

## What's Inside the Minds of Securely and Insecurely Attached People? The Secure-Base Script and Its Associations With Attachment-Style Dimensions

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In 8 studies the authors explored the procedural knowledge (secure-base script; H. S. Waters & E. Waters, 2006) associated with secure attachment (i.e., low scores on attachment anxiety and avoidance). The studies assessed the accessibility, richness, and automaticity of the secure-base script and the extent to which it guided the processing of attachment-relevant information. Secure attachment (lower scores on anxiety and avoidance) was associated with greater secure-base "scriptedness" of attachment narratives, greater accessibility of the secure-base script in narratives and dreams about distressing experiences, deeper processing of script-relevant information, and faster and more confident script-relevant judgments. In addition, secure participants' tendency to process secure-base information more deeply was evident even 5 days after being exposed to it and was impervious to the depletion of cognitive resources, indicating automatic processing. The discussion focuses on implications of the findings for understanding the cognitive bases of secure people's affect-regulation strategies and behavior in social relationships.

*Keywords:* attachment, secure base, script, dreams, attachment anxiety, avoidance

An important premise of attachment theory (Bowlby, 1982) is that temporal continuity in people's orientations to attachment, or attachment styles (e.g., secure, anxious, or avoidant), is attributable in part to mental schemas or "working models" of self, relationships, and relationship partners. The theory deals with the roots of security and insecurity in close relationships and with effects of the resulting mental structures on information processing, feelings, and interpersonal behavior. Various approaches have been taken to defining and measuring relational schemas, models, or scripts. In the present article we consider a particular kind of mental schema or model, the "secure-base script" (Waters & Waters, 2006). This script includes three components: (a) If one encounters an obstacle and/or becomes distressed, one can approach a relationship partner for help; (b) this partner will be available and supportive when one asks for support; and (c) one will experience relief and comfort as a result of proximity to this person. We show how this construct can be measured in adult samples, and we examine several of its effects on social information processing.

We begin with a brief overview of attachment theory and research and then concentrate on the secure-base-script concept. We outline a

series of hypotheses that we then test in eight separate studies. The results provide a large gain in the understanding of secure-base scripts, individual differences in such scripts, and the effects of more or less well-developed scripts on social information processing.

### Attachment Theory and Attachment Orientations

Bowlby (1982) claimed that human beings are born with an innate psychobiological system (the *attachment behavioral system*) that motivates them to seek proximity to significant others (*attachment figures*) in times of need. The term "attachment" was meant to convey that humans tend to form strong emotional bonds with the people on whom they rely for protection, comfort, and support. Bowlby (1973) also described major individual differences in the regulatory functioning of the attachment system. Interactions with attachment figures who are available in times of need and are sensitive and responsive to bids for proximity and support allow the attachment system to function optimally, promote an inner sense of security (a sense that the world is a generally safe place, that others are helpful when called upon, and that it is possible to explore the environment curiously and confidently and engage rewardingly with other people), and build confidence in support seeking as a distress-regulation strategy. When attachment figures are rejecting or unavailable in times of need, the sense of security is undermined, strategies of affect regulation other than normal support seeking (*secondary attachment strategies*, conceptualized in terms of two dimensions, *anxiety* and *avoidance*) develop, and the likelihood of self-related doubts and emotional problems increases (Mikulincer & Shaver, 2007a).

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When testing this theory, most researchers have focused on a person's attachment orientation or style—the systematic pattern of relational expectations, emotions, and behaviors that results from a particular attachment history (Fraley & Shaver, 2000). Research, beginning with Ainsworth, Blehar, Waters, and Wall (1978) and continuing through recent studies by social and personality psychologists (reviewed by Mikulincer & Shaver, 2003, 2007a), indicates that attachment orientations can be measured along two roughly orthogonal dimensions, attachment-related *anxiety* and *avoidance* (Brennan, Clark, & Shaver, 1998). The first dimension, *attachment anxiety*, reflects the degree to which a person worries that a partner will not be available or adequately responsive in times of need. The second dimension, *avoidance*, reflects the extent to which he or she distrusts relationship partners' goodwill and strives to maintain autonomy and emotional distance from them. People who score low on both dimensions are said to be secure, or securely attached.

Extensive research, including several 20-year longitudinal studies spanning the period from birth to young adulthood (reviewed by Grossmann, Grossmann, & Waters, 2005), has shown that a person's attachment style is predictably associated with interpersonal behavior and cognitions, relationship quality, emotion regulation, self-esteem, and adjustment and mental health. For example, securely attached children have been consistently found to have more constructive patterns of communication with their parents, to report lower levels of anxiety and frustration, to rely on more constructive methods of distress management, and to possess higher levels of academic and social skills than less secure children, either anxious or avoidant (see Thompson, 2008, and Weinfield, Sroufe, Egeland, & Carlson, 2008, for recent reviews). In adolescence and adulthood, secure attachment is associated with healthy expression of emotions, optimistic appraisal of potentially threatening events, and reliance on effective ways of coping with stress (see Mikulincer & Shaver, 2007a, for a review). Research also indicates that secure individuals have a more stable sense of self-worth, are less likely to suffer from mood disorders and other forms of psychopathology, have more stable and satisfactory romantic and marital relationships, and are more curious and creative and more empathic and compassionate toward others than less secure individuals (e.g., Feeney & Noller, 1990; Hazan & Shaver, 1987; Kirkpatrick & Davis, 1994; Mickelson, Kessler, & Shaver, 1997; Mikulincer, 1995, 1997; Mikulincer, Shaver, Gillath, & Nitzberg, 2005).

Recent experimental studies have shown that these correlational findings reflect the action of what we (following Fredrickson, 2001) call a broaden-and-build cycle of attachment security (Mikulincer & Shaver, 2003, 2007a). This cycle is a cascade of mental and behavioral events that flows from the activation of mental representations of attachment security to greater emotional equanimity, better personal and social adjustment, more satisfying close relationships, and autonomous personal growth. In our experimental studies, for example, we have consistently found that priming thoughts of a security-enhancing attachment figure (using a procedure that Mikulincer & Shaver, 2007b, called "security priming") has positive effects on mood, mental health, less defensive access to memories of painful experiences, compassionate and prosocial feelings and behaviors, and tolerance toward outgroup members; and this happens even in the case of otherwise insecure or insecurely attached people (Cassidy, Shaver, Mikulincer, & Lavy, in press; Mikulincer, Gillath, et al., 2001; Mikulincer, Hirschberger, Nachmias, & Gillath, 2001; Mikulincer & Shaver,

2001; Mikulincer et al., 2005; Mikulincer, Shaver, & Horesh, 2006). Similar positive effects of priming security-enhancing mental representations have been found with respect to self-concept, appraisals of romantic partners, and openness to new information, regardless of dispositional attachment style (e.g., Baccus, Baldwin, & Packer, 2004; Green & Campbell, 2000; Rowe & Carnelley, 2003, 2006).

### The Secure-Base Script

According to attachment theory, secure attachment results from a history of successfully seeking and receiving support from one or more attachment figures (Ainsworth et al., 1978; Bowlby, 1973). These gratifying experiences are thought to be mentally summarized and recorded in what Bowlby (1973) called inner or internal working models of self and others. They are thought to be part of a person's declarative knowledge of the self as special, valued, and able to elicit beneficial care from responsive relationship partners (Mikulincer & Shaver, 2004; Shaver & Mikulincer, 2007). Recent theoretical analyses propose that these working models also include procedural knowledge about distress management, which becomes organized around a relational secure-base script (Bretherton, 1987, 1990; Mikulincer & Shaver, 2007b; Waters, Rodrigues, & Ridgeway, 1998; Waters & Waters, 2006). Theoretically, this script includes the following if-then propositions: "If I encounter an obstacle and/or become distressed, I can approach a relationship partner 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; I can then return to other activities." Once activated, this script serves as a guide for adaptively regulating cognitive and affective processes and for coping with stress and distress.

According to Mikulincer and Shaver (2007b), regular activation of the secure-base script guides and sustains the broaden-and-build cycle of attachment security. The first major component of the secure-base script is the proposition that if one encounters an obstacle and/or becomes distressed, one can approach a relationship partner for help. This belief leads to what Epstein and Meier (1989) called constructive ways of coping—active attempts to manage problematic situations and restore emotional equanimity by seeking support and solving problems in ways that do not generate negative side effects. Reliance on the secure-base script thus makes it less necessary to rely on psychological defenses that distort perception, limit coping flexibility, and generate interpersonal conflicts (Mikulincer & Shaver, 2007b).

The second component of the secure-base script is the proposition that a relationship partner will be available and supportive when one asks for support. This belief sustains positive beliefs about others' intentions and traits and assuages worries about being rejected, criticized, or abused. These beliefs can allow a person to get emotionally close to a partner; express needs, desires, hopes, and vulnerabilities; and thereby establish and maintain intimacy and interdependence (Reis & Shaver, 1988), which contribute to relationship satisfaction.

The third component of the secure-base script is the proposition that relief and comfort will result from calling upon an attachment figure. This belief promotes a pervasive sense of safety, assuages distress, and allows secure people to remain relatively unperturbed during times of stress and experience longer periods of positive affectivity. This belief also sustains appraisals of life difficulties as

manageable, which helps a person maintain an optimistic and hopeful stance regarding distress management. It also sustains a sense of personal worth, competence, and mastery, because it means that one is worthy of others' affection and support.

According to Mikulincer and Shaver (2007b), the secure-base script underlies the beneficial effects of a secure attachment orientation. That is, securely attached people possess a more accessible, richer, and more elaborated secure-base script than less secure individuals, either anxious or avoidant, which contributes to their emotional stability, mental health, satisfying interpersonal relations, and self-esteem. In other words, securely attached individuals are relative experts in using the secure-base script.

Despite the assumed centrality of the secure-base script in the everyday lives of relatively secure individuals, few studies have examined the hypothesized links between attachment-style dimensions (anxiety and avoidance) and the accessibility, richness, and elaboration of the secure-base script. This is the purpose of the present article.

### Studying the Secure-Base Script

There are only a few studies assessing the secure-base script in adults, and all of them have focused on individual differences in the generation of attachment-related narratives—the extent to which a participant's narratives fit the chain of events represented in the secure-base script. Moreover, these studies have exclusively relied on the prompt-word outline method developed by Harriet Waters and her colleagues (e.g., Waters & Hou, 1987; Waters et al., 1998). In this technique, participants receive a story title and 12–14 prompt words. Although the prompt words are selected to loosely suggest elements of the secure-base script, participants are instructed to use the words in any way they like to formulate a story that includes all of the words. The first few words indicate the actors, the next few words suggest key issues and activities, and the last few words suggest a story conclusion. For example, in the prompt-word set titled “A Baby's Morning,” the initial words are *baby* and *mother* (Waters & Waters, 2006). The subsequent words point to constructive interaction between actors, an interruption, distress, and some kind of resolution (*play, blanket, hug, smile, story, pretend, teddy bear, lost, found, nap*). Trained judges score the extent to which a participant's narrative is organized around the secure-base script, with the highest score indicating extensive secure-base-script organization and the lowest score indicating no apparent secure-base-script content (see Waters & Waters, 2006, Appendix B, for examples of narratives with different degrees of secure-base scriptedness).

