Chapter 7

What Can Social Cognition and Priming Tell Us About Attachment?

One of the important themes of attachment theory and research is that people hold working models of themselves and their relationships and that those representations play a pervasive role in shaping people's interpersonal experiences (see chapter: What Are Attachment Working Models?). Because individual differences in attachment are based on cognitive structures—working models—and their functioning, these differences can be studied using experimental methods used to study similar cognitive structures (like schemas and scripts). To achieve this, scholars have turned to research conducted in social cognition and more specifically priming (Bargh, Schwader, Hailey, Dyer, & Boothby, 2012) and applied these methods to the context of attachment. Recent years have seen an exponential increase in attachment-related priming papers (for reviews see Gillath, Karantzas, & Karantzas, 2016; Gillath, Selcuk, & Shaver, 2008; Mikulincer & Shaver, 2007b). The current chapter serves as an introduction to the topic by defining key concepts, providing background into attachment-related priming, and reviewing the effects of priming, its limitations, and implications.

Priming is defined as the activation of a particular mental representation or association in one's memory. Frequently, priming is conceptualized and tested by its effects on a succeeding action or task—the effects of an event or action on subsequent associated responses (eg, Tulving, 1983) or on the activation of stored knowledge (Higgins & Eitam, 2014). The priming process is thought to increase sensitivity to particular stimuli. Often exposure to one stimulus facilitates (creates a mental readiness for) the processing of a following stimulus (Bargh & Chartrand, 2000). For example, in a lexical decision task (deciding whether letter strings are proper English words or not), exposure to the word chair (prime) makes the identification of the letter string "table" (target) easier and faster as compared with exposure to the word "phone." Priming can occur following a conscious or an unconscious exposure to a cue (supraliminal vs. subliminal priming) and can operate at a presemantic level (ie, before a meaning is inferred; Tulving & Schacter, 1990). The effects of priming can range from cognitive and affective responses to behavioral changes (Mikulincer & Shaver, 2007b).

The effects of priming, such as the facilitation observed in the lexical deci-sion task described earlier, are thought to occur due to the spreading of activation from one concept (or node) in an individual's memory to another (Anderson & Bower, 1973; Srull, 1981). Constructs are thought to be associated with each other in human memory (Meyer & Schvaneveldt, 1971). When people are ex-posed to one construct all the other constructs associated with it are primed or preactivated due to the spreading of activation from that related concept. This makes the other constructs more cognitively accessible and available to be used in succeeding tasks (Bruner, 1957; Higgins & King, 1981). Metaphorically, priming is like the gunpowder placed in the pan of a firearm to ignite a charge; it starts an action or a chain reaction.

Typically priming is thought to occur when a target is closely followed by a semantically related prime. But priming can also occur when two concepts are related in other ways (eg, they share affective content or are conceptually similar). Moreover, the effects of priming are not necessarily constrained to the controlled settings of the laboratory, but can also take place outside the lab. For example, Charles-Sire, Guéguen, Pascual, and Meineri (2012) showed that exposure to words like "loving" (as compared with the word "donating") on solicitors' t-shirts increased blood donations during an on-campus blood dona-tion drive. Moreover, priming manipulations have the potential to persist for longer periods of time than is typically observed in brief lab studies (eg, Gillath et al., 2008b; Silverman & Weinberger, 1985).

PRIMING IN CLOSE RELATIONSHIPS

Priming methods have become increasingly common in the study of close relationships (eg, Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Banse, 2003). Priming methods allow researchers to overcome some of the lim-itations of other research methods (eg, observational assessments, self-reports, and interviews), such as social desirability bias, positive self-presentations bias, and the inability to access people's unconscious processes or mentalization abilities (their ability to understand the mental state of oneself or others). For example, with self-report measures the only information captured is that which is consciously accessible to the person reporting it, and that which can be ex-pressed verbally (Schwartz, 1999). Priming is thought to bypass some of these limitations, by assessing automatic and less controlled cognitive processing, which is thought to be less affected by self-presentation biases and social desir-ability. The use of priming is also not as expensive as conducting interviews, and not as susceptible to demand characteristics or experimenter biases as other manipulations; simply because people often do not know what is expected from them, or what the goal of the study is. Priming is also relatively quick and easy to set up, score, and analyze, as we describe below.

