumelhart (1980), self-schemas consist of a number of placeholders that supply default behaviors for certain kinds of situations. Possessing this kind of schema helps a person respond quickly to relevant situations, and if the situation provides insufficient detailed information about how to respond, the default strategy can be quickly adopted. We expect the schemas of attachment-anxious adults to contain default placeholders that cause them (a) to remain vigilant with respect to possible threats, especially in unfamiliar or ambiguous situations; (b) to react quickly and strongly to early, perhaps unclear cues of danger (e.g., unusual noises, shuffling feet, shouts); (c) to alert others about the imminent danger; (d) if others are not immediately supportive, to heighten efforts to get them to provide support; and (e) to minimize distance from others when coping with a threat. We call this kind of working model, and its associated action tendencies, a sentinel schema because it sometimes alerts other people to a real danger.

There is ample evidence that avoidant people’s tendency to deactivate their attachment system affects the ways in which they appraise threats and cope with stressors. For example, they are
reluctant to seek help and comfort during stressful events and tend to rely on cognitive and behavioral distancing strategies, such as diverting attention from threat-related cues and suppressing threat-related thoughts (see e.g., Birnbaum et al., 1997; Fraley & Shaver, 1997; Lussier, Sabourin, & Turgeon, 1997; Mikulincer & Florian, 1995, 1998; Mikulincer et al., 1993; Simpson, Rholes, & Nelligan, 1992; Turan, Osar, Turan, Ilkova, & Damci, 2003). They tend to deal with stress on their own (a strategy that Bowlby, 1973, called compulsive self-reliance) and refrain from appraising events as threatening and from expressing distress, anxiety, or despair even if they are forced to experience these negative emotions (see Mikulincer & Shaver, 2007a, for a review).

According to Mikulincer and Shaver (2007a), avoidant, deactivating strategies are a reaction to past experiences with unavailable or unapproving attachment figures. From these experiences a person learns to expect better outcomes if feelings of vulnerability or neediness are hidden or suppressed. We believe that such a person is also likely to have constructed a schema that we call a rapid fight-flight schema, which contains something like the following placeholders: (a) minimize the importance of threatening stimuli; (b) when danger is clearly imminent, take quick self-protective action, either by escaping the situation or by taking action against the danger; and (c) at such times, not worry about coordinating one’s efforts with those of other people.

**Attachment-Related Schemas Guide**

**Information Processing**

Our main theoretical proposition in the present article is that attachment orientations include schemas related to ways of coping with threats and dangers. These schemas are expected to bias the processing of threat-related information. According to Markus (1977) and Rumelhart (1980), people who have ready access to a particular schema are sensitive to schema-relevant stimuli and notice information and events pertinent to the schema’s domain (Markus & Sentis, 1982). As a result, they use their schemas to make quick judgments about the associated domain and to recall and interpret ambiguous stimuli in a biased way (see e.g., Carpenter, 1988; Kanagawa, Cross, & Markus, 2001; Lurigio & Carroll, 1985; Markus, 1977, 1980; Roediger & McDermott, 1995).

We hypothesize that attachment-related schemas will affect the processing of information concerning threatening and dangerous situations, resulting in schema-congruent interpretations, faster recognition of schema-relevant stimuli, and more schematic and deeper processing of schema-relevant information. There is already preliminary evidence supporting this line of reasoning. Mikulincer and colleagues (2009) presented study participants with a picture of a needy person (an injured person with a sad facial expression in a hospital bed) and asked them to write a story about what would happen next. Participants who scored relatively low on measures of attachment anxiety, avoidance, or both (i.e., the secure ones) were more likely to write stories that included key elements of the secure-base script (support seeking, support provision, and distress relief). Using a prompt-word outline method, Waters and Waters (2006) also found that secure participants produced more stories organized around the secure-base script than did those who were relatively insecure. In addition, Mikulincer and colleagues (2009) found that relatively secure participants generated more inferences concerning the information they received relevant to the secure-base script and made faster and more confident judgments about it. Individual differences related to attachment were not associated with the number of neutral inferences made, confidence in the neutral inferences, or the time taken to make these inferences.

Research has yet to provide information about the ways in which relatively insecure people process information about threatening events. Mikulincer and colleagues (2009) and Waters and Waters (2006) reported only that such people did not rely on the secure-base script as much as did more secure people when processing threat-related information. This raises the question of what schemas anxious and avoidant people do rely on when processing threat-related information.

We have proposed social defense theory (SDT; Ein-Dor, Mikulincer, Doron, & Shaver, 2010), according to which each of the major attachment orientations (secure, anxious, and avoidant) is associated with a unique schema for processing threat-related information. Each kind of schema has implications, both positive and negative, for the inclusive fitness (Hamilton, 1964a, 1964b) of members of a group that contains all three kinds of attachment orientations. The secure-base schema allows secure people to remain emotionally stable in the face of threats and to calmly and efficiently coordinate and lead group members’ problem-solving efforts. But this schema may be counterproductive under certain circumstances. For example, when a serious danger is arising, the optimism inherent in the secure-base schema may retard secure people’s recognition of the gravity of the situation, thus causing them to be slower than less secure people to notice the danger and alert other group members to it. Moreover, secure people’s tendency to coordinate their actions with those of other people may interfere with rapid and effective self-protective behavior, because mobilizing group efforts often takes longer than simply acting immediately and alone (see Proulx, 2003, concerning survivors of the 9/11 attacks on the World Trade Center in New York). Therefore, the secure-base schema may at times decrease secure people’s inclusive fitness, as well as the fitness of other members of their groups, if it is not complemented by the schemas and actions of people with different attachment styles.

People who are high in attachment anxiety are likely to be vigilant in monitoring the environment for threats and to be vocal about detected threats and eager to have other people’s help in averting them (see e.g., Cassidy & Kobak, 1988; J. A. Feeney & Noller, 1990). According to SDT, anxious individuals may offset some of the deficiencies of secure group members by reacting quickly and vocally to early, and perhaps ambiguous, cues of imminent danger, a reaction that stems from what SDT calls a sentinel schema. Anxious individuals’ sentinel behaviors may increase inclusive fitness even if the anxious person is mainly concerned with gaining support from other group members rather than helping to save them from injury or destruction.

Avoidant individuals are accustomed to looking out for their own interests and taking care of themselves, even if this sometimes occurs at other people’s expense (see e.g., Collins & Read, 1990; B. Feeney & Collins, 2001; Van Lange, Oten, DeBruin, & Joireman, 1997; see Mikulincer & Shaver, 2007a, for a review). Thus, they are more likely to rely on self-protective fight-or-flight reactions in times of danger, without hesitating or needing to deliberate with other group members. For example, an avoidant person may enact the quickest protective maneuver (approach motivation) or
quickly notice the best escape route from a threatening situation (avoidance motivation), reactions that we propose are results of a rapid fight–flight schema. These kinds of behaviors may also assure other group members’ safety from injury or save their lives by identifying an escape route, and this may promote inclusive fitness even if the avoidant person does not care deeply about the welfare of other group members.