Using the prompt-word outline method, Waters and Rodrigues-Doolabh (2001), Coppola, Vaughn, Cassibba, and Constantini (2006), and Dykas, Woodhouse, Cassidy, and Waters (2006) found that the secure-base scriptedness of participants' narratives was strongly associated with the coherence of mind score based on the Adult Attachment Interview (described in detail by Hesse, 2008), the main indicator of attachment security in the interview. Moreover, Dykas et al. (2006) found that self-reports of attachment security (lower attachment anxiety and avoidance scores on the Experiences in Close Relationships inventory developed by Brennan et al., 1998) were associated with higher scriptedness scores on the prompt-word outline measure in a community sample of adolescents. These findings indicate that more secure individuals

tend to have better knowledge of and access to the secure-base script, which allows them to produce narratives organized by the script.

Other studies have shown that secure-base scriptedness and attachment security have similar correlates. For example, Tini, Corcoran, Rodrigues-Doolabh, and Waters (2003) and Bost et al. (2006) assessed the secure-base scriptedness of narratives generated by mothers and the attachment pattern of their infants, finding strong concordance between mothers' scriptedness scores and infants' attachment security. Similar findings were reported by Verissimo and Salvaterra (2006) in a sample of Portuguese families with adopted children. There is substantial evidence that infants' attachment security is correlated with their mothers' secure state of mind with respect to attachment as measured with the Adult Attachment Interview (see van IJzendoorn, 1995, for a meta-analysis). Additionally, Coppola et al. (2006) found that mothers' secure-base scriptedness score was associated with sensitivity to their infants' signals and needs in video-recorded mother–infant interactions—another correlate of a secure maternal state of mind with respect to attachment (see George & Solomon, 2008; Mikulincer & Shaver, 2007a, for reviews).

These studies provide strong support for the claim that the secure-base script is an important component of attachment security. However, they represent only initial steps in the theoretically important examination of the secure-base script. They all rely on a single method—the prompt-word outline technique. More important, they focus only on individual differences in the organization of attachment-related narratives and ignore other characteristics of people who hold a well-developed secure-base script and use it to navigate the social environment. For example, people who have become experts in using a particular mental script should have ready and automatic access to it, which allows them to process relevant information without effortful cognitive control and depletion of cognitive resources (e.g., Bargh, 1996). Moreover, such experts should anticipate a script-consistent unfolding of events and tend to complete missing parts of a sequence by inserting script-congruent elements (Schank & Abelson, 1977) and be surprised when events violate expectations (Schank, 1999). When they recall script-related events, they should selectively retrieve script-consistent memories (Nelson, 1986).

If securely attached people indeed possess a well-developed secure-base script, it should affect the ways in which they process attachment-relevant information. According to Markus, Smith, and Moreland (1985), a well-developed mental schema provides people with a cognitive framework for processing schema-relevant information and going beyond the information given. Markus et al. found that having a well-developed schema for a particular kind of social interaction enabled people to generate rich impressions of and conjectures about interaction partners' thoughts, feelings, intentions, and traits, including information that was not explicitly presented in a stimulus story. Markus (1977) also contended that people who have a well-developed mental schema are sensitive to schema-relevant information and pay close attention to it (Markus & Sentsis, 1982). As a result, they make schema-relevant judgments more quickly and confidently (e.g., Carpenter, 1988; Kanagawa, Cross, & Markus, 2001; Markus, 1977, 1980). Studies of cognitive expertise have also shown that having a well-developed schema for a given domain, social or non-social, allows people to make better use of contextual cues to improve the amount of schema-

relevant information they can recall (e.g., Chiesi, Spilich, & Voss, 1979; de Groot, 1965).

To date, researchers have not examined the extent to which securely attached people have ready and automatic access to a secure-base script and the extent to which they process attachment-related information in certain ways because of possessing such a script. We still know relatively little about how insecure individuals process such information—for example, by shaping it in certain ways based on a partial or distorted script. The eight studies reported here were designed to determine whether securely attached people process attachment-related information through the lens of a secure-base script and whether they use such a script the way experts of other kinds use their well-developed mental schemas to interpret and organize schema-relevant information. In Study 1, we attempted to replicate previous findings regarding the link between attachment security and the secure-base scriptedness of attachment-related narratives, but this time using a technique different from the prompt-words outline method. Studies 2–8 examined the links between attachment security and the appearance of the secure-base script in distress-related narratives and dreams (Studies 2 and 4), expectations of script-consistent patterns of events (Study 3), generation of script-relevant inferences and conjectures (Study 5), making rapid, confident script-relevant judgments (Study 6), using script-relevant cues to improve the recall of attachment-related information (Study 7), and the automatic processing of script-relevant information (Study 8).

We hypothesized that individuals who are more secure with respect to attachment would rely on the secure-base script for processing attachment-relevant information and would use this script like experts in other domains who possess accessible, well-developed, and elaborated schemas. Specifically, we hypothesized that lower scores on scales measuring attachment anxiety and avoidance would be associated with (a) more secure-base scriptedness in open-ended attachment-related narratives, (b) greater accessibility of the secure-base script when a person was thinking or dreaming about distressing events, (c) expecting more secure-base-script components (e.g., support seeking, support availability) when completing a story that ends with relief of distress, (d) generating more secure-base-script inferences and conjectures after receiving script-relevant information, (e) more quickly and confidently making judgments concerning secure-base-script information, (f) relying on more secure-base-script cues to improve recall of script-relevant information, and (g) more automatic, less controlled processing of secure-base-script information.

### Study 1

In Study 1, we examined the hypothesized link between attachment orientation (indicated by scores on the attachment anxiety and avoidance dimensions) and the secure-base scriptedness of attachment-relevant narratives, using a different technique from the one used in previous studies (the prompt-words outline method). The main goal of Study 1 was to replicate and generalize previous findings concerning the link between attachment security and secure-base scriptedness.

Participants completed the Experiences in Close Relationships inventory (ECR; Brennan et al., 1998), a well-established measure of attachment anxiety and avoidance, and were asked to write stories that described what was happening in two 3-picture se-

quences that schematically depicted the three major components of the secure-base script: distress, receipt of support, and relief from distress. In these sequences, the first picture (distress) showed a person in distress, the second picture (receipt of support) showed someone helping and supporting the distressed person, and the third picture (relief) showed the previously distressed person feeling better. Two independent judges read participants' stories and rated the secure-base scriptedness of their narratives.

To control for spurious effects and alternative interpretations, participants also wrote stories describing what was happening in neutral, attachment-unrelated sequences of pictures and completed measures of verbal ability and socially desirable responding. These sequences and measures allowed us to determine whether the association between the attachment-style dimensions and secure-base scriptedness could be explained by participants' general narrative richness, verbal ability, or need for social approval. Our main predictions were that (a) attachment insecurities (anxiety and avoidance) would be associated with lower levels of secure-base scriptedness in the attachment-relevant narratives and that (b) these associations would not be explained by general narrative richness, verbal ability, or socially desirable responding.

### Method

*Participants.* Fifty-seven Israeli undergraduates (31 women and 26 men, ranging in age from 18 to 32,  $Mdn = 22$ ) participated in the study in exchange for credit in their psychology courses.<sup>1</sup>

*Materials and procedure.* Each participant was run individually, in two separate sessions. In the first session, participants received four 3-picture sequences: two attachment-relevant sequences and two neutral, attachment-unrelated sequences.<sup>2</sup> The attachment and neutral sequences were presented intermittently, in pairs, and the presentation order within each type of sequence (attachment then neutral or neutral then attachment) was randomly determined for each participant. For half of the participants, the first set of pictures was an attachment-relevant sequence. For the other half, the first sequence was neutral and not attachment-relevant. Similar findings were obtained for the two groups of participants.

For each sequence, participants were told to examine the three pictures in the order presented and then to use them as the foundation for a story. They were also told that the pictures provided only an outline of a story which they were to build on and enrich in any way they wished. They then wrote a story about the first set of pictures and, after finishing it, were given the next set of pictures. The procedure was repeated until four stories had been created, with participants working at their own pace.

There were two attachment-relevant sequences. In the "hospital" sequence, the first picture showed an injured young adult with a

<sup>1</sup> Each study involved independent samples of undergraduates who did not participate in the other studies. Across all of the studies, including gender as an additional factor in the analyses did not change the findings. Moreover, no significant and 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.

<sup>2</sup> All of the pictures are available on request from the corresponding author.

sad facial expression, lying in a hospital bed. The second picture showed this person being cheered up by someone else, and the third picture showed the injured person, still in the hospital bed, but now with a happy facial expression. In the “work” sequence, the first picture showed a distressed-looking young adult in an office, overwhelmed by work. The second picture showed someone helping this person to complete the work, and the third picture showed the person, alone again in the office but now with a much happier demeanor. The three pictures in each sequence were drawn in black ink, presented on separate white cards, and ordered from top to bottom so that the top card showed a person in distress, the middle card showed someone else helping or comforting this person, and the bottom card depicted the person in a state of happy relief. To help each research participant identify with the distressed person, he or she was always portrayed as being of the same gender as the participant. That is, men wrote stories about distressed men; women wrote stories about distressed women.

There were two different versions of the hospital and work sequences, varying the gender of the supportive figure. Half of the participants received a hospital sequence showing a same-gender supportive person and a work sequence showing an opposite-gender supportive person. The remaining participants received the opposite-gender version of the hospital sequence and the same-gender version of the work sequence. Similar results were obtained for the two conditions.

There were also two sequences of neutral, attachment-unrelated pictures (a “bank” sequence and a “store” sequence). The first picture showed a person entering a bank or looking at a store-window display; the second picture showed the same person interacting with someone (a bank clerk or a salesperson); and the third picture showed the main character leaving the bank or store. As before, the gender of the main protagonist was the same as that of the participant.

