

Attachment Theory and Reactions to Others' Needs: Evidence That Activation of the Sense of Attachment Security Promotes Empathic Responses

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Five studies examined the effects of chronic and contextual activation of attachment security on reactions to others' needs. The sense of attachment security was contextually primed by asking participants to recollect personal memories, read a story, or look at a picture of supportive others or by subliminally exposing them to proximity-related words. This condition was compared against the priming of neutral themes, positive affect, or attachment-insecurity schemas. Then reports of empathy and personal distress or the accessibility of empathy and personal-distress memories were assessed. Attachment-security priming strengthened empathic reactions and inhibited personal distress. Self-reports of attachment anxiety and avoidance were inversely related to empathy, and attachment anxiety was positively related to personal distress. The discussion emphasizes the relevance of attachment theory for explaining reactions to others' needs.

Attachment theory (Bowlby, 1969, 1973) is viewed as a valid conceptual framework for explaining one's reactions to others' needs. In support of this view, recent studies have shown that the sense of attachment security—expectations that others would be supportive in times of need—seems to contribute to the provision of support to a needy person (e.g., Collins & Feeney, 2000). However, all these studies are correlational in nature and have not provided any evidence on the causal effects of attachment security on reactions to others' needs. Moreover, most of them have exclusively focused on caregiving behaviors within close relationships and have not distinguished between altruistic and egoistic sources of these behaviors. In fact, these studies have ignored Batson's (1991) empathy–distress distinction, with empathy reflecting altruistic other-oriented responses and personal distress reflecting a more egoistic self-focused response. The current studies attempt to fill in these gaps and to examine the effects of the activation of attachment security on empathy and distress reactions to the plight of nonintimate persons.

Attachment Theory and Reactions to Others' Needs

According to Bowlby's theory (1969, 1973), the reactions of significant others to one's own needs in times of stress has crucial implications for mental health, affect regulation, and interpersonal relations. In Bowlby's (1973) view, interactions with significant others who are available and responsive to one's needs promote the formation of a sense of attachment security. This sense of attachment security includes positive representations (“working

models”) of the self and others as well as the belief that proximity maintenance to significant others is an effective affect-regulation device (Bowlby, 1973). In contrast, interactions with significant others who are unavailable and unresponsive to one's needs elicit insecurities about others' responses, one's own value, and the effectiveness of proximity-seeking strategies. Attachment research has shown that the sense of attachment security significantly contributes to subjective well-being, affect regulation, high self-esteem, positive person perception, and well-adjusted interpersonal cognitions and behaviors (see Collins & Allard, 2001; Mikulincer & Florian, 2001, for reviews).

Although attachment theory mainly deals with others' responses to one's needs, Bowlby (1969) argued that his theory might be also relevant for explaining one's reactions to others' needs. According to Bowlby, these reactions are part of the caregiving behavioral system, which seems to maintain a dynamic interplay with the sense of attachment security. In Bowlby's view, the caregiving system is designed to provide protection and support to others who are either chronically dependent or temporarily in need and is guided by an altruistic motive—the alleviation of others' distress. Bowlby also proposed that this system shares two core components with the attachment behavioral system: distress regulation and the need for sensitive care (Bowlby, 1969). Along this reasoning, Collins and Feeney (2000) recently argued that if the sense of attachment security includes information about strategies designed to regulate one's own distress and the likelihood of receiving care from others, this inner sense might be related to beliefs about regulating others' distress and providing care to others.

Bowlby's (1969) ideas about the dynamic interplay of behavioral systems suggest that the sense of attachment security might promote altruistic reactions to others' needs. In Bowlby's terms, the absence of supportive others in times of stress and the consequent disruption of attachment security inhibit the activation of other behavioral systems, including cognitions and behaviors related to the caregiving system. In this case, people are so egoisti-

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cally self-focused on their attachment needs and distress that they lack the necessary resources to altruistically attend to others' needs and to engage in caring behaviors. However, when relief is attained and a sense of attachment security is restored, people could direct attention and energy to other behavioral systems. In this case, they would have more available resources to attend to others' needs and to provide adequate care for alleviating their distress. These persons would perceive others not only as a source of security and support, but also as human beings that may need help and comfort. On this basis, one can hypothesize that the sense of attachment security would promote a genuine concern to others' welfare and facilitate altruistic helping in times of need.

The core cognitive components of the sense of attachment security—positive working models of self and others—may also promote altruistic reactions to others' needs. Attachment research has found that the sense of attachment security is related to confidence in one's skills and competences (e.g., Bartholomew & Horowitz, 1991), the ability to manage stressors while maintaining a sense of optimism, control, and self-efficacy (Mikulincer & Florian, 2001), and less preoccupation with self-worth issues and self-focused needs (e.g., Mikulincer, 1998). These positive models of self would be highly relevant in the encounter with others' needs, which has been found to elicit distress and to activate affect-regulation strategies (e.g., Batson, 1987; Stotland, 1969). In this case, positive models of self would help people maintain a sense of control and confidence in how to cope with the distress-eliciting encounter, reduce one's distress, and then free inner resources to attend to others' needs. On this basis, one can claim that positive models of self would foster altruistic reactions to others' needs. Consistent with this claim, self-worth threats have been found to inhibit altruistic reactions (e.g., Lehman, Ellard, & Wortman, 1986).

The sense of attachment security also includes positive models of others (Bartholomew & Horowitz, 1991)—expectations that others would behave in a caring and benevolent manner—and comfort with closeness and interdependence (Hazan & Shaver, 1987). These positive beliefs may foster perception of others as deserving one's help, and then may motivate people to provide the necessary support to restore or maintain others' welfare. Furthermore, comfort with closeness would be particularly relevant during the encounter with distressed persons, who are typically perceived as demanding closeness and expressing a need to depend on others (Lehman et al., 1986). In this case, people who do not feel comfort with closeness may tend to distance from the distressed person so as to minimize the anticipated dependency. On this basis, one can claim that positive models of others would also maintain and reinforce altruistic reactions to others' needs.

Examining the Link Between Attachment Security and Reactions to Others' Needs

In the last 2 decades, a number of studies have examined the association between the chronic and global sense of attachment security and responses to the needs of a close relationship partner. Specifically, this line of research has focused on a person's attachment style—stable patterns of relational cognitions and behaviors—and has compared persons who report a secure style with those who report more insecure styles (see Feeney, 1999; Shaver & Hazan, 1993, for reviews). This relational construct seems to be

organized around two underlying dimensions: avoidance and anxiety (Brennan, Clark, & Shaver, 1998). Whereas attachment avoidance refers to negative models of others and a tendency to avoid closeness, attachment anxiety refers to negative models of the self and a tendency to worry about rejection and abandonment. Persons scoring low on these two dimensions exhibit the secure style and are characterized by a positive attachment history and a chronic sense of attachment security.

Findings on parental behaviors provide extensive support to the hypothesized link between attachment security and reactions to others' needs. Using laboratory observations and assessing attachment style through the Adult Attachment Interview, Crowell and Feldman (1988, 1991) found that securely attached mothers displayed more helpful and supportive responses to their preschool child in different tasks as well as in separation–reunion episodes than insecurely attached mothers did. These findings were extended to maternal sensitivity of infants' needs (e.g., Haft & Slade, 1989; Ward & Carlson, 1995) and fathers' responses to preschool children's needs (e.g., Cohn, Cowan, Cowan, & Pearson, 1992; Pearson, Cohn, Cowan, & Cowan, 1994). Using a self-report measure of attachment style, Rholes, Simpson, and Blakely (1995) also found that the higher the mother's attachment security, the more supportive she was toward her preschool child.

Adult attachment studies have also shown that self-reports of attachment security are significantly associated with relatively high levels of reported responsiveness to a romantic partner's needs (e.g., Carnelley, Pietromonaco, & Jaffe, 1996; Feeney, 1996; Kuncz & Shaver, 1994). In observational studies, Simpson, Rholes, and Nelligan (1992) and Rholes, Simpson, and Orina (1999) found that, as compared with insecure persons, men who scored high on attachment security spontaneously offered more comfort and reassurance to a female dating partner who was told she would be exposed to an anxiety-inducing procedure. These results were replicated among dating couples who were videotaped while discussing stressful life events (Collins & Feeney, 2000) as well as among couples separating at an airport (Fraleigh & Shaver, 1998).

In a recent study, Westmaas and Silver (2001) examined the association between attachment style and reactions toward a non-intimate person who purportedly had been diagnosed with cancer in an experimental setting. As expected, participants who scored low on attachment avoidance exhibited more supportive reactions to a confederate who had cancer than did participants who scored high on this dimension. In addition, participants who scored high on attachment anxiety reported higher anxiety during an interaction with the confederate than participants who scored low on this dimension. Overall, the results provided support for the hypothesized link between attachment security and reactions to others' needs.

Although these studies have consistently delineated attachment-style differences in reactions to others' needs, they are correlational in nature, have not assessed or manipulated the cognitive accessibility of the sense of attachment security, and have not provided any evidence that this sense was active while assessing reactions to others' needs. In this context, previous studies have ignored the fact that most people possess multiple attachment schemas and that congruent and incongruent attachment-related thoughts and memories may coexist with the global attachment style within the semantic associative network (Baldwin, Keelan,

Fehr, Enns, & Koh Rangarajoo, 1996). In fact, research has shown that people could develop a relationship-specific sense of attachment security organized around experiences with a specific partner, even if this representation does not fit with their global attachment style (Mikulincer & Arad, 1999; Pierce & Lydon, 2001). Moreover, like every cognitive representation, the sense of attachment security has been found to be contextually activated by actual or imagined encounters with supportive others even among insecurely attached persons (e.g., Mikulincer & Shaver, 2001).

Recently, a number of investigators have adopted an alternative research strategy, which seems to be more appropriate for testing causal predictions about the effects of the sense of attachment security. Using well-validated priming techniques, these researchers contextually activated representations of attachment security and assessed its psychological effects in well-controlled experimental settings. Overall, the contextual activation of the sense of a secure base leads people to respond similarly to people who have a secure attachment style. For example, Baldwin (1994) found that exposing participants to the name of a supportive other led to more positive self-evaluation. Pierce and Lydon (1998) found that the priming of proximity-related words increased reliance on support seeking and decreased reliance on self-denigrating strategies when people were coping with stress. Moreover, priming of memories of attachment security causes people to perceive a relationship partner in more positive terms and to increase cognitive openness in response to belief-discrepant information related to this partner (Mikulincer & Arad, 1999). In the same vein, Mikulincer and Shaver (2001) found that the contextual activation of attachment security (subliminal exposure to proximity-related words, guided imagination of an attachment-security script) led to less negative reactions to out-group members. On this basis, a valid examination of the causal effects of attachment security on reactions to others' needs demands the manipulation of the contextual accessibility of representations of secure attachment.

With the exception of Westmaas and Silver's (2001) study, all the studies have focused on responses to a close relationship partner (offspring or romantic partner). This seems to be the most adequate approach, because the attachment system should have its greatest effects within close relationships. Moreover, attachment researchers have been concerned with the excess of studies that strive to link attachment security with every possible behavior in every interpersonal setting. However, when analyzing the nature of caregiving reactions, one should expand attachment research and also assess reactions to nonintimate persons to avoid interpretational problems derived from an exclusive focus on close relationships. First, the reviewed findings may reflect the closeness, commitment, and responsibility that secure persons feel in their relationships (Shaver & Hazan, 1993) rather than an altruistic attitude toward others' needs. Second, because of the fact that close relationship partners tend to be "included within one self" (Aron & Aron, 1986), the reviewed findings may reflect an egoistical, self-focused response rather than an other-oriented reaction. That is, the support people offer to a relationship partner may result from the need to protect a part of the self. Therefore a valid examination of the hypothesized link between attachment security and the caregiving system demands the assessment of reactions to the needs of both intimate and nonintimate persons.