Taking advantage of these benefits, researchers (eg, Baldwin, 1992; Bald-win, Fehr, Keedian, Seidel, & Thomson, 1993; Baldwin et al., 1996) have

used priming techniques to study central constructs within close relationships, such as people's relational schemas. *Relational schemas* are knowledge structures, which include representations of oneself and of one's close relationships, or more broadly, one's social world. Relationship experiences and interactions are stored in these representations as they were observed, interpreted, and encoded by the individual. Once stored, these representations can be activated in the laboratory using priming methods, allowing researchers to study the activation and functioning of these relational schemas. Of interest to the current chapter are the attachment-related relational schemas known as working models (see chapter: What Are Attachment Working Models?).

Researchers often use priming to study the influence of context or the activation of a certain state of mind (Bargh & Chartrand, 2000; Cesario, 2014; Molden, 2014). In the attachment literature, priming is used to activate people's internalized working models. That is, researchers activate a certain attachment-related state of mind, making people temporarily feel more securely, anxiously, or avoidantly attached. Once activated, researchers can examine the outcomes of this activation as well as the outcomes of this activation's interaction with people's chronic attachment style. Using priming allows researchers to study the unique effects of each variable (the prime, one's level of anxiety or avoidance, etc.), and the issues related to directionality and causality of attachment processes in relatively controlled settings.

WHAT'S BEING PRIMED? ATTACHMENT-RELATED SCHEMAS

As mentioned in chapter: What Are Attachment Working Models?, interactions with primary caregivers, or as Bowlby (1969/1982) termed them *attachment figures*, are consolidated over time into *internal working models* (eg, Bretherton & Munholland, 1999). These models represent the *self* and *others.* These models or mental representations, which can be positive or negative in nature, are incorporated within long-term memory along with particular emotions, motives, goals, and behaviors which, collectively, form a person's *attachment style* (eg, Gillath et al., 2006; Mikulincer & Shaver, 2007ba).

The formation of an attachment style is thought to rely on learning processes such as conditioning (Mikulincer & Shaver, 2007a). As such, interactions with attachment figures that provide safety and support in times of need reinforce associations in long-term memory between turning to these figures for support, having one's insecurity and distress reduced, and his or her sense of security restored. Eventually, merely calling a supportive attachment figure to mind becomes a source of solace and acts as a mental resource to buffer life stressors and strains (Canterberry & Gillath, 2012; Mikulincer & Shaver, 2004). In the laboratory, attachment-related mental representations can be artificially activated, via priming, making people's sense of security more accessible and potentially affecting their cognitions and behaviors.

As we described earlier in the book (chapters: What Is an Attachment Relationship? and How Do Individual Differences in Attachment Develop?), repeated encounters with sensitive and responsive attachment figures are likely to result in the formation of a secure attachment style (see DeWolff & van IJzendoorn, 1997, for a metaanalysis), whereas interactions with inconsistent, insensitive, and unresponsive attachment figures are likely to result in the development of an insecure attachment style (Ainsworth, Blehar, Waters, & Wall, 1978). As a result of unsupportive experiences with attachment figures, people with an insecure attachment style develop negative representations of their relationships, relationship partners, and in some cases themselves.

According to Baldwin et al. (1993, 1996) most people experience different relational interactions, situations, and relationship histories, which can make them feel secure, anxious, or avoidant. Hence, everyone should have mental representations of secure and insecure experiences available in long-term memory; memories that can be activated in the laboratory. In other words, researchers can prime a sense of attachment security, anxiety, or avoidance among study participants due to their preexisting models.

