Implicit cognition and relationship processes

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Abstract

Mental representations of personal relationships or relational schemata strongly influence the interactions with the relationship partners, and in turn, relationship success. Since the beginnings of relationship research scholars have postulated that important features of relational schemas may not be accessible to introspection. The present chapter reviews the literature on such *implicit* cognitions and their consequences for relationship processes. After discussing the term implicit and its relation to the concepts unconscious and automatic, the chapter focuses on empirical research using different methods to investigate implicit relational schemata reaching from early interview techniques to the whole arsenal of mostly latency-based methods used in contemporary implicit social cognition research. The most important theoretical framework in this field is attachment theory that led to numerous predictions on the relation between mental representation, behavior and relationship functioning. The literature review covers empirical research on the content and structure of relational schemata, individual differences in mental models of relationships, their relation to numerous related concepts including motivation, goals, attention, and self esteem, and finally the relation between implicit cognitive processes and relationship outcomes such as relationship satisfaction, stability, and life satisfaction. The chapter concludes with a discussion of unsolved problems, open questions and possible future venues for implicit relational cognition research.

The topic of implicit social cognition has to be covered in a comprehensive treatise of relationship research – not only because it is fashionable, but more importantly, because in relationship research "implicit" phenomena were the subject of empirical research and theoretical controversy long before this was the case in social psychology at large. In most areas of social psychology the general faith in the validity of verbal self-reports was only restricted by the possibility of socially desirable responding, that people were not willing to truthfully report about issues such as prejudice and discrimination. In relationship research there has always been a lingering suspicion that at least some individuals may not only be unwilling but fundamentally unable to report about important aspects of their personal relationships.

Since the early days of implicit social cognition in relationship research the field has seen tremendous advances with respect to theory, methods and empirical results. In the present chapter we aim to give an overview of these developments. We will first discuss the concept *implicit* cognition and its relation to similar concepts such as automaticity, awareness and (un)consciousness. We will then explore the nature of the mental representation of relationships, how relationship processes influence this mental representation, and vice versa, how implicit (and explicit) cognitive processes influence relationship behavior and in turn relationship success. We will concentrate on empirical studies that use the methods of social cognition research, but because of space considerations other valuable indirect approaches such as psychophysiological measures (see Coan & Beckes, this volume) or behavior observation studies cannot be covered here. We also do not attempt to give an exhaustive review of all empirical work but rather select exemplary studies to illustrate conceptual or methodological developments. At the conclusion of the chapter we will try to critically evaluate the status quo of "relational cognition" research and make an attempt to identify emerging research questions that may be worth pursuing in the future.

The unconscious, the implicit, and the automatic

The meaning of the term "implicit measure" is vast and its use inconsistent even in the social cognition literature. Some authors use the term to denote properties of assessment methods (i.e., to distinguish direct self-report methods from indirect methods of assessment). Other authors use the term implicit to indicate certain properties of measures at the construct level that distinguish them from explicit measures (De Houwer, 2006). The terminological inconsistency adds a layer of confusion to an already difficult subject area. We therefore adopt the very straightforward proposition of De Houwer (2006) to call a measure *direct* if it relies on verbal self-reports on the construct of interest, and *indirect* if it exploits other aspects of behavior such as response latencies, physiological responses, or judgments on something else than the construct of interest. The term *implicit* will be reserved for specific properties of measure outcomes at the construct level, such as unconscious, automatic, uncontrollable, or task-independent. Moreover, we have to keep in mind De Houwer's note of caution: whereas it can be decided a priori whether a measure is direct or indirect, any specific claim about the nature of an implicit construct needs to be empirically demonstrated.

Perhaps the most important intended meaning of implicit is that implicit measures are unconscious. In their seminal article of implicit social cognition research, Greenwald and Banaji (1995, p. 8) define implicit constructs as "introspectively unidentified (or inaccurately identified) traces of past experience that mediate" a class of relevant response behaviors that are assumed to be influenced by that construct. This definition equates *implicit* with *unconscious*. Whereas it is, by definition, true that implicit constructs cannot be assessed by standard self-report or other direct measures, it is not the case that the use of an indirect measure already guarantees that its measurement outcome is implicit in the sense of outside of awareness or unconscious.

This question is elucidated in a conceptual analysis of implicit attitudes and stereotypes by Gawronski, Hofmann, and Wilbur (2006). The authors differentiate three distinct types of

conscious awareness of implicit attitudes: source awareness, content awareness, and impact awareness. Their review of the existing evidence shows that people often forget the origin of implicit attitudes (i.e., lack source awareness), but this is not a distinctive property of implicit attitudes or stereotypes. Indeed, people can also forget the origin of explicit constructs. The core meaning of unconscious constructs, however, is not to be aware of their content. According to Gawronski et al. there is no empirical evidence that people lack content awareness of implicit attitudes (i.e., attitudes that were assessed using indirect methods). There is evidence, however, that under specific circumstances people may lack awareness that their implicit attitudes (or stereotypes) do influence their behavior. In the domain of attitude research impact awareness therefore appears to be the only aspect of unconsciousness that clearly distinguishes implicit and explicit constructs and that is corroborated by solid empirical evidence.

Unlike the psychoanalytic notion of the unconscious as a powerful monitoring system that strategically decides whether pieces of information are allowed to become conscious or not, contemporary social cognition theories rather assume that implicit content can operate outside of awareness because it is automatically activated. Contemporary dual-process theories postulate two distinct information processing systems. For example, the Reflective-Impulsive Model of social behavior by Strack and Deutsch (2004) distinguishes a reflective and an impulsive system of information processing. The reflective system is based on propositional knowledge representations (i.e., information in the form of declarative sentences that are either true or false) and can perform complex, logical operations. This system is flexible and powerful, but it requires cognitive resources and allocation of attention. The impulsive system is based on an associative network and operates by the principle of spreading activation. Unlike the reflective system the impulsive system operates in an automatic fashion and does not require cognitive resources or the allocation of attention.

However, the fact that automatic or implicit processes do not require attention does not imply that the content or outcome of implicit processes are ipso facto unconscious.

At the same time, 'unconscious' processes have fascinated psychologists ever since the very early days of the discipline. For Sigmund Freud the conscious and introspectively accessible part of the mind was rather marginal. To him, a large part of a person's interpersonal experiences, particularly childhood experiences, were deleted from immediate consciousness but stored in the unconscious. The unconscious affected human lives (e.g. causing neurotic behavior) in a way that individuals were unaware of. Two distinct traditions of relationship research developed out of Freudian psychoanalysis. The first, more orthodox Freudian line of research has explored the effects of subliminal priming with psychodynamically relevant concepts (e.g., symbiosis with the mother) on global outcomes such as therapy success. We will first review the sometimes contested results of this research. The second, more eclectic and more influential research tradition, has built on the Freudian framework to formulate a more cognitive theory of object relations and eventually developed into modern attachment theory (see also Mikulincer & Shaver, this volume). This line of research will be extensively reviewed later in the chapter.

Subliminal Psychodynamic Activation: Fact or fiction?

Given the contemporary dominance of the social cognition paradigm, it may seem somewhat surprising that the historically earliest research program using subliminal semantic priming in the context of personal relationships was rooted in psychoanalysis and has been conducted in a clinical context. Silverman and Silverman (1964) presented a *Subliminal Psychodynamic Activation* (SPA) method to experimentally test hypotheses derived from psychoanalytic views of psychopathology. According to psychoanalytic theorizing, many adults harbour fantasies *to be one* or *to merge* with the comforting, protective, and nurturing "good mother of early childhood" (Silverman & Weinberger, 1985). The (subliminal)

activation of such fantasies in a therapeutic setting was claimed to enhance the beneficial

effects of the therapy. In typical SPA experiments, the sentence MOMMY AND I ARE ONE is

presented repeatedly by a tachistoscope for 4 ms during one or several therapeutic sessions,

and a neutral sentence such as PEOPLE ARE WALKING is used as a control prime. The priming

procedure is double-blind: The experimenter does not know whether the experimental or the

control prime is used, and the patient is unable to consciously recognize the prime due to the

short exposure time. The priming effects have been assessed using pre-post treatment

difference scores on various measures including ratings of psychopathology, well-being,

projective tests, smoking abstinence, physiological reactions, and the accuracy of performing

specific behavior tasks. Most studies have been conducted with participants diagnosed as

schizophrenics, other studies included depressive, phobic, or non-clinical samples.

The evaluation of the empirical status of SPA research could not be more contradictory.

Hardaway (1990) presented a meta-analytic review of SPA studies that confirmed a

significant SPA effect and concluded somewhat apodictically "Future research designed to

replicate basic experimental effects is deemed superfluous" (p. 177). However, although this

research program has produced an impressive number of studies its impact has been limited.

Both relationship researchers and scholars of unconscious cognition have been reluctant to

accept the results of this research as empirical fact. This skepticism was probably raised by

both "...the lack of widespread enthusiasm for the SPA result's proposed psychodynamic

interpretation" (Greenwald, 1992, p. 769), and perhaps more importantly, by the very unusual

methodological approach using entire sentences as primes in a subliminal priming procedure.

In an informal opinion survey among experts in unconscious cognition (Greenwald, 1992,

Appendix B), only a small minority considered the claimed subliminal psychodynamic

activation as empirically established. As one of the most outspoken critics Fudin (1999) raised

serious concerns about the internal validity of SPA experiments and underscored "...the need

to start anew research in this area" (p. 235). So not only the psychoanalytical explanation of

subliminal psychodynamic activation, but also the mere existence of the SPA effect has been contested.

In his meta-analysis Hardaway (1990) reviewed 56 studies containing results of 111 independent samples. Besides the prime sentence MOMMY AND I ARE ONE other sentences relating to the mother were used (e.g., MOMMY AND I ARE TWO, MOMMY FEELS FINE), and also stimuli that alluded to oneness but did not contain the word MOMMY (e.g., MY GIRL AND I ARE ONE, DADDY AND I ARE ONE). Besides the type of stimuli and the number of priming repetitions, Hardaway coded several potential moderator variables such as sample characteristics, methodological quality, and the laboratory affiliation of the authors.