The second session was conducted a week later by a different experimenter who was uninformed about participants’ stories. In this session, participants completed three randomly ordered psychological measures. Attachment orientation was assessed with a Hebrew version of the ECR scales. Participants rated the extent to which each item was descriptive of their feelings in close relationships on a 7-point scale ranging from *not at all* (1) to *very much* (7). Eighteen items assessed attachment anxiety (e.g., “I worry about being abandoned”) and 18 assessed avoidant attachment (e.g., “I prefer not to show a partner how I feel deep down”). The reliability and validity of the scales have been repeatedly demonstrated (beginning with Brennan et al., 1998; see Mikulincer & Shaver, 2007a, for a review). In the current study, Cronbach’s alpha coefficients were .88 for the anxiety items and .90 for the avoidance items; average scores were computed for each scale. The two scores were not significantly correlated,  $r(55) = -.06$ , as intended by the authors of the scales (Brennan et al., 1998).

Social desirability was assessed with a Hebrew version of the Marlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1960). Participants rated the extent to which each of the items was self-descriptive. Alpha for these items was .79; higher scores on the scale indicate a stronger tendency to respond in a socially desirable manner. There was a significant correlation between attachment anxiety and social desirability,  $r(55) = -.27$ ,  $p < .05$ , but not a significant correlation between avoidant attachment and social desirability,  $r(55) = -.19$ . (The correlations were negative

presumably because answering the ECR items in the insecure direction is not as socially desirable as answering them in a more secure direction.)

Verbal ability was assessed with a 15-item Hebrew vocabulary questionnaire based on the Scholastic Ability Test used by Israeli universities. These items have exhibited high reliability and validity in previous studies (e.g., Berant, 1998). Higher scores reflect greater verbal ability. There was not a significant correlation between the verbal ability measure and either attachment insecurity scale ( $r_s < .06$ ).

*Scoring procedure.* Participants’ stories were independently rated by two judges (psychology graduate students), who were unaware of participants’ attachment scores. For the two attachment-relevant sequences, the judges received an explanation of the three components of the secure-base script described in the introduction of the present article. They were then asked to read each story and rate the extent to which it fit the sequence of events implied by the secure-base script. Ratings were made on a 5-point scale, ranging from 1 (*not at all*) to 5 (*very much*). For neutral, attachment-irrelevant stories, judges were trained to rate the overall elaborative richness, without focusing on a specific kind of story content. Ratings were made on a 5-point scale, ranging from 1 (*very poor elaboration*) to 5 (*very rich elaboration*).

The two judges’ ratings were strongly correlated for all four stories, with  $r_s$  ranging from .79 to .88 (all  $p_s < .01$ ). We therefore computed four scores for each participant by averaging the two judges’ ratings for each story. Pearson correlations showed that these four scores were not significantly associated with the length of the stories<sup>3</sup> (number of sentences, number of words;  $r_s < .12$ ), verbal ability ( $r_s < .17$ ), or social desirability ( $r_s < .24$ ).

Pearson correlations between the four scores were computed in order to determine if the scores were related to each other in ways that reflected two different kinds of stories, as intended (attachment-relevant stories and neutral, attachment-irrelevant stories). These analyses indicated strong associations between the secure-base scriptedness ratings of the two attachment-relevant stories,  $r(55) = .73$ ,  $p < .01$ , and between the elaborative richness ratings of the two neutral stories,  $r(55) = .62$ ,  $p < .01$ . No significant correlation was found between the ratings of the two attachment-relevant stories and the ratings of the two neutral stories ( $r_s < .09$ ). On the basis of these findings we computed (a) a total secure-based scriptedness score by averaging ratings of the two attachment-relevant stories and (b) a total elaborative richness score by averaging ratings of the two neutral stories.

## Results and Discussion

To test our main prediction, that attachment insecurities would be associated with less secure-base scriptedness of attachment-relevant stories, but not with less elaborated neutral stories, we entered attachment anxiety and avoidance in a multiple regression

<sup>3</sup> Length of the generated stories was not significantly associated with attachment scores ( $r_s < .08$ ), and the four kinds of stories did not differ in length ( $F < 1$ ). However, verbal ability was significantly associated with story length ( $r_s > .29$ ,  $p_s < .05$ ), which provides construct validity for the verbal ability measure and indicates that it would have revealed verbal ability confounds with our other results if they had existed.

analysis predicting the judges' scores of each kind of story.<sup>4</sup> Social desirability and verbal ability scores were also entered as predictors to see whether they eliminated the effects of the attachment variables. Both attachment anxiety and avoidance made significant unique contributions to the secure-base scriptedness of attachment-relevant stories ( $\beta = -.35, p < .01$ , for anxiety;  $\beta = -.45, p < .01$ , for avoidance). In line with expectations, the greater a person's attachment anxiety or avoidance, the lower the secure-base scriptedness of his or her stories about attachment-relevant sequences. Moreover, introducing elaborative richness of the neutral stories as an additional predictor in the regression equation predicting the secure-base scriptedness of attachment-relevant stories did not substantially weaken the significant unique effects of attachment anxiety and avoidance ( $\beta$ s of  $-.35$  and  $-.42$ , respectively,  $ps < .01$ ). The same kind of regression analysis was conducted for the neutral stories, but in that case the attachment scores did not have significant unique effects ( $\beta$ s  $< .12$ ).

Overall, the findings support our predictions and generalize findings from past studies using different methods. Attachment insecurities were associated with lower secure-base scriptedness of attachment-relevant narratives, and these associations were not explained by verbal ability, social desirability, or general narrative skills. The findings indicate that adult attachment security is associated with the use of the secure-base script for generating and organizing attachment-relevant narratives.

## Study 2

In Study 2, we examined associations between the attachment insecurity dimensions and the cognitive accessibility of the secure-base script. Participants completed the ECR scales, were presented with the first picture of the hospital sequence from Study 1 (an injured person in a hospital bed displaying a sad facial expression), and were asked to write a story about what would happen next. Judges rated participants' stories for their congruence with the secure-base script. In addition, judges rated (a) the extent to which each of the three core components of the secure-base script (support seeking, support availability, and distress relief) appeared in participants' stories.

Our main prediction was that attachment anxiety and avoidance would be associated with less similarity between a story and the secure-base script. We also expected, however, that although both anxious and avoidant people would have lower cognitive access to the secure-base script, they would differ in the components of the script they left out and in the ways they represented themselves and others. Avoidant individuals are known to inhibit or suppress attachment-related thoughts and behaviors and to doubt others' supportiveness (see Mikulincer & Shaver, 2007a, for a review). Therefore, avoidant attachment should be particularly associated with the generation of stories that de-emphasize support seeking and support availability. Attachment anxiety is mainly defined by doubts about others' availability and supportiveness and pessimistic expectations about distress relief (see Mikulincer & Shaver, 2007a, for a review). Therefore, attachment anxiety should be particularly associated with writing stories that reflect pessimism about support availability and other people's capacity to relieve one's distress.

With regard to the association between attachment anxiety and the generation of stories that de-emphasize support seeking, we

cannot make ad hoc predictions due to a frequently observed discrepancy between anxiously attached motives and behavior. At the motivational level, anxiously attached people tend to emphasize their needs for social support and reassurance (see Mikulincer & Shaver, 2007a, for a review). Therefore, they should not de-emphasize support seeking in their stories. At the behavioral level, however, Mikulincer and Shaver (2007a) reviewed extensive evidence that anxiously attached people do not actively engage in support seeking due to their worries about unlovability and rejection. Therefore, if their stories reflected this inhibitory behavioral tendency, they probably would de-emphasize support seeking in their narratives. We explored this issue in detail in Study 2.

## Method

**Participants.** Sixty Israeli undergraduates (35 women and 25 men, ranging in age from 19 to 39,  $Mdn = 23$ ) participated in the study in exchange for credit in their psychology courses.

**Materials and procedure.** Participants were run individually and in two separate sessions. In the first session, they received the first picture of the hospital sequence used in Study 1. They were asked to look at the picture and write a story describing what was happening in the picture and what they thought would happen next. They were instructed to reflect on the protagonist's thoughts, feelings, and behaviors and describe how the situation would end. They wrote their story at their own pace.

The second session was conducted a week later by a different experimenter who was unfamiliar with participants' stories. In this session, participants completed the ECR scales, for which the alpha coefficients were again high (.86 for anxiety and .94 for avoidance). The two scale scores were not significantly correlated with each other or with story length ( $rs < .10$ ).

**Scoring procedure.** Participants' stories were independently rated by two judges (psychology graduate students), who were unaware of participants' ECR scores. Judges received explanations of the secure-base script and were trained to identify each of its components in participants' stories. They then read each story and rated the extent to which it included (a) active support seeking (the extent to which the injured person actively sought help, support, reassurance, or comfort from another person), (b) support availability (the extent to which others were available, sensitive, responsive, and supportive to the protagonist's needs), and (c) distress relief (the extent to which the injured person's emotional state was improved by the end of the story). In addition, the judges provided an overall rating of each story's conformity to the secure-base script. All ratings were made on a 7-point scale, ranging from *not at all* (1) to *very much* (7). Pearson correlations between the judges' ratings ranged from .84 to .96, indicating high interjudge reliability, so we averaged the two judges' scores.

To summarize, each participant's story was evaluated in terms of the three components of the secure-base script: support seeking, support availability, and distress relief. These three scores were significantly associated with judges' overall ratings of congruence between a story and the secure-base script, with  $rs$  ranging from .47 to .66 (all  $ps < .01$ ).

<sup>4</sup> 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.

## Results and Discussion

The data were analyzed with multiple regression analyses similar to those described in Study 1. In these analyses, the three specific scores for the components of the secure-base script and the overall rating of the story's conformity to the script were the dependent variables.

As can be seen in Table 1, both attachment anxiety and avoidance contributed significantly and uniquely to predicting a story's congruence with the secure-base script and support availability. Specifically, less secure participants generated stories that were less congruent with the secure-base script and included fewer descriptions of support availability. In addition, avoidant attachment but not attachment anxiety made a significant unique contribution to predicting support seeking. More avoidant participants were less likely to include support seeking in their stories (see Table 1). Attachment anxiety but not avoidance made a significant unique contribution to predicting distress relief. More attachment-anxious participants were less likely to include distress relief in their stories (again, see Table 1).

Overall, the findings support our predictions. The more secure a participant was (i.e., the lower his or her attachment anxiety and avoidance scores), the greater the congruence between his or her story and the secure-base script. In stories written by less secure participants, essential parts of the secure-base script were diminished or missing. The stories were less likely to include explicit descriptions of available and supportive others. Of special theoretical interest, whereas anxious participants' stories tended to lack the final step in the secure-base script (relief), avoidant participants' stories tended to lack the first step (active seeking of support). That is, anxious participants more often wrote about an injured protagonist who was seeking support or help and not achieving relief, whereas avoidant participants more often wrote about a person achieving relief without seeking or receiving support or help.