Recently, we (Ein-Dor, Mikulincer, & Shaver, in press) found, in a study of group effectiveness in dealing with an experimentally induced threat, that attachment anxiety was associated with quicker detection of the threat and therefore with greater group effectiveness. Avoidant attachment was associated with speedier responses to the danger once it was detected and therefore with greater group effectiveness in remaining safe. These effects were statistically significant even when extraversion and neuroticism, two potentially relevant broadband personality traits, were statistically controlled. Despite these promising results, there is still no information about whether avoidant people process threat-related information with a rapid fight–flight schema and whether anxious people process such information with a sentinel schema. Looking into these matters is the purpose of the studies reported here.

The Present Research

In Study 1 we provided participants with a picture of a threatening event and tested our predictions that (a) participants who scored higher on attachment anxiety would write stories compatible with the sentinel schema, and (b) more avoidant participants would write stories compatible with the rapid fight–flight schema. Study 2 examined the hypothesis that attachment anxiety would be associated with faster recognition of information relevant to the sentinel schema and with schema-biased memories of this information. Study 3 examined the hypothesis that avoidance would be associated with faster recognition of information relevant to the rapid fight–flight schema and with schema-biased memories of this information. Study 4 examined the hypothesis that attachment anxiety would be associated with deeper processing of information relevant to the sentinel schema, and Study 5 examined the hypothesis that avoidance would be associated with deeper processing of information relevant to the rapid fight–flight schema. Finally, in Study 6 we exposed small groups of participants to an experimentally induced threatening situation, a room gradually filling with smoke due to a malfunctioning computer (see also Ein-Dor et al., in press). This allowed us to test predictions that (a) the most attachment-anxious person in a group would be most likely to detect the presence of smoke (in accordance with the sentinel schema) and (b) the most avoidant person in a group would be most likely to take action following detection of the danger (in accordance with the rapid fight–flight schema).

Study 1

In Study 1 we examined associations between attachment anxiety and avoidance scores, on one hand, and cognitive accessibility of the sentinel and rapid fight–flight schemas, on the other. Participants completed a self-report measure of attachment anxiety and avoidance, examined a picture of a small group of people in a threatening situation, and wrote a story about what would happen next. Judges rated participants’ stories for congruence with (a) the sentinel schema and (b) the rapid fight–flight schema. Our main predictions were that (a) attachment anxiety, but not avoidance, would be associated with stories congruent with the sentinel schema and (b) avoidant, but not anxious attachment, would be associated with stories congruent with the rapid fight–flight schema.

While testing these predictions, we also attempted to rule out three alternative explanations of the results. First, previous studies have found associations between the two attachment insecurity dimensions and the Big Five personality traits: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (see e.g., Noffle & Shaver, 2006). This might mean that these personality traits could explain differences in the ways in which insecure people write stories about threatening events. Second, sentinel and rapid fight–flight behaviors in a social situation may differ in their social desirability, so it is important to rule out the influence of social desirability biases. Third, a person’s verbal and composition skills might influence the length and quality of written stories. To control for these possibilities, we asked participants to complete a test of verbal ability as well as self-report measures of the Big Five personality traits and social desirability bias.

Method

Participants. Eighty Israeli undergraduates (32 women and 48 men, ranging in age from 19 to 51, $M_{dn} = 22$) participated in the study in exchange for credit in psychology courses.1

Materials and procedure. Each participant took part in the procedures individually in two separate sessions. In the first session, he or she completed four randomly ordered psychological measures. Attachment orientation was assessed with a Hebrew version of the Experiences in Close Relationships (ECR) scales (Brennan et al., 1998). Participants rated the extent to which each item was descriptive of their feelings in close relationships on a 7-point scale ranging from 1 (not at all) to 7 (very much). Eighteen items assessed attachment anxiety (e.g., “I worry about being abandoned”), and 18 assessed avoidance (e.g., “I prefer not to show a partner how I feel deep down”). The reliability and validity of these scales have been repeatedly demonstrated (beginning with Brennan et al., 1998; see Mikulincer & Shaver, 2007a, for a recent review). In our study, Cronbach’s alphas were .90 for the anxiety items and .92 for the avoidance items. Mean scores were computed for each scale, and the two scores were not significantly correlated, $r(78) = .24$.

The Big Five personality traits were assessed with a Hebrew version of the 44-item Big Five Inventory (BFI; John, Donahue, & Kentle, 1991). Participants rated the extent to which each item described their personality on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). In the present study, Cronbach’s alphas were acceptable, especially given the brevity of the scales: extraversion (.77), neuroticism (.83), openness to ex-

1 Each study involved an independent sample of undergraduates who did not participate in any of the other studies. Across the studies, including gender as an additional factor in the analyses did not change the findings. Moreover, no significant or consistent gender differences were found across the studies, and none of the interactions between gender and the other predictor variables were significant. We therefore collapsed across gender in all of the analyses reported here.
perience (.68), agreeableness (.70), and conscientiousness (.75). Trait scores were computed for each participant by averaging the relevant item ratings.

Social desirability was assessed with a Hebrew version of the Marlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1964). Participants rated the extent to which each of the items was self-descriptive. Cronbach’s alpha for these items was .69; higher scores on the scale indicate a stronger tendency to respond in a socially desirable manner.

Verbal ability was assessed with a 15-item Hebrew vocabulary test based on the Scholastic Ability Test used by Israeli universities (called in Israel the Psychometric Entrance Test; Belller, 1995). These items have exhibited high reliability and validity in previous studies (see e.g., Berant, 1998). Higher scores reflect greater verbal ability.

Two weeks after the first session, the second session was conducted by a different experimenter, unaware of participants’ scores on the first-session measures. Upon arrival, participants received a drawing of two adults and two adolescents (one of each gender) walking in a forest with a large, menacing wolf-like creature stalking them from behind (see Appendix). They were asked to look at the picture and write a story describing what was happening and what they thought would happen next. They were instructed to reflect on the protagonists’ thoughts, feelings, and behaviors and to describe how the episode would end. They wrote the story at a self-selected pace without a time limit. Afterward, they were debriefed and thanked.

Scoring procedure. Participants’ stories were independently rated by two judges (psychology graduate students), who were unaware of participants’ scores on the first-session measures. Judges received explanations of the sentinel and rapid fight–flight schemas and were trained to code each story according to eight specific and well-defined criteria. Two of the ratings addressed core components of the sentinel schema: (a) noticing ambiguous signs of danger and (b) warning others about the threat. Five ratings addressed core components of the rapid fight–flight schema: (c) escaping the situation without helping others, (d) acting without receiving help from others, (e) reacting quickly without depending on other people’s actions, (f) not cooperating with others, and (g) not deliberating with others. An additional rating concerned passively accepting the situation, which is not a core component of either the sentinel or the rapid fight–flight schemas but might, nevertheless, be important to consider. For each participant, judges rated the extent to which each element appeared in his or her story. Ratings were made on a 7-point scale ranging from 1 (not at all) to 7 (very much).

