AUTOMATIC EVALUATION OF SELF AND SIGNIFICANT OTHERS: AFFECTIVE PRIMING IN CLOSE RELATIONSHIPS

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──────── ABSTRACT ────────

The affective priming paradigm developed by Murphy and Zajonc (1993) was adapted to assess an automatic evaluative response to friends ($n = 100$) or romantic partners ($n = 101$). It was investigated how a brief presentation of the first names and faces of relationship partners modulated the evaluation of immediately following Chinese letters. The visibility of the primes was manipulated by either masking the primes or not. In the low visibility condition, the Chinese letters were more positively evaluated when they were preceded by the name or face of the relationship partner than when they were preceded by the participant's name or face. In the high visibility condition, a similar but stronger effect was found for face primes, and no effect for name primes. All priming effects were replicated for friends and romantic partners. The short-term stability of individual priming effects was low. No significant relations between priming effects and relationship satisfaction or attachment styles were found. The results suggest that affect is an integral part of the relationship schema, but that the amplitude of this evaluative reaction does not reflect individual differences in relationship satisfaction or attachment styles.

KEY WORDS • affective reaction • faces • names • subliminal perception

Although the cognitive representation of relationships has only recently developed into a research topic in its own right (Fletcher & Fitness, 1996),

it is evident that mental representations are the very substrate of what we call a 'relationship'. The crucial difference between personal relationships and role relationships or zero-acquaintances is that personal relationships rely on their history. It is the cognitive representation of this history in both partners that provides continuity and allows for security and trust. This fact is so trivial and so deeply rooted in our normal functioning that it becomes salient only if this functioning is seriously impaired as in some severe organic brain syndromes, when even the most intimate relationship is destroyed by the loss of long-term memory.

Models of cognitive representations of relationships

The most influential model of relationship representation was developed by Bowlby (1969) in the framework of attachment theory. Based on psychoanalytic object relation theory, Bowlby postulated a 'working model' of the self and the attachment figure that integrates early experiences and regulates the child's interactions with the attachment figure, particularly under stress. In the tradition of attachment theory, the working model of the infant–parent relationship is assumed to have dispositional properties that determine the quality of later close relationships. Ainsworth describes three types of attachment (secure, avoidant, and anxious-ambivalent) of infants to their mother (Ainsworth, Blehar, Waters, & Wall, 1978). In contrast to Ainsworth's empirically derived typology, Bartholomew's (1990) model of adult attachment prototypes is based on Bowlby's theory about working models of the self and of the partner. According to this theory, the experiences with the relationship partner are integrated into the working model, leading to a positive evaluation of the self and the partner if the relationship works smoothly, or to a negative evaluation of either the self or the partner or both if the relationship does not satisfy the person's needs. If the evaluation is simplified to a positive–negative dichotomy, the four possible combinations of positive and negative evaluations of the self and the partner result in Bartholomew's (1990) attachment prototypes: secure (+,+), preoccupied (−,+), anxious (−,−), and dismissing (+,−).

A related, but more general model of relationship representation, was proposed by Baldwin (1992). Based on an extensive review of the literature, Baldwin proposed the concept of 'relationship schema' (RS) as a general model of cognitive relationship representations. An RS contains three basic elements: the relationship-specific representations of the self, the partner, and the interaction between them. Whereas the representations of self and other contain declarative knowledge, and are conceptualized as schemata, the representation of interactions contains procedural knowledge and is conceptualized as a script. Because attachment working models can be considered as a special case of an RS, only this term will be used in the following.

The representation of affect in relationship schemata

Relationship schemata have many features in common with general models of knowledge representation that have been developed in cognitive psychology or social cognition research. However, 'cold' knowledge about the

self, the other, and about interaction patterns seems insufficient for a comprehensive understanding of the representation of relationships. In their account of the cognitive representation of attachment, Collins and Read (1994) postulate that working models additionally contain relationship-specific goals and needs (e.g., need for closeness, need for approval, fear of rejection), and that working models guide emotional response patterns. In a similar vein, Baldwin (1992) states that 'an adequate model [of relational schemata] must eventually include an association among memory, goals, and affect' (p. 469).

There is a plethora of research about the importance of affect in close relationships and numerous theories about the role of affect in relationship schemata. However, direct empirical tests of these models are scarce. The aim of the present study was to directly investigate the representation of affect in relationship schemata through an experimental method used in cognitive psychology.

