



Moving Toward a Secure Attachment Style: Can Repeated Security Priming Help?

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Abstract

Despite the abundant literature on attachment processes and the development of a secure or insecure attachment orientation during childhood, it is still unclear whether adult attachment style can be changed through systematic interventions, and if so how the change process works. One way to learn more about such change is to create it, on a small scale, in the laboratory. It is already known that a person's sense of security can be momentarily changed in the laboratory (Mikulincer & Shaver, 2007a). But there is clearly a difference between very short-term and longer-term change. According to Bowlby (1982), the development of an attachment orientation in childhood is based on many encounters and interactions with caregivers, which gradually create a mental network of relatively stable expectations and concerns. Thus, it may take many episodes of security priming in a laboratory to begin to affect a young adult's attachment style in a lasting way. Here, we explore this possibility, review existing evidence from our own and other researchers' laboratories, and discuss directions for future research.

Beginning in infancy, people rely on attachment figures (close relationship partners who provide protection, comfort, and support; Bowlby, 1982) when they encounter stresses, threats, or disappointments. Over time, these figures and encounters with them are internalized as mental representations, which attachment theorists call 'working models' (e.g., Bretherton & Munholland, 1999). These models can represent the self, key relationship partners, and major kinds of interactions with such partners. Such mental representations are associated in memory with particular emotions, motives, and goals that, taken together, form a person's attachment style (e.g., Gillath et al., 2006; Mikulincer & Shaver, 2007b). Attachment styles are thought to develop through a combination of conditioning and cognitive representation (Mikulincer & Shaver, 2007b). For example, attachment figures who reliably provide safety and support in times of need reinforce the association in long-term memory between turning to them and having one's anxiety and stress reduced. Eventually, merely calling a supportive attachment figure to mind and perhaps also

viewing oneself as similar to this figure, becomes an internal source of strength and comfort (Mikulincer & Shaver, 2004).

People who have internalized positive representations or models of others (as being likely to provide comfort and assistance) and of the self (as deserving love and support) are said to have a secure attachment style, which is observable in a variety of social situations. Numerous studies have shown that repeated encounters with sensitive and responsive attachment figures play a major role in the formation of attachment security (see De Wolff & van IJzendoorn, 1997, for a meta-analysis). People who have internalized negative representations of relationships, relationship partners, and in some cases themselves are said to have an insecure attachment style. Extensive research (e.g., Bartholomew & Horowitz, 1991; Brennan, Clark, & Shaver, 1998) has shown that insecure forms of attachment can be defined in terms of two major dimensions: attachment anxiety (insecurity about partner availability and the self's inherent value) and avoidant attachment (discomfort with closeness to and reliance on a relationship partner). Hundreds of studies have shown that secure attachment (indicated by low scores on these two dimensions) predicts relationship satisfaction and well-being, is associated with more adaptive forms of coping with stress and regulating affect, and provides a resilience resource that reduces the likelihood of developing psychological disorders. These studies collectively demonstrate the benefits of having a secure attachment style, suggesting that it would be very worthwhile to discover ways in which a person could become more secure with respect to attachment (see Mikulincer & Shaver, 2007b; Steele & Steele, 2008, for comprehensive reviews).

Although it is clear that attachment security can be developed within the context of a supportive, reliable relationship, it is generally assumed that this takes considerable time. The attachment between an infant and its mother, for example, is not usually measured until the infant is 12 months of age, and in cases where a child is adopted or enters foster care, changes in the child's attachment pattern, predictable from the new mother's Adult Attachment Interview (Hesse, 1999), occur over a period of many months (see review by Dozier & Rutter, 2008). A stable attachment between young adult romantic partners is thought to take more than a year (e.g., Hazan & Zeifman, 1994).

Beginning with Bowlby (1988), psychotherapy has also been conceptualized in terms of attachment theory. In that case, the empathic, supportive therapist is perceived as a security-providing attachment figure, and the client is viewed as transferring some of his or her prior insecure working models and attachment strategies to the therapist. Over several months, if the therapeutic alliance develops properly, the client's models and strategies change in the direction of greater security. Numerous studies (reviewed by Mikulincer & Shaver, 2007b, Chapter 14) support this interpretation of the therapy process. (See also Kohut's, 1977 work on

psychotherapy as the repair of 'self-object' relationships through therapeutic 'mirroring', 'idealizing', and encouraging 'twinship' – work that has been empirically linked with attachment theory by Banai, Mikulincer, & Shaver, 2005.)