Hundreds of studies to date have shown that attachment style is a reliable predictor of various outcomes. For example, attachment security predicts relationship satisfaction and longevity, well-being, adaptive forms of coping with stress, and successful regulation of affect (Cassidy & Shaver, 2008; Obegi & Berant, 2010; Wallin, 2007). Such findings demonstrate the benefits of having a secure attachment style. Thus, it may be worthwhile to discover ways in which a person could become more secure with respect to attachment (see Mikulincer & Shaver, 2007b; and Steele & Steele, 2008, for comprehensive reviews). Indeed various researchers have used security priming to increase prorelational and prosocial behavior, positive mood, tolerance of outgroup members, and reduce symptoms of psychopathology (eg, Carnelley, Otway, & Rowe, 2015).

HOW DO YOU ALTER PEOPLE'S SENSE OF SECURITY IN THE SHORT TERM IN THE LABORATORY?

Several methods have been used to create short-term changes in people's sense of attachment security in the laboratory (see reviews by Gillath et al., 2008b; Mikulincer & Shaver, 2007b). These methods involve: (1) exposing people (subliminally/unconsciously or supraliminally/consciously) to security-related words (eg, love, hug, affection, support) or the names of security-providing attachment figures via different tasks (eg, a cross word puzzle); (2) exposing people (subliminally or supraliminally) to pictures representing attachment security (eg, a mother hugging a child); and (3) asking participants to recall memories of being loved and supported by attachment figures, or asking people to imagine such scenarios or relationships. These priming procedures have been shown to influence such diverse variables as mood (Mikulincer et al., 2001a), attitudes toward novel stimuli (Mikulincer, Hirschberger, Nachmias, & Gillath, 2001),

reactions to out-group members (Mikulincer & Shaver, 2001), death anxiety (Gillath & Hart, 2010), aggression (Mikulincer & Shaver, 2007a), and compassion and altruism (Gillath, Shaver, & Mikulincer, 2005; Mikulincer, Shaver, Gillath & Nitzberg, 2005). Moreover, security priming has been shown to decrease mental health symptomatology (Carnelley, Otway, & Rowe, 2015; Mikulincer, Shaver, & Horesh, 2006).

DO PRIMING EFFECTS LAST? THE 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 thus increasing the speed of identifying the other word ("semantic priming") last only a few seconds (eg, Becker, Moscovitch, Behrmann, & Joordens, 1997; Joordens & Becker, 1997). However, there are exceptions to this finding. For example, Srull and Wyer (1980) when using personality trait concepts as primes (eg, "hostile" and "kind") found effects on participants' judgments of a target person 24 h after the study. Dasgupta and Greenwald (2001) primed study participants with pictures of admired black or disliked white individuals and found that it weakened implicit prowhite attitudes measured 24 h after the priming session. 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. Going beyond a few days, Cave (1997) demonstrated that the effects of semantic priming could be detected between 6 and 48 weeks after the priming procedure took place. Finally, Mitchell (2006) reported that people who saw pictures for only 1–3 s in a study could identify fragments of these pictures 17 years later.

One factor that seems to contribute to long-lasting priming effects is the number of times people are exposed to the prime. Brown, Jones, and Mitchell (1996), for example, found that as the number of exposures to the prime (repetitions) increased, the effects of the prime became stronger and longer-lasting. Similarly, Salasoo, Shiffrin, and Feustel (1985) found that accuracy of identification a year after priming was affected by the number of repetitions of the prime stimuli.

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 the consolidation of working models in the long term, Gillath et al. (2008b) suggested that repeated security priming will have long-lasting effects on people's attitudes and behaviors. A few empirical studies provide support for the ideas regarding the lasting effects of security priming. Sohlberg and Birgegard (2003) subliminally primed participants with either the phrase "Mommy and I are one" (MIO; Silverman, 1983), designed to create a sense of closeness to—or merger with—an attachment figure, or "People are walking" (PAW), a control prime. They found that 7–10 days after the priming

manipulation the MIO group showed stronger correlations than the PAW group. Specifically, self–mother similarity was more strongly related to secure attachment and to low depressive symptoms, whereas fear of intimacy was more strongly associated with anxious or avoidant attachment in the MIO group.