From a conceptual perspective, one basic problem of the previous studies is that they have ignored theory and research that have

shown that support provision may reflect either egoistic or altruistic motives and may result from two conceptually different affective states—empathy and personal distress (e.g., Batson, Duncan, Ackerman, Buckley, & Birch, 1981; Batson, Fultz, & Schoenrade, 1987). On the one hand, empathy reflects an other-oriented reaction to the plight of another person; includes feelings of sympathy, compassion, and tenderness; and leads to helping behavior as an altruistic means to reduce others' distress (Batson, 1991). On the other hand, personal distress reflects a self-oriented aversive response, involves feelings of tension and discomfort by witnessing others' plight, and may lead to helping behavior as an egoistic means to reduce one's own aversive state (Batson, 1991). Over the past years, a large number of studies have provided extensive support to the empathy–altruism link as well as to the egoistic effects of personal distress (see Batson, 1991, for a review). Therefore, a valid examination of the link between attachment security and the caregiving system demands the assessment of both empathy and personal-distress reactions.

The altruistic–egoistic distinction is extremely relevant in understanding the link between attachment security and reactions to others' needs and may have important implications for relationship quality. In fact, both empathy and personal distress could promote support provision. However, whereas empathy is an other-oriented response, personal distress is a self-focused response. Therefore, empathic helping could promote a sense of common fate with the partner, feelings of togetherness and commitment toward the partner, and partner's appraisal that the person cares for the partner's welfare, which, in turn, would enhance relationship satisfaction and maintenance. In contrast, the helping derived from personal distress only reduces one's tension without having any positive implication for relationship quality. In fact, neither partner's welfare nor relationship maintenance are the underlying reasons of this helping reaction.

The Current Studies

The current studies attempted to examine the causal effects of attachment security on reactions to others' needs, while dealing with the above-reviewed limitations of previous studies. First, we examined the effects of both global attachment style and the contextual priming of the sense of attachment security. Second, we assessed reactions to the plight of a nonintimate person, attempting to eliminate alternative interpretations related to closeness and self-expansion. Third, we assessed the strength of empathy and personal-distress responses, attempting to examine the effects of attachment security on altruistic and egoistic sources of caregiving behaviors.

The main hypothesis of the current studies is that the contextual priming of the sense of attachment security would reduce personal distress and enhance empathy in reaction to others' needs. This hypothesis is based on the boosting of the positivity of models of self and models of others produced by the contextual priming of attachment security. With regard to personal distress, we argue that variations along models of self would explain the hypothesized effects of the priming of attachment security. Specifically, the boosting of positive models of self would promote feelings of control and self-efficacy in dealing with others' plight, which, in turn, would reduce the arousal of personal distress. With regard to empathy, we argue that variations along both models of self and

models of others would explain the hypothesized effects of the priming of attachment security. Specifically, the boosting of positive models of self would free inner resources to attend to others' needs, thereby contributing to the arousal of a more other-oriented response. Furthermore, the boosting of positive models of others would motivate people to reciprocate others' benevolence and/or to behave according to a benevolent code. As a result, positive models of others would reinforce empathic reactions.

If we view the contextual primes as affecting the on-line dynamics of the attachment system, then we should make the same predictions about the way the system works on the basis of its long-term settings (i.e., attachment style) and its temporary settings (based on priming its various components). Therefore, we apply the above rationale for postulating hypotheses about the associations between attachment style and reactions to others' needs. First, the argument that positivity of models of self reduces personal distress led us to hypothesize that this distress reaction would be mainly associated with attachment anxiety, which reflects variations along models of self (Brennan et al., 1998). Persons scoring high on attachment anxiety hold more negative models of self and then would react to others' needs with more personal distress than persons scoring low on this dimension. Personal distress would not be significantly associated with attachment avoidance, because avoidant persons' habitual tendency to suppress negative affect (Fraley, Davis, & Shaver, 1998) would also inhibit the expression of personal distress while witnessing other's plight. Second, the argument that positivity of both models of self and models others contribute to empathy led us to hypothesize that empathy would be a function of both anxiety and avoidance. Empathy would be inhibited by high scores on attachment anxiety, which reflect negative models of self (Brennan et al., 1998), or high scores on attachment avoidance, which reflect negative models of others (Brennan et al., 1998). In fact, felt anxiety and the lack of comfort with closeness would inhibit other-oriented altruistic responses.

The design of the current studies also enables the exploration of the possible interactive effects of attachment-security priming and global attachment style on reactions to others' needs. Although we cannot make any ad hoc prediction about these interactive effects, it is possible that the effects of attachment-security priming would be independent from the effects of attachment style. Because all human beings are potentially responsive to an enhanced sense of security, all of them may be susceptible to the effects of the priming of this sense regardless of variations in attachment style. In fact, Pierce and Lydon (1998), Mikulincer and Arad (1999), and Mikulincer and Shaver (2001) have found that attachment-security priming produced similar responses in persons who had reported high or low attachment anxiety and avoidance in close relationships.

Study 1

In Study 1 we examined the effects of the priming of attachment security and global attachment style on empathy and personal-distress reactions. Participants' attachment style was assessed by the Experience in Close Relationships Scale (ECR, Brennan et al., 1998), which taps the dimensions of anxiety and avoidance. Reactions to others' needs were assessed using Batson's procedure (e.g., Batson et al., 1989). Participants read about a student strug-

gling to care for her younger siblings after the death of her parents and rated their emotional reactions to the story. In Study 1, attachment security was primed by asking participants to read a story describing an interpersonal script of attachment security—distress arousal, support seeking, availability and supportiveness of significant others, and distress reduction resulting from others' assistance. Mikulincer and Shaver (2001) have used this procedure for priming attachment schemas.

We compared the effects of this priming procedure against two control conditions: (a) reading a neutral, emotionally irrelevant story (neutral priming) and (b) reading a comic story that has a positive affective connotation (positive-affect priming). The positive-affect-priming condition was introduced to control for the possible effects of positive affect on empathy and personal distress. Previous studies have found significant associations between attachment security and positive affect (see Shaver & Hazan, 1993 for a review), and there is evidence that positive affect is somewhat associated with helping (e.g., Isen, 1987). For the same control purpose, we asked participants to report their mood following the priming procedure and then examined whether mood mediated the effects of attachment security on empathy and distress.

Participants were randomly divided into three conditions according to the story they were asked to read: attachment-security story, positive-affect story, and neutral story. Following this procedure, all the participants answered a mood scale, read the needy person's story, completed a self-report scale tapping empathy and personal distress in reaction to this story, and, after a delay task, answered the ECR tapping variations in attachment style. The predictions were as follows:

1. Participants in the attachment-security-priming condition would report more empathy and less personal distress than would participants in the positive-affect and neutral priming conditions.
2. The lower the anxiety and avoidance scores, the stronger the empathy ratings would be.
3. The higher the attachment anxiety scores, the stronger the personal distress ratings would be.

Study 1 also explored the possible interplay of contextual and chronic accessibility of attachment security. Specifically, we examined the interactive effects of attachment-security priming and attachment-style scores on emotional reactions to others' need

Method

Participants. Sixty-nine students (44 women and 25 men ranging in age from 20 to 40, *Mdn* = 24) from various Israeli universities participated in the study without any monetary reward. Participants were randomly divided into three conditions, with 23 participants in each.¹

Materials and procedure. The study was conducted on an individual basis and was presented as social cognition research. Then, participants read a one-paragraph Hebrew story and were told that they would be asked questions about the story during the experiment. At this time, participants were divided into three conditions. In the attachment-security-priming condition, participants received a story describing a prototypical episode of attachment security. In this story, a person (same sex as the participant) faced a problem that he or she could not solve on his or her own (the person

¹ In all the studies, no significant gender difference was found between priming conditions. Moreover, there were no significant interactions of gender with priming or attachment styles in predicting any of the dependent variables.

arrived at home and become aware that he or she forgot his or her keys), asked his or her family for help, received assistance from his or her father and sister who were responsive to his or her distress, set aside other activities in assisting him or her, and solved the problem. In the positive-affect-priming condition, participants received a series of brief jokes, describing comic social interactions and consequences. In the neutral-priming condition, participants received a set of instructions about the installation of a high fidelity stereo.

To validate the categorization of the three stories, we presented another sample of 13 Israeli undergraduates with the attachment-security, positive affect, and neutral stories and asked them to rate the extent to which each story made them feel happy, good, and bad as well as the extent to which each story aroused feelings of warmth, love, closeness, and trust. These seven ratings were made on 5-point scales ranging from 1 (*not at all*) to 5 (*very much*). For each participant, we computed two total scores: (a) the extent to which a story aroused positive affect (average of happy, good, and bad ratings after reversing the negative affect item) and (b) the extent to which a story aroused attachment-security feelings (average of warmth, love, closeness, and trust ratings). Analyses of variance (ANOVAs) for repeated measures revealed that the positive affect story was rated as arousing more positive affect ($M = 4.17$, $SD = 0.58$) than the attachment-security story ($M = 3.51$, $SD = 0.57$), which, in turn, was rated as arousing more positive affect than the neutral story ($M = 3.03$, $SD = 0.27$), $F(2, 22) = 24.13$, $p < .01$, $\eta^2 = .41$. In addition, the attachment-security story was rated as arousing more attachment-security feelings ($M = 3.50$, $SD = 1.27$) than both the neutral story ($M = 1.17$, $SD = 0.48$) and the positive-affect story ($M = 1.54$, $SD = 1.23$), $F(2, 22) = 21.35$, $p < .01$, $\eta^2 = .37$. The findings validated our categorization.

Next, all participants rated their current mood to provide a check on the affective consequences of the priming procedure. On a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*), participants rated the extent to which they felt good, happy, bad, and sad. Cronbach's alpha coefficient for the four items (after reversing the response scales of the negative-affect items) was .83, indicating high internal consistency. We therefore computed a mood score by averaging the four items. Higher scores indicated a more positive mood.

Following the mood assessment, all the participants read a brief story about Miriam, a university student, whose parents and a sister had been recently killed in an automobile crash. Miriam explained that she was desperately trying to take care of her surviving younger brother and sister while trying to finish her last year of BA studies. If she did not finish, she would not be able to earn enough money to support her brother and sister and would have to put them up for adoption. This story was similar to Batson's story of Kate Banks (e.g., Batson et al., 1989).

After reading the story, participants received 14 adjectives describing different emotional states and rated how much they had experienced that emotion while reading the story. Ratings were done on a 7-point scale, ranging from 1 (*not at all*) to 7 (*extremely*). The adjectives were constructed on the basis of Batson's list of empathy and personal-distress adjectives (e.g., Batson et al., 1987). The list included six empathy-related adjectives (sympathetic, softhearted, warm, compassionate, tender, and moved) and eight personal-distress adjectives (alarmed, grieved, troubled, distressed, upset, disturbed, worried, and perturbed). A factor analysis with varimax rotation yielded two main factors (eigenvalue > 1), which explained 59% of the variance and replicated the two-factor structure of the 14 adjectives. The first factor (34% of explained variance) included the eight personal distress adjectives (loading $> .40$), whereas the second factor (25%) included the six empathy adjectives (loading $> .40$). Cronbach's alpha coefficients for the eight personal distress items and the six empathy items were high (.88, .94, respectively), implying adequate internal consistency. On this basis, we computed two scores by averaging items that load high on a factor. Higher scores reflect higher empathy and higher personal distress.²

Before ending the experiment, participants answered a delay/distractor scale on life habits and then completed a Hebrew version of the ECR (Brennan et al., 1998) that assesses attachment style.³ This self-report scale consisted of 36 items tapping the dimensions of attachment anxiety and avoidance. Participants rated the extent to which each item was descriptive of their feelings in close relationships on a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). Eighteen items tapped attachment anxiety (e.g., "I worry about being abandoned," "I worry a lot about my relationships") and 18 items tapped attachment avoidance (e.g., "I prefer not to show a partner how I feel deep down," "I get uncomfortable when a romantic partner wants to be very close"). The reliability and validity of the scale have been demonstrated (Brennan et al., 1998). The ECR was translated into Hebrew by Mikulincer and Florian (2000), who also validated its two-factor structure in an Israeli sample. In the current sample, Cronbach's alpha coefficients were high for the 18 anxiety items (.92) and the 18 avoidance items (.83). So two scores were computed by averaging items on each subscale.⁴

Results and Discussion

To examine the effects of the priming procedure and attachment scores, we conducted separate hierarchical regressions for empathy and personal distress.⁵ We created two dummy variables—one contrasting the attachment-security priming to the other priming conditions (security contrast) and the other contrasting the positive-affect priming to the other conditions (positive contrast). Then, we examined the main effects of the contrasts and attachment scores as well as the two-way and three-way interactions between each of the dummy variables and attachment scores. The main effects were entered in Step 1 of the regressions, the two-way interactions (product terms) were added in Step 2, and the three-way interactions were added in Step 3.