The effect size of the MOMMY AND I ARE ONE primes as compared to control primes was significant and of moderate size ($d = .41$). The effect size for other MOMMY stimuli ($d = .14$), and other oneness stimuli ($d = .22$) was still significant but substantially smaller. This result suggests that the MOMMY AND I ARE ONE primes activate a specific relational schema and elicit particularly strong effects for primes related to mother *and* oneness. The remaining variance between studies could be attributed to sampling error and the unreliability of measures. No significant influence was found for the researcher's laboratory affiliation or other potential moderators. Virtually identical results were reported in published and unpublished studies (Weinberger, 1992), and a file-drawer analysis revealed that 2,237 more unpublished studies with zero-effects would be needed to attribute the overall effect to a publication bias for significant results. In another meta-analysis, Bornstein (1990) showed that for patients subliminal priming had significantly larger effects than supraliminal priming, whereas no difference was found for normal controls. Hardaway (1990) states that experimental effects were also found for normal controls, but unfortunately fails to report the corresponding effect sizes. However, the results of Hardaway's meta-analysis provide evidence that the prime MOMMY AND I ARE ONE did positively influence the outcomes of therapeutic and educational interventions (but see Fudin, 1999).

The most intriguing result of the meta-analysis was that the sentence MOMMY AND I ARE ONE (or MIO) had more positive effects than primes relating either to MOMMY or to oneness. But how is it possible that some extremely brief exposures of a sentence can influence molar constructs such as therapy effects? Weinberger (1992) tried to demystify SPA-results by relating them to accepted phenomena of contemporary mainstream psychology. He proposed that the moderation of therapy effects by subliminal priming may be mediated by a positive mood induction, leading to more flexibility in thinking, better problem solving, and eventually to more positive therapy outcomes (but see Sohlberg, Samuelberg, Sidén, & Thörn, 1998, who found negative effects).

Whereas SPA research traditionally focused on main effects of the MIO prime as compared to neutral or negative primes, more recent studies have investigated individual differences and moderator effects. Sohlberg, Birgegard, Czartoryski, Ovefelt, and Strömbom (2000) postulated that the MIO prime has positive consequences only if individuals feel similar to their mother, and negative if not. They assessed the similarity with mother using the intra-individual correlation between judgments of self and judgments of mother on a list of 40 adjectives. As expected, subliminal priming with the MIO stimulus increased the feeling of "symbiotic oneness" in individuals feeling similar to their mother, but had the opposite effect in individuals feeling dissimilar to her. No priming effect was found after the neutral PEOPLE ARE WALKING prime. The idea that priming effects are moderated by individual differences in chronic mental representations has also been postulated and empirically confirmed in research on implicit attitudes (Perugini & Prestwich, 2007).

A particularly puzzling finding of SPA research was reported by Sohlberg and Birgegard (2003). In a series of five experiments they found persistent SPA effects (over 7 or 10 days) on the correlation between the representation of mother (similarity or remembered behavior of the mother) and depression or attachment measures. Whereas no or very small correlations were found after subliminal priming with neutral or irrelevant primes, very large

correlations were found after priming with relevant MIDIS (Mother and I are DISsimilar) or MIO stimuli. In the light of the very subtle priming manipulation these very strong and very persistent effects have evoked vivid criticism on procedural, statistical, and theoretical grounds (Fudin, 2006). Besides these criticisms, the very small sample sizes of about 20 to 30 participants per experimental condition cast doubt on the robustness of the reported correlations. An independent replication of the reported effects is therefore warranted.

Weinberger (1992) stated that the genuine psychoanalytic contribution to SPA-effects is the identification of potent stimuli. In fact, whereas one does not need to adhere to psychoanalytic theorizing to accept the word MOMMY as positive, hardly any other theoretical framework would predict *oneness* to be a potent positive stimulus. This fact may be partly responsible for the vivid skepticism SPA-results have encountered outside the psychoanalytic community. Besides the question of the potency of psychoanalytically motivated prime words the more fundamental criticism challenged the mere possibility that subliminally presented multiple word stimuli or even short sentences could be perceived and processed (Fudin, 1999, 2006; Greenwald, 1992). However, there is also some evidence on effective subliminal multiple word priming without referring to psychodynamic assumptions.

Glassman and Andersen (1999) used subliminal multiple word primes to activate relational schemata of significant others. The primes were short descriptions of significant others (e.g., *is usually very insightful*, *gets depressed sometimes*, *is very sensitive*) that had been generated by the participants at least a week before the priming session in an allegedly different experiment. A series of such describing sentences were briefly (71 to 100 ms) presented in parafoveal vision during a mock interactive computer game with a fictitious second person. A subsequent forced choice discrimination task showed that the prime sentences were indeed presented outside of awareness. As in previous research using written person descriptions of significant others (Andersen, Glassman, Chen, & Cole, 1995; see also Chen, Boucher, Andersen & Saribay, this volume), participants erroneously assigned

attributes of significant others to a fictitious person who shared some descriptors with the significant other. This was the case although the critical traits were *not* used for priming. This result suggests that the priming activated the significant other schema that was then used "to go beyond the information given" about the fictitious interaction partner. Less false positive memory was found in two control groups that were subliminally primed either with descriptions of nonsignificant others, or somebody else's significant others. Overall, these results provide strong evidence that schema effects can be attributed to the mental representation of significant others, and not to the self-generation of primes, or specific features of significant-other descriptions.

The results of Glassman and Andersen (1999) have several important implications. First it is noteworthy that the psychoanalytical concept of *transference* can be empirically demonstrated and explained as a "normal" schema effect that can occur with any significant other even if the significant other schema is activated outside of awareness. Second, in two experiments subliminally presented four-word sentences elicited specific and theoretically meaningful effects. Unlike the MOMMY AND I ARE ONE prime in SPA research no controversial theoretical assumptions are required to interpret the observed priming effects. The idiographic prime sentences generated by the participants can be straightforwardly interpreted as individual relational schemata. However, the basic problem of the complexity of the used primes remains. Whereas in the primes used by Glassman and Andersen it is in principle possible that the meaning of the whole sentence was grasped by just processing one salient word (e.g., depressed, insightful, or sensitive), for SPA effects it has been explicitly claimed and empirically supported that the very same words in a different order (e.g., ONE ARE AND MOMMY I) did not have the same effects (Sohlberg & Birgegard ,2003; Exp. 4). Is it plausible that subliminally presented sentences can be processed? Greenwald (1992) noted that nothing more complex than "a partial analysis of the meaning of single words" has been empirically established, but that "the task of demonstrating that attention-less unconscious cognition can

extract the meaning of a two word sequence poses a theoretically significant challenge (p. 775)".

Object relations theory and relational schemata

Another tradition inspired by Freud is object relations theory (e.g., Klein, 1932; Fairbairn, 1952) that has shifted from the heavy emphasis on the psychosexual development and the mother-child relationship to a more general theory of internalized images of significant others. Any personal relationship is characterized by the history of past interactions of two individuals. Therefore, the relationship concept *necessarily* requires some form of mental representation that preserves this history, and makes past relationship experience available for the individual involved in a relationship. In Freud's (1940, cf. Bretherton & Munholland, 1999) original idea of the inner world the ego is characterized as "…the activity of thought which, after taking its bearing in the present and assessing earlier experiences, endeavors by means of experimental actions to calculate the consequences of the course of action proposed" (p. 56). To state it more bluntly: the mental representation of a personal relationship *is* the personal relationship.

The prominence of such mental representations is also apparent in Bowlby's (1969, 1973, 1980) work that most strongly shaped our recent understanding of relational schemata and their role in relationships (see also Mikulincer & Shaver, this volume). Bowlby combined a psychoanalytic background with a strong interest for other theoretical and empirical approaches he considered helpful for a better understanding of the infant-mother relationship. He was familiar with contemporary psychoanalytic object relations theories but was also heavily influenced by evolutionary perspectives on internal working models (e.g., Craik, 1943). It was the idea of an internal working model used to flexibly shape and adapt behavior that strongly influenced Bowlby's thinking about the child's mental representation of the

world in general, and the attachment figure in particular, as becomes apparent in a later formulation:

> *"Confidence that an attachment figure is, apart from being accessible, likely to be responsive can be seen to turn on at least two variables: (a) whether or not the attachment figure is judged to be the sort of person who in general responds calls for support and protection; (b) whether or not the self is judged to be the sort of person towards whom anyone, and the attachment figure in particular, is likely to respond in a helpful way. Logically these variables are independent. In practice they are apt to be confounded. As a result, the model of the attachment figure and the model of self are likely to develop so as to be complementary and mutually conforming"* (Bowlby, 1973, p. 204).

Importantly, a central tenet of object relations theory is that some aspects of mental representations of persons are not consciously accessible. Not surprisingly, given the clinical and psychoanalytic background of object relations theory, these unconscious aspects of mental representations are considered as most important for an understanding of psychopathology. For example, traumatic events in important relationships may cause defensive processes that transform the events to a less threatening form of representation.

This psychodynamic notion of an unconscious or subconscious form of representation is also apparent in Bowlby's work. However, Bowlby tended to conceptualize defensive processes more in terms of contemporary cognitive psychology. It is a general feature of information processing under conditions of limited capacity that available but task-irrelevant information is inhibited (e.g., Norman, 1976). Bowlby thought that processes of this kind may also be used to exclude relationship related perceptions that would otherwise cause extreme anxiety and distress. Although he considered such behavior as potentially adaptive in the short term, negative consequences may eventually arise due to an impairment of a necessary update of the inner working model (cf. Bretherton & Munholland, 1999). If threatening and therefore highly relevant information concerning the attachment relationship would be systematically

excluded from integration in the internal working model, this model would increasingly lack precision and in turn fail to serve its primary function.

Unlike most object relations theorists Bowlby did not assume that "defensive" processes have to be obligatorily unconscious, but assumed a variety of more or less conscious processes of exclusion of threatening content and selective information processing. Inspired by the distinction between several memory systems (e.g., storing procedural, semantic, and episodic knowledge) Bowlby speculated that a child may build different "versions" of internal working models with different degrees of conscious accessibility. This view was bolstered by the clinical observation that patients often give very positive global evaluations of the relationship to their parents, which are then contradicted by rather negative descriptions of concrete behavior episodes (c.f. Bretherton & Munholland, 1999). This idea was later elaborated in studying the cognitive representation of caregiver relationships in adults.