It is unclear how long it might take to substantially alter the sense of security through focused laboratory interventions. However, if it were possible to alter security through such interventions, it might provide new insights into how attachment patterns are formed and changed under normal circumstances. We might, for example, gain new ideas about how to help people with 'attachment injuries' (e.g., Johnson & Whiffen, 2003; Schore, 2001) or how to help insecure individuals increase their sense of security in their close relationships and perhaps even more generally in their daily lives.

The purpose of the present article is to review what is known about security interventions that may have lasting effects and can be conducted and evaluated in the laboratory. We begin by introducing the security priming paradigm that we and other researchers have used in recent studies. Next, we review studies examining long-term effects of security priming and present findings from a recent study conducted in our laboratory. Finally, we outline directions for future research that will provide a deeper understanding of the dynamics of lasting security interventions.

Altering a Person's Sense of Security in the Short Run in the Laboratory

Several methods have been used to create short-term changes in people's sense of security in the laboratory (see review by Mikulincer & Shaver, 2007a). These methods involve: (a) exposing people (subliminally or supraliminally) to security-related words (e.g., love, hug, affection, and support) or the names of an individual's security-providing attachment figures; (b) exposing people (subliminally or supraliminally) to pictures representing attachment security; and (c) asking participants to recall memories of being loved and supported by attachment figures, or asking people to imagine such scenarios. These priming procedures have been shown to influence such diverse variables as mood (Mikulincer et al., 2001), attitudes toward novel stimuli (Mikulincer, Hirschberger, Nachmias, & Gillath, 2001), reactions to out-group members (Mikulincer & Shaver, 2001), death anxiety (e.g., Gillath & Hart, forthcoming), aggression (Mikulincer & Shaver, 2007a), and compassion and altruism (Gillath, Shaver, & Mikulincer, 2005; Mikulincer, Shaver, Gillath, & Nitzberg, 2005). Moreover, security priming seems to reduce distortions in body image common among women with eating disorders (Admoni, 2006) and decrease symptoms of mild PTSD (Mikulincer, Shaver, & Horesh, 2006).

The idea behind both subliminal and supraliminal priming manipulations is that stimuli associated with a sense of security enter a semantic network

and create a process of 'spreading activation' (Collins & Loftus, 1975; Förster & Liberman, 2007) that touches upon affective as well as semantic 'nodes', thereby creating a sense of security similar to that which might be evoked by supportive attachment figures.

In most of the studies conducted to date, the 'security priming' procedures (Mikulincer & Shaver, 2007a) do not interact with the two main dimensions of attachment styles (anxiety and avoidance); rather, they have beneficial effects on most study participants regardless of their dispositional attachment style. The usual effects of the dispositional styles continue to occur, but in the case of relatively insecure individuals, these negative effects of dispositions are reduced by the manipulations. In one recent study (Shaver, Mikulincer, Lavy, & Cassidy, forthcoming), security priming reduced anxious individuals' tendency to exaggerate and augment hurt feelings, whereas it reduced avoidant individuals' tendency to defensively deny hurt feelings or to react aggressively rather than experience being hurt. That is, increasing people's sense of security lowered their characteristic defenses (see also Arndt, Schimel, Greenberg, & Pyszczynski, 2002), although this had opposite effects on reported hurt feelings. These findings add to our impression that security priming truly increases a person's sense of security; it does not simply create a semantic connection between a positive stimulus and a resulting positive affect. Additional support comes from another recent study conducted in our laboratory (Gillath & Shaver, 2007a), in which priming people's sense of security caused them to react in a secure manner to threatening relationship scenarios (e.g., their partner betraying them), regardless of their attachment style.