### Study 3

In Study 3 we examined attachment-style differences in the extent to which people expect patterns of interactions that are congruent with the secure-base script. Specifically, we examined whether more securely attached people would be more likely to complete missing parts of a sequence beginning with distress and ending with relief by inserting the two secure-base-script components that lead to relief: support seeking and support availability.

Table 1  
Regression Analysis of Judges' Ratings of Participants' Stories as a Function of Attachment Anxiety and Avoidance (Study 2)

Judges' ratings	$\beta$		$R^2$ (%)	$F$
	Anxiety	Avoidance		
Overall rating	-.29*	-.36**	23.6	5.75**
Support seeking	.07	-.38**	15.4	3.39*
Support availability	-.45**	-.37**	37.1	11.01**
Distress relief	-.45**	-.06	22.9	5.54**

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

Participants completed the ECR scales, received the first and third pictures from the work sequence in Study 1 (a person with an unhappy expression working in an office and the same person working in the same office but now with a happier expression), and were asked to write a story describing what happened between the two pictures. Judges then rated the extent to which support seeking and support availability appeared in the stories. We expected that both attachment anxiety and avoidance would be associated with generation of stories that de-emphasize support availability. Based on the rationale presented in Study 2, we also predicted that avoidant attachment would be associated with generation of stories that de-emphasize support seeking.

In Study 3 we also assessed two individual-difference variables known to be correlated with the attachment-style dimensions, namely neuroticism and extraversion (e.g., Nofle & Shaver, 2006). We statistically controlled these variables and examined whether attachment insecurities still had unique effects on the insertion of secure-base elements into a story.

### Method

**Participants.** Sixty Israeli undergraduates (36 women and 24 men, ranging in age from 19 to 35,  $Mdn = 23$ ) participated in the study in exchange for credit in their psychology courses.

**Materials and procedure.** The study was run in two sessions. In the first session, participants completed the ECR scales during regular class time. Cronbach's alphas were again high for both anxiety (.85) and avoidance (.88), and the two scores were not significantly correlated,  $r(58) = .14$ . Participants also completed the Neuroticism and Extraversion subscales of the Big Five Inventory (John, Donahue, & Kentle, 1991). They were asked to rate the self-descriptiveness of each trait on a 7-point scale, ranging from 1 (*not at all*) to 7 (*very much*). Alphas for the two subscales were acceptable (.78 and .85 for Neuroticism and Extraversion, respectively) and, as expected (see Nofle & Shaver, 2006), there were significant associations between anxiety and neuroticism,  $r(58) = .35$ ,  $p < .01$ , and between avoidance and introversion (lack of extraversion),  $r(58) = -.29$ ,  $p < .05$ .

Another research assistant, who was unaware of participants' attachment scores, conducted a second session 2–3 weeks later. This session was described to participants (who were run individually) as a study of social cognition. Participants received the first and third pictures of the work sequence from Study 1 and were asked to identify whether and how the two pictures differed. All participants were able to identify that the single difference between the two pictures was the protagonist's facial expression. Participants were then asked to write a story, at their own pace, describing what happened between the two pictures.

The stories were independently rated by two judges (psychology graduate students), who were unaware of participants' ECR scores. Judges received an explanation of the secure-base script and were trained to identify its components in stories. They were then asked to rate the extent to which each story included support seeking and support availability (using the coding scheme described in Study 2). The two ratings were made on a 7-point scale, ranging from *not at all* (1) to *very much* (7). Pearson correlations between the judges' ratings were .87 for support seeking and .81 for support availability, allowing us to average the two judges' ratings in each case. The support seeking and support availability scores were

highly correlated, confirming that they are part of a single script,  $r(58) = .62, p < .01$ .

### Results and Discussion

The data were analyzed in a series of multiple regression analyses similar to the ones conducted in Studies 1 and 2. In addition, neuroticism and extraversion scores were included so that we could assess the unique contributions of the attachment scores. Findings indicated that, even after controlling for the more general individual differences, both attachment anxiety and avoidance were significantly associated with fewer descriptions of support seeking ( $\beta$ s of  $-.35$  and  $-.30$ , respectively,  $ps < .01$ ) and support availability ( $\beta$ s of  $-.33$  and  $-.27$ , respectively,  $ps < .01$ ). Interestingly, neither extraversion nor neuroticism made significant contributions to the regression model ( $\beta$ s  $< .07$ ). Overall, more secure people (those scoring relatively low on attachment anxiety or avoidance) were more likely to rely on the secure-base script when completing a story in which a person goes from being distressed to being relieved of distress. That is, secure people have a more accessible and perhaps more detailed secure-base script that guides their understanding of distress reduction, causing them to place special emphasis on support seeking and support availability as components of this process.

Interestingly, although attachment anxiety was not associated with support seeking in Study 2, the findings of Study 3 indicate that more anxious participants tended to de-emphasize support seeking. We do not have an explanation for this discrepancy, but it reflects a frequently observed discrepancy between anxious people's strong need for support and their tendency to inhibit actual support seeking (Mikulincer & Shaver, 2007a).

### Study 4

In Study 4 we examined associations between the attachment insecurity dimensions and the accessibility of the secure-base script, but this time aiming at a less explicit, less conscious level of processing. Specifically, we explored the possibility that attachment security would be associated with the appearance of the major components of the secure-base script in one's dreams—mental productions that Freud viewed as a royal road into the unconscious mind (e.g., Freud, 1900/1953). Participants completed the ECR scales and were asked to report their dreams each morning, immediately upon awakening, for a period of 31 consecutive days. In addition, each evening they completed a diary questionnaire about daily activities, events, and feelings. The dreams were reported in open-ended narratives, and participants were encouraged to include associations, thoughts, images, and feelings evoked by each dream.

Two judges independently read each participant's dream narratives and performed a two-step content analysis. In the first step, they searched for signs of stress or distress in the dream's main protagonist and selected out the *distress dreams* for further analysis. In the second step, they rated the extent to which each of the major components of the secure-base script (support seeking, support availability, distress relief) appeared in each dream narrative. We predicted that the distress dreams of more anxious and avoidant people would include less support availability. We also predicted that avoidant attachment would be associated with the

generation of dreams that de-emphasize support seeking and that attachment anxiety would be associated with the generation of dreams that de-emphasize distress relief. In addition, we determined whether these attachment-style differences were moderated by events occurring the day before the dream. We reasoned that distress-eliciting events might increase the psychological availability of the secure-base script for more securely attached individuals.

### Method

**Participants.** Sixty-five Israeli undergraduates (37 women and 28 men, ranging in age from 19 to 35,  $Mdn = 24$ ) participated in the study in exchange for 200 NIS (about \$50 U.S.). Potential study participants were included in the sample if they (a) agreed to report their dreams every morning for 31 days and (b) said they typically recalled at least three dreams per week.

**Materials and procedure.** Accepted participants came to a laboratory and completed the ECR scales and were trained to use the daily diary questionnaire. Cronbach's alphas for the anxiety (.88) and the avoidance (.89) scales were again acceptable, and the two scores were not significantly correlated,  $r(63) = .11$ .

Participants took the entire package of diaries home and began recording dreams on a daily basis. They were asked to describe each dream they remembered in an open-ended narrative format and record every major association, thought, image, or feeling elicited by the dream. On days when they remembered more than one dream, they were instructed to record all of them. In addition, each evening before going to sleep, participants completed a diary concerning activities, events, and feelings occurring that day. Here, we focus on distressing events. Participants were asked to mark whether they experienced two kinds of events: (a) an event that made them angry or anxious and (b) an event that made them sad. For each participant on each day, we counted the number of such events, with scores ranging from 0 to 2. We contacted participants by telephone every 2 days to improve compliance with the diary protocol. At the end of each week, we collected completed forms from each participant. At the end of the study, participants were debriefed, paid, and thanked for participating.

Overall, participants reported an average of 17.15 dreams during the 31-day period (resulting in a total of 1,167 dream narratives). The number of dreams reported by a participant ranged from 7 to 27. The number of dreams reported on a given day ranged from 1 to 4 ( $Mdn = 1$ ). On 70% of the days, participants reported only one dream. No significant association was found between participants' attachment scores and the number of reported dreams or the length of the reports (number of words per dream description).

Two judges (psychology graduate students), who were unaware of participants' attachment scores, independently read each dream narrative and analyzed it in the two steps mentioned earlier. In the first step, they marked whether or not a dream qualified as a distress dream by virtue of the main protagonist being exposed to a dangerous, threatening, or stressful situation; experiencing an obstacle, drawback, or failure; or exhibiting or expressing distress or other negative emotions. The level of agreement between the two judges was very high (96%). Only dreams that were marked by both judges as distress dreams were included in the second step of the analysis.

Seventy-one percent of the dreams ( $n = 827$ ) were distress dreams. Participants reported an average of 12.72 distress dreams



during the 31-day period, with the number of distress dreams ranging from 4 to 21. No significant association was found between participants' attachment scores and the frequency of distress dreams.

In the second step of dream analysis, judges read each of the 827 distress dream reports closely and rated the extent to which it included active support seeking (the protagonist actively seeks help, support, reassurance, or comfort from another person), (b) support availability (the protagonist receives support from this person), and (c) distress relief (the protagonist's emotional state was improved by the end of the dream). All of the ratings were made on a 7-point scale, ranging from *not at all* (1) to *very much* (7). Pearson correlations between the two judges' ratings ranged from .88 to .91, indicating high reliability and allowing us to average the ratings across judges.

### Results and Discussion

The data were analyzed with hierarchical linear models (HLM6; Raudenbush & Bryk, 2002). We examined the effects of participants' attachment insecurities (anxiety and avoidance) and the occurrence of distress-eliciting events on the content of distress dreams. The dependent variables were the extent to which major components of the secure-base script (support seeking, support availability, distress relief) appeared in the distress dream narratives. These analyses included both between-participants variables (attachment anxiety and avoidance) and within-participants variables (distress-eliciting events and dream content on a given day). At Level 1 (the within-participant level), we examined the effect of distress-eliciting events on the contents of distress dreams during a particular day-night sequence. At Level 2 (the between-participants level), we examined the global effects of attachment insecurities across the 31-day period. In addition, we examined interactions between attachment insecurities and the occurrence of distressing events on a given day. These analyses were conducted only for days on which a participant reported a distress dream. To facilitate interpretation, attachment anxiety and avoidance were centered with respect to their sample means, and the occurrence of distress-eliciting events was centered with respect to each participant's mean.

As can be seen in Table 2, the attachment insecurity dimensions had significant unique between-participants effects on distress dream narratives. Both attachment anxiety and avoidance had

unique significant associations with judges' ratings of support availability. That is, the higher a participant's attachment anxiety or avoidance, the less likely it was that his or her distress dreams included signs of support availability across the 31-day period (see Table 2). In addition, the higher a participant's avoidance score, the less likely it was that his or her distress dreams included signs of active support seeking. Judges' ratings of distress relief were significantly (negatively) predicted by attachment anxiety but not avoidance. That is, the higher a participant's attachment anxiety score, the less likely his or her distress dreams were to include signs of distress relief.