Digging deep: The Adult Attachment Interview

One prime candidate for an assumed limited introspective accessibility are negative experiences in child-caretaker relationships in early childhood. The potential unsuitability of verbal self report measures called for the development of alternative indirect assessment techniques of the mental representation of relationships. An early development to this end was the Adult Attachment Interview (AAI; George, Kaplan & Main, 1985; Hesse 2008) that has to be considered an indirect measure because it is mainly based on qualitative properties of the verbal report rather than the verbal content itself. To assess attachment representations with the AAI, adults are questioned at length about their relationship with their parents when they were a child (see Hesse, 2008 for an overview). This work substantiated Bowlby's clinical view on sometimes distorted relationship memories of adults. It was not the content of the interviews, but rather qualitative characteristics like coherency, richness of details, sudden changes in language style, or logical errors that proved to be of diagnostic value for the type

of relationship representation. For example, when respondents reported positive relationships with their parents at a global level, but were unable to report any concrete positive childhood memories involving their parents, this would indicate an insecure attachment.

The external validity of the AAI is corroborated by at least two sources of evidence. First, it is possible to use the AAI in adolescence or adulthood to retrodict the individuals' own attachment style as an infant, at least under conditions of relatively stable rearing environments (Hamilton, 2000; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). Second, the AAI classification of mothers was strongly related to their children's attachment type as assessed with the Strange Situation Test, even if the AAI was administered in mothers before the birth of their children. This finding was obtained in four independent studies (van Ijzendorn, 1995), and the effect size of the effects were large (*d* about 1). The mode of transmission of the mother's relationship representation to the attachment styles of their children is not yet fully understood. Maternal sensitivity was found to partially mediate this relation, but could not fully account for the large effects. The prediction of the attachment style of own later born children also implies that the specific way of assessing the cognitive representation of relationships in the AAI grasps some essential aspects of relationships. Most importantly, these aspects can apparently not be assessed using standard self-report questionnaires of attachment style.

Although questionnaire measures of adult attachment use similar verbal labels for secure and insecure attachment types or dimensions, correlations between the AAI and self-report measures tend to be very low (Crowell, Fraley, & Shaver, 1999; Roisman, Holland, Fortuna, Fraley, Clausell, & Clarke, 2007; but see Shaver, Belsky, & Brennan, 2000, for a more positive view). This pattern of empirical data provides evidence that the AAI shows incremental validity, and it is at least compatible with the notion that the AAI is an implicit measure of attachment. It is difficult to decide, however, whether the AAI taps into mental representations of the caregiver relationship of early childhood that are introspectively

inaccessible, or whether people are merely reluctant to report about these mental representations. Allen and Miga (2010), for example, offer important evidence and ideas concerning attachment in adolescence. They show that the remarkably strong link between parents' and children's attachment styles disappears as the children grow older. In contrast to a strong convergence between parents' Adult Attachment Interview (AAI) classification and the Strange Situation classification of their infants this relation is much weaker when the infants have grown to adolescence, an age period in which the AAI can be administered to both parents and offspring. Allen and Miga also show that in adolescence, the AAI is more strongly related to various aspects of emotion regulation and social competence in peer relations than to the parent's AAI classification. This finding causes Allen and Miga to question whether the AAI is, or ever was, a measure of adult "attachment." When first developed, the AAI was meant to assess a parent's (or parent-to-be's) "state of mind regarding attachment" that is predictive of the current or eventual attachment behavior of the parent's infant (Hesse, 2008). However, it is also conceivable that the AAI merely reflects mental and social skills relevant to parenting a young child. In this case, the result of the AAI would rather be another symptom of parental skill, and not a reflection of a mental representation of an attachment relationship.

Allan and Miga's (2010) critical re-interpretation of the AAI was (at least partially) motivated by disappointingly low correlations between adolescents' and mothers' AAI classifications. However, adolescence is known as a phase of many developmental transitions and changes that reduce the (apparent) stability of many constructs as well as their correlations with any other variables assessed before or after that phase. It therefore remains to be seen whether the AAI of mothers is better conceived of as a proxy of parental skill, or as a mental representation of relationships that sets the ground for parental skills.

Attachment styles as implicit and explicit knowledge structures

Theorizing about the mental representation of personal relationships goes back to Freud's (1940) inner world and Bowlby's (1969) internal working model. However, Baldwin's (1992) conceptualization of a *relational schema* consisting of a relationship-specific representation of the partner, the self, and their interaction in the form of *if-then* contingencies bridged the gap between the psychoanalytic tradition of object relations theory and the empirical research methods developed in experimental cognitive psychology. To this point, individual differences in attachment were investigated by observing behavior (Ainsworth, Blehar, Waters, & Wall, 1978), using self-report measures (Hazan & Shaver, 1987), or qualitative interview techniques (George, Kaplan, & Main, 1985). Starting with the pioneering work of Baldwin and colleagues (Baldwin, Carrel & Lopez, 1990), priming methods were not only used to evoke global behavioral effects as in SPA research, but to test specific predictions about the architecture and content of relational schemas and their effects on various responses such as information processing, affective reactions, and self-esteem.

Based on clinical observations of the interactions of mothers and children, Ainsworth et al. (1978) developed a typology of individual differences featuring three attachment types—secure, avoidant and anxious-ambivalent. Contrary to this data-driven clinical approach, Bartholomew (1990) proposed a more theory-driven adult attachment classification system that was based on Bowlby's idea that inner working models rely on two dimensions, namely the view of the self as more or less worthy and lovable, and the view of others as more or less available and trustworthy. If these two dimensions are orthogonally arranged (see Figure 1), they define the four attachment prototypes *secure* (positive evaluation of self and partner), *preoccupied* (negative evaluation of self and positive evaluation of partner), *dismissing* (positive evaluation of self and negative evaluation of partner), and *fearful* (negative evaluation of self and partner). At a theoretical level, Bartholomew's secure and preoccupied types correspond to Ainsworth's types secure and anxious-ambivalent, whereas the avoidant type is divided into the two categories fearful and dismissing.

Probing the relational schema with cognitive methods

The implicit representation of partner and self

Given that in Bartholomew`s model the defining properties of attachment styles boiled down to two object evaluations, it seemed possible to use relatively simple implicit attitude measures as an implicit measure of attachment. This approach would be much more economic and easier to implement than the AAI. Banse (1999) used a subliminal priming paradigm developed by Murphy and Zajonc (1993) to investigate implicit evaluations of the self and of romantic partners or friends. To automatically activate the representation of the self and the relationship partner, the respective first names and faces were presented under conditions of marginal or good visibility. Immediately afterwards participants rated the pleasantness of neutral stimuli (Chinese idiographs). It was assumed that any systematic influence of the prime category on the rating of neutral targets would reflect automatically activated implicit attitudes toward the self and the relationship partner. The results showed that hardly visible partner-related primes yielded significantly more positive ratings than self-related primes. This effect was consistent across name and face primes, but only under conditions of marginal visibility. The consistency of results across name and face primes for self and relationship partners strongly suggests that the priming procedure did indeed automatically activate relational schemas. However, although the sample was relatively large ($N = 201$) the effect was too weak and too unreliable to measure individual differences in implicit self and partner attitudes. No reliable correlations were found between implicit attitudes and scores on self-report attachment scales.

In a second study, Banse (2001) used an affective priming paradigm with an evaluative decision task. In this paradigm clearly visible partner and self-related primes produced more positive effects than primes related to a neutral or negative control person. Masked priming produced unexpected reversed priming effects. Again, effects were generally too weak and too unreliable for correlational analyses with explicit measures of relationship quality and

attachment. This problem was only overcome when the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was used to assess implicit attitudes towards the partner (Banse & Kowalick, 2007, Zayas & Shoda, 2005).

The Partner-IAT (Banse & Kowalick, 2007) consists of a double discrimination task. In one task, items (e.g., first name, profession, hair color) related to the partner or an unknown person had to be assigned to the category partner and stranger by pressing a left and right response key. In a second task, normatively positive and negative words had to be assigned to the categories good and bad. In a first critical block both tasks were mixed and alternately presented items related to good or bad or to the partner or a stranger had to be assigned to the category labels good and stranger using the left response key, and bad and partner using the right response key. In the next block the assignment of the response keys of target dimension partner and stranger was reversed. In a second critical block, both tasks were again mixed. Good and partner items had to be assigned to the left, and bad and stranger items to the right response key.

The rationale of the IAT relies on the assumption that it is easier to respond to items with the same response key if the category labels are strongly associated than if they are not. For a person with a negative implicit attitude toward the partner it should be relatively easier to respond (i.e., responses should be faster) with the partner/negative and stranger/positive key assignment as compared to the partner/positive and stranger/negative key assignment. The difference of the respective mean response latencies in the two blocks is then interpreted as an indicator of the implicit attitude (see Greenwald, Nosek, & Banaji, 2003 for scoring details).

The scores of the Partner-IAT showed satisfactory reliability ($\alpha = .83$), discriminated between contrast groups of women with abusing partners and controls, and correlated with explicit attitudes towards the partner and secure attachment (Banse & Kowalick, 2007). In a meta-analysis across three studies with more statistical power and a slightly different

implementation of the IAT, Zayas and Shoda (2005) also found positive correlations with secure attachment, and in addition significant negative correlations with dismissing and fearful attachment to the partner. Interestingly, the preoccupied attachment scale correlated marginally positive with the Partner-IAT. This finding is in line with the attachment model of Bartholomew (1990) that postulates that preoccupied individuals are characterized by a negative view of self and positive view of the partner. Whereas the Partner-IAT fully confirmed the predictions of attachment theory concerning the view of the partner, this was not the case for the postulated relations between attachment and the view of the self. A Self-IAT that was constructed very similarly to the Partner-IAT failed to produce any significant correlation with attachment scales across the three studies of Zayas and Shoda (2005). From a theoretical perspective (e.g., Bartholomew, 1990) the view of the self should be as important as the view of the partner for constituting individual differences in attachment, therefore it should be possible to demonstrate a link between implicit self-evaluations and attachment styles.