Long-term Effects of Security Priming

In cognitive priming experiments, it has generally been found that the effects of priming one of two associated words and then measuring the speed of identifying the other word ('semantic priming') last only a few seconds (e.g., Becker, Moscovitch, Behrmann, & Joordens, 1997; Joordens & Becker, 1997). However, exceptions to that conclusion have been noted. Cave (1997) found that effects of semantic priming could be detected between 6 and 48 weeks after the priming procedure took place. Mitchell (2006) reported that people who saw pictures for only 1 to 3 seconds could identify fragments of them 17 years later. Similarly, when personality trait concepts instead of simple words were used as primes, the effects seemed to persist beyond the confines of the priming experiment. For example, Srull and Wyer (1980) found that priming participants with trait words such as 'hostile' and 'kind' affected evaluative judgments of a target person 24 h later. Dasgupta and Greenwald (2001) primed study participants with pictures of admired black or disliked white individuals and found that it weakened implicit pro-white attitudes measured 24 h after the

priming session. Recently, Lowery, Eisenberger, Hardin, and Sinclair (2007) subliminally primed participants with intelligence-related words and found that it improved their test performance in an actual midterm examination one to four days after the priming session.

In addition to the nature of a prime, repeating its presentation seems to affect the duration of its effects. Brown, Jones, and Mitchell (1996), for example, found that as the number of exposures to the prime (repetitions) increased, the effects of the prime were stronger and longer lasting. Similarly, Salasoo, Shiffrin, and Feustel (1985) found that accuracy of identification a year after priming was affected by number of repetitions of the prime stimuli.

In line with the abovementioned findings, we suggest that security primes are likely to result in long-term effects, especially when people are repeatedly exposed to such primes. Based on Bowlby's (1973) conceptualization that repeated interactions with an attachment figure not only alter attachment-system functioning in the short term but also affect consolidation of working models in the long term, we would expect repeated security priming to have long-lasting effects on people's attitudes and behaviors.

Past research on the mechanisms underlying working models and a stable sense of security (e.g., Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996) has shown that people possess many different specific memories, corresponding to specific attachment experiences, and different working models corresponding to different *kinds* or *categories* of attachment experiences. These memory elements and working models form a complex network of excitatory and inhibitory links, such that the activation of one excites congruent memories and models while inhibiting incongruent ones (Mikulincer & Shaver, 2007b). For example, when an individual is treated in a security-enhancing way by an attachment figure, or when he or she thinks about a previous experience of that kind, the memories of other successful bids for proximity are activated and memories of unsuccessful proximity seeking attempts are inhibited. This in turn strengthens the future accessibility of such memories, and of secure working models, while weakening insecure models. With time, the most accessible working models are increasingly likely to govern the way the person thinks and acts.

Repeated security priming in the laboratory may have similar effects, if on a less consequential scale than important social interactions in a person's real life. Repeated priming is likely to keep secure mental representations (e.g., models of significant others being loving and supporting) activated. This, in turn, may repeatedly spread activation from representations of the primed material to related memories, expectations of self and others, and strategies of emotion- and self-regulation (Mikulincer & Shaver, 2007c), even when a person is no longer being primed from the outside. Thus far, however, only a few studies have explored this possibility. In the

next section, we review these studies and present new findings from a recent experiment conducted in our laboratory.

Empirical Evidence for Long-term Effects of Security Priming

One of the first empirical studies demonstrating long-term effects of security priming was reported by Sohlberg and Birgegard (2003), who used Silverman's (1983) 'Mommy and I are one' priming procedure. In a series of experiments, Sohlberg and Birgegard subliminally primed participants with either the phrase 'Mommy and I are one' (MIO), designed to create a sense of closeness to or merger with an attachment figure, or 'People are walking' (PAW), a control prime. In each experiment, the participants returned to the laboratory seven to ten days later and completed various measures that Sohlberg and Birgegard thought would tap a self-with-mother schema, such as self-mother similarity, attachment to mother, depression, or fear of intimacy. The researchers argued that even if the levels of these variables did not change as a result of the priming manipulation, the correlations among them might increase in the 'Mommy and I are one' condition because the circuits related to maternal closeness would become more tightly interconnected. Accordingly, they found that 7 to 10 days after the priming manipulation, the correlations among the mother-related variables were larger in the MIO group than in the PAW (control) group. Specifically, self-mother similarity was more strongly related to secure attachment and to low depression, fear of intimacy, and anxious or avoidant attachment in the MIO group than it was in the PAW group. The negative correlation between secure attachment to mother and depression was also stronger in the MIO group than it was in the PAW group.