In two more recent studies, Dandeneau, Baldwin, Baccus, Sakellaropoulo, and Pruessner (2007) demonstrated the effects of a task that might be interpreted as a security priming procedure. The task was learning to find an accepting/loving/smiling face out of an array of negative expressions. The researchers examined the effects of engaging in the task on reactivity to naturally occurring stressors. Although participants in the experimental and control groups did not differ in baseline exam stress, those in the experimental group experienced significantly less stress by the end of the fifth day of priming. And the effects of priming persisted even after the students took their final exams at school. In a second field study, telemarketers completed the same task for five consecutive days. Dependent variables included cortisol levels (assessed from saliva), sales data, and supervisor ratings. Participants in the experimental group had higher self-esteem, decreased self-reported stress, lower cortisol levels, improved sales performance, and higher ratings by supervisors compared with control participants.

Carnelley and Rowe (2007) found similar results following repeated security priming. Specifically, participants primed with security had more positive expectations of relationship partners' behavior and more positive self-views. Further, 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, whereas no such change occurred in the control group. However, there was no such effect on avoidant attachment, perhaps because avoidant individuals attempt to actively block or deactivate the effects of the security prime, as part of their use of deactivating strategies (Mikulincer & Shaver, 2007b). Finally, neither trait attachment anxiety nor trait avoidant attachment moderated the effects of security priming.

Gillath et al. (2008b) reported a study where they tested whether repeated security priming might result in benefits that persist for one week after priming. Specifically, these authors tested the effects of repeated subliminal security priming on mood, and on the functioning of the caregiving and exploration systems. Changes in caregiving were operationalized as a change in willingness to show compassion to others, and changes in exploration as better performance on a creativity task. There were a few differences between the Carenelley and Rowe study and the Gillath et al. study. First, whereas Carnelley and Rowe (2007) used a supraliminal priming technique, Gillath and colleagues used subliminal technique. Second, Carnelley and Rowe exposed participants to either a security or a control prime each day for a total of 3 days, whereas Gillath and colleagues exposed participants to a security or a control prime three times a

week for 3 weeks. Third, 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 the Gillath study. Nevertheless the results of the two studies are in line with one another.

Gillath et al. (2008b) found that participants in the experimental condition had higher self-esteem and higher positive mood scores at the end of the study as compared with participants in the control group, even though the two groups were not different at baseline. Participants in the experimental group also reported higher compassion toward others by the end, and there was a trend in the expected direction for creativity. Overall, the evidence to date provides initial support for the idea that security priming has long-term effects; however further research is needed to fully understand these effects and their underlying mechanisms.

WHAT IS THE RELATIONSHIP BETWEEN ATTACHMENT PRIMING AND ATTACHMENT STYLE?

The effects of security priming remain statistically significant, even when one controls for factors such as dispositional neuroticism, positive affect, and self-esteem (eg, Mikulincer, Hirschberger, Nachmias, & Gillath, 2001). But what happens when one controls for the effects of dispositional attachment style? In many of the studies conducted to date, security priming procedures (Mikulincer & Shaver, 2007b) are not moderated by attachment style (ie, trait attachment anxiety and avoidance). Rather, the priming procedures yield beneficial effects on study participants regardless of their dispositional attachment style. For example, in one study conducted by Gillath and Shaver (2007) people were asked to select how they would respond to various relational scenarios, many of which included negative acts by their partner (eg, their partner betraying them, revealing a secret, embarrassing them). At first people were asked to select among different behaviors that represent secure, anxious, or avoidant responses to the act. In this first stage of the study, people's attachment style was found to predict which option they were likely to select (eg, anxious people were likely to select an anxious response). In the second stage of the study, participants were primed with a security or insecurity prime first, and then completed the questionnaire including the hypothetical scenarios for a second time. Priming people with a security prime caused them to react in a secure manner to threatening relationship scenarios, regardless of their dispositional attachment style. By-and-large the responses chosen after exposure to security priming were secure and prosocial in nature.