Intraclass correlations (ICCs) indicated satisfactory interrater reliability (ICCs > .86, ps < .001). Therefore, eight scores were computed for each participant by averaging the two judges’ scores. Using exploratory factor analysis with maximum likelihood extraction and direct oblimin rotation, we found that two factors (with eigenvalues > 1) explained 51.7% of the explained variance. The first factor (accounting for 27.3% of the variance) included the following six features: escaping the situation without helping others (loading .65), acting without receiving aid from others (.90), acting rapidly without depending on others’ actions (.84), not cooperating with others (.65), not deliberating with others (.47), and passively accepting the situation (.37). We call this factor Rapid Fight–Flight Behaviors because it included the five components of the rapid fight–flight schema and low levels of passively accepting the situation. The second factor (accounting for 24.4% of the variance) was defined mainly by two story elements: noticing danger before others did (.93) and warning others about the threat (.91). We call this factor Sentinel Behaviors because it includes the two core components of the sentinel schema. A score was computed for each factor, for each participant, using the Anderson–Rubin method (a procedure for creating unit-weighted composites that maximize independence among factors). The two-factor scores were not significantly correlated, r(78) = .17, p = .18.

Results and Discussion

Preliminary analyses revealed that the average length of participants’ stories was 149 words (SD = 82.18, Mdn = 132) and that the attachment scores were not significantly associated with story length (rs < .06). Pearson correlations also indicated that attachment anxiety was significantly associated with neuroticism, r(78) = .54, p < .001, and with low levels of agreeableness, r(78) = −.46, p < .001; conscientiousness, r(78) = −.42, p < .001; and verbal ability, r(78) = −.39, p < .01. Avoidant attachment was significantly associated with low levels of extraversion, r(78) = −.65, p < .001; agreeableness, r(78) = −.28, p < .05; conscientiousness, r(78) = −.30, p < .05; and openness to experience, r(78) = −.28, p < .05.

Social desirability was not significantly associated with either attachment score.

The predictions were examined in two two-step hierarchical regression analyses, one predicting rapid fight–flight behaviors within a narrative and the other predicting sentinel behaviors. In the first step of these regressions, we introduced the Big Five personality trait scores (agreeableness, conscientiousness, neuroticism, extraversion, openness to experience), social desirability, and verbal ability as predictors. In the second step, we added attachment anxiety and avoidance as predictors to determine their unique contribution to the rapid fight–flight and sentinel scores beyond the contribution of personality traits, social desirability, and verbal ability.2

For the rapid fight–flight score, the first step of the analysis was not statistically significant, F(7, 71) = 0.65, p = .71, R² = .09. However, the addition of attachment anxiety and avoidance in the second step yielded a statistically significant increase in variance accounted for, ΔF(2, 69) = 4.70, p < .05, ΔR² = .16. As can be seen in Table 1, avoidant attachment, but not attachment anxiety, was significantly associated with the rapid fight–flight score: More avoidant participants included more components of the rapid fight–flight schema in their narratives. No other effects were significant.

For the sentinel score, the first step of the regression analysis yielded a significant result, F(7, 71) = 2.80, p < .05, R² = .30, with agreeableness, neuroticism, and extraversion making significant and positive contributions (see Table 1). In the second step, the addition of attachment anxiety and avoidance yielded a marginally significant change in variance accounted for, ΔF(2, 69) =

2 None of the interactions between attachment anxiety and avoidance were statistically significant in any of the studies. We therefore say no more about this interaction.
Table 1

Standardized Regression Coefficients Predicting Rapid Fight–Flight and Sentinel Scores (Study 1)

<table>
<thead>
<tr>
<th>Step and variable</th>
<th>Rapid fight-flight</th>
<th>Sentinel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td>.28</td>
<td>.30*</td>
</tr>
<tr>
<td>Extraversion</td>
<td>−.04</td>
<td>.32*</td>
</tr>
<tr>
<td>Openness to Experience</td>
<td>.03</td>
<td>.02</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.03</td>
<td>−.28</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>.08</td>
<td>.37</td>
</tr>
<tr>
<td>Social Desirability</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Verbal ability</td>
<td>−.14</td>
<td>−.13</td>
</tr>
<tr>
<td>Attachment anxiety</td>
<td>.11</td>
<td>.50**</td>
</tr>
<tr>
<td>Avoidant attachment</td>
<td>.49**</td>
<td>−.12</td>
</tr>
</tbody>
</table>

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

2.60, p = .08, ΔR² = .08, and as can be seen in Table 1, attachment anxiety, but not avoidance, was significantly associated with the sentinel score. Participants who scored higher on anxiety mentioned more components of the sentinel schema in their narratives. In addition, only agreeableness (which is generally associated with helping others) was significantly related to the sentinel score after the attachment scores had been added to the set of predictors.³

Overall, the findings supported our predictions. First, participants scoring higher on attachment anxiety were more likely to generate stories that were congruent with the sentinel schema. Second, more avoidant participants were more likely to generate stories that were congruent with the rapid fight–flight schema. These associations were significant even after controlling for broad personality traits, social desirability bias, and verbal ability.

**Study 2**

In Study 2, we examined the hypothesized associations between attachment anxiety and memory for core components of the sentinel schema. According to Rumelhart’s (1980) theorizing and findings from previous studies, a well-developed and highly accessible schema for a particular domain increases and speeds up recognition of schema-relevant information from a previous learning task, as well as increasing false recognition of schema-relevant items that were not actually presented in the learning task. Both results suggest schema-biased information processing (see e.g., Lurigio & Carroll, 1985; Markus, 1977; Roediger & McDermott, 1995). We therefore expected that having a well-developed, highly accessible sentinel schema would cause attachment-anxious people to recognize more schema-relevant information while also exhibiting more false memories and speedier reaction times (RTs) for information relevant to the sentinel schema.

Participants completed the ECR scales, watched a video clip of a young woman answering threat-relevant and threat-irrelevant questions, and then performed a recognition test related to her answers. For half of the participants, the target woman’s answers to threat-relevant questions were congruent with the sentinel schema. For the remaining participants, the target woman’s answers were incongruent with the schema. In the recognition test, participants received statements that had appeared among the target woman’s answers (old items) and statements that resembled the target woman’s answers semantically but had not actually been uttered (new items). We predicted that attachment anxiety, but not avoidance, would be associated with faster responses and better recognition of old threat-relevant items and with faster and more numerous false memories for new threat-relevant items that were congruent with the sentinel schema.

These associations were not expected to be significant for threat-irrelevant items or when the target woman’s answers were incongruent with the sentinel schema.

**Method**

**Participants.** Sixty-nine Israeli undergraduates (24 men and 45 women, ranging in age from 19 to 27, Mdn = 22) participated in the study in exchange for credit in psychology courses.

**Materials and procedure.** Participants took part individually in two separate sessions. In the first session, they completed the ECR scales. Cronbach’s alphas were again high for both anxiety (.85) and avoidance (.89), and the two scores were not significantly correlated, r(67) = .13.

The second session was conducted 2 weeks later by a different experimenter, unaware of participants’ ECR scores. Upon arrival, participants were informed by the experimenter that they would be shown a video clip of another participant answering several questions and would then perform a memory test related to that person’s answers.