Further evidence comes from two recent studies by Dandeneau, Baldwin, Baccus, Sakellaropoulo, and Pruessner (2007) which revealed the effects of a prime that might be interpreted as a security prime – learning to see accepting/loving/smiling facial expressions in an array that also contained many negative expressions – on reactivity to naturally occurring stressors. In one of the studies, undergraduate students completed an online cognitive task once a day for 5 days before a final exam. In the experimental ('security priming') condition, the task consisted of quickly finding and clicking on an accepting/smiling target face in a 4×4 matrix of otherwise negative faces. In the control condition, another group of participants had to find a five-petaled flower in a 4×4 array of seven-petaled flowers. In both conditions, there were 80 trials per day.

At baseline, participants completed various measures including one assessing stress regarding the upcoming final exam. After the final exam, they again completed several measures, including assessments of state anxiety and perceived school ability. Although participants in the experimental

and control groups did not differ in baseline exam stress, those in the experimental group were experiencing significantly less stress by the end of the fifth day of priming. And the effects of priming persisted even after the students took the exam.

Dandeneau et al. (2007) also conducted a field study with a sample of telemarketers. At baseline, participants completed measures of self-esteem and perceived stress. For 5 days, they then completed the find-the-face (or find-the-flower) task described above at the beginning of each work shift. On the final day of the study, the participants also provided saliva samples at five time points. Sales data and supervisor ratings of participants were also collected for the study week. By the end of the study, participants in the experimental group had increased significantly in self-esteem and decreased significantly in self-reported stress. No such changes occurred among participants in the control condition. Participants in the experimental condition also had lower cortisol levels by the last day and a lower peak level of cortisol, again suggesting lower stress. Participants in the experimental group also improved their sales performance, whereas no such change occurred in the control group. Finally, participants in the experimental group were rated by their supervisors as more self-confident at the end of the study compared with the control participants.

In a more direct investigation of the long-term effects of attachment security priming, Carnelley and Rowe (2007) tested whether repeated security priming alters participants' views of themselves and their relationships, and changes their attachment style. At Time 1, university students completed measures of expectations concerning relationship partners' behaviors, positive self-views (consisting of self-liking and self-competence), attachment insecurity dimensions (anxiety and avoidance), and general feelings of security (assessed with two items: 'To what extent do you generally feel secure?' and 'To what extent do you generally feel safe?'). The participants also provided names of people with whom they had a secure relationship. One week later, on the first and third of three consecutive days (Times 2 and 4), half of the participants (the experimental group) were primed by writing for 10 min about a person with whom they had a secure relationship; the other half constituted the control group. At Time 3, participants in the experimental group were asked to imagine themselves in a problematic situation, but one in which they were surrounded by sensitive and responsive others who were willing to help. Participants in the control group were asked to write about a coursework writing plan (at Time 2), their route to school (Time 3), and shopping at a supermarket (Time 4). At Time 5 (2 days after Time 4), all participants returned to the laboratory and completed the same measures administered at Time 1.

Repeated security priming had positive effects on participants' views of themselves and their relationships. Specifically, participants in the experimental group had more positive expectations of relationship partners'

behavior and more positive self-views at Time 5 than at Time 1. Moreover, for both expectations of relationships partners' behavior and self-views, the increase showed a linear trend across priming sessions. No significant increase was observed in the control group for either expectations of relationships partners' behavior or self-views. Repeated security priming also decreased attachment anxiety: Participants in the experimental group reported lower levels of attachment anxiety at Time 5 than at Time 1, whereas no such change occurred in the control group. However, there was no such effect on avoidant attachment, which has generally proven more difficult to change (Mikulincer & Shaver, 2007b, Chapter 14). Finally, neither attachment anxiety nor avoidant attachment moderated the effects of security priming, a finding that is also compatible with previous security priming studies (Mikulincer & Shaver, 2007a). However, general feelings of security moderated the difference in relationship expectations between Times 1 and 5. Specifically, for participants who scored high on general feelings of security at Time 1, security priming led to more positive expectations of relationships partners' behavior as compared with neutral primes; whereas for those low on general security at Time 1, there was no difference between the experimental and control groups.