Although in many studies the effects of security priming occur regardless of one's dispositional style, some studies have shown that security priming sometimes interacts with people's dispositional styles. In one such study, participants were asked to recall an incident when a close relationship partner hurt their feelings (Shaver, Mikulincer, Lavy, & Cassidy, 2009). After recalling this event,

participants were primed with a security or a control prime, and then asked to rate their current feelings. Security priming had a different effect on people as a function of their attachment styles. Among anxiously attached individuals the prime reduced the tendency to exaggerate and augment hurt feelings, leading to a decrease in reported hurt feelings. Conversely, among avoidantly attached individuals security priming decreased the tendency to defensively deny hurt feelings or to react aggressively rather than minimize the experience of being hurt. That is, increasing people's sense of security lowered avoidant individuals' defensive tendencies (see also Arndt, Schimel, Greenberg, & Pyszczynski, 2002), leading to an increase in reported hurt feelings.

A different set of studies focusing on breakup strategies (Collins & Gillath, 2012) provides further support for the moderation by attachment style. Participants were asked to select which breakup strategy best fits their typical response to relationship dissolution (eg, the degree to which they use compassionate or direct breakup strategies). In one study, people's attachment styles were found to predict which strategies they selected (eg, people high on avoidance chose less direct breakup strategies and those high on anxiety chose strategies to keep the option of getting back together open). Participants were then primed with either a security or a neutral control prime. Prime type (security/neutral) interacted with people's attachment style, such that those high on avoidance were less likely to choose the less direct strategies, and those high on anxiety were less likely to select the "keep open" strategies after exposure to the security prime.

The fact that in some studies security priming interacts with chronic attachment style, but not in others, raises questions. For example, is there a moderator that influences whether or not such an interaction takes place? Is it an issue of statistical power, prime strength [some procedures (eg, subliminal vs. supraliminal) or stimuli (eg, words vs. pictures) might be more efficient at increasing security], or some other factor? Can these studies be replicated? Are the findings valid and do they have meaningful real world implications? These questions are in line with recent concerns regarding priming findings and the inability to replicate them (eg, Harris, Coburn, Rohrer, & Pashler, 2013; Waroquier, Marchiori, Klein, & Cleeremans, 2009). Various researchers have tried and failed to replicate "classic" priming studies, concluding that these findings are at best unreliable (Donnellan, Lucas, & Cesario, 2015; Doyen, Klein, Pichon, & Cleeremans, 2012; LeBel & Campbell, 2013). In light of the concerns regarding attachment priming, further investigation into the reliability of priming effects is necessary.

CAN WE TRUST ATTACHMENT PRIMING EFFECTS? USING META-ANALYSIS

To deal with these concerns Gillath et al. (2016) conducted a metaanalysis of the studies related to security priming and its benefits. Examining published and unpublished research papers and doctoral theses between the years 1981 and 2013,

they identified a total of 92 studies that examined the effects of security priming (most studies were conducted in the late 1990s and beyond, after Baldwin et al. (1996) introduced the idea of multiple attachment models and their temporary activation). Just over 91% of studies reported an effect for security priming, with approximately 65% of studies employing supraliminal priming methods, while the remainder of studies employed subliminal methods. Across all these studies, investigating the effects of security priming revealed an average effect size of ($r = 0.28$, $p < 0.01$).