The occurrence of distressing events on a given day had no significant within-participant effects on distress dreams that night. There was, however, a significant interaction between attachment anxiety and the occurrence of distressing events, such that more anxious participants who experienced distress on a given day were less likely to include support seeking in their dreams that night (see Table 2). Simple slope analyses indicated that attachment anxiety was significantly associated with higher levels of support seeking in distress dreams following less distressing days (1 *SD* below the mean of the distressing events scale;  $\gamma = .29, p < .01$ ) but not following more distressing days (1 *SD* above the mean;  $\gamma = -.15$ ). Moreover, distressing events on a given day were significantly associated with higher levels of support seeking in distress dreams that night when attachment anxiety was 1 *SD* below the mean ( $\gamma = .36, p < .01$ ) but not when it was 1 *SD* above the mean ( $\gamma = -.08$ ). Another way of saying this is that distressing events on a given day increased the inclusion of support seeking in distress dreams mainly among participants who were more secure in the sense of being less anxious about attachment.

Overall, the findings support our predictions. More secure people tended to have more of the core components of the secure-base script available to them even at an implicit, unconscious level, as indicated by their dreams. Less secure participants, either anxious or avoidant, were less likely to include support availability in their dreams. In addition, replicating findings from Study 2, more avoidant participants were less likely to include active support seeking in their dreams, and more anxious participants were less likely to include indications of the protagonist's distress relief. Moreover, anxiously attached participants who had reported a distressing day were less likely than their more secure counterparts to report support seeking in their dreams. However, it is important to note that this tendency of anxiously attached participants should be interpreted tentatively and cautiously, because only one of six possible interactions was significant.

Table 2  
*Hierarchical Linear Model Coefficients for Judges' Ratings of Distress Dreams as a Function of Attachment Insecurity Dimensions and Daily Distress-Eliciting Events (Study 4)*

Effect	Support seeking	Support availability	Distress relief
Between-participants effects			
Attachment anxiety	.07	-.28**	-.38**
Attachment avoidance	-.29**	-.33**	-.20
Within-participants effects			
Distress-eliciting events	.14	.07	.06
Anxiety $\times$ Distress events	-.22**	-.04	-.12
Avoidance $\times$ Distress events	.12	-.09	-.10

\*\*  $p < .01$ .

### Study 5

In Study 5, we examined the hypothesized links between attachment insecurities and the extent to which people go beyond the information given while processing secure-base script stories. Following Markus et al.'s (1985) analysis of well-developed mental schemas, we hypothesized that secure individuals' well-developed secure-base scripts would provide them with a framework for processing script-relevant information. As a result, when learning about a story that included the major components of the secure-base script, relatively secure people, compared to less secure people, would be more likely to go beyond the information given and generate more conjectures and inferences about the thoughts,

feelings, and traits of both the support seeker and the support provider. These inferences would be confined to aspects of a stimulus story that were relevant to the secure-base script and would not extend to script-irrelevant aspects of the story. In this study, we also assessed participants' recall of attachment-related facts or story components in order to explore the possibility that the well-developed secure-base scripts of securely attached people would allow them to recall more accurately script-relevant story components.

Participants completed the ECR scales and were asked to read a story that included the major components of the secure-base script. 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: secure-base-script recollections, secure-base-script impressions, neutral (script-irrelevant) recollections, and neutral impressions. Our main prediction was that attachment anxiety and avoidance would be associated with generating fewer secure-base-script impressions. We also explored whether attachment insecurities are associated with the number of secure-base-script recollections.

### Method

*Participants.* Fifty-nine Israeli undergraduates (35 women and 24 men, ranging in age from 19 to 48,  $Mdn = 23$ ) participated in the study in exchange for credit in their psychology courses.

*Materials and procedure.* Participants were run individually, each in two separate sessions. In the first session, participants completed the ECR scales. Once again, Cronbach's alphas for both anxiety (.88) and avoidance (.87) were acceptable, and the two scores were not significantly correlated,  $r(57) = .18$ .

The second session was conducted a week later by a different experimenter who was unaware of participants' ECR scores. In this session, participants read a story describing a social interaction between an athlete (of the same gender as the participant), who had just been injured in a car accident, and his or her romantic partner, who came to the hospital and provided support and comfort.<sup>5</sup> This interaction paralleled the secure-base script: (a) The injured athlete showed explicit signs of distress, (b) he or she actively sought comfort and support from the romantic partner, (c) the partner provided effective emotional and instrumental support, and (d) the athlete's distress was relieved. The story also included attachment-irrelevant information about the main characters, describing the injured athlete's ambitions and achievement-related behaviors and the romantic partner's extraverted behaviors. To avoid possible halo affects, half of the attachment-irrelevant behaviors of each character were positive (e.g., "Dan organizes successful parties and knows a lot of people") and the other half were negative (e.g., "Sometimes Dan jumps from one thing to another"). Overall, the story consisted of 10 eight-line paragraphs, with 5 paragraphs containing information relevant to the secure-base script and the remaining 5 paragraphs containing attachment-irrelevant information. The paragraphs were organized in such a way that each of the ones containing secure-base information was followed by an attachment-irrelevant paragraph. The story was designed so as to contain only behavioral descriptions and to avoid explicit statements about the characters' feelings, thoughts, intentions, or per-

sonality traits (although ambitiousness and extraversion could be inferred from the described behaviors).

After reading the story, participants performed a memory task similar to that used by Markus et al. (1985, Study 2). A pile of blank cards was placed in front of the participant and he or she received the following instructions:

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 may use is not restricted, but you can work on this task for no longer than five minutes.

No participant stopped before using all 5 min.

*Scoring procedure.* Participants' responses were independently content analyzed by two judges (psychology graduate students) 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 recollections (i.e., information that was explicitly mentioned in the story) and impressions (assumptions or conclusions inferred from the story but not explicitly presented in it). They had been trained to distinguish recollections and impressions that were relevant to the secure-base script as well as attachment-irrelevant recollections and impressions.

Following training, each judge independently sorted every one of a participant's responses into one of the following categories: (a) secure-base-script recollections (e.g., "Sharon called Dan and asked him to come to the hospital"), (b) secure-base-script impressions (e.g., "It seems that when Sharon is sad, she wants Dan to be close to her"), (c) attachment-irrelevant recollections (e.g., "Dan likes to dance at parties"), and (d) attachment-irrelevant impressions (e.g., "Dan is an extraverted person"). Interjudge agreement was acceptable, with kappa coefficients ranging between .57 and .60, and disagreements were resolved through discussion. Four scores were computed for each participant by counting the number of secure-base-script recollections, secure-base-script impressions, attachment-irrelevant recollections, and attachment-irrelevant impressions he or she generated.

### Results and Discussion

The predictions were examined with a series of multiple regression analyses performed on the number of secure-base-script recollections and impressions and the number of attachment-irrelevant recollections and impressions. In these analyses, we entered attachment anxiety and avoidance while controlling for the total number of responses a participant generated in the memory task. In this way, we controlled for participants' general memory and inference skills.

As can be seen in Table 3, both attachment anxiety and avoidance had significant unique (negative) effects on the number of secure-base-script impressions. In line with predictions, the higher a participant's attachment anxiety or avoidance, the fewer secure-base-script impressions he or she generated. In contrast, regression analyses conducted on the number of secure-base-script recollections, attachment-irrelevant impressions, and attachment-irrelevant

<sup>5</sup> The story is available from the authors.

Table 3  
Regression Analyses of Number of Secure-Base-Script and Attachment-Irrelevant Recollections and Impressions Predicted by Attachment Insecurity Dimensions (Study 5)

Memory type	Anxiety $\beta$	Avoidance $\beta$	$R^2$ (%)	$F$
Secure-base script				
Impressions	-.26*	-.37**	15.2	7.98**
Recollections	.07	.18	2.6	1.62
Attachment-irrelevant				
Impressions	-.01	-.09	1.6	1.31
Recollections	.08	.06	1.2	0.62

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

recollections revealed no significant effects of attachment anxiety or avoidance (see Table 3).

Overall, the findings support our predictions. Whereas attachment insecurities were associated with generating fewer inferences concerning the secure-base script, they did not explain individual differences in the number of inferences made about attachment-irrelevant issues. This finding 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 has no effect on global inferential skills. Interestingly, attachment insecurities were not associated with the recollection of attachment-related facts or story components, suggesting that having a rich and well-developed secure-base script does not improve simple recollection of script-relevant facts. However, this suggestion should be viewed cautiously because it is based on a null effect.

## Study 6

In Study 6, we examined associations between attachment security and people's judgments about core components of the secure-base script. Following Markus's (1977) findings concerning the latency and confidence of schema-relevant judgments, we hypothesized that having a well-developed secure-base script allows secure individuals to make quicker and more confident script-relevant judgments than their insecure counterparts.

Participants completed the ECR scales and read the story used in Study 5 to depict the core components of the secure-base script. They then performed two judgment tasks. In the first, they read a list of traits that were either related or unrelated to the secure-base script and decided as quickly as possible whether each trait did or did not apply to one of the main characters in the story. In this task, we assessed decision-making latencies. In the second task, participants read a series of arguments concerning the story, either related or unrelated to the secure-base script. They then made true-false judgments about each argument and rated their confidence in the decision. We predicted that lower scores on attachment anxiety or avoidance (i.e., greater attachment security) would be associated with faster and more confident judgments about secure-base script information, but we did not expect the attachment dimensions to be significantly associated with the latencies and confidence of judgments about attachment-irrelevant information.

## Method

**Participants.** Seventy-six Israeli undergraduates (44 women and 32 men, ranging in age from 18 to 30,  $Mdn = 23$ ) participated in the study in exchange for credit in their psychology courses.

**Materials and procedure.** Participants were run individually, each in two separate sessions. In the first session, they completed the ECR scales, for which Cronbach's alphas were again high for both anxiety (.92) and avoidance (.89). This time, the two scores were somewhat correlated,  $r(74) = .26, p < .05$ .