The video clip portrayed a young woman (a confederate) answering 12 open-ended questions. Six questions dealt with neutral issues (e.g., “When you go to the beach, you . . .”), and six questions dealt with threat-relevant issues (e.g., “You walk with your friends and hear a loud roar behind you. Then, you . . .”). The order of questions was semirandomized with the constraint that no two successive questions dealt with the same kind of issue (neutral or threat-related).

Participants were randomly assigned to two experimental conditions. In the sentinel schema condition (n = 37), the confederate’s answers to the threat-relevant questions indicated that she was highly sensitive to danger and likely to warn others about threats (e.g., “I would be very scared. I would scream with fear, turn around, and yell to warn the others”). In the control condition (n = 32), the confederate’s answers to the threat-relevant questions indicated that she would remain calm in threatening situations and would not necessarily engage in sentinel behavior (e.g., “I would turn around and look where the roar was coming from. I am usually calm in these situations. I act according to what I see”). The confederate’s answers to the six neutral questions were identical in the two conditions.

Following the video clips, all participants completed a 10-min distracter task (a paper-and-pencil word-search task) followed by a
computerized recognition task containing segments of the confederate’s answers. In this task, participants were asked to decide as quickly and accurately as possible whether each of 36 sentences had appeared in the video clip.

Eighteen of the sentences dealt with neutral issues, and 18 dealt with threat-relevant issues. Each sentence category was further divided into two groups: nine old sentences that had appeared in the original clip (e.g., “I usually go to the sea with friends”) and nine new sentences that resembled the originals but had not appeared in the clip (e.g., “I usually go to the forest with friends”). All sentences were matched for length and number of words.4

Participants sat in front of a 19-in. SVGA screen with a 100-Hz refresh rate. The task was administered by a 486 IBM (1.8-GHz) computer with DirectRT as the experimental platform. Each of the 36 recognition trials began with a X in the center of the screen for 500 ms, followed by a target sentence. Brightness and contrast were set somewhat low, and the target sentences were displayed in yellow lettering on a black background in the middle of the screen. Participants judged as quickly as possible whether each target sentence had appeared in the clip by pressing F on the keyboard if they thought the sentence had appeared or K if they thought it had not. Sentences remained on the screen until the participants pressed a key. Following the recognition task, participants were debriefed and thanked.

Results and Discussion

For each participant and each sentence category (neutral, threat), we calculated the following two scores: (a) the percentage of trials in which old sentences were accurately recognized (“hits”) and (b) the percentage of trials in which new sentences were incorrectly believed to have appeared in the video clip (“false memories”). We also calculated mean RTs for (a) old sentences that were correctly recognized (RTs for hits) and (b) new sentences that were inaccurately considered to be old (RTs for false memories).5

The data were analyzed in two-step hierarchical regression analyses. In the first step, we entered attachment anxiety and avoidance scores and experimental condition (a dummy variable comparing the sentinel, 1, with the control condition, –1) as predictors. For threat-related scores, we also inserted the relevant neutral score as a covariate to control for general memory ability or response speed. In the second step, we added the product of each attachment score and experimental condition to examine potential interactions. In all of these analyses, attachment scores were centered around their means. Standardized regression coefficients are presented in Table 2.

In the analyses of memory and RT scores for neutral sentences, there were no significant main effects or interactions. Moreover, there were no significant main effects in the analyses of memory and RT scores for threat-relevant sentences. However, there were significant interactions between attachment anxiety and experimental condition in the analyses of hits for threat-related sentences (β = .28, p < .05) and RTs for hits and false memories when responding to threat-related sentences (β = −.26, p < .05, and β = −.32, p < .01, respectively).

Simple slope tests (Aiken & West, 1991) revealed that in the sentinel condition, attachment anxiety was associated with more hits of threat-related sentences (β = .37, p < .01), faster RTs for hits when responding to sentences that were correctly recognized (β = −.36, p < .01), and faster RTs for new sentences that were inaccurately considered to be old (β = −.48, p < .001; see Figure 1). In the control condition, however, attachment anxiety was not significantly associated with accurate recognition or RTs of threat-related sentences (β = −.19, and β = .16, respectively) or with RTs for new sentences that were inaccurately considered to be old (β = .16).

Overall, the findings were in line with predictions: Attachment anxiety, but not avoidance, was significantly associated with more hits of threat-related sentences and faster recognition of schema-biased memories (speedier responses to sentences that were correctly recognized and to new sentences that were inaccurately considered to be old). We did not find a significant association between attachment anxiety and more new sentences that were inaccurately considered to be old.

Study 3

In Study 3, we examined the hypothesized associations between avoidant attachment and memory for components of the rapid

Table 2

<table>
<thead>
<tr>
<th>Attachment variable and group</th>
<th>Neutral sentences</th>
<th></th>
<th>Threat-related sentences</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hits</td>
<td>FM</td>
<td>Hits RT</td>
<td>FM RT</td>
</tr>
<tr>
<td>Neutral stimuli</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Avoidance</td>
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<td>.02</td>
<td>.19</td>
<td>−.09</td>
</tr>
<tr>
<td>Anxiety</td>
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<td>−.10</td>
<td>.00</td>
<td>.17</td>
</tr>
<tr>
<td>Condition</td>
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<td>−.06</td>
<td>.19</td>
<td>.15</td>
</tr>
<tr>
<td>Avoidance × Condition</td>
<td>−.01</td>
<td>.02</td>
<td>.20</td>
<td>.23</td>
</tr>
<tr>
<td>Anxiety × Condition</td>
<td>−.07</td>
<td>−.11</td>
<td>.20</td>
<td>.13</td>
</tr>
</tbody>
</table>

Note. RTs = reaction times; FMs = false memories.
*p < .05. **p < .01. ***p < .001.

4 The video clips and all of the sentences used in the recognition memory tasks in Studies 2 and 3 are available upon request (in Hebrew or in English translation).
5 Outliers (RTs lower or higher than three standard deviations from the mean) were excluded from the analyses of RTs in Studies 2 and 3. The average percentage of trials on which such outliers existed was low (1.8% in Study 2, and 2.1% in Study 3), and the trials were randomly distributed across categories.
fight–flight schema. As in Study 2, participants completed the
ECR scales, viewed a video clip of a young woman answering
threat-relevant and threat-irrelevant questions, and then performed
a recognition task. For half of the participants, the target woman’s
answers to threat-relevant questions were congruent with the rapid
fight–flight schema. For the remaining participants, the target
woman’s answers were not congruent with this schema. We pre-
predicted that avoidant attachment, but not attachment anxiety, would
be associated with faster recognition of threat-relevant information
and more hits and false memories related to this information but
only when the target woman’s answers were congruent with the
rapid fight–flight schema. These associations were not expected to
appear for threat-irrelevant items or when the target woman’s
answers were incongruent with the rapid fight–flight schema.

Method

Participants. Fifty-seven Israeli undergraduates (19 men and
38 women, ranging in age from 19 to 30, $Mdn = 22$) participated
in the study in exchange for credit in psychology courses.

Materials and procedure. Participants took part individually
in two separate sessions. In the first session, they completed the
ECR scales. Cronbach’s alphas were again high for both anxiety
(.87) and avoidance (.85), and the two scores were not significantly
correlated, $r(55) = .20$.