Methods for the assessment of relationship schemata

The most direct approach for studying RS is the analysis of verbal report data about the relationship. Although analyzing the content of verbal reports has proven useful in studying the content of RS (e.g., Holmberg & Holmes, 1994), this method is obviously limited to '… surface-level beliefs and motives which individuals can consciously experience and articulate' (Shaver, Collins, & Clark, 1996, p. 45).

A very different approach for studying RS is the experimental priming technique that has been developed in cognitive psychology as a general tool to investigate the content and structure of cognitive representations. The principle of priming is based on the idea that knowledge is represented as units or nodes of cognitive networks. If a unit is activated, this activation spreads along the connections of the network and activates related units. Because of this pre-activation or 'priming', related units are easier to activate or faster to access than unrelated units. For example, people recognize the word 'butter' faster after having read the word 'bread' than after having read the word 'nurse' (Anderson, 1995).

Baldwin (1992, 1995) strongly advocated the use of this technique for the study of cognitive representations of relationships and has demonstrated its usefulness for the study of relationship schemata. For example, in an experiment by Baldwin, Carrel, and Lopez (1990), students evaluated their own research ideas less favorably when they were subliminally exposed to the scowling face of a familiar evaluative academic authority (Robert Zajonc) as compared to a friendly looking postdoctoral fellow. However, the experiment does not allow one to determine whether the person or the expression of emotion were responsible for the effect. In a second experiment, female Roman-Catholic students had to read a text showing a permissive attitude towards sexuality. The students were then subliminally exposed to a picture of the disapproving faces of either Pope John Paul II or Robert Zajonc (unfamiliar to these students). As expected, only Catholic students who were exposed to the picture of the Pope showed more nega-

tive self-concept scores. Moreover, the drop in self-concept was stronger in individuals who reported a higher level of practicing their religion.

   These results support the view that the effect was caused by the activation of a relationship schema plus a negative affect expression rather than the affect expression alone. Baldwin (1994) extended these findings by moving from a role relationship schema (Pope, academic authority) to personal relationship schemata. Here, the subliminal presentation of the names of critical others caused lower ratings of self-esteem, particularly with respect to concerns about social evaluation.

Priming as a method for the assessment of affect representations

It seems reasonable to assume that relationship satisfaction depends on some form of integration of positive and negative affect. Because the evaluation of close relationships is important for the individual, one should expect that a global evaluation or affective value of the relationship partner is an integral and highly accessible part of the RS. At a more general level, close associations between object and evaluation have been called 'strong attitudes' by Fazio, Sanbonmatsu, Powell, and Kardes (1986). There is evidence that the mere activation of object representations (Fazio et al., 1986), or person schemata (Fiske, 1981), can be sufficient to activate the associated evaluation or affect. If the individual is unaware of the source of the affect activation, it can easily be misattributed to another object. An experimental approach based on this phenomenon was developed by Murphy and Zajonc (1993). They induced affective reactions using subliminal presentations of faces expressing anger or happiness. Immediately afterwards, the participants rated Chinese letters on a liking scale. The evaluation of the letters was systematically influenced by the affective valence of the facial expressions, even though the participants were not aware of the presentation of these primes.

Rationale for the present study

The present study was designed to investigate whether (i) an affective reaction takes place upon the mere activation of the representation of a significant other, and (ii) whether relationship quality or personality influence the affective reaction in the affective priming task. To investigate these questions, a procedure similar to the paradigm of Murphy and Zajonc (1993) was adapted to assess spontaneous affective reactions to significant others. Instead of facial expressions of emotions, familiar faces and names were used as stimuli. Baldwin (1994) has shown that the subliminal presentation of familiar names has systematic effects on specific aspects of self-evaluation. This view is consistent with the connectionist model of person recognition by Burton, Bruce, and Johnston (1990), according to which the activation of the 'name node' or the 'face node' of a person spreads to a representation of the person's identity, from where the activation spreads further to 'nodes' that represent the person's attributes. The evaluation of the person or of the relationship with that person could be such attributes.

Relationship types

Two relationship types were investigated: romantic partnerships and friendships. Because both are clearly positively valued, no large difference was expected with respect to positive priming effects of these significant others. The use of two relationship types allows for an internal replication and greater generalizability of results.