The second session was conducted a week later by a different experimenter, who was unaware of participants' ECR scores. In this session, participants read the story from Study 5 and completed a 20-item filler measure about life habits. They then completed two tasks, the first of which was a trait-recognition task in which 30 traits were presented and participants decided whether each trait was descriptive of one of the characters in the story (the injured athlete or the romantic partner). The task was presented on a Pentium IBM personal computer, with an SVGA color monitor, and it was programmed with SuperLab software. Participants completed two versions of the task. In one they decided whether each of the 30 traits described the injured athlete. In the other, they decided whether each trait described the romantic partner. Half of the participants completed the "injured athlete" version first; the other half completed the "romantic partner" version first.<sup>6</sup>

On each trial, a trait name was displayed in black lettering on a white background in the middle of the screen. Participants indicated whether the trait described one of the story characters by pressing "1" on the keyboard number pad (labeled "yes") or "3" (labeled "no"). They were instructed to make the decision as quickly as possible, and their response latencies were recorded. Each trait was displayed until the participant pressed one of the buttons. The trait name then disappeared from the screen and the next one was displayed after a 2-s delay. The traits were presented in a different random order for each participant.

Each version of the trait-recognition task included 10 traits that were relevant to the secure-base script, 10 attachment-irrelevant traits that could be inferred from the story (the injured athlete's ambitiousness, the romantic partner's extraversion), and 10 traits that could not be inferred from the story. In the secure-base-script category, half of the traits accurately described a character (e.g., "distressed" and "needy" for the injured athlete; "helpful" and "supportive" for the romantic partner). The other five traits did not accurately describe a character (e.g., "detached" and "relaxed" for the injured athlete; "rejecting" and "insensitive" for the romantic partner). Similarly, five traits in the attachment-irrelevant category were descriptive of a character (e.g., "ambitious" and "persistent" for the injured athlete; "extraverted" and "talkative" for the romantic partner), and five traits were not accurately descriptive (e.g., "lazy" and "underachiever" for the injured athlete; "reserved" and "shy" for the romantic partner). None of the 10 story-irrelevant traits could sensibly be inferred from the story (e.g., "sophisticated" and "innovative"). The story-irrelevant traits were chosen based on a pretest in which 15 Israeli undergraduates read the story, considered a list of 20 traits, and said whether each

<sup>6</sup> Statistical analyses revealed no significant order effect, and the effects of attachment anxiety and avoidance were not moderated by task order.

one accurately described one of the main characters. Only traits alleged by more than 90% of the pretest participants to be irrelevant were included in the final list.

The responses of participants in the main study supported our categorization of the traits. For the secure-base-script traits and attachment-irrelevant traits, more than 80% of the participants said “yes” to traits we considered descriptive of the story characters and “no” to traits we did not consider descriptive (91% accurate responses across the secure-base-script traits and 89% accurate responses across the attachment-irrelevant traits). Most participants (72% “no” responses) rejected the story-irrelevant traits.

Following the trait-identification task, participants were presented with eight sentence-long inferences about the story characters or their relationship. They were asked to decide whether each of the sentences was true or false and rate the extent to which they felt confident about their answers on a 6-point scale ranging from 1 (*not at all*) to 6 (*very much*). Four of the sentences included information relevant to the secure-base script—half drawing appropriate inferences from the story (e.g., “Sharon, the injured athlete, and Dan, her romantic partner, have a trusting relationship”) and half drawing inappropriate inferences (e.g., “It’s highly probable that the relationship between Dan and Sharon will end after Sharon is released from the hospital”). The other four sentences included attachment-irrelevant information—half drawing appropriate inferences (e.g., “Dan could be a very good Army officer”) and half drawing inappropriate inferences (e.g., “Dan had a history of frustrating relations with women before meeting Sharon”). Participants were accurate in their true–false judgments. For true inferences, correct responses ranged from 72% to 88% ( $M = 84%$ ). For false inferences, correct responses ranged from 72% to 95% ( $M = 83%$ ). These findings supported our categorization of the sentences.

## Results and Discussion

**Trait-recognition task.** Before evaluating our prediction concerning response latencies, we examined attachment-related differences in the accuracy of participants’ judgments. For each participant, we computed the number of correct responses for each category of traits (secure-base script, attachment-irrelevant, story-irrelevant) across the two versions of the task (injured athlete, romantic partner).<sup>7</sup> We then conducted multiple regression analyses similar to those described in the previous studies. We entered attachment anxiety and avoidance as predictors while controlling for a participant’s total number of accurate responses in the trait-recognition task, which we viewed as an index of overall memory skills.

There were no significant unique effects of attachment insecurities on number of correct responses for story-irrelevant traits and attachment-irrelevant traits ( $\beta_s < .17$ ,  $ps > .10$ ). However, avoidance had a significant negative effect on participants’ accuracy in judging the descriptiveness of secure-base-script traits ( $\beta = -.34$ ,  $p < .01$ ). There was not a significant unique effect of attachment anxiety ( $\beta = .05$ ). In other words, more avoidant participants were less accurate in making secure-base-script judgments, and the deficit could not be explained by global memory deficits.

To examine the prediction concerning response latencies, we computed reaction times (RTs) for correct responses in the trait-recognition task. For each participant, RTs for correct responses

were averaged according to trait category (secure-base script, attachment-irrelevant, story-irrelevant) across the two versions of the task.<sup>8</sup> These RTs were approximately normally distributed. We then conducted multiple regression analyses similar to those performed on accuracy scores. The dependent variables were participants’ average RTs for the different trait categories. In these regressions, we entered attachment anxiety and avoidance as predictors while controlling for a participant’s average RTs across the three trait categories, to control for memory and motor skills.

There were no significant unique effects of attachment insecurities on RTs for story-irrelevant traits and attachment-irrelevant traits (see Table 4). But both attachment anxiety and avoidance had significant unique effects on latencies in judging the descriptiveness of secure-base-script traits. In line with predictions, the lower a participant’s anxiety or avoidance score, the faster his or her responses when judging the descriptiveness of secure-base-script traits.

**Inference-recognition task.** Before examining the prediction concerning confidence ratings, we checked for attachment-related differences in the accuracy of participants’ true–false judgments. For each participant, we computed the number of correct judgments in each category of inferences (secure-base script, attachment-irrelevant). We then conducted multiple regression analyses similar to those in previous studies. There were no significant unique effects of attachment insecurities on the number of correct responses for attachment-irrelevant inferences ( $\beta_s < .12$ , all  $ps > .10$ ). For secure-base-script inferences, however, the analysis revealed that both attachment anxiety and avoidance reduced accuracy ( $\beta = -.24$ ,  $p < .05$ , for anxiety, and  $\beta = -.46$ ,  $p < .01$ , for avoidance). Less anxious or avoidant (i.e., more secure) participants were more accurate in assessing the validity of the secure-base-script inferences.

To examine the prediction concerning subjective confidence in judgments related to the secure-base script, we computed mean confidence ratings for correct responses in each of the two categories: secure-base script and attachment-irrelevant. We then conducted multiple regression analyses like the ones performed on the accuracy scores (see Table 4). There were no significant unique effects of the attachment-insecurity scores on participants’ confidence about attachment-irrelevant inferences. However, for secure-base-script inferences, avoidant attachment contributed significantly to explaining the confidence ratings. In line with our prediction, less avoidant participants were more confident in their judgments concerning the validity of secure-base-script inferences. The effect of attachment anxiety was not significant.

**Conclusions.** Overall, the findings support our predictions. Secure attachment (lower scores on attachment anxiety or avoidance) was associated with faster and more confident judgments concerning secure-base-script information, but it was not associated with response latencies and confidence ratings concerning attachment-irrelevant information. In addition, more avoidant par-

<sup>7</sup> Regression analyses performed separately on each version of the task yielded similar findings.

<sup>8</sup> Outliers (RTs  $\pm 3$  SDs from the mean) were excluded from the analyses. The average percentage of trials on which such outliers existed was low (2.1%), and the outlying trials were randomly distributed across trait categories.

Table 4  
*Regression Analyses of Reaction Times and Recall Confidence Ratings for Secure-Base-Script and Attachment-Irrelevant Information Predicted by Attachment Insecurity Dimensions (Study 6)*

Dependent variable	Anxiety $\beta$	Avoidance $\beta$	$R^2$ (%)	$F$
Reaction times				
Secure-base-script traits	.32**	.41**	39.7	18.35**
Attachment-irrelevant traits	.07	-.08	1.1	0.27
Story-irrelevant traits	.11	.10	5.1	1.33
Confidence ratings				
Secure-base-script inferences	.12	-.38**	17.2	4.79**
Attachment-irrelevant inferences	-.09	.04	0.1	0.22

\*\*  $p < .01$ .

ticipants were less accurate in judging the validity of secure-base-script traits and inferences than their less avoidant counterparts.

### Study 7

In Study 7, we evaluated the hypothesized associations between attachment insecurities and the extent to which people make use of contextual cues to go beyond the information given while processing information relevant to the secure-base script. Following studies on cognitive expertise (e.g., Chiesi et al., 1979; de Groot, 1965), we hypothesized that having a well-developed secure-base script would allow relatively secure individuals to make better use of contextual cues to improve the processing of script-relevant information.

Participants completed the ECR scales and were asked to read the story from Study 5 depicting the major components of the secure-base script. Five days later, they were asked to recall the story and perform the task used in Study 5 to generate recollections and impressions of the story. Before performing this task, participants were randomly assigned to one of two experimental conditions according to the contextual cues they were provided—secure-base-script cues or script-irrelevant cues. In this replication and extension of the findings of Study 5, we predicted that attachment anxiety and avoidance would be associated with generating fewer secure-base-script impressions even after a 5-day delay. However, our main prediction was that providing secure-base-script cues (compared to script-irrelevant cues) would increase the number of secure-base-script impressions mainly among more secure individuals (those who scored relatively low on attachment anxiety and avoidance). We also assessed participants' recollections of script-relevant information in order to explore whether the provision of secure-base-script cues could improve this recollection among secure and insecure participants.

### Method

**Participants.** Eighty Israeli undergraduates (55 women and 25 men, ranging in age from 20 to 35,  $Mdn = 23$ ) participated in the

study in exchange for credit in their psychology courses. Forty were assigned to each of the two experimental conditions.

**Materials and procedure.** The study was run in two sessions. In the first session, participants completed the ECR scales. Cronbach's alphas were high for both anxiety (.90) and avoidance (.89), and the two scores were not significantly correlated,  $r(78) = .10$ . In addition, participants read the story used in Study 5 and were asked a series of questions about it.

The second session was conducted 5 days later by a different experimenter, who was unaware of participants' ECR scores. In this session, participants were randomly assigned to one of two experimental conditions. In the *secure-base-script cues* condition, they were shown the three-picture work sequence described in Study 1 (i.e., the sequence in which a person was overwhelmed by work at his/her office and someone was helping him/her complete the work). In the *script-irrelevant cues* condition, participants were given the three-picture store sequence described in Study 1, in which a person was depicted looking into a store window, paying a salesperson, and then leaving the store. In both conditions, participants were asked to color the black-and-white pictures using colored-ink pens.