Thus, it appears that security priming has detectable effects on various outcomes. Metaanalyses, however, cannot solve all the problems that have been levelled against priming research. There are at least two issues that should be considered more carefully in the future. First, given the bias in the field against publishing null findings, the odds of getting a paper written and ultimately accepted are substantially higher if the priming effect worked than if it did not. Thus, the metaanalytic effect size probably better summarizes the average effect in studies in which the priming "worked" than in a random sample of studies that employed priming. Second, given the small sample sizes often used in this kind of research, the effects that are statistically significant are likely to be over-estimates of the true effect. We hope future research will strive to solve these challenges and the perplexing questions that still remain unanswered in security priming research.

WHAT PHYSIOLOGICAL/NEURAL MECHANISMS UNDERLIE SECURITY PRIMING?

Although ample research documents the effects of attachment security, relatively little is known about the physiological mechanisms and neural pathways by which security priming results in these effects. To address this gap in the literature, Canterberry and Gillath (2013) conducted an fMRI study examining the neural mechanisms that underlie enhanced attachment security. Canterberry and Gillath's findings indicate that security enhancement involves cognitive, affective, and behavioral aspects or processes (see more details in chapter: What can Neuroscience, Genetics, and Physiology Tell us About Attachment?). These findings support the conceptualization of attachment security as part of a behavioral system with multiple components (affective, cognitive, and behavioral). These components are thought to act together as a resource—allowing the person to calm down, focus on the task at hand, and not be distracted by anxieties and concerns. These resources could facilitate the functioning of other behavioral systems—if one does not have to cope with anxieties, he or she can focus on behaviors such as exploration or providing care for others. Thus, the findings based on brain activation are in line with the idea that attachment security allows a person to relax, boosts the person's self-esteem and positive affect, and buffers distress and anxiety (affective component). Specifically, the activation in prefrontal areas is in line with the idea that internalized working

models are being primed, which provides the person examples of how to deal with stressors, schemas of secure base scenarios, and caregiving provision (cognitive). Brain activation in areas related to motivation and motor functioning supports the proposition that security priming provides motivation to act or strengthen behavioral tendencies.

Further support for the idea that attachment security can act as a resource comes from another recent study that focused on the association between security and glucose. Glucose serves as a vital resource for our metabolism and brain functioning (eg, Gailliot et al., 2007). In the study by Gillath, Pressman, Stetler, and Moskovitz (2016) participants were assigned either to a security priming or a control priming condition. Following the priming procedure participants' glucose levels (assessed via saliva samples) were measured. If indeed, security acts as a resource, one would expect an increase in glucose to occur following the security priming. As expected, security priming resulted in higher glucose levels compared to exposure to a control prime. These findings suggest that security priming not only results in affective and cognitive changes (eg, mood and attention), but also physiological changes, and specifically, the enhancement of physiological resources such as blood-level glucose. It is more than likely that the various cognitive, affective, behavioral, and neurophysiological changes that have been linked to security priming co-occur. If this is the case, then it may be posited that the effects of security priming are multilevel in nature and involve various physiological and psychological pathways.

CONCLUDING REMARKS

This chapter reviews research on the importance of security priming and its outcomes. Security priming seems to increase people's sense of attachment security, and, at least temporarily, make them feel, think, and behave like securely attached people. The findings further suggest that security priming procedures do not simply create a semantic connection between a positive stimulus and a resulting positive affect, but actually result in a multitude of outcomes that resemble the correlates of attachment security (eg, prosocial and prorelational tendencies). The effects of security priming have been found even when researchers controlled for positive affect, and self-esteem, suggesting that there is more to security priming than mood enhancement, or boosts to self-esteem.

Although the findings reviewed above add to our understanding of security priming, they also raise concerns and there are still open questions, such as: How do state security (primed) and trait security differ? How long can the effects of security priming last? What changes seem to occur in people as a result of security priming? Future research using a multilevel multimethod approach to the study of security priming is needed to answer these questions and improve our understanding of the underlying mechanisms and processes that underpin attachment security.