Control conditions

An evaluation of the affective reaction to a significant other requires a comparison standard. As one control condition, the self seems adequate, because the self-schema is at least as complex and accessible as the representations of significant others. As compared to friends or romantic partners, the evaluation of the self is expected to be somewhat more negative because the representation of the self is likely to include more negative information than the representation of friends and romantic partners (at least in a student sample, e.g., Asendorpf & Ostendorf, 1998), and because partners are often idealized (Murray, Holmes, & Griffin, 1997).

As an additional control condition, the name and the face of a non-significant other seemed appropriate. Whereas it is no problem to present an unfamiliar face, it is not possible to find a first name that is unknown for everyone. Instead, an affectively neutral word was chosen as a control for the priming with names. Both control stimuli do not provide a perfectly neutral baseline on an evaluation continuum. The control face is expected to be evaluated moderately positively, because this seems to be the default evaluation for unknown individuals (Fiske, 1981). Also, the repeated presentation of control stimuli during the experiment should induce a mere exposure effect (Kunst-Wilson & Zajonc, 1980) and hence a moderately positive evaluation, especially for marginally visible faces (Bornstein & D'Agostino, 1992).

Manipulation of prime visibility

A strength of the priming paradigm is the possibility of presenting stimuli outside of the individual's awareness, thereby excluding controlled or strategic processes as an explanation of observed effects (Bargh, 1994). In the present study, the visibility of primes was reduced by presenting a mask after the prime. Pretests showed that there were considerable individual differences in the awareness threshold for these stimuli. A further complication arose because the prime stimuli were different for each pair of participants. In order to control for possible recognition effects, two measures were taken. First, the individual's ability to recognize the masked primes was assessed in a separate name and face discrimination task. Second, the visibility of primes was manipulated by adding an unmasked priming condition. Everything else being equal, a dissociation of priming effects between masked and unmasked priming conditions would provide strong evidence for the effectiveness of the masking procedure (Cheesman & Merikle, 1986; Merikle & Reingold, 1992).

Individual differences in relationship quality
In addition to the study of general affective effects of significant-other schemata, the present study offers the opportunity to explore affective priming effects from an individual difference perspective. The amplitude of partner-triggered positive affect may bear information about individual differences in relationship quality or attachment style. Bartholomew's (1990) adult attachment typology is based on stable differences in evaluations of the self and the relationship partner. If these evaluation differences are reflected in individual affective priming effects, clear predictions can be derived from Bartholomew's model. When primed with partner-related stimuli, individuals with secure and preoccupied attachment styles are expected to show more positive priming effects than individuals with anxious and dismissing attachment styles. When primed with self-related material, individuals with secure and dismissing attachment styles are expected to show more positive priming effects than individuals with preoccupied or anxious attachment styles. In addition, relationship satisfaction was included as a potential correlate of priming effects. In order to test whether affective priming measures are reliable and stable, a retest session of the priming experiment was planned for a subsample.

Hypotheses
The following hypotheses were tested: (i) the presentation of masked faces and first names of significant others activates a spontaneous affective reaction that is more positive for friends and partners than for the participant's face or first name, or for a neutral control stimulus. If primes are clearly visible, a different pattern of results may emerge. (ii) The four adult attachment styles postulated by Bartholomew (1990) are related to affective effects of self- and partner-related primes according to the stable evaluation of the self and the partner in the RS, respectively: secure $(+,+)$, dismissing $(+,-)$, preoccupied $(-,+)$, and anxious $(-,-)$. (iii) The strength of the spontaneous affective reaction upon the activation of a significant other representation is positively related to relationship satisfaction.

Method

Overview
The priming experiment was designed as a fully crossed 2 (relationship type; friends versus romantic partners) $\times$ 3 (prime identity; self, partner, neutral) $\times$ 2 (prime modality; names versus faces) $\times$ 2 (prime visibility; unmasked versus masked) factorial. In order to investigate the visibility of masked primes, a name and a face discrimination task were conducted following the priming experiment. To investigate the stability of priming effects, a subset of the sample returned for a second session of the priming experiment.

Participants
A total of 214 friends and romantic partners were recruited at the Humboldt University for a study on 'close relationships and information processing.'

Participants were invited to come to the laboratory either with a same-sex friend or with their romantic partner. The minimal relationship duration requirement was 6 months. Psychology students received course credit, and other students received a 12-DM (≈US$7) telephone card for their participation. In order to diminish the temptation of pretending to be friends with a classmate in order to obtain course credit, psychology students could only participate with a friend not enrolled in psychology.