The second session was conducted 2 weeks later by a different
experimenter, who was unaware of participants’ ECR scores. The
instructions, procedure, video clip, and recognition task were sim-
ilar to those used in Study 2. This time, however, the video clip
was focused on the rapid fight–flight schema. Specifically, partic-
ipants were randomly assigned to two experimental conditions. In
the rapid fight–flight condition ($N = 28$), the woman’s answers to
the six threat-related questions indicated that she usually acts alone
and without hesitation in times of danger (e.g., “I deal with the
threat by myself. I do not trust others to do the job”). In the control
condition ($N = 29$), the woman’s answers to the six threat-related
questions indicated that she usually cooperates with others in times
of threat and waits to see what others are doing (e.g., “I see what
others are doing and act accordingly”). As in Study 2, the woman’s
answers to the six neutral questions were identical in the two
conditions. After watching the video, all participants completed
the 10-min distracter task used in Study 2. They then took a
36-item computerized recognition test in which they were asked to
decide whether old and new neutral and threat-related sentences
had appeared in the videotaped woman’s comments. The apparatus
and procedure were identical to those used in Study 2. At the end
of the experiment, participants were debriefed and thanked.

Results and Discussion

For each participant and sentence category (neutral, threat), we
calculated two memory scores (hits, false memories) and two RT
scores (RTs for hits, RTs for false memories), as described in Study
2. The data were analyzed in two-step hierarchical regression analy-
ses, as also described in Study 2. Standardized regression coefficients
are presented in Table 3.

In the analyses of memory and RT scores for neutral sentences,
there were no significant main effects or interactions. Moreover,
there were no significant main effects in the analyses of memory
and RT scores for threat-relevant sentences. However, there were
significant interactions between avoidant attachment and experi-
mental condition in the analyses of false memories for threat-
related sentences ($\beta = .25$, $p < .05$) and RTs for hits when
responding to threat-related sentences ($\beta = -.25$, $p < .05$). No
other interactions were significant.

Simple slope tests revealed the following pattern of effects (see
Figure 2): In the rapid fight–flight condition, avoidant attachment

![Figure 1. Experimental condition was found to qualify the link between attachment anxiety and number of hits, reaction times (RTs) for hits, and RTs for false memories of sentinel-related sentences. The higher the participants’ attachment anxiety, the higher their percentage of trials in which old sentinel-related sentences were accurately recognized, the quicker their reaction to old sentinel-related sentences that were correctly recognized, and the quicker their reaction to new sentinel-related sentences that were inaccurately considered to be old sentinel-related sentences.](image-url)
was associated with more false memories of threat-related sentences ($\beta = .28, p < .05$) and faster RTs for accurate recognition of threat-related sentences ($\beta = -.22, p < .05$). In the control condition, however, avoidant attachment was associated with fewer false memories of threat-related sentences ($\beta = -.22, p < .05$) and slower RTs for accurate recognition of threat-related sentences ($\beta = .22, p < .05$).

Overall, the findings were in line with predictions: Avoidant attachment, but not anxious attachment, was significantly associated with more schema-biased memory (false memories) and faster recognition of information that was congruent with the rapid fight–flight schema (hits). When the information in the video clip was not congruent with the rapid fight–flight schema, more avoidant participants reacted with less schema-biased memory. However, we did not find the expected associations between avoidance and more hits for information that was congruent with the rapid fight–flight schema or between avoidance and faster RTs to new sentences that were inaccurately considered to be old.

**Study 4**

In Study 4, we examined the hypothesized link between attachment anxiety and deep processing of information relevant to the sentinel schema. Markus, Smith, and Moreland (1985) showed that a well-developed schema provides a cognitive framework for going beyond the schema-relevant information given. Specifically, they found that having a well-developed schema for a particular domain enables people to generate more impressions of and conjectures about the thoughts, feelings, intentions, and traits of a story’s protagonist—information that was not explicitly presented in the story. We similarly hypothesized that anxious individuals’ well-developed sentinel schema would allow them to process information relevant to the sentinel schema more deeply. As a result, when asked to recall a story that included the major components of the sentinel schema, participants who scored higher on attachment anxiety would go beyond the information given and generate more conjectures and inferences about the thoughts, feelings, and traits of story protagonists. Moreover, these conjectures and inferences would be confined to aspects of the story that were relevant to the sentinel schema and would not extend to schema-irrelevant information. Less attachment-anxious people were expected to process the sentinel-schema information in a shallower manner and therefore to recall mainly information that was explicitly presented in the story.

Once participants completed the ECR scales, they were asked to read a story that included the major components of the sentinel schema. They then generated recollections (actual facts presented in the story) and impressions (inferences, feelings, and opinions) about the story. Two independent judges placed each participant’s responses into one of the following categories: sentinel-schema
recollections, sentinel-schema impressions, neutral (schema-
irrelevant) recollections, and neutral impressions. Our main
prediction was that attachment anxiety, but not avoidance, would be
associated with generating more sentinel-schema impressions. We
did not expect an association between attachment anxiety and
more sentinel-schema-generated recollections, because the task
was fairly straightforward and was completed immediately follow-
ing the short story.

Method

Participants. Eighty-four Israeli undergraduates (12 men and
72 women, ranging in age from 20 to 30, \( M_{dn} = 23 \)) participated
in the study in exchange for credit in psychology courses.

Materials and procedure. Participants took part individually
in a single experimental session. Upon arrival, they were told that
the study dealt with memory and deductive reasoning. They then
completed the ECR scales. Once again, Cronbach’s alphas for both
anxiety (.92) and avoidance (.86) were acceptable, and the two
scores were not significantly correlated, \( r(82) = -.10 \). All partic-
ipants also completed a bogus personality test, which served as a
distracter task, and were then asked to read a story describing a
23-year-old person (of the participant’s gender) who took a hike in
an unfamiliar forest with three friends. Half of the sentences in the
story concerned neutral topics (e.g., “I saw lots of tiny flowers”),
and the remaining sentences described behaviors central to the
sentinel schema (e.g., “I walked quietly and listened attentively to
whatever might be happening”). All of the sentences describing
sentinel behaviors were derived from stories written by partici-
pants in Study 1. Ten Israeli undergraduates who had not partic-
ipated in the study were asked to judge the extent to which each of
the sentences was congruent with the sentinel schema. Ratings
were made on a scale ranging from 1 (not at all) to 7 (very much).
The 10 judges rated all of the sentences as highly congruent with
the schema (\( M = 6.60, SD = 0.70, M_{dn} = 7 \)).

The story consisted of 38 sentences, with 19 sentences contain-
ing information relevant to the sentinel schema and the remaining
19 sentences containing schema-irrelevant information. The sen-
tences were organized such that no more than two from the same
category (sentinel-schema or neutral) were presented consecu-
tively. The story was designed to contain only behavioral descrip-
tions and to avoid explicit statements about the characters’ feel-
ings, thoughts, intentions, or traits (which could nevertheless be
inferred from the described behaviors).