What would you do if I sang out of tune? Implicit If-Then contingencies

Baldwin, Fehr, Keedian, Seidel, and Thomson (1993) investigated the relation between individual differences in attachment and chronic expectations of partner responses to own behavior by using explicit and implicit approaches in parallel. It was expected that individuals with secure attachment would indicate more optimistic interaction expectations than insecure individuals. Explicit interpersonal expectations in a romantic relationship were measured in three different contexts (trust, dependency, and closeness) using sentences such as "You want to spend more time with your partner...". The participants then indicated the frequency of positive (...he/she accepts you) and negative outcomes (...he/she rejects you). As expected, anxious-ambivalent individuals reported more negative expectations in the domains of trust and closeness seeking (but not dependency), and avoidant individuals reported more negative expectations in the trust domain. However, these results could be accounted for by individual

differences in social desirability or by semantic overlap between reported interpersonal expectations and attachment measures.

In a second experiment, these alternative explanations were eliminated by using a lexical decision task to assess interpersonal expectancies. To prime specific interpersonal contexts, sentences were displayed word by word (600 ms each), followed by targets which had to be classified as words or non-words. As expected, secure individuals responded relatively faster to words related to positive partner behavior, and avoidant individuals relatively faster to target words related to negative partner behavior (the number of anxious-ambivalent participants was not sufficient for analysis). This result was the first experimental demonstration that adult attachment styles are indeed characterized by specific if-then contingencies at the representational level.

What are the cognitive underpinnings of secure attachment? In a very extensive research program comprising eight studies, Mikulincer, Shaver, Sapir-Lavid, and Avihou-Kanza (2009) explored the "secure base script" (Waters & Waters, 2006). This script is postulated to reflect the steps of the activation and deactivation of the attachment system in a securely attached individual: 1) If distressed one can seek proximity to a relationship partner for help, 2) this partner will be available and responsive, 3) proximity to this person provides comfort and alleviates distress. Prior work on the secure base script has mainly used the prompt-outline technique, in which participants are prompted with a sequence of words that suggest a distressing situation and some kind of resolution. These words have to be used to write a full story of the event. This narrative is then coded for correspondence with a normative secure base script. Interestingly, the "scriptedness" of the narratives was related to the coherence of mind score of the Adult Attachment Interview and to self-report measurers of adult attachment (c.f., Mikulincer et al., 2009). In their study Mikulincer et al. (2009) tested the hypotheses that securely attached individuals would use their "secure base" script to deal with a distressing event exactly as an expert confidently deals with a problem based on his scripted

expert knowledge. In Study 1, four sets of three pictures were used to prompt a story that had to be written by the participants. The three pictures were always showing one person in distress, some other person helping, and the distressed person in a state of happy relief. Two picture sets were attachment-related (injured person in a hospital or a stressed person at work), and two attachment-unrelated (showing a person dealing with a bank or a shop clerk). The attachment-related narratives were later judged on their correspondence to the secure base script and the unrelated stories on general elaborative richness without referring to attachment. The results of Study 1 showed that the secure base scriptedness of narratives was negatively related to attachment anxiety ($ß = -.35$) and avoidance ($ß = -.45$) in a multiple regression, but unrelated to verbal ability, social desirability, or narrative skills.

In Study 2, participants were only shown the first picture of the hospital set and were asked to write how the story continues. The narratives were coded for the three elements of the secure base study (i.e., active seeking of support, support availability, and relief of distress). As expected, insecure attachment was related to less secure base scriptedness. Interestingly, and perfectly in line with the theory, anxiously attached participants more often wrote stories in which an injured person was seeking support but was not helped and not relieved, whereas avoidant individuals rather wrote stories in which the protagonist achieved relief but did not seek or find support. A negative relation between avoidance and anxiety with support seeking and support availability was also found when participants were presented with the first and the third picture (distress and relief) and had to tell a story what had happened in between (Study 3).

Returning to the roots of Freudian psychoanalysis, Mikulincer et al. also investigated to what extent elements of the secure base script would appear in dreams. For a period of one month the participants wrote down all their dreams. From these dream diaries, distress-dreams were identified and coded for secure base-scriptedness. Also in this spontaneously generated material higher scores in anxious and avoidant attachment were related to fewer mentions of

support seeking, support availability, and distress relief. In the Studies 5 and 7 it was investigated whether the secure base script would show a classic schema-effect of going beyond the information given. Participants had to read a complex story about an athlete who was injured and hospitalized. The story contained a large number of details that were related to a secure base script (e.g., that he was distressed and called his girlfriend to the hospital) or unrelated to attachment (e.g., about his ambitions and achievements). Then participants had five minutes to write down all the material they could remember. The items were content coded into the categories secure base script recollections or impressions, and attachment irrelevant recollections and impressions. As expected, the secure base impressions (i.e., attachment-related thoughts that had not been mentioned in the story), were negatively related to both avoidant and anxious attachment. No relation was found for recollections of attachment-related story material, or attachment irrelevant impressions and recollections.

In the remaining studies it was shown that avoidant and anxious attachment was related to longer response latencies in judging attachment related traits of the protagonists, a better long-term memory and more efficient information processing of attachment-related information (but not for irrelevant material). This latter effect was also observed under a cognitively taxing thought suppression instruction (not thinking about a white bear) during the recollection task. This latter finding indicates that the information processing advantage of securely attached individuals for (and only for) attachment-related information is due to a largely automatic operation of the secure base script. Overall this study not only provides impressive evidence for attachment-specific individual differences in the mental representation of relationships, but also how these individual differences can be systematically investigated using the methods that have been developed in cognitive psychology.

Attachment as a dynamic cognitive-motivational process

It is a core tenet of attachment theory that the attachment system is activated by any kind of distress. Mikulincer and Shaver (2003) formulated a process model that specifies the cognitive and motivational processes that distinguish the three attachment types (i.e., secure, anxious-ambivalent and dismissive). The process model consists of three consecutive steps or modules (Figure 2). A first module scans the environment for signs of threat or danger. Upon the discovery of a threatening event the attachment system is activated and a search for proximity with an attachment figure (real or imagined) is initiated. Then in the second module it is checked whether an attachment figure is available, and whether the figure is attentive and responsive. If that is the case, security based strategies are activated and the threatening situation is overcome.

If no attachment figure is available, or if the person is not attentive and responsive, the system elicits attachment insecurity that is accompanied by increasing distress. At this point the third module evaluates whether proximity seeking is a viable option. If that is not the case, the system starts deactivating strategies that aim to down-regulate the system and to avoid threat and attachment-related cues. A chronic use of this behavior strategy constitutes dismissive attachment. If proximity seeking appears to be an option, the system elicits hyper-activating strategies leading to hypervigilance regarding threat and attachment related cues. A chronic use of this strategy constitutes anxious-ambivalent attachment.

The model neatly maps onto the three attachment types secure, avoidant, and anxious-ambivalent described by Ainsworth et al. (1978). It can explain the attachment-specific patterns of behavior, arousal, emotion, and also allows researchers to derive specific hypotheses regarding cognitive processes such as attention allocation, and the activation or inhibition of specific kinds of information. The model is also consistent with the secure and fearful attachment types postulated by Bartholomew (1990). However, the one type of avoidant attachment is not compatible with Bartholomew`s distinction of a dismissing-

avoidant and a fearful-avoidant type. Mikulincer and Shaver (2003) make an attempt to integrate the fearful-avoidant type into their model by suggesting a chronic simultaneous activation of hyperactivation and deactivation strategies. This possibility is not very plausible, however, because in the model these two strategies are clearly conceptualized as *alternative* ways of coping with insecurity. However, the incompatibility between both models could be resolved by considering Batholomew´s (1990) account as a model of the cognitive representations of the self and significant others, whereas Mikulincer and Shaver's model (2003) is a process model that describes the unfolding dynamics of the attachment system when it is activated. There is no logical reason to assume that a negative evaluation of the partner and the self is only driven by hyperactivating and deactivating strategies. However, from the Mikulincer and Shaver model specific hypotheses can be derived about the interaction between the mental representation of attachment figures, current threat, and attachment cues when the attachment system is activated.

Activating the attachment system: Effects of threat and distress

Under conditions of distress the attachment system is activated and individual differences in attachment are expected to fully unfold. Based on this reasoning one might expect that an assessment of implicit relational schemas under emotionally neutral laboratory conditions may be suboptimal to unravel the potency of the socio-cognitive approach. In a series of three experiments Mikulincer, Gillath, and Shaver (2002) tested experimentally whether subliminally presenting a threatening (failure or separation) versus neutral (hat) word influences the accessibility of names of attachment figures, close persons without attachment functions, known, or unknown persons. For each participant the names of people belonging to the four groups were individually identified; the accessibility was assessed using a word-non word discrimination task. As expected, after a very brief presentation of the threat related word "failure" the name of the attachment figures was more quickly recognized than in the neutral condition, and the attachment figure was more quickly recognized than any other

person category. Moreover, anxiously attached individuals were generally faster to recognize the names of attachment figures independently of the threat manipulation (Mikulincer et al. 2002, Study 1). The authors interpret this finding as evidence for an almost chronically activated attachment system in anxiously attached individuals. In a second study the word "separation" was used as a threat stimulus. The results of Study 1 were fully replicated. In addition an effect of avoidant attachment was also obtained such that following subliminal presentation of the word "separation" the accessibility of names of attachment figures was *reduced* in avoidant individuals. The results were conceptually replicated in a third experiment using a color naming task in a Stroop paradigm.

Stressful conditions were also effective in moderating the correlates of implicit measures of partner- and self attitudes. Building on the work of Zayas and Shoda (2005), Dewitte, De Houwer, and Buysse (2005) made an effort to experimentally activate the attachment system before assessing a Self-IAT by instructing participants to imagine that their relationship partner would go abroad for a long time. Moreover, as compared to Zayas and Shoda, they implemented a more relationship-specific self-esteem IAT using the labels *relationally worthy* (with items like loved, liked, agreeable) and *relationally unworthy* (with items like inferior, rejected, disagreeable). Under these conditions, low scores in the Self-IAT were in fact related to self-report measures of anxious attachment, and also predicted negative feelings and thoughts related to the separation situation.