Eleven participants had to be excluded from the sample. Two friends had identical first names, two had experience with Chinese letters, three interrupted the experiment, and four reported correct hypotheses about the masked presentation of primes after the experiment. The data of 101 friends (78 female, 23 male) and 100 partners (52 females, 48 males) were included in the analysis. For this sample, the mean age was 23.9 years ($SD = 3.4$), and the mean relationship duration was 6.0 years for friendships ($SD = 5.14$) and 3.4 years for romantic partnerships ($SD = 2.65$). Out of the 201 participants in the experiment, 66 participated at a retest session (26 friends, 40 romantic partners).

Material and apparatus

Primes. The faces of the participants were videotaped against a black background in upright position, full frontal view, and with neutral expressions. The black-and-white photographs were presented on a PC monitor. On the screen, the photos were 85 mm high and 65 mm wide. The first names of the participants and their partner's or friend's first name were presented in white on a black background. As control stimuli, the faces of two unknown persons (of the same sex as the participant's partner) were used for the face priming, and the word 'Strasse' (street) for the name priming conditions.

Masks. To mask the faces, the picture of an additional face was cut in 16 rectangular pieces and rearranged in three different random orders. These scrambled faces were presented upside down. To mask the names, three pattern masks (containing letters with vertical, diagonal, and round shapes, respectively) were superimposed. The length of the name mask was adjusted for each participant so that it covered both names and the control stimulus.

Targets. One hundred Chinese letters were selected. Care was taken to avoid both very unusual and familiar shapes (e.g., roman letters). The Chinese letters had the same size as the face primes and were presented in white on a black background.

Apparatus. The experiment was run on two identical PCs with fast monitors (95.3 Hz). The Experimental Run Time System (Beringer, 1994) was used for the priming part of the experiment. The keys 1 to 6 of the right number field of the computer keyboard were used as response keys.

Priming procedure. Each trial started with the presentation of a fixation cross (1000 ms) followed by the prime (10.5 ms). Under low visibility conditions, face primes were followed by three scrambled faces, and name primes by a pattern mask. The Chinese letters were presented 42 ms after the onset of the primes and remained for 500 ms on the screen (see Figure 1). The rating scale remained visible until a response was given. The high visibility conditions

FIGURE 1
Time sequence of the priming procedure for (A) name priming, and (B) face priming. On the computer monitor, all material was presented white on black background
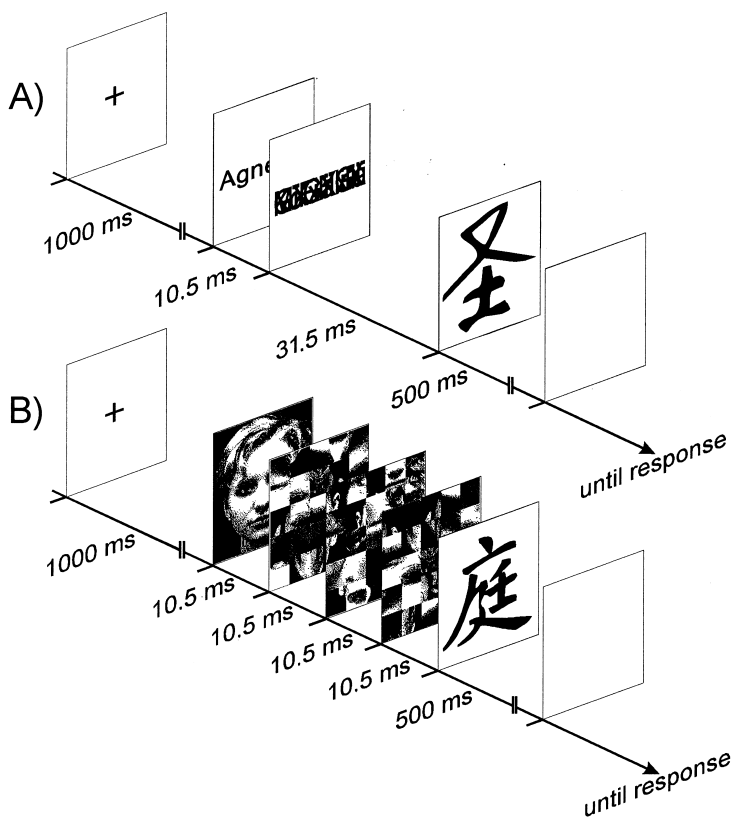
were similar in all respects, except that the masks were replaced by a blank screen. The priming experiment contained five blocks that were always run in the following order: (i) training phase (10 trials), (ii) masked priming (180 trials), (iii) unmasked priming (90 trials), (iv) name discrimination (60 trials), and (v) face discrimination (60 trials). After each block, participants were encouraged to take a break. During the masked priming block, 30 different Chinese letters were preceded by the three name primes and 30 by the three face primes, resulting in 180 trials. Thus, each ideograph served as its own control with respect to priming effects. The prime-target pairs were presented in a fixed pseudo-random order that was balanced for possible effects of trial order, trial position, and target repetition. The unmasked prime block was constructed in the same way, except that only 15 different Chinese letters were used in the name, and 15 in the face prime condition.