After reading the story, participants completed a memory test
similar to the one used by Markus and colleagues (1985, Study 2).
Stacks of blank cards were placed in front of participants and they
were instructed as follows: “Please write on the cards anything you
can remember about the story or about the story characters. Write
only one item per card. The number of cards you use is not
restricted, but you can work on this task for no longer than five
minutes.” No participant stopped before the end of the 5-min
period (see Mikulincer et al., 2009, for details). Following the
memory task, participants were debriefed and thanked.

Scoring procedure. Participants’ responses were indepen-
dently content-analyzed by two judges (psychology graduate stu-
dents) who were unaware of participants’ ECR scores. Before
analyzing a participant’s responses, judges read the story several
times until they were able to distinguish clearly between recollec-
tions (information explicitly mentioned in the story) and impres-
sions (assumptions or conclusions inferred from the story but not
explicitly presented in it). Judges had been trained to distinguish
recollections and impressions that were relevant to the sentinel
schema from schema-irrelevant recollections and impressions.

Following training, each judge independently sorted each of a
participant’s responses into one of the following categories: (a)
sentinel-schema recollections (e.g., “Shay [the character’s name]
was the first to notice the danger”), (b) sentinel-schema impres-
sions (e.g., “Shay seemed to be alert. He paid attention to his
surroundings”), (c) neutral recollections (e.g., “They took a family
vacation in the northern part of Israel”), and (d) neutral impres-
sions (e.g., “Shay seemed to be a good athlete”). Interjudge agree-
ment was adequate (\( \kappa = .72 \)), and disagreements were resolved
through discussion. Four scores were computed for each partici-
 pant by counting the number of sentinel-schema recollections,
sentinel-schema impressions, neutral recollections, and neutral im-
pressions he or she generated.

Results and Discussion

The predictions were tested with a series of multiple regression
analyses performed on the number of sentinel-schema recollec-
tions and impressions and the number of neutral recollections and
impressions. In these analyses, we entered attachment anxiety and
avoidance scores as predictors while controlling for the total
number of responses a participant generated in the memory task. In
this way, we controlled for general memory and inference skills. In
line with predictions, the analyses revealed no significant effect of
either attachment anxiety or avoidance on the number of neutral
collections, neutral impressions, and sentinel-schema recollec-
tions (\( \beta_s < .13, p_s > .23 \)). Attachment anxiety, however, signifi-
cantly predicted the number of sentinel-schema impressions (\( \beta =
.23, p < .05 \)); the higher a participant’s attachment anxiety score,
the more sentinel-schema impressions he or she generated. Avoid-
ance scores were not significantly related to the number of
sentinel-schema impressions.

In summary, the findings supported our predictions: Attachment
anxiety was associated with generating more inferences concern-
ing the sentinel schema, but it did not explain individual differ-
ences in the number of sentinel-schema recollections or the num-
ber of inferences made about schema-irrelevant statements. This
fits with Catrambone and Markus’s (1987) conclusion that having
a rich and well-developed schema facilitates deeper information
processing and more extensive inferences about schema-relevant
information, but it does not affect simple recollection of actual
facts or depend on global inferential skills.

Study 5

In Study 5, we examined the hypothesized link between
avoidant attachment and deep processing of information relevant
to the rapid fight–flight schema. We hypothesized that avoidant
participants’ well-developed rapid fight–flight schema would al-
low them to process schema-relevant information more deeply.
Hence, when asked to recall a story that included the major components of the rapid fight-flight schema, more avoidant people would go beyond the information given and generate more conjectures and inferences about the thoughts, feelings, and traits of the protagonists. These impressions would be confined to aspects of the story relevant to the rapid fight-flight schema and would not extend to schema-irrelevant information.

Once participants completed the ECR scale, they read a story that included the major components of the rapid fight-flight schema. They then generated recollections and impressions about the story, after which two independent judges placed each of a participant’s responses into one of four categories: rapid fight-flight recollections, rapid fight-flight impressions, neutral (schema-irrelevant) recollections, and neutral impressions. We expected avoidant attachment to be associated with generating more rapid fight-flight impressions. As in Study 4, we did not expect an association between avoidance and more schema generated recollections because the task was fairly straightforward and was completed immediately after the short story.

Method

Participants. Seventy-two Israeli undergraduates (24 men and 48 women, ranging in age from 21 to 42, Mdn = 24) participated in the study in exchange for credit in psychology courses. Materials and procedure. Participants took part individually in a single experimental session. Upon arrival, they were told that the study dealt with memory and reasoning abilities. They then completed the ECR scales. Cronbach’s alphas for both anxiety (.89) and avoidance (.76) were acceptable, and this time the two scores were significantly correlated, r(70) = .32, p < .01. All of the participants completed a bogus personality test, which served as a distracter task, and then read a 38-sentence story similar to the one used in Study 4. In Study 5, however, 19 sentences concerned neutral topics (e.g., “I saw lots of tiny flowers”) and 19 sentences described behaviors central to the rapid fight-flight schema (e.g., “Immediately, without hesitation, I ran and climbed the nearest tree”). All of the sentences describing rapid fight-flight behaviors were derived from stories written by participants in Study 1. Ten Israeli undergraduates who had not participated in the study were asked to judge the extent to which each of the sentences was congruent with the rapid fight-flight schema. They rated all of the sentences as highly congruent with the schema (M = 6.20, SD = 0.79, Mdn = 6). After reading the story, participants completed the memory task described in Study 4 and were debriefed and thanked.

Scoring procedure. Participants’ responses were independently content-analyzed by two new judges (psychology graduate students) who were unaware of participants’ ECR scores and who had received the training described in Study 4. Each judge independently sorted each of a participant’s responses into one of the following categories: (a) rapid fight-flight recollections (e.g., “The wolf was scared away by a stick”), (b) rapid fight-flight impressions (e.g., “A person’s heroic action may benefit other people”), (c) neutral recollections (e.g., “They took a family vacation in the northern part of Israel”), and (d) neutral impressions (e.g., “Shay seemed to be a good athlete”). Interjudge agreement was acceptable (k = .70), and disagreements were resolved through discussion. Four scores were computed for each participant by counting the number of rapid fight-flight recollections, rapid fight-flight impressions, neutral recollections, and neutral impressions he or she generated.

Results and Discussion

Our predictions were tested in a series of multiple regression analyses identical to those described in Study 4. The analyses revealed no significant associations between either attachment anxiety or avoidance and the number of neutral recollections and neutral impressions (βs < .17, ps > .17). However, the main effect of avoidant attachment on the number of rapid fight-flight impressions was significant (β = .30, p < .05); the higher a participant’s avoidance score, the more rapid fight-flight impressions he or she generated. Although attachment anxiety was not associated with the number of rapid fight-flight impressions, it significantly predicted the number of rapid fight-flight recollections (β = −.33, p < .01), but the association was negative. That is, the higher a participant’s attachment anxiety score, the fewer rapid fight-flight recollections he or she generated. Avoidant attachment was not significantly associated with the number of rapid fight-flight recollections.

In summary, as predicted, avoidant attachment was associated with generating more inferences about the rapid fight-flight schema. It did not, however, explain individual differences in the number of rapid fight-flight recollections or the number of recollections or inferences made about schema-irrelevant issues. In addition, attachment anxiety seemed to impair recall of information congruent with the rapid fight-flight schema.