Immediately following this task, all participants were told to try to recall the story they had read 5 days before and perform the memory task described in Study 5. Participants' responses to the memory task were independently content analyzed by two judges (psychology graduate students), who were unaware of participants' ECR scores. Each judge was trained as described in Study 5 and independently sorted each participant's responses into secure-base-script recollections, secure-base-script impressions, attachment-irrelevant recollections, or attachment-irrelevant impressions. Interjudge agreement was acceptable (kappa coefficients ranged between .56 and .60). Disagreements were resolved by discussion. We computed four scores for each participant by counting the number of secure-base-script recollections, secure-base-script impressions, attachment-irrelevant recollections, and attachment-irrelevant impressions he or she generated.

### Results and Discussion

The data were analyzed with a series of hierarchical regression analyses performed on the number of secure-base-script recollections, secure-base-script impressions, attachment-irrelevant recollections, and attachment-irrelevant impressions. In the first step of the regressions, we entered secure-base-script cues (a dummy variable comparing the secure-base-script cues condition, coded 1, with the script-irrelevant cues condition, coded -1), attachment anxiety, and avoidant attachment as predictors. Attachment scores were centered with respect to their means. In the second step, we added the two-way interactions between secure-base-script cues and each of the two attachment scores.

As can be seen in Table 5, the analyses performed on attachment-irrelevant recollections and attachment-irrelevant impressions produced no significant main effects or interactions. In contrast, the regression analysis performed on secure-base-script recollections yielded a significant main effect of secure-base-script cues. The number of secure-base-script recollections generated was significantly higher in the secure-base-script cues condition than in the script-irrelevant condition. The main effect for avoidant attachment was also significant, with more avoidant participants

Table 5  
*Regression Analyses Predicting Number of Secure-Base-Script and Attachment-Irrelevant Recollections and Impressions From Secure-Base-Script Cues and Attachment Insecurity Dimensions (Study 7)*

Effect	Secure-base impressions	Irrelevant impressions	Secure-base recollections	Irrelevant recollections
Step 1				
$\beta$ secure-base-script cues	.31**	.01	.23*	-.13
$\beta$ attachment anxiety	-.36**	-.01	-.06	.17
$\beta$ attachment avoidance	-.25*	.04	-.25*	.06
Step 2				
$\beta$ Secure-Base-Script $\times$ Anxiety	-.20*	.10	-.27*	.11
$\beta$ Secure-Base-Script $\times$ Avoidance	-.18 <sup>†</sup>	-.09	-.02	.08
$F(5, 74)$	9.13**	0.25	3.71**	1.25
$R^2$ (%)	33.9	1.6	14.6	7.7

<sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

generating fewer secure-base-script recollections. The interaction between secure-base-script cues and attachment anxiety was also significant (see Table 5). Simple slope tests indicated that providing secure-base-script cues, compared to script-irrelevant cues, significantly increased the number of secure-base-script recollections when attachment anxiety was 1 *SD* below the mean ( $\beta = .50$ ,  $p < .01$ ) but not when it was 1 *SD* above the mean ( $\beta = -.04$ ). That is, only participants scoring low on attachment anxiety benefited from the presence of secure-base-script cues when recalling the secure-base-script components of the story.

The regression analysis for secure-base-script impressions also revealed a significant main effect of secure-base-script cues (see Table 5). The number of secure-base-script impressions generated was significantly higher in the secure-base-script cues condition than in the script-irrelevant condition. As in Study 5, the main effects of attachment anxiety and avoidance were also significant, with less anxious and less avoidant participants generating more secure-base-script impressions. However, these main effects were qualified by a significant interaction between attachment anxiety and secure-base-script cues. Also, the interaction between avoidant attachment and secure-base-script cues approached statistical significance (see Table 5). In line with our predictions, simple slope tests indicated that providing secure-base-script cues, compared to script-irrelevant cues, significantly increased the number of secure-base-script impressions only when attachment anxiety or avoidance was 1 *SD* below its mean ( $\beta = .51$ ,  $p < .01$ , for attachment anxiety;  $\beta = .49$ ,  $p < .01$ , for avoidance). When attachment anxiety or avoidance was 1 *SD* above its mean, providing secure-base-script cues did not significantly influence the number of secure-base-script impressions ( $\beta$ s  $< .11$ ). That is, only participants scoring low on attachment anxiety or avoidance benefited from the presence of secure-base-script cues when retrieving impressions related to secure-base-script components of the story.

Overall, the findings provide strong support for our predictions. Extending the findings from Study 5, more secure participants (those scoring relatively low on attachment anxiety, avoidance, or both) were better able to generate impressions of the secure-base-script components of the story even 5 days after reading it. In addition, the more secure participants made greater use of available cues concerning the secure-base script while retrieving memories and generating impressions of the secure-base-script aspects

of the story. In other words, they exhibited greater expertise in processing and retrieving information that might have been organized by the secure-base script, taking advantage of relevant contextual cues. Of theoretical importance, these effects were specific to secure-base-script information and did not extend to the processing of attachment-irrelevant information.

## Study 8

In Study 8, we examined the hypothesis that, compared with relatively insecure people, secure people's processing and retrieval of secure-base-script information would be more automatic and would require fewer self-regulatory resources. We focused once again on attachment-style differences in the extent to which people go beyond the information given in a story containing core elements of the secure-base script and generate inferences and conjectures about the script-relevant aspects of the story (see Studies 5 and 7 for examples). This time, however, we evaluated attachment-style differences after participants either worked on a highly demanding cognitive task, found in past studies to deplete self-regulatory resources, or on a non-demanding activity. Specifically, we used a procedure pioneered by Wegner, Schneider, Carter, and White (1987) in which participants were instructed to try to suppress any thoughts of a white bear for 6 min. It has previously been shown that effortful suppression of forbidden thoughts tends to consume self-regulatory resources, leaving people depleted during subsequent cognitive tasks (e.g., Muraven, Tice, & Baumeister, 1998; Vohs, Baumeister, & Ciarocco, 2005).

We expected relatively secure people to be able to process incoming information about the secure-base script in a relatively automatic way. Hence, their ability to generate inferences and conjectures about the secure-base script was expected not to be strongly affected by the depletion of self-regulatory resources. In contrast, insecure individuals' processing of secure-base-script information was expected to be less automatic and more resource-taxing. As a result, they were expected to show a decrease in their already relatively poor performance in generating inferences related to the secure-base script in the demanding task condition (compared with the non-demanding condition).

## Method

**Participants.** Seventy-six Israeli undergraduates (59 women and 17 men, ranging in age from 19 to 28,  $Mdn = 22$ ) participated in the study in exchange for credit in their psychology courses. Half were randomly assigned to each of two experimental conditions.

**Materials and procedure.** The study was run in two sessions. In the first session, participants completed the ECR scales during regular class time. Cronbach's alphas were high for both attachment anxiety (.92) and avoidance (.91), and this time the two scores were moderately correlated,  $r(74) = .34, p < .01$ . Participants also completed the Extraversion and Neuroticism subscales of the Big Five Inventory described in Study 3. Cronbach's alphas for the two subscales were acceptable (.77 and .86 for Extraversion and Neuroticism, respectively). As in Study 3, there was a significant correlation between attachment anxiety and neuroticism,  $r(74) = .26, p < .01$ , but this time the correlation between avoidance and extraversion was not significant.

The second session was conducted a week later by a different experimenter, who was unaware of participants' ECR scores. This session consisted of three parts. In the first part, participants read the story from Study 5. In the second part, they were asked to perform a thought-listing task, which involved listing all of their thoughts for 6 min. They were then randomly assigned to one of two experimental conditions, which determined the task they would be asked to perform. Those in the *demanding task* (thought suppression) condition ( $n = 38$ ) were allowed to think about anything they chose, except that they were not to think about a white bear. They were told that if they did happen to have any thoughts about a white bear, they should make a check mark in the margin of the thought-listing page and move on. Participants in the *neutral* (no suppression) condition ( $n = 38$ ) were told that they could think about anything they wanted, including a white bear. They were told that if they did happen to have any thoughts about a white bear, they should make a check mark in the margin. Participants were given 6 min to complete the thought-listing task. The instructions and procedure were identical to those used by Vohs et al. (2005).

In the third part of the session, following the thought-listing task, all participants performed the memory task described in

Study 5—generating recollections and impressions of the story they read earlier. Participants' responses were independently content analyzed by two judges (psychology graduate students), who were unaware of participants' ECR scores. Each judge was fully trained and then sorted each participant's responses into the four categories used in previous studies: secure-base-script recollections, secure-base-script impressions, attachment-irrelevant recollections, and attachment-irrelevant impressions. Interjudge agreement was acceptable (kappas between .58 and .60), and disagreements were resolved through discussion. There were four scores for each participant: the number of secure-base-script recollections, secure-base-script impressions, attachment-irrelevant recollections, and attachment-irrelevant impressions.

## Results and Discussion

The data were analyzed with a series of hierarchical regression analyses, as described in the previous studies. In the first step, we entered the demanding-task dummy variable (contrasting the demanding task condition, coded 1, with the non-demanding condition, coded -1), attachment anxiety, and avoidant attachment. Attachment scores were centered with respect to their means. In the second step, we entered the two-way interaction terms.

As can be seen in Table 6, analyses performed on secure-base-script recollections, attachment-irrelevant recollections, and attachment-irrelevant impressions yielded significant main effects for demanding task. Participants in the demanding task condition generated fewer secure-base-script recollections, attachment-irrelevant recollections, and attachment-irrelevant impressions than participants in the non-demanding condition. No other effects were significant (see Table 6). As noted in previous studies, the thought suppression task impaired memory (or retrieval) of information acquired by reading.

The regression analysis performed on secure-base-script impressions also produced a significant main effect for demanding task, but the effects of attachment anxiety and avoidance were also significant (see Table 6). Replicating Study 5, more anxious and avoidant participants generated fewer secure-base-script impressions. In addition, the two-way interactions between demanding task and the two attachment insecurity scores were also significant. Simple slope tests revealed that the thought suppression task,

Table 6  
Regression Analyses Predicting Number of Secure-Base-Script and Attachment-Irrelevant Recollections and Impressions From Demanding Task and Attachment Insecurity Dimensions (Study 8)

Effect	Secure-base impressions	Irrelevant impressions	Secure-base recollections	Irrelevant recollections
Step 1				
$\beta$ demanding task	-.19*	-.44**	-.28*	-.38**
$\beta$ attachment anxiety	-.37**	-.12	-.03	.08
$\beta$ attachment avoidance	-.24*	.15	.16	-.12
Step 2				
$\beta$ Demanding Task $\times$ Anxiety	-.22*	.12	.04	-.01
$\beta$ Demanding Task $\times$ Avoidance	-.32**	-.16	-.18	-.19
$F(5, 70)$	11.59**	4.72**	2.44*	3.35**
$R^2$ (%)	41.3	25.2	13.8	19.3

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

compared with the non-demanding task, significantly lowered the number of secure-base-script impressions generated when attachment anxiety or avoidance was 1 *SD* above its mean ( $\beta = -.41$ ,  $p < .01$ , for attachment anxiety;  $\beta = -.51$ ,  $p < .01$ , for avoidance). However, when attachment anxiety or avoidance was 1 *SD* below its mean, the thought suppression task did not significantly impair the generation of secure-base-script impressions ( $\beta$ s of .03 and .12, respectively).