The regression conducted on empathy ratings indicated that the entire model was significant, $F(11, 57) = 4.35$, $p < .01$, explained 35% of the variance, and yielded the following results (see *bs* in Table 1). First, the security contrast had a significant unique effect—attachment-security priming led to higher empathy ratings than the neutral-priming condition. Second, both attachment anxiety and attachment avoidance had significant unique main effects on empathy ratings—the higher the attachment anxiety or avoid-

² In all the reported studies, empathy and personal-distress ratings were not significantly associated (r s ranging from .02 to .18), supporting the orthogonality of these ratings.

³ In all the studies, participants received the ECR scale after the manipulations; therefore, their answers might have been affected by these procedures. However, in all the studies, ANOVAs yielded no significant effects for priming condition on anxiety and avoidance scores (F s < 1), implying that ECR scores were not significantly affected by contextual priming. Moreover, we included a delay/distracting task before measuring attachment style to avoid any effect of contextual priming on ECR scores. In fact, measuring attachment style before the manipulations would have been more problematic, because this measurement may activate chronic attachment-related schemas during the contextual priming of attachment security.

⁴ In all the studies, the two attachment scores were not significantly associated (r s ranging from .07 to .16), supporting the orthogonality of the anxiety and avoidance dimensions.

⁵ In all the studies, we selected the sample size to approximate the power level of .80, after having estimated the effects of contextual priming and attachment scores to be observed.

Table 1
Regression Coefficients, Standard Errors, and Significance Tests of the Contributions of Priming Conditions and Attachment Scores to Empathy and Personal Distress (Study 1)

Effect	Empathy responses				Personal distress			
	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>b</i>	<i>SE</i>	β	<i>t</i>
Sec	1.68	.40	0.44	4.19**	-1.04	.29	-0.41	-3.56**
Pos	0.57	.41	0.15	1.39	-1.13	.30	-0.44	-3.79**
Anx	-0.49	.15	-0.32	-3.33**	0.46	.11	0.45	4.42**
Avo	-0.66	.20	-0.31	-3.22**	-0.04	.15	-0.02	-0.26
Anx \times Avo	0.11	.19	0.32	0.60	-0.08	.14	-0.29	-0.54
Sec \times Anx	0.40	.39	0.40	1.02	-0.09	.28	-0.13	-0.32
Sec \times Avo	-0.19	.63	-0.15	-0.31	0.14	.45	0.17	0.31
Pos \times Anx	0.25	.41	0.26	0.61	-0.02	.29	-0.03	-0.08
Pos \times Avo	0.07	.49	0.07	0.14	-0.38	.36	-0.50	-1.07
Sec \times Anx \times Avo	-0.55	.53	-1.80	-1.04	-0.01	.40	-0.06	-0.04
Pos \times Anx \times Avo	-0.61	.49	-1.94	-1.27	-0.15	.37	-0.71	-0.41

Note. Sec = attachment-security priming; Pos = positive-affect priming; Anx = anxiety; Avo = avoidance.
 ** $p < .01$.

ance scores, the lower the reported empathy was. Third, the positive-affect contrast was not statistically significant. Fourth, all the two-way and three-way interactions were not significant. Overall, attachment security priming and lower scores on the two attachment style dimensions were significantly and independently associated with higher empathy ratings. Positive-affect priming did not significantly contribute to ratings of empathy.

The regression conducted on personal distress indicated that the entire model was significant, $F(11, 57) = 3.94, p < .01$, explained 28% of the variance, and yielded the following results. Both the security contrast and the positive-affect contrast were significant—the priming of attachment-security or positive-affect representations led to lower ratings of personal distress than the neutral-priming condition (see Table 1). In addition, attachment anxiety had a significant unique effect on personal distress—the higher the attachment anxiety, the higher the reported distress was (see Table 1). The main effect for avoidance and all the interactions was not significant.

In the above regressions, the dummy-coded priming variables allowed us to compare (a) security priming versus neutral priming and (b) positive-affect priming versus neutral priming. However, they did not include a direct comparison of security priming versus positive-affect priming. To get such information, we ran another set of hierarchical regressions using security priming as the comparison group (coded 0), coding positive-affect priming as 1 in the first contrast, and coding neutral priming as 1 in the second contrast. According to Aiken and West (1991), the resulting coefficients of the first contrast would yield information about the comparison between positive-affect and security-priming conditions. Beyond these contrasts, we included the two attachment dimensions and all the interactions between the contrasts and these dimensions as additional predictors. However, our main interest was in the security priming versus positive-affect priming contrast as well as in its interactions with attachment dimensions.

With regard to empathy, the regression yielded that the security priming versus positive-affect priming contrast was significant, $b = -1.12, SE = .41, t(64) = -2.74, p < .01$, with security priming leading to higher empathy than positive-affect priming.

With regard to personal distress, this contrast was not significant, $t < 1$. In the two regressions, all the interactions between this contrast and attachment scores were not significant.

To examine the possible mediating role of reported mood, we adopted Baron and Kenny's (1986) analytic strategy. In their view, a variable acts as a mediator if (a) there is a significant association between the independent variable and the hypothesized mediator; (b) there is a significant association between this mediator and the dependent variable controlling for the independent variable; and (c) when the mediator is controlled, the strength of the association between the independent and dependent variables is notably reduced and no longer significant.

To examine the first criterion we performed a hierarchical regression on positive mood with security contrast, positive-affect contrast, attachment anxiety, attachment avoidance, and all their interactions as the predictors. The technical details were identical to the regressions described above. This regression yielded significant unique effects for the security contrast, the positive-affect contrast, and attachment-anxiety scores on reported mood, $b = 0.84, SE = .28, t(64) = 3.03, p < .01$; $b = 1.33, SE = .28, t(64) = 4.71, p < .01$; $b = -0.56, SE = .10, t(64) = -5.60, p < .01$, respectively. The main effect for attachment avoidance and all the interactions was not significant. The priming of attachment-security or positive-affect representations and lower scores on attachment anxiety were significantly associated with more positive mood. That is, mood could potentially explain the effects of priming condition and attachment anxiety.

To examine the second criterion, we conducted hierarchical regressions on empathy and personal distress with security contrast, positive-affect contrast, anxiety, avoidance, mood, and all their interactions as the predictors. These regressions revealed that mood significantly contributed to ratings of personal distress, $b = -0.32, SE = .16, t(63) = -2.09, p < .05$, but not to empathy ratings, $t < 1$. The more positive the reported mood, the lower the reported distress.

To test the third, and critical, Baron and Kenny's criterion, we conducted the hierarchical regressions described above and examined the contribution of attachment-security priming, positive-

affect priming, and attachment scores after controlling for reported mood. With regard to empathy, attachment-security priming, attachment anxiety, and attachment avoidance had significant unique effects on empathy ratings even after controlling for reported mood (*bs* of 1.96, -0.67, and -0.63, respectively) and these regression coefficients were similar to those obtained before controlling for mood (for a comparison, see *bs* in Table 1). In fact, Sobel's (1982) tests revealed that the differences in the contribution of attachment-security priming, attachment anxiety, and attachment avoidance to empathy before and after the control for reported mood were not significant, $Z < 1$. These findings imply that mood did not significantly mediate the effects of attachment-security priming and attachment style on empathy ratings.

With regard to personal distress, the picture is more complex. On the one hand, attachment-security priming and attachment anxiety had significant unique effects on ratings of personal distress after controlling for reported mood (*bs* of -0.94 and 0.44, respectively) and these coefficients were similar to those obtained before controlling for mood (for a comparison, see *bs* in Table 1). Again, Sobel's (1982) tests revealed that the differences in the contribution of attachment-security priming and attachment anxiety to personal distress before and after the control for reported mood were not significant, $Z < 1$. On the other hand, we found that the unique effect of positive-affect priming on personal-distress ratings was no longer significant after controlling for mood ($b = -0.18$). Accordingly, Sobel's (1982) test revealed that the difference in the contribution of positive-affect priming to personal distress before and after the control for mood (*bs* of -1.13 versus -0.18) was statistically significant, $Z = 4.16$, $p < .01$. Overall, reported mood significantly mediated only the effects of positive-affect priming on personal distress.

Taken as a whole, the findings were in line with our predictions. First, the contextual activation of attachment-security representations led participants to report higher empathy and lower personal-distress reactions to a needy person. Second, the chronic activation of attachment security (lower scores on attachment anxiety and avoidance) was also significantly associated with higher empathy responses. Third, attachment anxiety scores were significantly related to higher personal distress scores. Interestingly, the findings revealed no significant interaction between attachment-security priming and attachment-style scores, implying that the contextual and chronic activation of attachment security made unique and independent contributions to emotional reactions to a needy person. Whereas empathy was facilitated by the contextual activation of attachment security and inhibited by chronic doubts of attachment security along either the anxiety or the avoidance dimensions, personal distress was facilitated by attachment anxiety and inhibited by the contextual activation of attachment security.

The findings also indicated that the observed effects of attachment-security priming and attachment-style scores could not be explained by an alternative mood explanation. Although the priming of positive affect and reported mood significantly contributed to personal distress, they did not significantly contribute to ratings of empathy, and they failed to mediate the effects of attachment-security priming and attachment-style scores on both empathy and personal distress.

Although the current findings emphasized the important role that attachment security may play in shaping emotional reactions to a needy person, the findings were based on a single priming

technique and a single assessment technique and should be replicated with other priming procedures as well as with other instruments and techniques. Moreover, the findings were obtained in regard to a single need situation and should be replicated with other types of needs. In Studies 2 through 4 we attempted to deal with these limitations.

Study 2

In Study 2 we attempted to replicate findings of Study 1 while using a different priming procedure, exposing participants to a different need situation, and assessing emotional reactions with a different self-report scale. First, we primed attachment security by "inadvertently" exposing participants to a picture depicting the availability of supportive others in a distressing situation (i.e., a person being comforted by an opposite-sex partner). Mikulincer, Hirschberger, Nachmias, and Gillath (2001) have already used a variety of pictorial representations depicting supportive interactions as a means to prime attachment security. As in Study 1, the effects of this picture were compared against a picture that elicited attachment-unrelated positive affect (positive-affect priming) and a neutral picture (neutral priming). Second, participants read a story about a physically disabled person. Third, empathy and personal-distress reactions were assessed by a brief version of the Pity Experience Inventory (Florian, Mikulincer, & Hirschberger, 2000).

Participants read a story about a person suffering from a severe physical disability and completed the Pity Experience Inventory. While completing the questionnaire, participants were exposed to an attachment-security picture, a positive-affect picture, or a neutral picture. Then, participants answered a mood scale and the ECR scale. Predictions were the same as in Study 1.

Method

Participants. Another independent sample of 60 undergraduate students (31 women and 29 men ranging in age from 17 to 39, $Mdn = 24$) from various Israeli universities participated in the study without any monetary reward. They were randomly divided into three conditions, with 20 participants in each.

Materials and procedure. The study was conducted on an individual basis and was presented as research on social cognition. After receiving general instructions, participants received a folder with a self-report scale tapping reactions to others' needs. In the inside cover of this folder, in front of the questionnaire's sheets, we printed a picture, and participants were exposed to this picture while completing the self-report questionnaire. According to this picture, participants were randomly divided into three conditions. In the attachment-security-priming condition, participants received a picture depicting a same-sex distressed person being helped and physically comforted by an opposite-sex partner. In the positive-affect-priming condition, participants received a picture depicting a dog wearing a colorful pullover and a wool hat. In the neutral-priming condition, participants received a picture depicting a country view.

To validate the categorization of the three pictures, we presented another sample of 20 Israeli undergraduate students with the attachment-security, positive-affect, and neutral pictures and asked them to rate each picture along the seven dimensions described in Study 1. For each participant, we computed two total scores: (a) the extent to which a picture aroused positive affect (average of happy, good, and bad ratings after reversing the negative-affect item), and the extent to which a picture aroused attachment-security feelings (average of warmth, love, closeness, and trust ratings). ANOVAs for repeated measures revealed that the positive-affect and

security pictures were rated as arousing more positive affect ($M = 4.33$, $SD = 0.82$; $M = 4.32$, $SD = 0.60$, respectively) than the neutral picture ($M = 3.00$, $SD = 1.93$), $F(2, 38) = 4.95$, $p < .05$, $\eta^2 = .18$. The security picture was rated as arousing more attachment security feelings ($M = 4.18$, $SD = 0.72$) than both the neutral picture ($M = 2.35$, $SD = 0.97$) and the positive-affect picture ($M = 3.25$, $SD = 1.10$), $F(2,38) = 14.36$, $p < .01$, $\eta^2 = .29$. The findings validated our categorization.