In a recent experiment, we (Gillath & Shaver, 2007b) attempted to extend previous findings regarding long-term effects of security priming. Past research has shown that contextual activation of attachment security is associated with a more positive mood (e.g., Mikulincer et al., 2001) and better functioning of other behavioral systems (e.g., caregiving: Mikulincer et al., 2005; exploration: Green & Campbell, 2000). We tested whether repeated priming might cause these beneficial effects to persist for 1 week after the priming sessions ended. Specifically, we hypothesized that in addition to its beneficial effects on perceptions of self-worth (Carnelley & Rowe, 2007), repeated subliminal security priming would have beneficial effects on mood, and on the functioning of caregiving and exploration systems 1 week after the priming sessions. We operationalized change in caregiving as a change in willingness to show compassion to others and change in exploration as better performance on a creativity task.

Our study differed from that of Carnelley and Rowe (2007) in a number of ways. First, the dependent variables were different in the two studies: Carnelley and Rowe focused on effects of security priming on self and relationship representations. We, on the other hand, focused on mood and the functioning of other behavioral systems. Both Bowlby's (1982) initial formulation of attachment theory and contemporary conceptualizations of the relation between attachment security and the functioning of other behavioral systems (Mikulincer & Shaver, 2003, 2007b) argue that attachment security is a fundamental requirement for the full functioning of other behavioral systems. Thus, if attachment security can be experimentally augmented in a fairly lasting way, this should have

persisting beneficial implications for the caregiving and exploration systems. Second, Carnelley and Rowe (2007) used a supraliminal priming technique, whereas we used subliminal techniques. The subliminal approach is likely to be less subject to experimental demand characteristics and perhaps less subject to avoidant individuals' defenses. Third, the number and frequency of priming sessions were different in the two studies. Whereas participants in the Carnelley and Rowe study were exposed to a security or a control prime each day for a total of 3 days, participants in our study were exposed to a security or a control prime three times a week for 3 weeks. Finally, the time period between the final priming session and assessment of the dependent variables was 2 days in the Carnelley and Rowe study and 1 week in our study.

Fifty undergraduate students participated in our study. At baseline (Time 1), they completed measures of self-esteem, mood, compassion, and creativity. They then completed these same measures again at the end of the 3-week priming period (Time 2) and 1 week after the last priming session (Time 3). Self-esteem was assessed using the State Self-Esteem Scale (Heatherton & Polivy, 1991); positive mood was assessed using the positive affect subscale of the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). Compassion toward others was assessed using the Compassion subscale of the Dispositional Positive Affect Scale (Shiota, Keltner, & John, 2006). Finally, creativity was assessed using the Alternate Uses Test (Guilford, 1967), in which participants were asked to come up with as many creative uses for a given object as possible during a 2-min period. The test object was a brick at Time 1, a paperclip at Time 2, and a newspaper at Time 3.

After completing the baseline measures, each participant was randomly assigned to either a security prime condition or a neutral prime condition. All participants came to the laboratory every other weekday morning for 3 weeks to complete various computerized cognitive tasks. They were not told the real purpose of the study until after the Time 3 assessments. Participants in the security prime condition were exposed subliminally to security-related words (e.g., secure, embrace, and love) during each trial of the cognitive tasks; participants in the neutral prime condition were primed with neutral words (e.g., funnel and lamp). Security and neutral prime words were matched for length and frequency. Every week, participants completed three different cognitive tasks (one per day), with a different task order each week. One task required participants to rate how much they liked each of a series of multi-colored abstract designs; another task required participants to rate how similar or related two words were (using whatever definition of 'similar' they liked; e.g., television-chair); the third task required them to rate how well a particular word fit within a particular category (e.g., category: computer; items: keyboard, clock, monitor). Each task consisted of 40 trials. Thus, participants completed a different task in each session of a given week, but all

participants completed the same task on the same day. At the end of the 3-week period and a week later, participants again completed the set of measures mentioned above.