This pattern of findings supports our predictions and indicates that relatively secure individuals (those with relatively low scores on attachment anxiety, avoidance, or both) were not subject to a depletion of self-regulatory resources caused by the thought suppression task. In fact, they continued to generate relatively high numbers of secure-base-script impressions even after engaging in thought suppression. This suggests that more secure individuals process information related to the secure-base script in a fairly automatic, non-taxing manner. This result cannot be attributed to global cognitive immunity on the part of secure people, because the demanding task affected the number of secure-base-script recollections and attachment-irrelevant recollections or impressions regardless of attachment security. Rather, the relative immunity to depletion exhibited by the more secure participants in the case of secure-base-script impressions seems likely to have resulted from the automaticity of their processing of secure-base-script information. Finally, an additional regression analysis performed on the number of secure-base-script impressions indicated that including neuroticism and extraversion as covariates did not modify the significant effects reported in Table 6, confirming that the findings are unique to the attachment insecurity dimensions and not to more general personality traits.

### General Discussion

This series of studies contributes greatly to understanding what is “inside,” or part of the architecture of, components of the mind that organize security-related social perceptions and action plans. As argued by Waters and Waters (2006), among others, attachment security is closely associated with a “secure-base script” (Mikulincer & Shaver, 2007b). Here, we have examined the extent to which secure attachment (indicated by relatively low scores on scales measuring attachment anxiety and avoidance) is associated with the accessibility, automaticity, and richness of a person’s secure-base script and with the extent to which that script shapes the processing of attachment-related information. Our main contention was that the secure-base script is a core ingredient of attachment security, one that guides the processing of information concerning attachment-related events and one’s behavior in social relationships. Relatively secure individuals have a more accessible and richer secure-base script than less secure people have; they are “experts” in the use of attachment figures to provide a safe haven and secure base, and their expertise affects their processing of attachment-relevant information (even in dreams) and their retrieval of attachment-related memories. In short, the eight studies reported here provide important new information about the implicit, script-like procedural knowledge that is inside the minds of people who are secure with respect to attachment.

Previous studies had already shown that secure individuals tend to organize attachment-related narratives in accordance with the secure-base script (e.g., Waters & Waters, 2006). However, those

studies relied on a single research technique—the prompt-words outline method (Waters & Rodrigues-Doolabh, 2001), so it was unclear whether the same effects could be obtained with other methods. Study 1 showed that the key effect—secure-base scriptedness of narratives—can definitely be replicated. Using a different method (asking people to generate a narrative based on a sequence of three pictures portraying an attachment-related series of events), we replicated and extended previous findings showing that lower scores on the two main attachment-insecurity dimensions were associated with more secure-base scriptedness of attachment-relevant narratives.

More important, previous studies had provided little information about other cognitive properties of the secure-base script (e.g., its accessibility, automaticity, and effects on information processing and memory retrieval), so they had not revealed the full extent to which securely attached people rely on this script for processing attachment-relevant information. Findings from Studies 2–8 provide ample evidence concerning the cognitive properties of the secure-base script and the ways in which it organizes expectations, memories, and judgments. Overall, our findings portray secure individuals as experts in the use of the secure-base script for processing attachment-relevant information.

Studies 2 and 4 revealed that relatively secure individuals (those who scored low on attachment anxiety or avoidance, or both) had ready access to the secure-base script when composing a story or when dreaming about distressing events. Study 3 showed that secure individuals expected more secure-base-script components (support seeking, support availability) in an imagined story that began with a distressing experience and ended with distress reduction. In Study 5, we found that relatively secure individuals were more likely to go beyond the script-relevant information we provided and to generate inferences and conjectures based on this information. The tendency of relatively secure individuals to process secure-base-script information in a deeper, more elaborated way was evident even 5 days after being exposed to the information (Study 7) and was not affected by the depletion of cognitive resources caused by an effortful task—a sign that secure-base-script information was processed easily and automatically (Study 8). Study 7 also showed that relatively secure participants were more likely than their less secure counterparts to rely on secure-base-script cues to improve their recall of script-relevant information and to generate more inferences based on this information. Finally, Study 6 indicated that relatively secure participants were quicker and more confident in making judgments concerning secure-base-script-related information.

It is important to reiterate that these findings were limited to the processing of attachment-relevant information. Across the different studies, scores on the attachment insecurity dimensions were not associated with the processing of attachment-irrelevant information. Moreover, the observed effects of attachment security could not be explained by individual differences in attachment-unrelated verbal and memory abilities, latency and confidence of attachment-unrelated judgments, or attachment-unrelated narrative skills. Moreover, the findings were not explained by general personality traits (neuroticism and extraversion) or by scores on a measure of socially desirable responding. Instead, they were unique to individual differences in the attachment domain.

Findings from Studies 2–4 suggest that people who are secure with respect to attachment possess highly accessible and well-



organized implicit knowledge about the sequence of social interactions that can often lead from distress to relief. This knowledge presumably makes it easier for relatively secure individuals to optimistically seek support when needed and to maintain a positive emotional state while seeking relief from distress. It is easier for such people to disclose their needs and fears to relationship partners, because they implicitly believe their partners will be willing and able to help. This comforting, highly accessible knowledge probably contributes to the well-documented fact that relatively secure individuals remain emotionally stable in the face of threats and stressors and cope more effectively than do less secure individuals with all kinds of difficulties (see Mikulincer & Shaver, 2007a, for extensive evidence). They can generally focus attention on constructive alternatives rather than succumbing to rumination, catastrophizing, or demoralization.

Admittedly, our findings provide information only about secure people's access to and reliance on the secure-base script, not about the effects of such access and reliance on emotional outcomes. However, previous laboratory studies have shown that experimental inductions aimed at heightening the accessibility of the secure-base script have soothing effects on people's emotional state and help sustain a positive mood even following exposure to stressors (e.g., Mikulincer, Hirschberger, et al., 2001). We believe, therefore, that the accessibility of the secure-base script documented here in both open-ended laboratory narratives and naturally occurring dreams is one pillar of securely attached individuals' resilience and emotional balance in times of stress.

Findings from Studies 5–8, showing that secure individuals' processing of secure-base-script information is deeper and more elaborate than less secure individuals' processing, and that more secure individuals make more accurate, faster, and more confident judgments about secure-base-related information, have important implications for understanding how secure and insecure people manage their close relationships. Secure individuals generally make realistic appraisals of their relationships and relationship partners; they are more likely to notice supportive, caring behavior and are quicker to understand and forgive partners who fail, under certain circumstances, and deviate from their normally considerate, supportive behavior (e.g., Collins & Feeney, 2004; Mikulincer, Shaver, & Slav, 2006).

Our findings also suggest that relatively secure people are better equipped cognitively than less secure people to deal with interdependence dilemmas. In their risk-regulation theory, Murray, Holmes, and Collins (2006) assumed that dependence on a partner's care and support—at times when one expresses needs for proximity and support—can automatically activate worries about rejection and disapproval (“How can I be sure my partner will accept my bid for support?”). Because most people do not want to be rejected or to endanger their sense of self-worth, Murray et al. also assumed that people need to carefully assess a partner's regard and responsiveness before engaging in intimate or interdependent behavior. That is, they seem likely to rely on an if-then rule: “If I am feeling a partner's regard and acceptance, then I can increase interdependence; but if I am experiencing or expecting the partner's rejection, I should retreat from interdependence.” Relatively secure individuals, who have rich, elaborated, and accessible knowledge about the secure-base script, can be both optimistic and accurate in applying this if-then rule. They can generally count on their partner's support, if it has been available in the past, and can

openly express needs and confidently engage in intimacy-promoting behavior. This kind of behavior generally fosters relational harmony and contributes to relationship satisfaction, which is a frequently documented correlate of attachment security (see Feeney, 2008, for a review).

Less secure individuals are likely to have more difficulties associated with the if-then rule, difficulties associated with errors of both omission and commission. They may erroneously dismiss partners' signs of affection and care, and hence fail to engage in support seeking and intimacy-promoting behavior. This is the avoidant individual's typical pattern of interpersonal appraisals and behavior (see Mikulincer & Shaver, 2007a, for a review). Additionally, they may misinterpret a partner's behavior and amplify their expression of vulnerability and need, resulting in conflict and the exacerbation of distress rather than relief. This is what is often observed in anxiously attached individuals (see Mikulincer & Shaver, 2007a, for a review). Findings from Studies 2 and 4 indicate that these tendencies are evident in insecure people's narratives and dreams. Active support seeking was absent from avoidant participants' stories and dreams, and anxious participants wrote stories and dreamed about a distressed protagonist who sought support but did not obtain it, and who was, therefore, not able to escape distress.

Although the studies reported here provide novel and important information about the implicit, procedural knowledge that underlies secure people's relationship-related appraisals, judgments, decisions, and actions, there is need for additional studies that reveal the cognitive components of insecure attachment orientations. For example, we did not collect data on the particular ways in which insecure individuals process attachment-related information. Because Waters and Waters (2006) paved the way to the present studies by articulating the secure-base script and designing one method for measuring it, we also focused on insecure people's lack of a fully elaborated secure-base script and their inability to rely on such a script when processing attachment-relevant information. We did not attempt to find out whether people scoring high on attachment anxiety or avoidance process attachment-relevant information with the help of some other kinds of scripts. More theoretical and empirical work is needed to reveal and delineate such scripts if they exist, and they well might exist if people's scripts are summaries of their actual previous relationship experiences.

It is also important to mention that all eight of our studies were conducted with Israeli undergraduates, and attachment insecurities were assessed with a single self-report measure. Future studies should include participants from other nations, age groups, and education levels and should use other measures of attachment security and insecurity (e.g., the Adult Attachment Interview). This would further establish the expected generality of our findings. (In many of our previous studies we have obtained similar results in the United States and Israel and when testing much broader age groups [e.g., Mickelson, Kessler, & Shaver, 1997], so we expect the present results to generalize as well.) What is most striking about the present studies, in our view, is the amazing precision and consistency of the results. This outcome suggests that the secure-base script is a robust and very significant component of attachment orientations, one worthy of further elaboration and research.

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