We had participants complete a brief 24-item version of the Pity Experience Questionnaire (Florian et al., 2000) developed by Hirschberger (2001) to assess reactions to another person's need within experimental settings. Participants read a brief story about a same-sex young person suffering from a severe physical disability and the interpersonal problems resulting from this disability. Then, they were asked to rate the extent to which each of the 24 items was descriptive of the feelings and thoughts they had experienced while reading the story. Ratings were done on a 6-point scale, ranging from 1 (*not at all*) to 6 (*very much*).

The 24 items consisted of cognitive, emotional, and motivational manifestations of two major factors: compassionate caring and passive identification. The Compassionate Caring factor consisted of 14 items tapping empathy-related feelings, helping-oriented thoughts, and caring-oriented responses (e.g., "I imagined ways to encourage this person," "I wanted to comfort this person," "I felt sympathy toward this person"). This factor corresponds to Batson's (1991) conceptualization of empathy. The passive identification factor consisted of 10 items tapping sorrow-related emotions, a sense of helplessness, anxiety reactions, and escapist tendencies (e.g., "I felt helplessness," "I thought about the possibility of ending up in a similar situation," "I wanted to forget the story"). This factor corresponds to Batson's conceptualization of personal distress. In the current sample, the Cronbach's alpha coefficients for the two factors were high: .89 for the compassionate-caring items and .88 for the passive-identification items. On this basis, we computed two total scores by averaging items that belonged to each factor.

When the participants had completed the Pity Experience Inventory, the experimenter took the folder and gave participants another set of self-report scales in a different folder (without any picture in the inside cover). First, all participants rated their mood using the four-item scale described in Study 1. Cronbach's alpha for these items was adequate (.80), so a mood score was computed by averaging the four items. Second, participants answered a delay/distractor scale on life habits. Third, they completed the Hebrew version of the ECR scale described in Study 1. In the current sample, Cronbach's alphas were high for the 18 anxiety items (.88) and

the 18 avoidance items (.89). Therefore two scores were computed by averaging items on each subscale.

Results and Discussion

The data were analyzed by the hierarchical regressions described in Study 1. As can be seen in Table 2, these regressions replicated findings of Study 1. The regression conducted on compassionate caring indicated that the entire model was significant, $F(11, 48) = 2.57$, $p < .05$, explained 23% of the variance, and yielded the following results (see *bs* in Table 2). Attachment-security priming led to higher compassionate caring than did neutral priming. In addition, the higher the attachment-anxiety or avoidance scores, the lower this empathic response. The positive-affect contrast and all the interactions were not significant. With regard to passive identification, the regression indicated that the entire model was significant, $F(11, 48) = 2.34$, $p < .05$, explained 20% of the variance, and yielded the following results. Attachment-security priming and positive-affect priming led to lower passive identification ratings than neutral priming. In addition, the higher the attachment-anxiety scores, the higher the personal-distress reaction was. The effect for attachment avoidance and all the interactions was not significant.

With regard to the security priming versus positive-affect priming contrast (see details in Study 1), the regression conducted on compassionate caring indicated that this contrast was significant, $b = -0.77$, $SE = .26$, $t(55) = -3.02$, $p < .01$, with security priming leading to higher compassionate caring than positive-affect priming. For passive identification, the comparison between security priming and positive-affect priming was not significant, $t < 1$. In the two regressions, all the interactions between this contrast and attachment scores were not significant.

To examine the contribution of reported mood, we conducted statistical analyses identical to those described in Study 1. A hierarchical regression performed on reported mood yielded significant unique effects for attachment-security priming, positive-affect priming, and attachment-anxiety scores, $b = 1.09$, $SE = .26$, $t(55) = 4.13$, $p < .01$; $b = 0.72$, $SE = .78$, $t(55) = 2.66$, $p < .01$;

Table 2
Regression Coefficients, Standard Errors, and Significance Tests of the Contributions of Priming Conditions and Attachment Scores to Compassionate Caring and Passive Identification (Study 2)

Effect	Compassionate caring				Passive identification			
	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>b</i>	<i>SE</i>	β	<i>t</i>
Sec	0.62	.25	0.33	2.52*	-0.66	.30	-0.28	-2.19*
Pos	-0.14	.26	-0.07	-0.57	-0.72	.31	-0.31	-2.33*
Anx	-0.24	.09	-0.28	-2.41*	0.41	.12	0.39	3.38**
Avo	-0.22	.10	-0.23	-2.01*	0.21	.13	0.18	1.59
Anx \times Avo	-0.02	.12	-0.15	-0.22	0.01	.15	0.05	0.07
Sec \times Anx	0.03	.26	0.05	0.11	0.16	.32	0.23	0.51
Sec \times Avo	0.12	.31	0.19	0.38	0.08	.38	0.12	0.23
Pos \times Anx	0.16	.25	0.33	0.65	0.19	.31	0.33	0.65
Pos \times Avo	0.16	.27	0.25	0.60	-0.10	.33	-0.14	-0.31
Sec \times Anx \times Avo	-0.32	.34	-0.32	0.98	-0.10	.49	-0.48	-0.21
Pos \times Anx \times Avo	-0.43	.41	-0.51	1.01	-0.23	.33	-1.23	-0.69

Note. Sec = attachment-security priming; Pos = positive-affect priming; Anx = anxiety; Avo = avoidance. * $p < .05$. ** $p < .01$.

$b = -0.22$, $SE = .10$, $t(55) = -2.10$, $p < .05$, respectively. The main effect for attachment-avoidance scores and all the interactions were not significant. Hierarchical regressions on empathy and personal distress with security contrast, positive-affect contrast, attachment anxiety, attachment avoidance, reported mood, and all their interactions as the predictors revealed that reported mood significantly contributed to ratings of passive identification, $b = -0.30$, $SE = .12$, $t(54) = -2.45$, $p < .05$, but not to compassionate caring ratings, $t < 1$. The more positive the reported mood, the lower the reported passive identification.

After statistically controlling for reported mood, we found that the unique effects for attachment-security priming, attachment anxiety, and attachment avoidance on compassionate caring were still significant (bs of 0.95, -0.31 , -0.22 , respectively). These regression coefficients were similar to those obtained before controlling for mood (for a comparison, see bs in Table 2). In fact, Sobel's (1982) tests revealed that the differences in the contribution of attachment-security priming, attachment anxiety, and attachment avoidance to compassionate caring before and after the control for mood were not significant, $Z < 1$. As in Study 1, mood variations did not significantly mediate the effects of security priming and attachment-style scores on empathic responses.

With regard to passive identification, security priming and anxiety had significant unique effects after controlling for mood (bs of -0.62 and 0.37) and these coefficients were similar to those obtained before controlling for mood (for a comparison, see bs in Table 2). Again, Sobel's (1982) tests revealed that differences in the contributions of security priming and anxiety to passive identification before and after the control for mood were not significant, $Z < 1$. In contrast, the unique effect of positive-affect priming on passive identification was no longer significant after controlling for reported mood (b of -0.28). Accordingly, Sobel's (1982) test revealed that the difference in the contribution of positive-affect priming to passive identification before and after the control for mood was significant, $Z = 3.67$, $p < .01$. As in Study 1, reported mood significantly mediated only the effects of positive-affect priming on passive identification.

Overall, the findings replicated the results of Study 1 and were consistent with our predictions. Whereas empathy was facilitated by the priming of attachment security and inhibited by attachment-anxiety or avoidance scores, personal distress was inhibited by the priming of attachment security and facilitated by attachment anxiety. As in Study 1, the interactions between contextual and chronic attachment representations were not significant and the effects of these attachment factors on reactions to others' needs were not significantly explained by mood.

Study 3

Studies 1 and 2 used priming techniques that might have activated conscious thoughts about helping and caring, and therefore might have aroused participants' demand characteristics and other motivational or cognitive biases while rating reactions to others' needs. Even if participants in Study 2 were not explicitly asked to watch the priming pictures, the mere exposure to a pictorial representation of attachment security might have activated conscious thoughts about caring and support and led participants to react in a socially desirable manner. In dealing with this potential limitation, Study 3 used a subliminal priming technique, in which

participants were not aware of the primed representations. Specifically, attachment security was primed by subliminal presentation of words that are core components of a secure working model (e.g., love, support). This procedure has been already used by Pierce and Lydon (1998) and Mikulincer and Shaver (in press) to prime attachment representations. We compared the effects of this attachment-security priming with the subliminal priming of neutral or positive words.

Two other possible limitations of Studies 1 and 2 deal with the assessment of reactions to others' needs. First, these reactions were assessed in regard to a hypothetical target person. Although this technique enables standardization of the need situation and strict control of other contextual factors, the hypothetical situation may not be so vivid, familial, or personally relevant for some of the participants. In other words, the use of this technique may suffer from lack of ecological validity and may impede a generalization of the findings to real-life situations. Second, reactions to others' needs were assessed using self-report scales, in which participants received a list of items and rated the extent to which each item was self-descriptive. Again, although this technique enables response standardization, it may prevent participants from expressing responses to others' needs in their own idiosyncratic manner. In dealing with these possible limitations, Study 3 assessed reactions to others' needs using a more idiographic procedure. Specifically, participants were asked to recall a personal experience in which they witnessed the plight of another person and to freely describe, in an open-ended format, the way they reacted to this situation. Then, we content analyzed these freely generated responses and rated the level of empathy and personal distress each participant expressed.

Participants completed a computerized lexical decision task in which they were randomly divided into three subliminal priming conditions: attachment-security priming, positive-affect priming, and neutral priming. Following this procedure, participants rated their mood, were asked to recall a personal experience in which they witnessed the plight of another person, and were asked to freely describe their responses to this situation. Then, after a delay/distracting task, participants completed the ECR scale. Predictions were identical to those of Study 1.

Method

Participants. Another sample of 60 Israeli undergraduates (34 women and 26 men ranging in age from 19 to 36, $Mdn = 23$) participated in the study without any monetary reward. They were randomly divided into three conditions, with 20 participants in each.

Materials and procedure. The study was conducted on an individual basis. After receiving general instructions (see Study 1), participants performed a computerized 60-trial lexical decision task. This task was run on a Pentium IBM personal computer, with an SVGA color monitor (Hewlett Packard, Palo Alto, CA), and letter strings were displayed in black lettering on a white background in the middle of the monitor. Participants worked at their own pace.

Each trial consisted of a rapid subliminal presentation of a prime word (for 20 s) followed, after a pause of 500 ms, by the presentation of 1 of 60 target letter strings (for 1000 ms). Participants judged as quickly as possible whether the letter string was a word or not by pressing "1" on the keyboard number pad if they thought the string was a word or "3" if they thought it was a nonword. The string then vanished and the next trial began. Participants were told that each trial would begin with an "x" in the middle of the screen, which they had to keep their eyes fixed on, followed

by a light flash, which they should ignore, and then, after a brief pause, the target letter string would appear. It is important to mention that even when a prime is presented for as little as 20 ms, the afterimage may remain temporarily active in the peripheral parts of the visual system. To avoid this problem, we masked the primes with an XXX pattern immediately after their presentation. An earlier study using the same procedure (Mikulincer & Shaver, in press) revealed that participants were not able to detect the subliminal primes.

The target letter strings consisted of 30 Hebrew common attachment-unrelated Hebrew words (e.g., umbrella, elevator) and 30 nonwords. The subliminal primes consisted of four words, which were randomly presented 15 times during the 60 trials. Trials were randomly ordered across participants. Participants were randomly assigned to one of three conditions according to the prime words they received. For participants in the attachment-security-priming condition, the primes were four Hebrew words (*kirva, ahava, hibuk, ezra*) that connote the attainment of proximity to others (closeness, love, hug, support). For participants in the positive-affect-priming condition, the primes were four Hebrew words (*simha, hagnun, mazal, hazlaha*) that have a positive connotation but no direct link to attachment themes (happiness, honesty, luck, success). For participants in the neutral priming condition, the primes were four Hebrew words (*misrad, shulhan, sira, tmuna*) that have no positive or negative connotations and no link to attachment themes (office, table, boat, picture).