We conducted 2 (prime: experimental vs. control) \times 2 (time: Time 1 vs. Time 3) mixed-model ANCOVAs with time as a within-subject factor and attachment anxiety and avoidance as covariates. Supporting our hypotheses, we found two-way interactions between prime type and time in three of the four analyses. Participants in the experimental condition had higher self-esteem and higher positive mood scores at Time 3 than participants in the control group, although the two groups were not different at Time 1. Participants in the experimental group also reported higher compassion toward others at Time 3, compared with participants in the control group, although there had been no difference at Time 1. For creativity, there was a trend in the expected direction, with security-primed participants showing enhanced creativity at Time 3, but the difference did not reach significance. Overall, our study, like Carnelley and Rowe's (2007), indicates that repeated security priming has effects that last well past the end of the priming procedure.

Remaining Questions

The studies reviewed here provide support for the hypothesis that repeatedly activating mental representations of security has long-lasting beneficial effects – more positive views of self and relationships, a more positive mood, increased compassion, lower exam-related anxiety, and improved performance at work. Although these early findings are encouraging, we need more studies replicating and extending the effects reported so far. In this final section, we outline directions for future research that will provide a deeper understanding of long-term effects of security priming.

Effects of security priming on actual behavior

Most of the effects we discussed here have to do with self-reports rather than physiology or actual behavior. However, Dandeneau et al. (2007) did find that repeated priming affected both cortisol levels and sales records. Whether long-term effects of security priming can be replicated using other behavioral measures is still an open question. Future research should investigate this possibility. Studies of short-term security priming (Mikulincer et al., 2005) suggest that behavioral effects will occur. Even very small doses of security have affected willingness to help another person, willingness to meet with a member of an outgroup, and ability to respond quickly and non-defensively to threatening stimuli (Mikulincer, Shaver, & Horesh, 2006). But none of these studies involve real social interactions or extended behavior in real-life situations.

Comparison of different security-priming procedures

Another important limitation of the priming studies conducted so far is that they say relatively little about the relative effectiveness of different priming methods. For example, we know little about whether supraliminal or subliminal priming is more effective in producing a long-term effect. No study has yet compared these two priming techniques. Of the four studies we reviewed, two (Dandeneau et al., 2007; Carnelley & Rowe, 2007) used supraliminal primes, whereas the other two (Gillath & Shaver, 2007b; Sohlberg & Birgegard, 2003) used subliminal primes, and all of them produced lasting effects. Studies examining the immediate effects of security-priming (Mikulincer & Shaver, 2007a) have often obtained similar effects regardless of participants' level of awareness of the primes (e.g., Mikulincer & Shaver, 2001; Mikulincer et al., 2005). Based on these preliminary findings, we expect both priming techniques to have long-term effects, but this obviously needs to be confirmed in future studies.

Moreover, it is still unclear how many priming repetitions, over what time period, would be optimal. Non-attachment studies (Brown et al., 1996; Salasoo et al., 1985) have already shown that more repetitions result in stronger effects. It seems likely that there is some upper limit or asymptote to security-priming effects, but no studies have yet examined this issue.

Finally, how long do security priming effects of a certain size last? Carnelley and Rowe (2007) found significant effects 2 days after their last priming session; Gillath and Shaver (2007b) found significant effects after a 1-week delay. Similarly, Sohlberg and Birgegard (2003) found effects extending for at least 7 to 10 days. Moreover, in one of their studies (Experiment 5), they detected effects even 4 months after priming (although these effects were smaller than the ones measured after only 10 days). Future studies should examine this issue parametrically.