In a field study Banse and Kowalick (2007) showed that correlations between a Partner-IAT and well being were contingent upon the stress level of participants. In a group of female students with relatively low stress levels only explicit, but not implicit attitudes toward the romantic partner were related to well being. In a high-stress group of women with pregnancy-complications in an ante-maternity ward, however, both explicit and implicit attitudes toward the partner were independently related to well being. This result is compatible with the idea that only under stressful life conditions the attachment system is activated. In this situation a

positive implicit partner attitude can serve as a psychological resource that can effectively buffer against stress and increase well being over and beyond the positive effects of explicit partner attitudes.

Attachment and Selective Attention under Stress

One crucial psychological factor in coping with stress is selective attention. The direction of attention is a core element of the behavior patterns that define Ainsworth et al.'s. (1978) insecure attachment types in the Strange Situation: despite their distress, avoidant children almost conspicuously direct attention away from the returning mother, whereas anxiously-ambivalent children appear to simultaneously turn away from and to desperately seek close contact with their mother. Attention plays an important role when the attachment system is activated, but individual differences in attachment also should reflect chronic tendencies to avoid or to attend to threatening stimuli, in particular if these are relationship-specific.

Dewitte, Koster, De Houwer, and Buysse (2007) explored the relation between adult attachment and selective attention using the dot-probe paradigm (MacLeod, Mathews, & Tata, 1986). In this paradigm two words, one neutral, and one relevant, are presented simultaneously at different locations on a computer screen. In this study relevant stimuli were words related to a general threat, attachment related threat, as well as general positive, or attachment-related positive words. Immediately after the words were removed from the screen, a dot-probe was presented either at the location of the neutral or the relevant word. Participants had to react to the location of the dot-probe as fast as possible. If attention was already directed to the location of the probe, this reaction is faster than in trials in which the participant had attended to the other location. The results showed that only individuals with high scores in both anxious and avoidant attachment turned their attention away from attachment-related threat words (separated, rejected, ignored). This interaction effect was

specific to relationship threat (as opposed to general threat words) and to insecure attachment (as opposed to general anxiety).

Edelstein and Gillath (2008) conducted a similar study, but used a variant of the emotional Stroop task to measure selective attention. In this task, participants have to name the print color of emotional and neutral words. If the response latencies are longer for emotional than for neutral words, this effect is interpreted as an interference effect of the task-irrelevant emotional meaning of the words. Contrary to the dot-probe task an allocation of attention to relevant words results in longer and not in shorter response latencies, but both tasks are assumed to indicate the selective allocation of attention to relationship-specific threatening words. The main hypothesis of Edelstein and Gillath (2008) was that avoidant individuals would direct their attention away from attachment-related words. In addition they investigated whether this process is automatic or whether it requires cognitive resources by manipulating cognitive load during the Stroop task. The relationship status was assessed as a control variable.

The results did not confirm the author's hypotheses that avoidant attachment is related to a general avoidance of attachment-related information. However, an interesting complex interaction was observed: highly avoidant individuals who were currently in a romantic relationship showed a significant decrease of Stroop interference for attachment-related words, but only under conditions of low cognitive load. This finding is theoretically suggestive, because it indicates that attention allocation is related to avoidant attachment, but only for individuals with a romantic partner for whom relationship words are presumably more relevant. Even more importantly, the effect of the cognitive load manipulation suggests that the selective attention effect is a controlled process that requires cognitive resources, as opposed to a highly overlearned automatic process. Of course, although the sample was relatively large ($N = 189$), complex interaction effects of this kind call for a replication. However, this study is a good example that the use of cognitive research paradigms can shed

light on the exact nature of attachment-related information processing. From a psychodynamic perspective one might expect that the avoidance of potentially threatening information in avoidant individuals reflects defensive coping and is therefore a largely unconscious defense process. But the findings of this study rather suggest the contrary that avoidant attention allocation can be a controlled strategy to cope with relationship-specific threat.

Stressed up and nowhere to go: Motivation and goals

According to the Mikulincer and Shaver (2003) model the immediate consequence of the activation of the attachment system is seeking proximity to an attachment figure. One should therefore expect that the presentation of a threat-related word, even under conditions of marginal visibility, will activate the attachment system and in turn the cognitive representation of attachment figures and the abstract concept of connectedness. This hypothesis was confirmed by Murray, Derrick, Leder, and Holmes (2008) who showed that after writing a short description of how they had been hurt, disappointed, or let down by a close other (threat) participants were faster to recognize connectedness words (e.g., kiss, trust, faith) than to recognize self-protection or hostility words in a lexical decision task. Noteworthy, this finding is in line with a dynamic view of connectedness regulation but the opposite of what one would expect on base of a semantic priming effect.

The model further predicts that approach tendencies to an attachment figure should depend on the activation of the attachment system, and they should be particularly strong in anxiously attached individuals, and particularly weak in avoidant individuals. Dewitte, De Houwer, Buysse, and Koster (2008) tested these predictions by manipulating a relationship-specific or unspecific threat (imagining a separation in Exp. 1 and failing an exam in Exp. 2). Approach-avoidance tendencies were assessed by instructing participants to move an animated manikin towards or away from stimuli related to the attachment figure or an acquaintance. Relatively faster movements towards and slower movements away from a

specific target were then used as an implicit indicator of approach tendencies. Across two experiments, the threatening situation elicited more approach tendencies than the non-threatening situation. The expected effect of increased approach behavior by anxious individuals was confirmed in both experiments, a decreased approach behavior of avoidant individuals was found in Experiment 2. No interactions between threat and attachment were observed, a result that was expected for anxious attachment (due to an almost chronic activation of the attachment system) but not for avoidant attachment. In a further study (Dewitte & DeHouwer, 2008) the strength of approach and avoidance goals was assessed using a standard evaluation IAT with the target concept labels *proximity* and *distance* (Exp. 1) and a more motivational IAT-variant with the attribute labels *I want* and *I don't* want. The results showed that independently of the threat-manipulation, attachment avoidance was related to a more positive evaluation of distance goals at both the implicit and explicit level. Attachment anxiety was only related to explicit distance goals.

A study by Gillath, Mikulincer, Fitzsimons, Shaver, Schachner, and Bargh (2006) investigated the effects of an unobtrusive activation of attachment figure representations on attachment- related behavior tendencies (self-disclosure in Exp. 1 and support seeking in Exp. 2) toward a non-threatening new friend. Subliminal priming with attachment figures, but not close others or acquaintances, led to more willingness to self-disclose. Attachment style moderated the effects: avoidance was related to less willingness to self-disclose, and anxiety to faster self-disclosure decisions (Exp. 1), probably due to lower levels of decision conflict about self-disclosure. The tendency to seek support was negatively related to avoidant attachment (Exp. 2). In Exp. 3 the type of attachment to the attachment figures and the type of goal (anxious, secure, and avoidant) presented in a word/non-word decision task were crossed in a full factorial within-participant design. The results confirmed that subliminal priming with a person towards whom the participant has a secure, anxious, or avoidant attachment specifically facilitated the word recognition for the corresponding secure, anxious, or avoidant

behavior goal words. Together the three experiments strongly support the prediction of the Mikulincer and Shaver attachment model that specific attachment persons are mentally associated with attachment-specific behavior goals.

In a particularly fascinating follow-up study, Mikulincer, Shaver, Bar-On and Ein-Dor (2010) investigated attitudinal and motivational *ambivalence* toward romantic partners at the explicit and implicit level. The attachment model predicts that anxious-ambivalent individuals have a strong motive to be close to the partner, but simultaneously fear to be rejected. These opposing tendencies should lead to a simultaneous activation of positive *and* negative evaluations of the partner, as well as to a simultaneous activation of approach *and* avoidance tendencies.

Attitudinal ambivalence at the explicit level was measured by asking participants to rate their partner on several traits that were each represented by a positive and a negative item. If ambivalence was low, the difference between positive and negative items should be relatively large (e.g., if the evaluation of the partner is positive, the positive item has a high and the negative item a low score). Ambivalent attitudes were characterized by simultaneously holding strong positive and strong negative evaluations about the partner, rendering the average score of a positive and a negative item high, and their score difference small. At the implicit level, ambivalence was assessed using an approach-avoidance task in which a lever had to be pulled towards the participant (approach) or pushed away from the participants (avoidance) when words related to closeness, distance, or attachment-irrelevant words were presented. The ambivalence score was again calculated by "subtracting the absolute difference between the approach and avoidance scores from the average of these scores" (Mikulincer et al., 2010, p. 455). Across two studies, the results showed significant negative relations between attachment-anxiety (but not avoidance) with explicit attitudinal ambivalence toward closeness, and also implicit ambivalence, as assessed by simultaneous approach and avoidance tendencies. These results were further extended by using a lexical

decision task as an implicit measure of ambivalence. In this task, participants had to react to words denoting positive and negative partner traits (that were ideographically determined) after being subliminally primed with the partner name or not. Together this series of studies provides strong supportive evidence that anxiously attached individuals simultaneously hold positive and negative explicit attitudes toward their relationship partner, and that this ambivalence can also be demonstrated at an implicit level for simultaneously activated approach and avoidance tendencies and the simultaneously increased accessibility for both positive and negative attributes of the partner.

Self-esteem and automatic functioning

As an alternative approach to the effect of individual differences in self- and partner-related cognitions researchers have investigated the effects of self-esteem on automatic functioning. Self-esteem, the positive evaluation of the self, is strongly connected with attachment styles and partnership behavior. In Bartholomew's (1990) model of attachment, the four different prototypical attachment styles result from the configuration of the view of the self and of the partner as either positive or negative. Given that two types of insecure attachment (preoccupied and fearful) are characterized by negative models of the self the estimation of oneself seems to play a pivotal role. Although in Bartholomew's model the view of the self as positive or negative refers to one's self-evaluation as a relationship partner, it seems highly plausible that relation-specific self-worth is at least partially contingent on one's general estimation of self-worth, being one's self-esteem.