Study 6

Studies 1 to 5 supported our premise that people who score high on attachment-related avoidance process threat-related information with a rapid fight-flight schema and that people who score high on attachment anxiety process such information with a sentinel schema. Study 6 was designed to explore whether these schemas and action tendencies translate into actual behavior. To this end, we exposed small groups of participants to an experimentally created threatening situation, a room gradually filling with smoke due to a malfunctioning computer. We then examined our predictions that (a) the most anxious person in a group would be most likely to detect the presence of smoke (in accordance with the sentinel schema) and (b) the most avoidant person in a group would be most likely to act quickly following detection of the danger (in accordance with the rapid fight-flight schema). As in Study 1, we examined associations between the two kinds of attachment insecurity and sentinel and rapid fight-flight behaviors while statistically controlling for neuroticism and extraversion. We (Ein-Dor et al., in press) reported other analyses from this study that examined whether groups that are more diverse with respect to attachment (i.e., contain at least one group member scoring low on both attachment anxiety and avoidance [i.e., being relatively secure], one group member scoring high on attachment anxiety, and one group member scoring high on avoidance) would be more effective in dealing with threats than would less diverse groups (and this hypothesis was supported). Here we focus on the association between attachment insecurities and individuals’
behavior in groups. (In other words, the present findings concern the individual level of analysis rather than the group level.)

Method

Participants. One hundred thirty-eight Israeli undergraduates (89 women and 49 men aged 19–27, *Mdn* = 22) participated in the study in exchange for credit in psychology courses.

Materials and procedure. The study spanned two sessions. In the first session, participants completed two randomly ordered scales. Attachment orientations were assessed, as in the previous studies reported here, with the ECR scales. Cronbach’s alphas were .89 for the anxiety items and .90 for the avoidance items. Mean scores on the two scales were somewhat correlated, *r*(136) = .23, *p* < .05.

Participants also completed the neuroticism and extraversion subscales of a Hebrew version of the Big Five Inventory (John et al., 1991). Cronbach’s alphas were .86 for neuroticism and .76 for extraversion. Trait scores were computed for each scale by averaging the appropriate item ratings.

The second session was conducted 2 weeks later by a different experimenter, unaware of participants’ scores on the first-session measures. Participants were invited to the laboratory three at a time (resulting in 46 groups). Any gender combination within a group was allowed. Once the participants had all arrived, the experimenter told them a cover story, according to which they were going to play an Internet-based game. The experimenter then took the three participants to a large room, sat them beside a long table, and asked them to complete a battery of bogus questionnaires regarding their daily habits while he prepared the control-room computers for their experiment. He told them he would call them on an intercom when the computers were ready, and he then left the room and closed the door behind him.

Participants were videotaped by hidden cameras throughout the session and could be watched from the control room. Ten feet behind the participants’ table was another table on which there was an SVGA computer monitor displaying a generic desktop graphic. On the floor nearby was an apparently attached PC with a stack of paper on it. The screen was controlled by a computer in the control room, and the visible PC computer was actually a disguise for a nontoxic party smoke machine. Exactly 1 min after the experimenter departed, he began sending smoke into the room through the bogus computer, making it seem to participants that the computer had caught fire. There was a large open window in the room, which ensured that participants could breathe despite the smoke. The experiment ended either when the participants exited the room or when they tried to deal with the smoking computer. Afterward, they were debriefed and thanked. All said they had believed that the computer fire was genuine. The overwhelmingly common response to the threat was flight (all but one of the groups left the room) rather than attempting to deal with the smoking computer, so we were not able to test the possibility that in some situations more avoidant individuals might approach (and if necessary “fight”) a threat in order to remove it.

Scoring procedure. Video records of the sessions were independently rated by two judges (psychology graduate students), who were unaware of the study hypotheses and of participants’ scores on the first-session measures. Judges recorded (a) the identity of the group member who first detected the smoke and (b) the identity of the group member who first took action following detection of the smoke, either by exiting the room (which was all but one case) or by trying to deal with the smoking computer, whichever came first. The judges were in perfect agreement (hence, *κ* = 1).

Results and Discussion

Groups consisted of three members, so each group member had a 33.3% chance of being the first to identify the presence of smoke and/or being the first to act following detection of the smoke. For each group we ranked its members by their level of attachment anxiety and avoidance (i.e., 1 for the most attachment-anxious person, 2 for the second most attachment-anxious person, and 3 for the group member with the lowest score on attachment anxiety). We also ranked them by their neuroticism and extraversion levels.

We expected that the most anxious person in a group would be most likely to detect the presence of the smoke (significantly more often than expected by chance, 33.3%). To this end, we ran a series of chi-square tests for goodness of fit. The analyses revealed that the group member with the highest attachment anxiety score noticed the threat first in 46.7% of the cases, *χ*(2) = 5.94, *p* < .05. But this was not true for the most neurotic person (34.1% of cases), *χ*(2) = 0.36, *p* = .84, or the most extraverted person (42.5% of cases), *χ*(2) = 3.25, *p* = .20, although there was a tendency for extraverts to be more vocal about the threat. We also found that the most avoidant group member was unlikely (24.4% of cases) to detect or mention the smoke first, *χ*(2) = 6.47, *p* < .05. Although not explicitly predicted, the latter finding is consistent with the premise that the rapid fight-flight schema contains placeholders that tend to minimize threatening stimuli.

We also expected that the most avoidant person in a group would be likely to act first following the detection of danger (significantly more than the 33.3% expected by chance). A series of chi-square tests for goodness of fit failed to support this prediction, and in fact none of the individual-difference measures (avoidance, anxiety, neuroticism, or extraversion) was significantly related to taking action first, *χ*(2) < 2.62, all *ps* > .27. This absence of effects may have been due to the ease of escaping the situation we created. As mentioned, all but one of the groups left the room rather than try to put out the “fire.”

In summary, the findings supported our prediction that attachment anxiety would be associated with quick detection of a threat, but they did not support our prediction about avoidant individuals being quickest to take action. That prediction should be tested in a situation that requires (or at least seems to participants to require) more courageous action.

General Discussion

Bowlby (1973, 1980) argued that people vary in how they deal with threats and in the mental representations of attachment experiences that underlie such variation. Supporting his contentions, recent studies (Mikulincer et al., 2009; Waters & Waters, 2006) have shown that reactions of relatively secure people to threatening situations are organized around a secure-base script. When in trouble or in need of help or support, secure individuals expect other people to be available and responsive and to help them cope with dangers or stressors. Less secure people have less accessible
and less elaborated secure-base scripts and do not rely confidently on such a script when processing threat-related information.

In the studies reported here, we explored the possibility that insecure people possess alternative schemas for dealing with difficult situations. Specifically, we hypothesized that insecure–anxious individuals rely on what we call a sentinel schema—one that encourages high sensitivity to clues of impending danger and a readiness to warn others about the danger while maintaining proximity to them. We also hypothesized that avoidant people’s reactions to danger would be organized around what we call a rapid fight–flight schema, a perception–action schema that encourages rapid self-protective responses to danger without consulting other people or seeking their help.