Detecting changes in dispositional attachment style

Although Carnelley and Rowe (2007) found that a person's general sense of security could be changed by repeated security priming, as could their score on a dispositional measure of attachment anxiety, they found no priming-induced change in avoidant attachment. A similar outcome was noted in a recent unpublished study of the effects of a security-inducing dating partner on college-aged individuals in a new relationship (Lavi, 2007); people whose partners showed security-inducing behavior in a videotaped interaction early in the relationship became less attachment-anxious over time, but their dispositional avoidance did not change over the 8-month course of the study. Additional studies are needed to determine whether dispositional attachment insecurities of both the anxious and the

avoidant kinds can be reduced at a dispositional level over time, and if so, how.

Primed security vs. chronic security

In all of the reviewed studies, primed security had an effect on outcome variables of the same kind found in many correlational studies looking at the correlates of dispositional attachment security. Moreover, dispositional attachment anxiety and avoidance did not moderate the effects of security priming in the Carnelley and Rowe (2007) study or in the Gillath and Shaver (2007b) study. Nor did low self-esteem (a common correlate of attachment anxiety) moderate the effects of the smiling-face manipulation used by Dandeneau et al. (2007). Taken together, these preliminary studies suggest that priming works regardless of a person's dispositional attachment style or level of self-esteem, but the issue needs to be studied in greater detail.

In a different kind of priming study, we (Mikulincer, Gillath, & Shaver, 2002) found that the nature of a subliminal threat prime (not a security prime) interacted with dispositional attachment style. In particular, more avoidant participants took longer to identify the names of their attachment figures when the subliminal threat word was 'separation'. Under the same conditions, relatively secure or anxious participants identified their attachment figures' names quickly. This interaction effect makes us cautious about assuming that the effects of attachment-related priming manipulations will always be independent of dispositional attachment insecurities.

Despite the need for further research, the studies conducted so far and reviewed here strongly suggest that repeated security priming can have persisting effects. This work integrates methods developed by social cognition researchers with developmental and social research stimulated by attachment theory. It promises to be useful in clinical settings, where attachment research is already beginning to be applied (e.g., Johnson & Whiffen, 2003; Mallinckrodt, Porter, & Kivlighan, 2005; Wallin, 2007), and perhaps also in organizational and business settings (Davidovitz, Mikulincer, Shaver, Ijzak, & Popper, 2007; Dandeneau et al., 2007). Because we already know that attachment and general security are associated with many positive personal and social outcomes, it would be of great benefit to humanity if we could find additional ways to increase people's sense of security on a lasting basis.

Short Biography

Omri Gillath, PhD, is an Assistant Professor in the Department of Psychology and the Hoglund Brain Imaging Center at the University of Kansas. He has been the principal investigator on a number of grant-supported

research projects and has co-authored numerous articles and chapters on attachment processes and their underlying mechanisms. His work focuses on human pair-bonding behavior and the effects of personality on cognition and behavior. In recent years, he has expanded this work by using neuroimaging, gene mapping, and virtual reality techniques. He has explored associations between attachment style (or relationship style) and cognitive performance, sexual motivation and behavior, mating strategies, and caregiving behavior. Before coming to the University of Kansas, Gillath taught and conducted postdoctoral research at the University of California, Davis. He holds a BA in Psychology from Haifa University in Israel and a PhD in Philosophy from Bar-Ilan University in Israel.

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Phillip R. Shaver is Distinguished Professor of Psychology at the University of California, Davis. He has been a faculty member at Columbia University, New York University, University of Denver, and State University of New York at Buffalo, and has co-authored and co-edited numerous books, including *In Search of Intimacy*; *Measures of Personality and Social Psychological Attitudes*; *Attachment in Adulthood: Structure, Dynamics, and Change*; and *Handbook of Attachment: Theory, Research, and Clinical Applications*. He has published over 200 scholarly articles and book chapters. His research focuses on attachment, human motivation and emotion, close relationships, personality development, and the effects of meditation on behavior and the brain. He is a member of the editorial boards of *Attachment and Human Development*, *Personal Relationships*, *Journal of Personality and Social Psychology*, and *Emotion*. He has been executive officer of the Society of Experimental Social Psychology and is a fellow of the American Psychological Association and the Association for Psychological Science. He is currently president of the International Association for Relationship Research, from which he received a Distinguished Career Award in 2002.

Endnote

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