Following the lexical decision task, participants rated their mood using the four-item scale described in Study 1. Cronbach's alpha for these items was high (.93), so a mood score was computed by averaging the four items. Then participants were asked to remember a situation in which they witnessed the plight of another person and to provide a detailed written description of the recollected episode. They were encouraged to describe the sequence of events, the feelings of the other person, and their own feelings, thoughts, and responses in the situation. No participant had problems in recollecting and describing the targeted situation. They wrote on average around 12 lines. No significant effect for priming condition and attachment-style scores was found on the identity of the other person or on the length of the description.

Omri Gillath and Neta Avihou, who were trained in Batson's definition of empathy and personal distress and were unaware of participants' attachment-style scores and condition assignment, independently read each participant's protocol and made two ratings. First, they rated the extent to which a participant expressed emotional, cognitive, and behavioral signs of empathy in the recollected episode. Second, they rated the extent to which a participant expressed emotional, cognitive, and behavioral signs of per-

sonal distress in this episode. Ratings were made on a 7-point scale, ranging from 1 (*not at all*) to 7 (*very much*). Interjudge reliability was high: $r(58) = .91, p < .01$, for empathy; $r(58) = .79, p < .01$, for personal distress. On this basis, we averaged the two judge ratings, and each participant received an empathy and a personal-distress score.

Two independent raters also read each participant's protocol and rated the level of the other person's distress, as expressed in the protocol. This variable could be tremendously important in explaining reactions to others' needs and can be associated with a participant's attachment organization. In fact, anxiously attached persons may be particularly prone to recollect highly distressing experiences or may be highly sensitive to another person's expressions of distress (Mikulincer & Florian, 2001). This rating was also made on a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). Interjudge reliability was high, $r(58) = .80, p < .01$, allowing us to average the two judge ratings into a needy person's distress score.

Before ending the experiment, participants answered the delay/distractor scale on life habits and then completed the Hebrew version of the ECR scale described in Study 1. In the current sample, Cronbach's alphas were high for the 18 anxiety items (.94) and the 18 avoidance items (.91). Therefore, two scores were computed by averaging items on each subscale.

Results and Discussion

The data were analyzed by the hierarchical regressions described in Study 1. With regard to rated empathy, the regression indicated that the entire model was significant, $F(11, 48) = 4.16, p < .01$, explained 32% of the variance, and yielded the following results (see *bs* in Table 3). Participants in the attachment-security-priming condition were rated as expressing more empathy than participants in the neutral priming condition. In addition, the higher a participant's attachment anxiety or avoidance, the lower he or she was rated as expressing empathy to others' needs. The positive-affect contrast and all the interactions were not significant. With regard to rated personal distress, the regression indicated that the entire model was significant, $F(11, 48) = 4.87, p < .01$, explained 33% of the variance, and yielded significant unique effects found for attachment-security priming and attachment anxiety. Participants in the attachment-security-priming condition were rated as expressing less personal distress than participants in the neutral-priming condition. In addition, the higher a partici-

Table 3
Regression Coefficients, Standard Errors, and Significance Tests of the Contributions of Priming Conditions and Attachment Scores to Rated Empathy and Personal Distress (Study 3)

Effect	Empathy responses				Personal distress			
	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>b</i>	<i>SE</i>	β	<i>t</i>
Sec	1.64	.51	0.36	3.21**	-0.84	.38	-0.28	-2.22*
Pos	-0.70	.52	-0.15	-1.37	0.18	.38	0.06	0.48
Anx	-0.47	.20	-0.24	-2.29*	0.61	.15	0.45	3.99**
Avo	-0.70	.18	-0.41	-3.89**	0.20	.13	0.17	1.49
Anx \times Avo	0.13	.17	0.39	0.81	-0.12	.11	-0.39	-1.09
Sec \times Anx	0.16	.54	0.12	0.30	-0.14	.36	-0.16	-0.39
Sec \times Avo	0.08	.47	0.07	0.18	0.20	.31	0.24	0.65
Pos \times Anx	0.06	.55	0.04	0.11	-0.52	.37	-0.55	-1.40
Pos \times Avo	0.24	.47	0.17	0.50	-0.43	.32	-0.46	-1.35
Sec \times Anx \times Avo	-0.59	.43	-1.76	-1.37	-0.14	.28	-0.66	-0.54
Pos \times Anx \times Avo	-0.18	.43	-0.48	-0.41	-0.30	.28	-1.18	-1.07

Note. Sec = attachment-security priming; Pos = positive-affect priming; Anx = anxiety; Avo = avoidance.
* $p < .05$. ** $p < .01$.

pant's attachment anxiety, the higher he or she was rated as expressing personal distress. The main effects for positive-affect priming and attachment avoidance and all the interactions were not significant.

With regard to the security priming versus positive-affect priming contrast (see details of the analysis in Study 1), the regression conducted on rated empathy indicated that this contrast was significant, $b = -2.34$, $SE = .51$, $t(55) = -4.56$, $p < .01$, with security priming leading to higher empathy than positive-affect priming. For personal distress, this contrast was also significant, $b = 1.02$, $SE = .38$, $t(55) = 2.69$, $p < .01$, with security priming leading to lower personal distress than positive-affect priming. In the two regressions, all the interactions between this contrast and attachment dimensions were not significant.

To examine the possible mediating role of reported mood, we conducted statistical analyses identical to those described in Study 1. A hierarchical regression performed on reported mood only yielded a significant unique effect for attachment anxiety, $b = -0.44$, $SE = .16$, $t(55) = -2.63$, $p < .01$. Other main effects and interactions were not significant. Importantly, unlike Studies 1 and 2, neither attachment-security priming nor positive-affect priming made a significant contribution to mood. Hierarchical regressions on empathy and personal distress with security contrast, positive-affect contrast, attachment anxiety, attachment avoidance, reported mood, and all their interactions as the predictors revealed that reported mood significantly contributed to ratings of personal distress, $b = -0.25$, $SE = .12$, $t(54) = -2.08$, $p < .05$, but not to empathy ratings, $t < 1$. The more positive the reported mood, the lower the rated distress.

After statistically controlling for reported mood, the regression indicated that the unique effects for attachment-security priming, attachment anxiety, and attachment avoidance on rated empathy were still significant (bs of 1.57, -0.40 , -0.70 , respectively). These regression coefficients were similar to those obtained before controlling for mood (for a comparison, see bs in Table 3). In fact, Sobel's (1982) tests revealed that differences in the contribution of security priming, attachment anxiety, and attachment avoidance to rated empathy before and after the control for mood were not significant, $Z < 1$. As in Studies 1 and 2, mood did not significantly mediate the effects of attachment-security priming and attachment-style scores on empathic responses.

With regard to rated personal distress, attachment-security priming and attachment anxiety had significant unique effects after controlling for mood (bs of -0.78 and 0.54) and these coefficients were similar to those obtained before controlling for mood (for a comparison, see bs in Table 3). Sobel's (1982) tests revealed that differences in the contributions of attachment-security priming and attachment anxiety to rated personal distress before and after the control for mood were not significant, $Z < 1$. Overall, these findings imply that mood did not significantly mediate the effect of attachment-security priming and attachment anxiety on personal distress.

In the next analytical step, we examined the role of the needy person's distress, as expressed in participants' descriptions. A hierarchical regression on this score as predicted by priming variables and attachment-style scores yielded a significant unique effect for attachment anxiety, $b = 0.83$, $SE = .19$, $t(55) = 4.46$, $p < .01$. Anxiously attached persons were likely to describe the needy person as suffering from higher levels of distress than less

anxious persons were. The unique effects for attachment-security priming, positive-affect priming, and attachment avoidance and all the interactions were not significant.

A hierarchical regression performed on empathy with priming variables, attachment-style scores, and the needy person's distress score as the predictors revealed that the main effects of attachment-security priming, attachment anxiety, and attachment avoidance were still significant after controlling for the needy person's distress score (bs of 1.50, -0.71 , and -0.62 , respectively). Interestingly, the main effect for the needy person's distress score was also significant, $b = 0.29$, $SE = .14$, $t(55) = 2.03$, $p < .05$. The higher the needy person's distress, the stronger the empathy reactions. None of the interactions were significant. The same hierarchical regression performed on personal distress revealed that the main effects of attachment-security priming and attachment anxiety were still significant after controlling for the needy person's distress score (bs of -0.82 and 0.63 , respectively). The main effect for the needy person's distress score did not significantly contribute to personal distress, but the interaction between attachment anxiety and this score was significant, $b = -0.18$, $SE = .09$, $t(48) = 2.02$, $p < .05$. Other interactions were not significant.

To examine the source of the significant interaction, we adopted Aiken and West's (1991) suggestions and computed regression lines for personal distress on attachment anxiety as a function of two values of the needy person's distress—one standard deviation above the mean of the needy person's distress score and one standard deviation below this mean. These regressions revealed that the positive effect of attachment anxiety on personal distress was significant (slope different from 0) when the needy person's distress was one standard deviation above the mean, $b = 0.97$, $SD = .24$, $t(55) = 4.06$, $p < .01$, but not when this score was one standard deviation below the mean, $b = 0.31$, $SD = .20$, $t(55) = 1.52$. That is, attachment anxiety seemed to be significantly associated with higher personal distress mainly when the needy person was viewed as suffering from relatively high levels of distress.

Study 3 strengthened our confidence on the validity of the findings obtained in Studies 1 and 2. Moreover, the findings rejected the possibility that the effects of security priming might have resulted from demand characteristics or social desirability bias related to the priming techniques. Even when participants were not aware of the activation of security representations (subliminal priming), this activation led participants to recollect personal memories in which they reacted with higher empathy and lower personal distress to others' needs. As in Studies 1 and 2, these effects were not significantly moderated by attachment style or mood variations.

The findings also replicated and extended the effects of attachment style observed in Studies 1 and 2. Whereas attachment anxiety was found to inhibit empathy responses and to facilitate personal distress, attachment avoidance only inhibited empathy responses. Again, these effects were not significantly mediated by mood variations. Interestingly, the recollection of the needy person's distress was significantly associated with attachment anxiety and seemed to moderate the effects of this attachment-style dimension on personal distress. Specifically, anxiously attached persons tended to react with high personal distress mainly when the needy person was viewed as suffering from high levels of distress.

One can tentatively conclude that a person scoring high on attachment anxiety is highly sensitive to signs of others' distress, and that these signs tend to increase his or her personal distress reactions.

Study 4

Findings of Studies 1 to 3 were obtained by relying on participants' self-reports, which may be still influenced by motivational and cognitive biases. Moreover, these instruments did not provide any evidence about the cognitive substrate of the link between attachment security and reactions to others' needs. That is, we have no information about whether the contextual or chronic activation of the sense of attachment security actually activates empathy-related representations. In dealing with these limitations, Study 4 assessed the cognitive accessibility of empathy—and distress-related representations—and the readiness of these representations to affect information processing. Specifically, we used an autobiographical memory task in which the reaction time (RT) to retrieve a memory served as an index of the cognitive accessibility. In this task, we asked participants to recall personal episodes in which they witnessed the plight of another person and reacted with either empathy or personal distress. RTs for empathy memories and RTs for personal-distress memories were the main dependent variables of Study 4.

In Study 4, we used the priming procedure described in Study 2 (apparently inadvertent exposure to pictorial representations) and randomly divided participants into three conditions: attachment-security priming, positive-affect priming, and neutral priming. At the same time, participants performed an autobiographical memory task in which we assessed the accessibility of empathy and personal-distress memories. Then, participants rated their current mood, completed a delay/distracting task, and answered the ECR scale.

Method

Participants. Seventy-two undergraduate students (37 women and 35 men ranging in age from 20 to 37, $Mdn = 24$) from Israeli universities participated in the study without any monetary reward. Participants were divided into three conditions, with 24 participants in each.

Materials and procedure. The study was conducted on an individual basis and was presented as research on autobiographical memories and social cognition. After receiving these instructions, participants performed a six-trial computerized autobiographical memory task. They were told that they would be asked to recall real-life episodes in which they witnessed another person's plight and experienced a specific emotional reaction toward this person. They were informed that each trial would begin with the presentation of a sentence describing the targeted episode and that they should read the sentence, recall as soon as possible a personal experience that fit this sentence, and press the *space* key on the computer keyboard on the retrieval of this experience. On pressing the button, the sentence would disappear, and they should write a one-sentence description of the recalled episode. Following the description of the recalled episode, they were asked to press the *Enter* key to begin the next trial. No participant had problems in recalling and providing a one-sentence description of the six targeted episodes.