A number of studies have investigated the effect of explicitly measured self-esteem on the automatic processing of relationship-relevant information. Baldwin and Sinclair (1996) showed that individuals with low self-esteem were faster to correctly detect words related to rejection after being primed with words representing failure, and they were also faster to detect acceptance words after success primes. Thus, participants with low self-esteem showed

a greater automatic association of performance (success vs. failure) and reaction (acceptance vs. rejection), indicating an internal representation of acceptance contingent on success (as opposed to unconditional acceptance).

Subsequent research showed that this contingent acceptance was not only true for the perception of low self-esteem individuals' acceptance *by others* but also for their own acceptance of others. DeHart, Pelham, and Murray (2004) showed that the implicit liking of relevant others (preference for partner's or best friend's name letters) was contingent on explicit estimation of current relationship quality only for low self-esteem individuals. Whereas high self-esteem individuals always showed implicit liking of their partner or friend, low self-esteem individuals only did so when they currently felt close to this person.

Such a contingent representation of acceptance in a relationship exposes low self-esteem individuals to the constant threat of rejection – in any situation in which they do not meet the expectations of significant others. The connection between self-esteem and rejection sensitivity is also at the core of self-esteem theories. According to Leary's (Leary, Tambor, Terdal, & Downs, 1995) sociometer theory, self-esteem is essentially a monitor of the degree to which one is either accepted and included or rejected and excluded by others. In line with such reasoning, low self-esteem has been described as embodying general expectations of rejection (Leary & Baumeister 2000; Murray, Derrick, Leder, & Holmes, 2008).

Based on these assumptions, low self-esteem individuals are hypothesized to be particularly sensitive to words with rejection-relevant content. To test this, Dandenau and Baldwin (2004) had participants low or high in self-esteem complete a Stroop task in which they had to identify the print color of words that were neutral or related to rejection. If rejection-related content automatically captured attention, this would cause longer latencies in color naming (i.e., greater interference) as compared to neutral words. Such a pattern of results was previously found for unpopular school children (Martin & Cole, 2000), and indeed was replicated for low self-esteem individuals by Dandenau and Baldwin (2004; Study 2).

Rejection sensitivity and automatic functioning

As argued above, low self-esteem and greater attention to rejecting peers or partners are closely related. In addition to the well-established link between low self-esteem and automatic rejection sensitivity (e.g., Dandenau & Baldwin, 2004) an individual difference measure in rejection sensitivity was developed to tap into this process more directly (Downey & Feldman, 1996). Corroborating the previous findings, highly rejection sensitive individuals also show greater interference caused by rejection words in a Stroop task (Berenson et al., 2009). Speaking to the close relation between self-esteem and sensitivity to rejection, low self-esteem individuals have been shown to have higher scores on rejection sensitivity (Edelstein & Gillath, 2008; Gyurak & Ayduk, 2007) with the two continuous measures being negatively correlated (around $r = -.46$; Berenson et al., 2009). Persuasive evidence for the underlying automatic nature of individual differences in rejection sensitivity was provided by Downey, Mougios, Ayduk, London and Shoda (2004) who demonstrated that highly rejection sensitive individuals showed an increased activation of the defensive motivation system (DMS; Lang, Bradley, & Cuthbert, 1990) as indicated by heightened startle responses when viewing images conveying rejections.

The assumption that a greater sensitivity for rejection-related cues is one of the core mechanisms of insecure attachment is not only supported by moderate correlations between measures of rejection sensitivity and measures of attachment anxiety ($.43 \leq r \leq .48$; Berenson et al., 2009) as well as with avoidant attachment ($.30 \leq r \leq .33$; Berenson et al., 2009), but also by similar effects at an automatic level. Replicating findings reported for anxious and highly avoidant people (Dewitte, Koster, De Houwer, & Buysse, 2007) rejection sensitive people also actively avoid threatening faces in a Visual Probe task (Berenson et al., 2009).

Overcoming automatic rejection sensitivity

Given the central role attributed to attentional adhesion to rejection cues in insecure attachment and low self-esteem, it seems highly desirable to learn whether it is in principle

possible to intervene at such an early stage of attention to promote healthier attachment and self-esteem processes. Dandenau and Baldwin (2004) have proposed a paradigm to retrain automatic attention away from rejection cues and towards acceptance cues. Participants were instructed to find one smiling (accepting) face in an array of 15 frowning (rejecting) faces for 112 consecutive trials. Compared to a control group that had to find five-petaled flowers in an array of seven-petaled flowers low self-esteem individuals who did such a retraining showed less interference by rejection words in a subsequent Stroop task. This result was replicated by Dandenau, Baldwin, Baccus, Sakellaopoulo, and Pruessner (2007; Study 2) who showed that this effect was not just a matter of desensitization or habituation due to exposure to rejection-related facial expressions but specifically related to the task of identifying the accepting face. Whereas shifting attentional bias to the accepting face decreased the interference caused by rejection words, the mere exposure to the same matrix of predominantly angry looking faces did not have the same effect; instead, it further increased interference caused by rejection words. If the training procedure developed by Dandenau and Baldwin (2004) could be shown to have robust effects also across a longer time span it would offer an intervention directed at one of the core mechanisms of insecure attachment. Future research should systematically explore whether it is possible to re-learn the habitual attentional focus from rejection cues to acceptance cues and thereby breaking a vicious cycle inherent in insecure attachment.

Recent developments: Predicting relationship outcomes

The Achilles' heel of measurement approaches to automatic attitudes has long been the question of reliability. Despite the large amount of meaningful results found with lexical decision tasks and sequential priming these procedures commonly do not meet the standards of psychometrically sound measures. As has been noted by several researchers, priming procedures have particularly low reliability ($r = .02$ to $.26$; e.g., Banse, 1999, 2001), making it difficult to relate individual differences in implicit measures of automatic functioning to other

outcome variables of relationships. Such suboptimal reliability scores of priming procedures are not specific to the relationship domain but an inherent problem of priming procedures that have a comparable reliability also in other domains ($r_{sh} < .20$; Olson & Fazio, 2003). These psychometric flaws also limit the applicability of procedures. A procedure with low reliability might suffice to test for group differences between artificially created groups high or low in the psychological variable of interest (e.g., self-esteem). However, for the measurement of continuous individual differences and their relation to outcome variables it is crucial to have a reliable estimate of individual scores on the dimension of interest (see Table 1 for an overview of indirect measures).

With the increased interest in automatic processes in social cognition research new methods have been developed that seem to produce more robust effects. The most widely used of these procedures is the Implicit Association Test (IAT; Greenwald et al., 1998). One of the major advantages of the IAT is its comparably high reliability, indicated by internal consistencies ranging from .70 to .90 (Nosek, Greenwald, & Banaji, 2007) and a median retest reliability of around .50 (Lane, Banaji, Nosek, & Greenwald, 2007). In addition to its reliability, a large number of studies have also provided support for the validity of the IAT approach (for an overview and an extensive discussion of criticisms and unresolved issues see Teige-Mocigemba, Klauer & Sherman, 2010).

Partner-IAT scores have been shown to be positively related to indicators of secure attachment and negatively to an avoidant attachment style (Zayas & Shoda, 2005). As further evidence that the IAT taps into meaningful variance Murray, Holmes, and Pinkus (2010) recently showed that individual differences in the association between the partner and general positivity after four years of marriage were meaningfully related to initial partner experiences among these couples at the beginning of their marriage. For more than 100 newlywed couples diary data from the first weeks of marriage was used to code for frequency of one partner's unresponsiveness to the other partner's needs, cold and distancing behavior in general and

specifically in reaction towards feeling rejected. These negative early relationship experiences were systematically related to lower Partner-IAT scores four years later.

So far, no other indirect measure equals the IAT with regard to reliability and the mere quantity of supporting evidence for its validity. However, a very promising runner up is the Affective Misattribution Procedure (Payne et al., 2005). In this task participants are briefly exposed to a prime word or picture (e.g., a partner-related word) for 75ms that is then replaced by a Chinese ideograph as an affectively neutral target for 100ms, before this is again replaced by a noise pattern (composed of black random dots on a white background). Participants are instructed to evaluate whether the pleasantness of each ideograph is above or below average. This apparently minor modification of the Murphy and Zajonc (1993) priming procedure employed in previous relationship research (e.g., Banse, 1999) seems to create dramatic effects: The AMP not only produces strong priming effects, but AMP-scores also show very high internal consistency ($\alpha > .80$) and it therefore appears suitable for the assessment of individual differences. Banse, Imhoff, Steffens, Schramm, Rösch, Roberts, et al. (submitted) provided evidence that the AMP discriminated between women with and without a history of abuse. Women with a recent battering experience exhibited a more negative evaluation of the Chinese ideographs when they were preceded by partner-related word compared to women with no experience of abuse. This effect was specific to partner-related primes, no difference was observed in the response to other-related control primes.

With such reliable measures at hand it becomes possible to relate implicit partner attitudes to relevant outcome variables like relationship behavior, life satisfaction or relationship stability. However, these possibilities also come with new requirements. For the exploration of the relational schema at an automatic level it was sufficient to show that automatic functioning was contingent on theoretically derived meaningful variables like attachment style, self-esteem or rejection sensitivity. To show that implicit measures of individual differences are a useful tool to further elucidate the role of automaticity in

relationship it does not suffice to show a relation between these measures and an outcome variable, but it is crucial to empirically establish the incremental validity of these measures. The extra efforts invested to assess implicit attitudes are only justified if these measures tell us anything we could not have known based on direct measures. So what are the empirical findings on implicit attitudes as predictors of relevant outcome variables?

Well-being

Numerous studies have found a positive relation between relationship quality and life satisfaction (Berscheid & Reis, 1998; Diener, Eunkook, Lucas, & Smith, 1999), and there is also some evidence that relationship quality is the causal factor that influences life satisfaction, and not vice versa (Heady, Veenhoven, & Wearing, 1991; cf. Diener et al., 1999). Based on these findings, a number of studies have tested the hypothesis that positive implicit partner attitudes are related to well-being (i.e., life satisfaction). As already mentioned, Banse and Kowalick (2007) found that only in women subjected to severe stress implicit partner attitudes could account for variance in well-being above and beyond explicit partner attitudes. This finding suggests that stressful life conditions activate the attachment system and that a positive automatic representation of the partner can constitute a coping resource that in turn improves well-being.