The results were generally supportive of these hypotheses. With regard to attachment anxiety, Study 1 found this form of insecurity to be associated with ready access to core components of the sentinel schema (noticing danger before other people do, warning others about the danger) when writing a story about threatening events. Study 2 showed that more anxious participants remembered (i.e., recognized) more recently encountered sentinel-schema information, reacted quickly to sentinel-related information, and were prone to “recall” schema-biased false memories. In Study 4, participants who scored higher on attachment anxiety were more likely to process sentinel-schema information in a deep way and to generate more inferences and conjectures on the basis of this information. Studies 2 and 5 also revealed that more anxious participants had poorer and shallower recall of information that was not congruent with the sentinel schema or that was, instead, congruent with the rapid fight–flight schema. Finally, Study 6 revealed that the most attachment-anxious person in a group was more likely than other group members to quickly detect a threat (smoke from a malfunctioning computer).

With regard to attachment-related avoidance, Study 1 revealed that more avoidant participants had reader access to core components of the rapid fight–flight schema (escaping a dangerous situation without helping others, acting rapidly without depending on others’ actions, not deliberating or cooperating with others) when thinking and writing a story about threatening events. Study 3 indicated that avoidant attachment is associated with schema-biased processing (false memories) and correct memories (hits) and fast recognition of information relevant to the rapid fight–flight schema. In Study 5, avoidant participants were more likely to process rapid fight–flight-schema information in a deep way and to generate more inferences and conjectures on the basis of this information. Study 3 also revealed that more avoidant participants exhibited fewer schematic memories of information that was not congruent with the rapid fight–flight schema. Similarly, Study 6 revealed that the most avoidant group member was less likely than the other members of his or her group to detect and broadcast a laboratory threat. However, given the situation we created, avoidant attachment was not related to being first to escape a laboratory room following a group member’s detection of danger.

These findings were limited to the processing of threat-relevant information. Across all six studies, attachment insecurity scores were not associated with processing threat-irrelevant information. We did not, however, control for participants’ general memory ability or general motor-reaction speed, which may affect the associations between attachment insecurity scores and the processing of neutral information by reducing “noise” in the model. Still, the robustness of our findings implies that attachment insecurities are less related to processing of neutral information than to processing of threat-related information. Moreover, the effects of attachment anxiety and avoidance were not explained by individual differences in attachment-unrelated verbal and memory abilities, speed of recognizing attachment-irrelevant information, or attachment-unrelated inference skills. Moreover, the findings were not explained by general personality traits (e.g., neuroticism, extraversion) or by scores on a measure of socially desirable responding. Instead, they were unique to individual differences in the attachment domain.

Our findings suggest that people who are anxious with respect to attachment possess highly accessible and well-organized implicit knowledge about a sequence of events that goes from monitoring and quickly reacting to potential sources of danger to alerting others about the imminent danger and maintaining proximity to them. This knowledge presumably makes it easier for anxious individuals to react to threatening situations in line with an accessible sentinel schema: Be vigilant regarding possible danger, respond quickly to signs of threats, warn others about these signs, and seek their help. This accessible knowledge structure probably contributes to the well-documented tendency of people who score high on attachment anxiety to become highly distressed in the face of threats and to cope with all kinds of difficulties by catastrophizing, directing attention to threat-related information, expressing needs and vulnerabilities, and desperately seeking other people’s proximity, support, and comfort (see Mikulincer & Shaver, 2007a, for a review).

Our findings also indicate that avoidant individuals possess accessible and well-organized knowledge about a sequence of behaviors that includes rapid efforts to preserve themselves—by either fight or flight—without deliberating or coordinating their responses with other people or expecting help from them. This accessible rapid fight–flight schema may underlie research findings showing that avoidant people are reluctant to seek support in times of distress, keep somewhat distant from and independent of other people, suppress distress-related thoughts, and emphasize autonomy and self-efficacy (see Mikulincer & Shaver, 2007a, for a review). Our one important failure to confirm a key prediction occurred when neither avoidance nor any of the individual-difference variables we measured were related to acting first to escape from or eliminate a threat. However, as noted earlier, we continue to believe that the schema accessibility documented here in both open-ended narratives and information-processing tasks is part of the explanation for insecure people’s emotional and behavioral reactions to threatening situations. The setting we created may have made flight too easy, not allowing us to observe “fight” or other problem-attacking reactions. Future studies should examine our hypotheses in experimental settings that enable or encourage more varied responses to a threat.

Together with findings from Mikulincer and colleagues (2009) and Waters and Waters (2006), the present findings suggest that, although insecure people lack an accessible and fully elaborated secure-base script, they do possess rich, accessible alternative schemas. One implication of these alternative schemas is that they may distort or disrupt social interactions and close relationships. For example, the sentinel schema may cause anxious individuals to have an overly liberal criterion for detecting relationship problems.
and partner transgressions and to exaggerate their negative consequences. The schema may also cause anxious people to misrepresent troubling interactions with a relationship partner. The rapid fight-flight schema may cause avoidant individuals to defer talking with a partner about relational problems and to fail to coordinate problem-solving efforts with the partner. These kinds of cognitive and action tendencies have been noted in previous studies (see e.g., Mikulincer, 1998; Shaver, Mikulincer, Lavy, & Cassidy, 2009; Simpson, Rholes, & Phillips, 1996; see J. A. Feeney, 2008, for a review), but the cognitive mediators had not been fully identified.

Well-developed schemas can also influence what Markus and Nurius (1986) called possible selves, future-oriented self-conceptions that allow a person to outline steps and strategies for accomplishing a certain goal and to organize goal-directed behavior (see Markus & Ruvolo, 1989, for a review). These possible selves closely resemble Bowlby’s (1973) conception of internal working models of self. An accessible schema biases memory and fantasies in the direction of the schema and favors deeper processing of schema-congruent information (see also Rumelhart, 1980). This creates a self-fulfilling prophecy about oneself in threatening situations. The sentinel schema encourages a self-portrait emphasizing vulnerability, dependence, and emotional instability, whereas the rapid fight-flight schema emphasizes strength, independence, and emotional suppression. The schematic components of models of self and their influence on imagined possible selves deserve further research attention.

Overall, our findings supported SDT’s (Ein-Dor et al., 2010) predictions that each of the major attachment orientations (secure, anxious, and avoidant) is associated with a specific schema for processing threat-related information that may increase the inclusive fitness of members of groups that are diverse with respect to attachment orientations. These diverse groups should detect potential problems and threats quickly (with the help of anxious members’ sentinel schemas); act quickly without much deliberation, negotiation, or compromise (with the help of avoidant members’ rapid fight-flight schemas); and manage complex social tasks (with the help of secure members’ secure-base schemas).

All six of our studies were conducted with Israeli undergraduates, and attachment insecurities were assessed with a single self-report measure, the ECR. Future studies should include other kinds of samples and other kinds of attachment measures (e.g., the Adult Attachment Interview, as explained by Hesse, 2008). Despite these limitations, the six studies described here contribute novel and, we believe, important insights into the kinds of implicit procedural knowledge that organize perceptions, expectations, memories, and action plans of people with different attachment styles.

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Appendix

**Drawing Used in Study 1**

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