In each trial, a sentence was presented in the middle of a personal computer monitor, describing the targeted episode participants were asked to recall. These sentences were of the following type: "Recall a personal episode in which you witnessed another person's plight and reacted with

_____ toward this person." Each sentence presented a different emotional reaction. Three sentences asked participants to recall a personal episode in which they experienced empathic emotional reactions—compassion, closeness, or love. Three sentences asked participants to recall a personal episode in which they experienced personal distress—fear, distress, or embarrassment. Each sentence appeared in a small white window in the middle of the computer in black lettering and disappeared only after participants pressed the space key indicating they retrieved the memory. RTs for pressing the space key (retrieval RT) served as the dependent measure. Before the experimental trials, participants performed a practice trial, in which they were exposed to the above-described sentence and were told that a specific emotional reaction would appear in the blank space during the experimental trials.

During the memory task, participants were apparently inadvertently exposed to a picture in the monitor desktop. This picture appeared before and during all the trials. In fact, during each trial, a small white window was open in the middle of the background picture. When a participant pressed the space button, this window closed and the participant was exposed to the entire picture until the next trial. Participants were randomly assigned to one of three priming conditions according to the picture they were exposed to: attachment-security picture, positive-affect picture, and neutral picture. These pictures were identical to those described in Study 2.

When the participants completed the memory task, the experimenter shut down the computer and gave them a set of self-report scales. First, all participants rated their mood using the four-item scale described in Study 1. Cronbach's alpha for these items was adequate (.87), so a mood score was computed by averaging the four items. Second, participants answered a delay/distractor scale on life habits and completed the Hebrew version of the ECR scale described in Study 1. In the current sample, Cronbach's alphas were high for the 18 anxiety items (.92) and the 18 avoidance items (.91). So, two scores were computed by averaging items on each subscale.

Results and Discussion

We computed two RT scores for each participant: (a) the average RT for memories of compassion, closeness, and love (empathy memories) and (b) the average RT for memories of fear, embarrassment, and distress (personal-distress memories).⁶ Then, these two scores were analyzed by hierarchical regressions identical to those described Study 1.

The regression conducted on RT for empathy memories indicated that the entire model was significant, $F(11, 60) = 4.47, p < .01$, explained 34% of the variance, and revealed a significant unique effect for attachment-security priming, with the priming of attachment security leading to faster retrieval of empathy memories (higher cognitive accessibility) than neutral priming (see *bs* in Table 4). The unique effects of positive-affect priming, attachment anxiety, and attachment avoidance were not significant (see Table 4). Importantly, the interactions for Attachment-Security Priming \times Attachment Anxiety as well as for Attachment-Security Priming \times Attachment Avoidance were significant (see Table 4). Other interactions were not significant.

⁶ For empathy memories, the mean RTs (in seconds) in each experimental condition were 1.47 ($SD = 0.27$) in security priming, 1.63 ($SD = 0.25$) in positive-affect priming, and 1.71 ($SD = 0.21$) in neutral priming, $F(2, 69) = 5.32, p < .01, \eta^2 = .14$. For personal distress, the mean RTs (in seconds) in each experimental condition were 1.64 ($SD = 0.31$) in security priming, 1.59 ($SD = 0.31$) in positive-affect priming, and 1.64 ($SD = 0.30$) in neutral priming, $F < 1$.

Table 4
Regression Coefficients, Standard Errors, and Significance Tests of the Contributions of Priming Conditions and Attachment Scores to Reaction Times for Empathy and Distress Memories (Study 4)

Effect	Empathy responses				Personal distress			
	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>b</i>	<i>SE</i>	β	<i>t</i>
Sec	-0.22	.07	-0.40	-3.09**	-0.01	.09	-0.02	-0.13
Pos	-0.08	.07	-0.14	-1.06	-0.07	.09	-0.10	-0.77
Anx	-0.03	.02	-0.13	-1.20	-0.08	.03	-0.32	-2.71**
Avo	-0.02	.03	-0.09	-0.79	0.01	.03	0.06	0.55
Anx \times Avo	0.01	.03	0.19	0.31	-0.01	.04	-0.26	-0.38
Sec \times Anx	0.15	.06	0.98	2.35*	0.09	.08	0.55	1.12
Sec \times Avo	0.14	.07	0.81	2.06*	0.18	.09	0.96	1.94
Pos \times Anx	-0.01	.06	-0.01	-0.01	-0.01	.08	-0.11	-0.22
Pos \times Avo	-0.11	.06	-0.67	-1.72	0.13	.09	0.73	1.57
Sec \times Anx \times Avo	0.03	.08	0.75	0.37	-0.10	.11	-1.05	-0.86
Pos \times Anx \times Avo	0.08	.07	1.96	1.07	-0.11	.10	-1.25	-1.04

Note. Sec = attachment-security priming; Pos = positive-affect priming; Anx = anxiety; Avo = avoidance.
 * $p < .05$. ** $p < .01$.

With regard to the interaction for attachment-security priming and attachment anxiety, the procedure suggested by Aiken and West (1991) yielded the following results. Attachment-security priming had a significant inverse effect on RT for empathy memories (slope different from 0) when attachment anxiety was one standard deviation below the mean, $b = -0.39$, $SE = .08$, $t(68) = 4.86$, $p < .01$, but not when this attachment style score was one standard deviation above the mean, $b = 0.01$, $SE = .08$, $t(68) = 0.16$. A similar pattern of associations was found for the interaction between attachment-security priming and attachment avoidance. Attachment-security priming had a significant inverse effect on RT for empathy memories when attachment avoidance was one standard deviation below the mean, $b = -0.44$, $SE = .09$, $t(68) = 5.05$, $p < .01$, but not when this attachment-style score was one standard deviation above the mean, $b = 0.04$, $SE = .08$, $t(68) = 0.46$. That is, the priming of attachment security led to faster retrieval of empathy memories mainly when attachment-style scores along anxiety or avoidance dimensions were low.

The regression for personal distress memories indicated that the entire model approached statistical significance, $F(11, 60) = 1.76$, $p < .10$, explained 10% of the variance, and revealed a significant unique effect for attachment anxiety (see *bs* in Table 4). The other main effects and all the interactions were not significant (see *bs* in Table 4). The findings indicated that the higher the attachment anxiety, the faster the retrieval of personal distress memories. That is, attachment anxiety was associated with heightened accessibility of memories of personal distress.

With regard to the security priming versus positive-affect priming contrast (see details in Study 1), the regression for empathy memories revealed that this contrast was significant, $b = 0.15$, $SE = .07$, $t(67) = 2.04$, $p < .05$, with security priming leading to faster retrieval of empathy memories than positive-affect priming did. For personal-distress memories, the comparison between security priming and positive-affect priming was not significant, $t < 1$. In the two regressions, all the interactions between this contrast and attachment scores were not significant.

To examine the possible mediating role of mood, we conducted statistical analyses identical to those described in Study 1. A

hierarchical regression performed on reported mood yielded significant unique effects for attachment-security priming, positive-affect priming, and attachment anxiety: $b = 0.89$, $SE = .27$, $t(67) = 3.23$, $p < .01$; $b = 1.16$, $SE = .27$, $t(67) = 4.22$, $p < .01$; $b = -0.27$, $SE = .09$, $t(67) = -2.76$, $p < .01$, respectively. The main effect for attachment avoidance and all the interactions was not significant. However, hierarchical regressions on RTs for empathy and personal distress with security contrast, positive-affect contrast, attachment anxiety, attachment avoidance, reported mood, and all their interactions as the predictors revealed that reported mood did not make a significant contribution, $t < 1$. These hierarchical regressions also indicated that the unique effect for attachment-security priming and the interactions for Attachment-Security Priming \times Attachment Anxiety and for Attachment-Security Priming \times Attachment Avoidance on RTs for empathy memories were still significant after controlling for mood (*bs* of -0.24 , 0.15 , and 0.14). Accordingly, attachment anxiety had a significant unique effect on RT for personal-distress memories after controlling for mood ($b = -.10$). These findings indicated that reported mood did not significantly mediate the effects of security priming and attachment scores on the accessibility of empathy and personal-distress memories.

The findings provide important data about the cognitive substrate of the association between attachment security and reactions to others' needs. However, they also revealed that this cognitive substrate was not identical to the variations in reports of empathy and personal distress observed in Studies 1 to 3. First, whereas security priming and attachment-style scores were found to have significant independent effects on empathy ratings, only the contextual priming of attachment security had a unique effect on the cognitive accessibility of empathy memories. Global attachment style did not have a significant unique effect on this accessibility measure. Second, whereas security priming and attachment style had no significant interactive effects on empathy ratings, significant interactions were found in RTs for empathy memories. Specifically, security priming led to heightened accessibility of empathy memories mainly among participants who had low anxiety or avoidance scores. It seemed that heightened accessibility of

empathy memories demanded both chronic and contextual activation of attachment security. Third, whereas security priming inhibited personal-distress ratings, it had no significant effect on the accessibility of personal-distress memories. Only attachment anxiety was significantly associated with the accessibility of these memories: The higher the attachment anxiety, the higher the accessibility of personal-distress memories. Despite these basic differences, the findings indicated that the activation of empathy and personal distress memories was significantly affected by attachment organization and that these effects could not be explained by mood.

Study 5

The main goal of Study 5 was to examine the specific attachment representations that are involved in the causal effects of attachment-security priming on empathy and personal distress. In our theoretical model, the priming of attachment security should boost the positivity of models of self and others, thereby inhibiting representations of attachment anxiety and avoidance. Whereas the inhibition of attachment anxiety would affect both empathy and personal distress, the inhibition of attachment avoidance would mainly contribute to empathy. Findings of Studies 1 to 4 supported these hypotheses by delineating the correlations between attachment-style scores along the anxiety and avoidance dimensions and reactions to others' needs. However, they are not a direct test of the causal effects of these two attachment dimensions, because we did not manipulate their contextual activation while assessing reactions to others' needs. In fact, we only primed representations of attachment security and compared this manipulation with the priming of neutral or positive representations. No information was provided about the contextual accessibility of representations of attachment anxiety or avoidance during the security-priming procedure, and then it was not clear what we primed with the security primes. In dealing with this limitation, Study 5 assessed the causal effects of priming representations of attachment security, avoidance, or anxiety on reactions to others' needs. We predicted that (a) attachment-security priming would lead to stronger empathy than the priming of attachment anxiety or avoidance and (b) attachment-anxiety priming would lead to stronger personal distress than the priming of attachment security or avoidance.

Another goal of Study 5 was to examine the role that relationship closeness may play in the link between attachment security and reactions to others' needs. In Studies 1 through 4, this link was examined in regard to the plight of nonintimate others. However, relationship closeness is an important factor in explaining reactions to others' needs: The higher the closeness between the observer and the victim, the stronger the observer's reaction to the victim's plight (Cialdini, Brown, Lewis, Luce, & Neuberg, 1997). Therefore, Study 5 manipulated relationship closeness and examined the effects of attachment security on reactions to the plight of either a close relationship partner ("best friend") or a nonintimate other ("near stranger"). We predicted that, although participants would react with stronger empathy and personal distress to the plight of a best friend than to the plight of a near stranger, the effects of attachment security would be replicated in the two target conditions.

In Study 5, we primed attachment-related representations by asking participants to think about the relationship with their parents and to visualize a specific secure, anxious, or avoidant episode in that relationship. Then, participants were asked to visualize the plight of either a best friend or a near stranger and to rate their own emotional reactions to this visualization. Before ending the experiment, all the participants completed the ECR tapping variations in attachment style.

Method

Participants. One-hundred fifty undergraduate students (66 women and 84 men ranging in age from 18 to 27, $Mdn = 23$) from universities and colleges in the central area of Israel participated in the study without any monetary reward. Participants were randomly divided into six conditions, with 25 participants in each.