The finding that IAT scores were unrelated to well-being under normal (not stressful) conditions was replicated in another study with male and female students (Banse et al., submitted). However, in this study the AMP proved more sensitive, showing a positive correlation with life satisfaction even under non-stressful life conditions. Importantly, this relation was incremental to the relation between explicit partner attitudes and well-being. Specifically, the effect of explicit attitudes on well-being was diminished once social desirability (self deception) was controlled for. In contrast, implicit partner attitudes as measured with the AMP remained a significant predictor of well-being above and beyond social desirability. Confirming the usefulness of the AMP, it also outperformed explicit

measures in predicting well-being in a sample of female students and women with a recent battering experience once the battering experience was statistically controlled for (Banse et al., submitted; Study 2).

The seemingly robust finding of greater well-being for participants who have a positive attitude towards their partner was also investigated in the domain of ex-partners by Imhoff and Banse (in press). They hypothesized an ironic effect of positive implicit partner-attitudes and a dissociation between explicit and implicit attitudes in their relation to well-being. Whereas self-reported attitudes should be indicative of how individuals have coped with the breakup, implicit attitudes were theorized to be less susceptible to quick adaption (Gawronski & Bodenhausen, 2006). It was thus expected that positive explicit attitudes are a sign of coping and would be related to greater well-being. In contrast, positive implicit attitudes would be related to ongoing attachment to the ex-partner and thus lead to greater suffering due to the breakup and to less well-being. These hypotheses were fully supported with one additional constraint. Such a pattern was only observable for those participants who had not engaged with a new partner. Once a new partner was found, neither explicit nor implicit attitudes towards the ex-partner had any effect on life satisfaction at all.

Relationship maintenance and dissolution

One of the most central indicators of relationship success is relationship stability. Less positive implicit evaluations of the partner could be an early indicator of relationship problems even before these translate into doubts that are accessible via introspection and self-report. In line with this reasoning Lee, Rogge and Reis (2010) provided evidence that participants with positive implicit partner evaluation (as measured with a G-NAT; Nosek & Banaji, 2001) were less likely to separate during the following year, even after controlling for self-reported relationship satisfaction, hostile conflict and neuroticism. A similar (albeit indirect) effect was provided by LeBel and Campbell (2009). Preference scores for the partner's first and second initial were interpreted as an indicator of implicit partner attitudes,

which was positively related to relationship satisfaction and relationship status four months later.

In an innovative measurement approach Etcheverry and Le (2005) explored the combined role of commitment and the accessibility of commitment-related content for relationship persistence. Whereas the explicit responses on a standard questionnaire (Rusbult, Martz, & Agnew, 1998) indicated the degree of commitment, the response time participants took to complete these items was interpreted as accessibility of these contents. The authors could show that the predictive validity of the explicit responses was strongest for the fastest responses as the relation between the explicit commitments scores and relationship persistence seven months later was moderated by commitment accessibility. Interestingly, low explicit commitment that was highly accessible only predicted breakup for those participants who initiated the breakup, not for those who have been left by their partner. In a second study the same pattern was found for accommodative relationship behavior and the willingness to make sacrifices for the romantic partner. Again, the relation between commitment and pro-relationship behavior was particularly pronounced for those participants whose automatic accessibility of commitment (i.e., the speed with which they responded to the commitment scale) was strongest.

Breakup adjustment

If implicit representations of the partner are indeed less susceptible to change than explicit and verbalized attitudes it is highly likely that implicit partner-related attitudes continue to have an impact on the life even after a relationship has dissolved. Mirroring the finding that implicit negative associations with the partner may serve as early indicators of relationship decay (Lee et al., 2010; see above), positive attitudes after breakup might have the reverse effect. As noted above, research by Imhoff and Banse (in press) indeed showed that positive implicit ex-partner attitudes (measured with an AMP) after breakup were related to a diminished life satisfaction as long as no new partner appeared on the scene. Furthermore,

for participants who were still single, positive implicit attitude towards the ex-partner were related to greater suffering and a greater willingness to undo the breakup and get back together with the partner. No such effect was observed for any explicit measure. These findings are corroborated by results from a study that employed a different indirect measure: a lexical decision task with partner vs. other names as target and subliminally presented positive or negative words as primes (Fagundes, 2011). As in the study by Imhoff and Banse (in press) greater negative implicit evaluation of the ex-partner was related to less depression. In addition, an increase in implicit negative evaluation over the course of four months was associated with a decrease in depressive affect, providing further evidence for the protective function of negative implicit attitudes towards the ex-partner after breakup.

Future challenges for the "relational cognition" approach

Implicitness

What exactly do indirect measures measure? Are implicit partner attitudes unconscious, unknown or only un-admitted? The answer is: we still do not know. As we have argued above the evidence for the claim that implicit measures are unconscious is marginal at best. For pragmatic reasons, however, it may seem sufficient to demand that the extra efforts required by latency-based or other indirect measures should be rewarded by extra benefits that could not have been achieved by simply asking individuals. For instance, implicit partner-related attitudes have been repeatedly shown to explain additional variance over and above explicit measures (Banse et al., submitted; Banse & Kowalick, 2007), that they are independent of social desirability (Banse et al., submitted) and under specific circumstances, that their effect is even directly opposed to the effect of explicit attitudes (e.g., Imhoff & Banse, in press). DeHart et al.'s (2004) finding that low self-esteem individuals' liking of relevant others was contingent on the explicit estimation of current relationship quality was only found for implicit but not for explicit liking of the other.

Direct evidence for the extra information inherent in indirect measures comes from a study by Scinta and Gable (2007). They reasoned that individuals who have high barriers to exit a relationship – either because they have already invested so much in the relationship or because they have no attractive alternatives to turn to – should be particularly motivated to idealize their potentially imperfect relationship. Whereas individuals with low exit barriers might just leave an unhappy relationship, those with high barriers were expected to rather stay together and to adjust their evaluation to this choice. However, convincing oneself or others of the virtues of the relationship should be a reflective or controlled process. In contrast, automatically activated attitudes were hypothesized to be unaffected by such strategic considerations. This is exactly what the authors found: barriers to terminate the relationship moderated the relation between implicit and explicit measures. For participants who had low barriers to quit the relationship the explicit relationship satisfaction was aligned with their automatic attitudes towards their partner. However, for participants with a high necessity to sustain the relationship (high barriers to exiting) negative automatic attitudes were accompanied by (descriptively even more) positive explicit evaluation of the relationship. This result shows the usefulness of taking automatic associations into account. Whereas explicit self-reports were strategically adapted in a manner of dissonance reduction, automatic attitudes were unaffected by this reflective process (see also Gawronski & Strack, 2004).

Although these results support the usefulness of indirect measurement approaches in principle, they do not imply that any evidence of implicit processes has explanatory power exceeding that of direct measures. It thus remains highly desirable to provide evidence for both the implicitness of the involved processes (cf. De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009) and its incremental validity above and beyond explicit measures.

From static to dynamic attachment models

The review of the research literature has demonstrated that a large range of important questions in relationship research can be investigated using priming methods or other

cognitive paradigms. As opposed to some earlier accounts, Baldwin's (1992) concept of a tripartite relational schema consisting of a view of the self, the relationship partner, and an interaction script provides a precise conceptual framework for the mental representation of relationships. The presented research demonstrates that the relational cognition approach has generated many hypotheses about the function of relational schemata that have been subjected to empirical tests. In addition, the use of mainly latency based, cognitive measurements has avoided some of the methodological problems that plague the use of self-report measures in relationship research.

Until now, the research program presented above has been particularly successful in investigating structural features of relational schemata such as the relation between significant other schemata and interaction scripts, and the connections of relational schemata with other constructs such as self-esteem or coping strategies. The inclusion of motivational and emotional processes in the dynamic attachment model of Mikulincer and Shaver (2003) opens a new range of fascinating questions. So far research has presented corroborating evidence for the postulated secure script, and hyperactivating and deactivating strategies underlying anxious and avoidant attachment. Future research can build on this work and tackle a host of interesting and important questions anew: which person and environmental factors determine the development of insecure attachment, how do relationship experiences maintain or change attachment-related cognitive processes and representations, and how do these translate into relationship behavior, and eventually relationship outcomes? Although many of these questions have already been addressed at a modal level, their examination at the micro-level of the very substrate of relational schemata will shed new light on the mediating processes.

Clarifying the meaning of different measurement approaches

Besides the empirical demonstration that relational schemata can be specifically activated it was also intended to develop *implicit measures* of specific aspects of the relational schema, such as the evaluative component. The presented evidence strongly suggests that it is

possible to elicit person-specific affective reactions upon the activation of person schemata or relational schemata. The Implicit Association Test (IAT) and the Affect Misattribution Procedure (AMP) were found to be valid and sufficiently reliable for an investigation of individual differences in implicit relational schemata.

Even though reliable implicit measures of relational schemata are now available, the cognitive approach has still to meet a major challenge. There are two reasons to use implicit measures in relationship research. One is to avoid that measures are distorted by a positive self-presentation or social desirability. The available evidence suggests (Teige-Mocigemba et al., 2010) that it is possible to voluntarily influence the scores of an IAT, but that it is more difficult than producing socially desirable self-report data, and that "faking good" requires either knowledge about or at least experience with the measurement procedure (Fiedler & Blümke, 2005). The second potential advantage of implicit measures in relationship research is their potential capacity to assess aspects of the relational schema that are not accessible by self-report measures, either because they are not introspectively accessible, or because they rely on automatic processes.

Although proponents of the subliminal psychodynamic activation paradigm might claim that their experimental results are due to an activation of the unconscious motive to merge "with the good mother of early childhood", to our knowledge it has not yet been empirically demonstrated that experimental approaches are able to assess unconscious contents stored in memory. It also seems rather difficult to define an empirical criterion that would make it possible to distinguish between truly unconscious content and content that is consciously accessible but not reported. In fact, it would be desirable to define a pragmatic empirical criterion to decide whether it is reasonable to assume that an indirect assessment method taps into partially or totally unconscious memory content.

Up to now the differences between implicit and explicit attachment can only be investigated by comparing the relation of explicit and implicit measures with other constructs.