Materials and procedure. The study was conducted on an individual basis and was presented as visualization-skills research. Participants were asked to think about the relationship with their parents and to recall a specific episode in that relationship. Specifically, participants were given a written prototypical description of the targeted episode and were asked to recall and visualize a specific interaction with their parents in which they felt that way. Then they were randomly divided into three conditions.⁷ In the attachment-security-priming condition, the described interaction fit Hazan and Shaver's (1987) prototypical description of secure attachment. In the attachment-avoidance-priming condition, participants were presented with Hazan and Shaver's avoidant-attachment description. In the attachment-anxiety-priming condition, participants read Hazan and Shaver's anxious-attachment description. Four persons who failed to recall the targeted episode were dropped from the sample. In all the conditions, participants were asked to bring the targeted episode to mind, to think about it for 2 min, and to rate the vividness and clarity of the visualization (on 7-point scales). No significant differences were found between priming conditions in vividness or clarity ratings.

On completing the priming procedure, participants performed another visualization task, in which we manipulated the identity of the needy person. Participants in each priming condition were randomly divided into two subgroups according to the relationship closeness with the needy person. In the best-friend condition, participants were asked to visualize their same-sex best friend. In the near-stranger condition, participants were asked to visualize a "same-sex student you don't really know, someone you would recognize from class, but not say 'hello' to if you passed each other on campus." At this point, all the participants were told to imagine that the targeted person (best friend or near stranger) suffered a car accident in which he or she was seriously wounded and that his or her two legs were amputated. Then, they were asked to visualize the targeted person in a wheelchair, to keep this image in their mind for 2 min, and to rate the vividness and clarity of the visualization (on 7-point scales). No significant effects for priming and relationship closeness were found on vividness or clarity ratings.

Following the visualization procedure, all participants rated the emotions they felt for the targeted person (best friend or near stranger). Specifically, they rated the extent to which they felt four empathy-related emotions (sympathetic, softhearted, warm, compassionate) and four personal-distress emotions (alarmed, worried, uneasy, distressed). Ratings were made on a 7-point scale, ranging from 1 (*not at all*) to 7 (*extremely*). A factor analysis with varimax rotation yielded two main factors (eigenvalue > 1), which

⁷ Originally, we intended to manipulate a fourth priming group—the fearful-avoidant condition, which consisted of both anxiety and avoidance feelings toward a relationship (Bartholomew & Horowitz, 1991). However, a pretest ($N = 10$) revealed that most of the participants were not able to recall a fearful-avoidant episode in the relationship with their parents.

explained 56% of the variance and replicated the two-factor structure of these emotions. Whereas the first factor (32% of explained variance) included the four personal-distress items (loading > .40), the second factor (24%) included the four empathy adjectives (loading > .40). Cronbach's alpha coefficients for the four personal-distress items and the four empathy items were high (.94 and .86, respectively). On this basis, we computed two scores by averaging items that load high on a factor.

Before ending the experiment, participants answered the delay/distractor scale on life habits and then completed the Hebrew version of the ECR scale described in Study 1. In the current sample, Cronbach's alphas were high for the 18 anxiety items (.89) and the 18 avoidance items (.83). Therefore, two scores were computed by averaging items on each subscale.

Results and Discussion

To examine the unique and interactive effects of priming of attachment-related representations, relationship closeness, and attachment scores on empathy and personal distress, we conducted hierarchical regressions similar to those described in Study 1. In this regression, we included three dummy variables together with scores of attachment anxiety and avoidance. First, we created a dummy variable contrasting the attachment-security-priming condition to the two other priming conditions (secure-anxiety contrast). Second, we created a dummy variable contrasting the attachment-avoidance-priming condition to the attachment-anxiety-priming condition (avoidance-anxiety contrast). Third, we created a dummy variable contrasting the best-friend condition to the near-stranger condition (relationship-closeness contrast).

The regression conducted on empathy ratings indicated that the entire model was significant, $F(23, 126) = 2.93, p < .01$, explained 23% of the variance, and yielded the following results (see *bs* in Table 5). First, the secure-anxiety contrast had a significant unique effect—the priming of attachment security led to higher empathy ratings than the priming of attachment anxiety. Second, the anxiety-avoidance contrast was not significant. Third, relation-

ship closeness had a significant unique effect—higher empathy ratings were found in response to a best friend's needs than to a near stranger's needs. Fourth, the interactions for Secure-Anxiety Contrast \times Relationship Closeness and for Avoidant-Anxiety Contrast \times Relationship Closeness were not significant, implying that relationship closeness did not moderate the significant effect of attachment-security priming on empathy ratings. Fifth, both attachment anxiety and attachment avoidance had significant unique main effects on empathy ratings—the higher the attachment anxiety or avoidance, the lower the reported empathy. Sixth, all the interactions between dummy variables and attachment scores were not statistically significant. Overall, attachment-security priming, high relationship closeness, and lower scores on the two attachment dimensions were significantly associated with higher empathy.

The regression conducted on ratings of personal distress indicated that the entire model was significant, $F(23, 126) = 4.88, p < .01$, explained 34% of the variance, and yielded the following results (see *bs* in Table 5). First, both the secure-anxiety contrast and the avoidance-anxiety contrasts were significant. As can be seen in Table 5, (a) the priming of attachment security led to lower personal distress than the priming of attachment anxiety and (b) the priming of attachment anxiety led to higher personal distress than the priming of attachment avoidance. Second, relationship closeness had a significant unique effect—higher personal-distress ratings were found in response to a best friend's needs than to a near stranger's needs. Third, the interaction for Secure-Anxiety Contrast \times Relationship Closeness and for Avoidant-Anxiety Contrast \times Relationship Closeness were not significant, implying that relationship closeness did not moderate the significant effects of the contextual priming of attachment representations on personal distress. Fourth, attachment anxiety had a significant unique effect on ratings of personal distress—the higher the attachment

Table 5
Regression Coefficients, Standard Errors, and Significance Tests of the Contributions of Priming Conditions, Relationship Closeness, and Attachment Scores to Rated Empathy and Personal Distress (Study 5)

Effect	Empathy responses				Personal distress			
	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>b</i>	<i>SE</i>	β	<i>t</i>
S-A contrast	1.01	.20	0.35	5.01**	-0.49	.21	-0.17	-2.33*
X-V contrast	0.01	.12	0.01	0.02	0.30	.12	0.18	2.47*
Clo	0.73	.19	0.27	3.82**	0.63	.20	0.23	3.15**
Anx	-0.31	.09	-0.24	-3.37**	0.51	.09	0.38	5.24**
Avo	-0.46	.12	-0.27	-3.78**	-0.07	.13	-0.04	-0.58
Anx \times Avo	-0.21	.19	-0.48	-1.24	-0.01	.13	-0.01	-0.01
S-A \times Clo	0.21	.42	0.06	0.49	-0.03	.40	-0.01	-0.08
X-V \times Clo	-0.18	.24	-0.07	-0.74	-0.07	.23	-0.03	-0.30
S-A \times Anx	-0.17	.20	-0.21	-0.83	-0.20	.19	-0.36	-1.11
S-A \times Avo	-0.16	.26	-0.18	-0.62	-0.72	.25	-0.84	-2.93**
X-V \times Anx	-0.01	.12	-0.03	-0.14	0.21	.11	0.42	1.82
X-V \times Avo	0.02	.16	0.02	0.09	-0.23	.15	-0.43	-1.50
Clo \times Anx	-0.13	.20	-0.18	-0.66	0.24	.15	0.73	1.57
Clo \times Avo	0.01	.26	0.01	0.01	-0.25	.25	-0.31	-1.03

Note. Three-way and four-way interactions are not presented in the table, because all these effects were not significant, $t < 1$. S-A = secure-anxiety priming contrast; X-V = anxiety-avoidance priming contrast; Clo = Closeness; Anx = Anxiety; Avo = Avoidance.

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

anxiety, the higher the reported distress. Fifth, the main effect for avoidance was not significant. Sixth, the two-way interaction for Secure–Anxiety Contrast \times Avoidance was significant. Other interactions were not significant.

In examining the source of the significant interaction, we found that the procedure suggested by Aiken and West (1991) yielded the following results. After the priming of anxious representations, attachment avoidance significantly contributed to higher ratings of personal distress, $b = 0.31$, $t(97) = 2.25$, $p < .01$. However, following the priming of secure representations, the slope of personal distress on attachment avoidance was not significantly different from 0, $b = -0.16$, $t(47) = 0.35$. That is, the priming of memories of attachment anxiety facilitated a positive association between attachment avoidance and ratings of personal distress.

In the above regressions, the dummy-coded priming variables allowed us to compare security priming with anxiety priming as well as anxiety priming with avoidance priming. However, these regressions did not provide direct information on the comparison between security priming and avoidance priming. Therefore, we ran an additional set of hierarchical regressions, in which we included this contrast and all the interactions with closeness and attachment dimensions (see details in Study 1). With regard to empathy ratings, the regression indicated that the security versus avoidance contrast was significant, $b = -1.01$, $SE = .23$, $t(144) = -4.35$, $p < .01$, with security priming leading to higher empathy than avoidance priming. For personal distress, the comparison between security priming and avoidance priming was not significant, $t < 1$. In the two regressions, all the interactions between this contrast, relationship closeness, and attachment scores were not significant.

Overall, the findings were consistent with the predictions and delineated the causal link between specific attachment representations and reactions to others' needs. Whereas the contextual and chronic activation of attachment anxiety significantly affected both empathy and personal distress, the contextual and chronic activation of attachment avoidance was significantly related to empathy. Attachment-avoidance scores were significantly associated with personal distress only when representations of attachment anxiety were contextually primed. Importantly, relationship closeness strengthened both empathy and personal-distress reactions, but did not significantly moderate the effects of attachment representations.

General Discussion

The findings of the five studies shed light on the hypothesized causal link between attachment security and reactions to others' needs. Our findings clearly indicated that the contextual activation of the sense of attachment security led participants to react to others' needs with more empathic responses and lower levels of personal distress. Accordingly, the chronic sense of attachment security, as manifested in lower scores along dimensions of attachment avoidance and anxiety, was also significantly related to higher empathic responses. In addition, attachment-anxiety scores were positively related to the strength of personal distress in reaction to other's plight. These findings fit previous results on the association between attachment style and caregiving in interpersonal relationships (e.g., Collins & Feeney, 2000; Kunce & Shaver, 1994), while extending them to the causal effects of the

contextual activation of the sense of attachment security and to specific emotional reactions to the needs of close and distant others.

Attachment-security priming seemed to facilitate empathy responses toward other's plights and to inhibit the arousal of personal distress. These effects were replicated using various nomothetic priming techniques (reading an attachment-security story, being exposed to pictorial representations of attachment security), an idiographic priming technique (recalling an episode of attachment security in a close relationship), and even when participants were not aware of the activation of attachment-security representations (subliminal priming of security-related words). Accordingly, the effects of attachment-security priming were replicated across different need situations as well as in reaction to the plight of close and distant others. Similar effects of attachment-security priming were also found across different self-report scales of empathy and personal-distress reactions (Studies 1, 2, and 5) as well as in participants' recollections of personal episodes in which they witnessed others' plight (Study 3). Importantly attachment security priming was also found to facilitate the cognitive accessibility of empathy memories (Study 4). However, attachment-security priming failed to significantly affect the cognitive accessibility of personal-distress memories (Study 4). With this single exception, the replicability of the findings across priming procedures, need situations, and assessment techniques strengthen the validity and robustness of the causal effects of attachment-security priming on reactions to others' needs.

The significant effect of attachment-security priming on the cognitive accessibility of empathy-related memories (Study 4) implies that this priming procedure can actually affect a person's semantic associative network. That is, attachment-security priming did not only bias conscious self-reports of empathic responses, but it also biased the cognitive substrate of these reports. This conclusion is reinforced by findings of Study 3 that a subliminal priming of attachment-security representations had significant effects on reports of empathy and personal distress. This priming did not demand awareness and seemed to act directly on the semantic associative network. As a result, one can reject alternative interpretations that the effects of attachment-security priming were due to motivational and cognitive biases related to self-report techniques or to a conscious deliberation as to the appropriateness of responses to another's plight.