This approach is viable, but quite cumbersome due to the notoriously limited number of individuals for whom an interview based attachment classification is available. However, even if a number of labs would need to join forces, it would be a tremendous advance to conduct a study with a large sample of young adults and to simultaneously use all three classes of attachment measures (explicit, latency-based and interview-based) to assess conceptually similar attachment representations (e.g., to partner or mother) and to investigate their interrelations and their multivariate relationships to important variables of relationship success (i.e., general well-being, relationship satisfaction, and stability).

Interventions at the automatic level

Preliminary evidence suggests that one of the core principles of insecure attachment, rejection sensitivity, can be retrained so that rejection-related words do not automatically attract a disproportionate amount of attention anymore (Dandenau & Baldwin, 2004; Dandenau et al., 2007). Building on these results it seems worthwhile to explore the opportunities provided by such interventions on automatic processes. If one could show an effect of an altered automatic reaction on macro-level relationship outcomes (e.g., relationship maintenance, support-seeking behavior, accommodative behavior) this would constitute a major breakthrough for strategies directed at the cognitive undercurrent of partnership problems. Such an approach may seem naïve or unrealistic at first glance.

However, research from other fields of psychology corroborates the effectiveness of interventions at an automatic level. For instance, Wiers, Eberl, Rinck, Becker and Lindemeyer (2011) provided support for the effectiveness of an automatic cognitive bias motivation intervention that targeted an approach bias for alcohol in alcoholic patients. Participants in one experimental condition were instructed to push away images of alcoholic beverages (explicit instruction). In another condition, the instruction participants received did not mention the content of the photograph but merely the format (landscape or portrait format). Importantly, the format was confounded with content of images (e.g., all landscape format

images depicted alcoholic beverages). Thus, without being explicitly instructed to do so, effectively participants in this *implicit instruction* condition pushed away images depicting alcoholic beverages. Participants in the control group received either no training at all or pushed away images according to an instruction that was effectively unrelated to alcoholic content. After four 15-minute sessions, participants in the experimental condition showed a decreased approach bias for alcohol in indirect measures (i.e., approach-avoidance task and IAT). More importantly, participants who underwent the cognitive bias re-training showed a decreased relapse rate one year later (compared to the control group).

Transposing these findings into the sphere of implicit relational cognition is tempting but not as straightforward as it seems. To the degree that individuals' avoidance or approach tendencies are dysfunctional, a cognitive bias re-training might support other forms of intervention. However, for approach and avoidance tendencies in the relationship domain it seems less clear to what degree they really are normatively dysfunctional. For individuals whose partners continuously neglect their needs it may be rather functional to avoid attention to these potentially hurtful behaviors. Similarly, the hyperactivating strategy of anxious relationship partners may function as the necessary glue to keep the relationship from falling apart. For ethical and clinical reasons it may be therefore problematic to use "direct" cognitive methods to manipulate relational schemata. Despite these problems further exploring the possibilities of interventions at the automatic level of relational cognition will be a fascinating venue for future research.

A final credo

Personal relationships are a complex phenomenon, which is why research in this field is often surprising, sometimes disappointing, but always fascinating. A common feature of the empirical work presented here is the combined use of different research methods including explicit verbal self-reports, behavior observation, and sophisticated indirect methods

(including a range of conceptually different methods such as the AAI, IAT and AMP). The historical development of relationship research and many other fields of psychology teaches us that scientific progress is often hampered if empirical research is too tightly linked to a single method or research paradigm. The work presented here shows that we have at our disposal a large variety of methods to study mental representations of relationships and their consequences at different levels and from different perspectives, thus preventing us from acquiring a one-sided view due to methodological shortcomings. We just have to use them.

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Table 1. Reliabilities of latency-based measures of partner attitudes.

Measure	Study	Reliability
Implicit Association Test (IAT)[A]	Banse & Kowalick, 2007	$\alpha = .83$
	Zayas & Shoda, 2005[B]	$\alpha = .74$ (Study 1), $\alpha = .64$ (Study 2)
	Banse, et al., 2011	$\alpha = .78$
	Scinta & Gable, 2007	Not reported
Affect Misattribution Procedure (AMP)	Imhoff & Banse, 2011	$\alpha = .83$
	Banse et al., 2011	$\alpha = .82$ (Study 1); $\alpha = .89$ (Study 2)
Go/ no-go association task (G-NAT)	Lee et al., 2011	Not reported
Name Letter Effect	LeBel & Campbell, 2009[C]	$\alpha = .48$[D]
Sequential Priming (lexical decision task)	Fagundes, 2011	$r_{tt} = -.05$ (four month retest interval)
Sequential priming (evaluative classification task)	Scinta & Gable, 2007	Not reported
	Banse, 2001	$\alpha \leq .26$
Sequential priming (evaluative judgment task)	Banse, 1999	r_{tt} between -.06 and .28

Note. [A] Reliabilities differ partially due to the number of critical trials ranging from 40 (Zayas & Shoda, 2005) to 160 (Banse & Kowalick, 2007) per combined block. [B] Reliability estimate not included in the publication, calculated for Partner-IATs based on the raw data kindly provided by the authors (internal consistency based on two standardized difference scores for the first and second half of the combined blocks). [C] Reliability estimate not included in the publication but kindly provided by the authors. [D] Based on ipsatized double-correction algorithm (I-algorithm; Baccus, Baldwin, & Packer, 2004; LeBel & Gawronski, 2009) calculated on partner's first name and surname initials
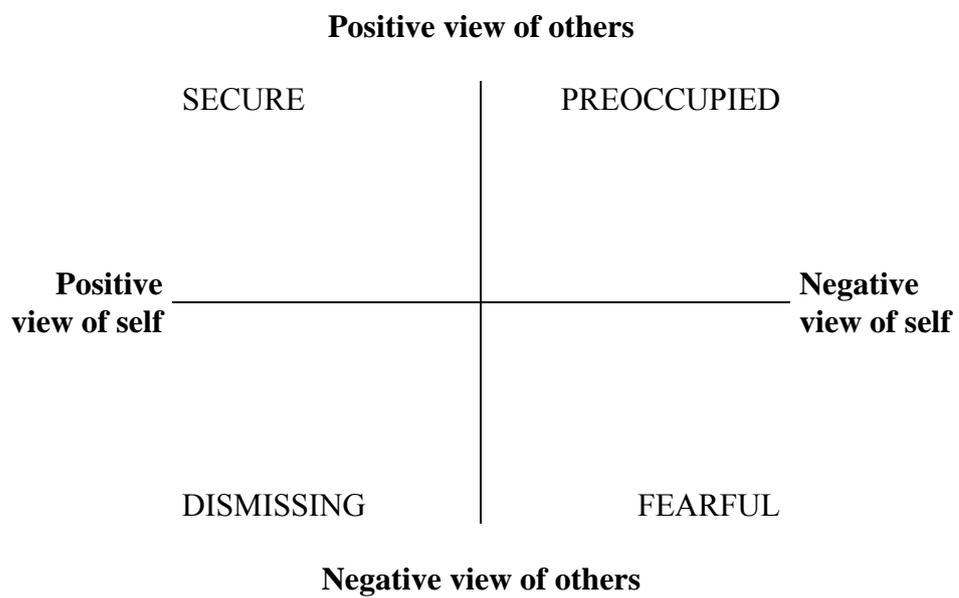
Figure 1

Positive view of others

SECURE   PREOCCUPIED

Positive   **Negative**
view of self   **view of self**

DISMISSING   FEARFUL

Negative view of others

Figure 1. The four prototype attachment model (Bartholomew, 1990).
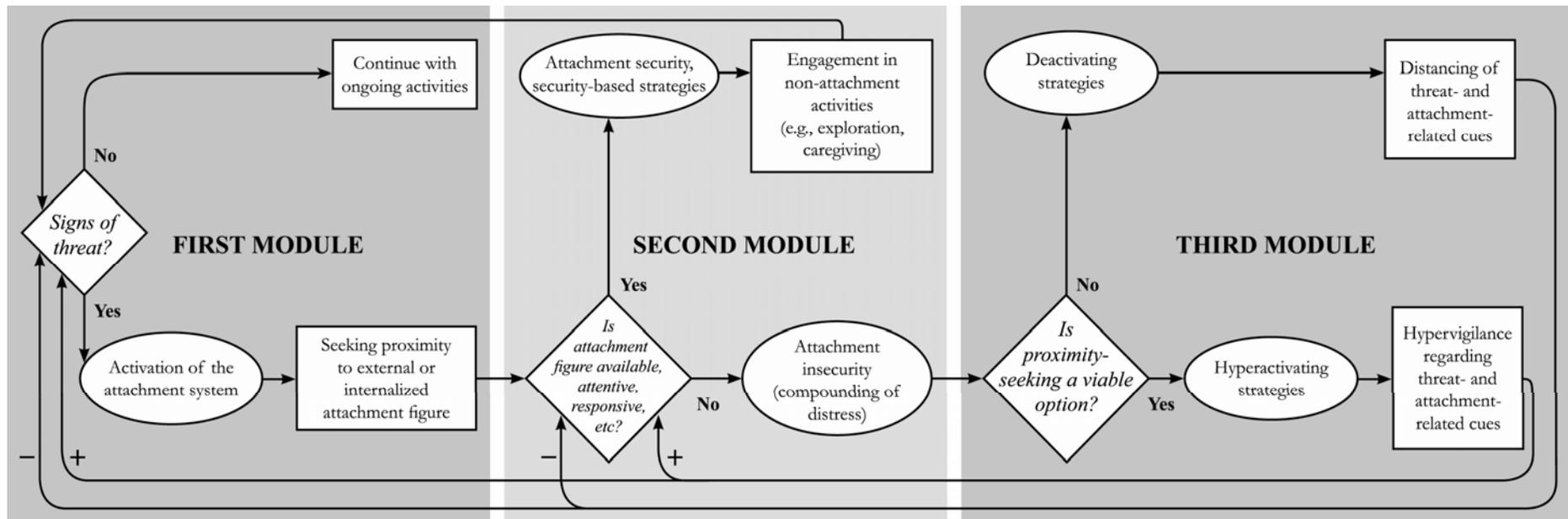
Figure 2. The dynamic model of attachment processes (adapted from Shaver & Mikulincer, 2003).