However, one should take into account that attachment-security priming failed to inhibit the cognitive accessibility of personal-distress memories. This finding may delineate the boundaries of the cognitive effects of the sense of attachment security: Whereas it may have strong excitatory links with empathy-related nodes in the semantic associative network, it may have weaker inhibitory links with nodes related to personal distress. This differential association may reflect the fact that the sense of attachment security is mainly activated by interactions with empathic and loving others, thereby creating an enduring link between attachment security and empathy-related thoughts and memories. With regard to personal distress, although attachment security may provide relief and comfort (Mikulincer, Gillath, et al., 2001) and then inhibit personal distress, memories of distress arousal may be more strongly linked with representations of attachment anxiety than with the sense of attachment security. As shown in Study 4, attachment-anxiety scores were positively associated with the cog-

nitive accessibility of personal-distress memories. Therefore, it is possible that the contextual activation of representations of attachment anxiety would be more effective than attachment-security priming in affecting the cognitive substrate of personal-distress responses. Further research should examine this ad hoc explanation while manipulating specific attachment representations.

It is important to note that the effects of attachment-security priming on reactions to others' needs cannot be attributed to mood variations. Across the reported studies, the priming of positive affect had no significant effect on empathy. In addition, although attachment-security priming led to mood improvement, variations in reported mood were not significantly related to empathy and failed to explain the effects of attachment-security priming. Fitting Batson's (1991) conceptualization of empathy, this reaction was not significantly affected by induced or reported mood, so heightened empathy to others' needs following attachment-security priming could not reflect any mood improvement or nonspecific good feelings. Rather, it seemed to be a direct response to the contextual activation of representations of others' supportiveness and love.

With regard to personal distress, the pattern of findings was somewhat more complex. Across the reported studies, both induced and reported mood had significant effects on personal distress—the more positive the participants' mood, the lower their personal distress reactions. As can be seen, positive affect had inhibitory effects on personal distress that resembled those of attachment-security priming. However, although variations in reported mood significantly accounted for the inhibitory effects of positive-affect priming on personal distress, these variations did not significantly account for the inhibitory effects of attachment-security priming. This finding implies that both positive affect and attachment security had inhibitory effects on personal distress, but that the effects of attachment security did not depend on positive affect.

The current studies shed light on the relevance of attachment theory for explaining reactions to others' needs and advance our knowledge on three critical directions. First, our findings provide direct evidence on the causal effects of attachment security on reactions to other's plight. In this way, the findings help to refine the previously documented correlations between attachment style and support provision. Second, our findings provide direct evidence that the sense of attachment security led people to adopt a more altruistic, empathic attitude not only to close relationship partners but also to nonintimate others. Of course, a close relationship partner was found to elicit stronger empathy and personal distress than a near stranger, but the effects of attachment-security priming on these reactions were not significantly moderated by relationship closeness (Study 5). In this way, the findings enable us to reject alternative explanations related to relationship quality and self-expansion motives. Third, our findings indicate that the association between attachment security and support provision is derived from an altruistic source. The fact that attachment-security priming strengthens empathy and inhibits personal distress implies that any resulting helping response may reflect an other-oriented altruistic motivation rather than an egoistic motivation aimed at reducing one's distress.

The current findings also allow us to delineate the specific attachment representations that seemed to be involved in affecting empathy and personal distress. According to our theoretical rea-

soning, the activation of attachment security would boost positive models of self, which would promote feelings of control and mastery in dealing with other's plight, reduce self-related worries, and free inner resources to attend to other's needs. As a result, positive models of self would contribute to the inhibition of personal distress as well as to the arousal of other-oriented empathic responses. The activation of attachment security would also bring to mind positive models of others, which would motivate people to reciprocate others' benevolence or to behave according to a benevolent code. On this basis, we hypothesized that positive models of self would affect both empathy and personal distress and that positive models of others would mainly contribute to empathic responses.

The observed effects of attachment anxiety and attachment avoidance were in line with this hypothesis. First, attachment-anxiety scores, which reflect variations along models of self, were significantly related to both personal distress and empathy. Second, attachment-avoidance scores, which reflect variations along models of others, were significantly associated only with empathy. Third, whereas the priming of attachment-anxiety representations inhibited empathy and strengthened personal distress, the priming of attachment-avoidance representations only inhibited empathy. In other words, empathy was inhibited by negative models of self and others and personal distress was facilitated by negative models of self. This pattern of findings implies that heightened empathy following attachment-security priming may reflect the activation of positive models of self that enable a cognitive-affective focus on others' needs as well as the activation of positive models of others that motivate people to behave in an altruistic, benevolent manner. The findings also imply that lowered personal distress following attachment-security priming may reflect the activation of positive models of self that mitigate self-related worries.

The current findings can be compared with other recently documented effects of models of self and others. On the one hand, Mikulincer and Shaver (2001) found that reactions to out-group members were significantly associated with attachment anxiety: the higher the attachment anxiety, the more negative reactions to out-group members were. This effect seemed to reflect the action of models of self when confronting others who are potential sources of threat (out-group members). On the other hand, Mikulincer, Gillath, et al. (2001) found that the endorsement of self-transcendent values—values that reflect a concern for the welfare of close and distant others—was significantly associated with attachment avoidance: the higher the attachment avoidance, the lower the endorsement of these values. In this case, no threat was elicited and the finding may mainly reflect a person's global attitudes toward others. However, when witnessing other's plight, both models of self and others may be involved in shaping empathic reactions, because other's suffering is both a potential source of threat and a target of global attitudes toward others. This dual nature of the encounter with others' needs may explain the fact that both attachment anxiety and avoidance were found to significantly contribute to empathic reactions.

Following this reasoning, persons who hold a global avoidant attachment style or have contextual accessibility of attachment avoidance representations may become emotionally detached while witnessing other's plight. They may react to this situation with neither empathy nor personal distress. This detached attitude is in line with the habitual affect regulation strategies of persons

scoring high on attachment avoidance—distancing from sources of threat and suffering, repression of painful memories, and suppression of distressing thoughts and emotions (e.g., Fraley et al., 1998; Mikulincer & Florian, 2001). This escapist strategy may be activated following the exposure to other's plight, because this encounter may be a vicarious source of painful thoughts, memories, and emotions. As a result, this strategy may directly inhibit personal distress, because it involves the repression or suppression of any negative self-focused affect. This strategy may also inhibit empathy, because it involves cognitive-affective distancing from the source of suffering. In fact, empathy reflects an altruistic attempt to approach and help the suffering person (Batson, 1991). Further research should attempt to examine the role this escapist strategy plays in shaping reactions to others' needs.

Importantly, this escapist regulatory strategy might have failed to inhibit personal distress when representations of attachment insecurity were made contextually accessible (Study 5). In this case, persons scoring high on attachment avoidance reported more personal distress than persons scoring low on this attachment dimension did. This finding was in line with previous results showing that avoidant strategies were effective in reducing inner distress in neutral situations but not under threatening contexts (see Mikulincer & Florian, 2001, for a review). It is possible that priming memories of attachment insecurity in a close relationship were an additional source of threat that may impair the functioning of avoidant strategies while dealing with the threat implied by other's plight. As a result, the reactions of avoidant persons became similar to those of persons who scored high on attachment anxiety—both of them reacted with heightened personal distress. If this reasoning is true, the findings of Study 5 are an additional testimony of the pseudosecurity of avoidant persons as well as of the fragility of their affect-regulation strategies.

Persons who hold a global anxious attachment style or have contextual accessibility of attachment-anxiety representations may become emotionally overwhelmed while witnessing other's plight. This self-focused reaction is in line with the habitual affect regulation strategies of persons scoring high on attachment anxiety—mental rumination of self-related worries, hypervigilant attentional focus on sources of threat and suffering, and self-other merging (see Mikulincer & Florian, 2001, for a review). These strategies may be activated following the exposure to other's plight and may account for the reactions of anxiously attached persons. First, these strategies may activate self-focused worries and result in personal distress. Second, they may increase attentional focus on other's suffering, thereby making anxiously attached people more vulnerable to the other's plight. In fact, persons scoring high on attachment anxiety described a needy person as suffering from higher levels of distress than less anxious persons did, and their personal distress reactions increased proportionally with the appraised distress of the needy person (Study 3).

The question here is why persons scoring high on attachment anxiety showed an inhibition of empathic reactions despite their attentional focus on other's suffering. In our view, their lack of self-other differentiation (Mikulincer & Florian, 2001) may prevent empathic responses. In fact, Batson (1991) claimed that the arousal of empathic responses demands self-other distinctiveness as well as a distinction between increasing the other's welfare and increasing one's welfare. On this basis, one can delineate the following sequence of mediational events: While witnessing the

plight of another person, anxiously attached persons would increase attentional focus on other's suffering as well as self-other merging, which, in turn, would result in the activation of self-related negative cognitions and emotions. This cognitive-affective state would be manifested in overwhelming personal distress as well as in the inhibition of empathic reactions. Again, further research should examine this sequence of psychological events.

The current findings also indicate that the effects of attachment-security priming on self-reports of empathy and personal distress did not significantly depend on attachment-style scores. That is, contextual activation of attachment security led to higher reports of empathy and lower reports of personal distress without regard to variations in attachment anxiety or avoidance-style scores. This finding implies that a temporary activation of the sense of attachment security leads even chronically insecure persons to react to others' needs similarly to persons who have a more secure attachment style. This contextual activation may remind people of similar episodic memories, inhibit incongruent memories of attachment insecurity, bring to mind schemas that are congruent with the sense of attachment security, and inhibit incongruent schemas of attachment anxiety and avoidance. In this way, the contextual activation of a particular representation of attachment security may spread over the entire semantic memory network, and a person's responses would be temporarily biased in accordance with the activated representation. It is important to note that our findings suggest that the temporary effect of activating the sense of attachment security coexists with the effects of attachment style. That is, reactions to others' needs could be concurrently affected by priming of attachment security, on the one hand, and by chronically accessible schemas of attachment avoidance and anxiety, on the other.

This reasoning, however, is challenged by findings that the contextual and chronic activation of attachment representations significantly interacted in determining the accessibility of empathy memories (Study 4). In fact, attachment-security priming heightened the accessibility of empathy memories mainly among persons who scored low on attachment anxiety or avoidance. No significant effect of attachment-security priming was found among chronically insecure persons (scoring high on anxiety or avoidance). That is, global representations of attachment anxiety or avoidance in close relationships seemed to prevent the accessibility of empathy memories even when representations of attachment security were contextually activated. It is possible that the inhibitory link between empathy memories and chronic representations of attachment insecurity within the semantic associative network is so strong and pervasive that it impedes the spread of activation from contextually accessible representations of secure attachment to empathy memories. Research should systematically examine the dynamic interplay of global attachment representations, contextual activation of these representations, and empathy-related cognitions.

Before ending this discussion, it is important to mention that we focused on only two reactions to others' needs. However, Florian et al. (2000), for example, noted that superiority feelings are an additional reaction to other's plight. In addition, we did not collect data on the actual provision of help and support to a needy person. Further research should examine the effects of attachment security on both empathic-derived and egoistically derived helping behaviors. In this context, one could manipulate egoistic motives, such

as negative-state relief or empathic joy (e.g., Cialdini et al., 1987; Smith, Keating, & Stotland, 1989), and examine the effects of secure attachment on helping. We believe that these manipulations would not affect the link between attachment security and helping because this link results from the arousal of altruistic motives.

It is also important to mention that all the representations that were used to prime attachment security might have equally primed the caregiving system, which, in turn, might have led to heightened empathy responses. In fact, recollecting memories or watching pictures of supportive others may activate not only representations of attachment security but also a person's schemas of caregiving and helping. The problem here is that it is impossible to prime attachment security without concomitantly activating representations of supportiveness, because these representations are a core component of secure attachment. However, the fact that the effects of attachment style paralleled the effects of the priming procedures strengthens our confidence in the relevance of attachment-security representations for explaining reactions to others' needs.

Our findings do not imply that reactions to others' needs are exclusively determined by the sense of attachment security. In fact, other sociocultural and motivational factors may play a critical role in shaping these reactions. In addition, our findings were obtained in laboratory settings. They should be replicated in field studies that assess reactions to others' needs during real-life interpersonal interactions with actual persons. Nevertheless, our studies show that the sense of attachment security has unique and reliable effects on reactions to others' needs. They also constitute an important step in demonstrating the utility of attachment theory for explaining altruistic behavior as well as in extending the theory to the study of broad social phenomena and to the development of intervention techniques that could encourage prosocial behavior.

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Received May 9, 2001

Revision received August 2, 2001

Accepted August 2, 2001 ■