Because the participants knew that their names and faces would be used during the experiment, an attempt was made to prevent them from actively searching for these stimuli during the masked prime presentation. For this, the masked priming block was introduced as a 'control task' in which ideographs

would be preceded by 'control stimuli' (in fact, the masks). Additionally, participants were told that their names and faces would be used later in the experiment. This procedure was very effective in focusing the participant's attention on the evaluation task. Only four out of 214 participants reported suspicion about a covert presentation of this material in the post-experimental interview (and were excluded from the analysis).

Prime discrimination tasks. In two separate blocks of 60 trials each, the participants had to distinguish their own and their partner's names and faces. The procedure was identical to the masked priming condition, except that the evaluation scale was replaced by a 2-point scale labeled 'self' and 'partner'. The participants were asked to guess if they could not recognize the primes.

Procedure
Upon their arrival in the laboratory, the participants were videotaped, then brought to two separate rooms where they completed questionnaires while the primes were prepared. Then the participants were left alone for the priming experiment. Following the experiment, the participants were interviewed about unexpected observations and regarding their hypotheses about the experiment. They were invited to participate at a retest session a week later, paid, and thanked for their participation. The test–retest interval ranged from 1 to 4 weeks. In the retest session, the priming part of the first session was repeated. After the completion of the study, all participants received a written full debriefing and a research report containing the results of the experiment.

Measures

Evaluation of Chinese letters. The Chinese letters were rated on a 6-point Likert scale (1 = *I don't like it*, 6 = *I like it quite a bit*).

Relationship satisfaction. The relationship satisfaction of romantic partners was assessed using a German translation (Sander & Böcker, 1993) of the Relationship Assessment Scale (Hendrick, 1988). The original items of this scale were reformulated to be appropriate for friendships. The internal consistency of both versions was equal and sufficient ($\alpha = .81$). The means, standard deviations, and the correlations with other variables were similar for the two versions. These data suggest that the friendship version of the RAS is both reliable and valid.

Adult attachment. The German version (Doll, Mentz, & Witte, 1995) of Bartholomew's (1990) four prototype descriptions (secure, anxious, preoccupied, dismissing) of adult attachment was reformulated to refer specifically to the romantic partner or to the friend. Participants rated on 5-point scales to what extent each prototype correctly described their relationship.

Results

Discrimination of masked primes
Cohen's κ was used as the index for the individual performance in the two discrimination tasks (Cohen's κ accounts for the number of hits expected by

chance, $\kappa = 0$ indicating performance at chance level, $\kappa = 1$ perfect discrimination). Figure 2 shows that masked names were generally poorly discriminated with only a few cases showing substantial discrimination (maximum $\kappa = .60$). The sample mean of $\kappa = .05$ is low but significantly higher than zero ($t(200) = 5.06$, $p < .001$). For the discrimination of masked faces, a clear bimodal distribution of good and poor recognizers emerged.

A three-factorial MANOVA with the within-subject factors partner (dyad member 1 and 2) and prime type (names and faces), and the between-subjects factor relation type (partners and friends) was calculated on the discrimination scores. The results show that faces were significantly better discriminated than names ($M = .40$ versus $M = .05$, $F(1, 95) = 138.69$, $p < .001$). The type of relationship did not significantly influence performance. This result implies also that it made no difference whether names and faces of the same sex (in the case of friends) or of opposite sex (in the case of partners) had to be discriminated. No other effects approached significance.

General priming effects

Priming effects were analyzed using a 2 (relation type: romantic partner versus friend) $\times$ 2 (prime visibility: masked versus unmasked) $\times$ 3 (prime identity: self, partner versus control) $\times$ 2 (prime modality: name versus face) MANOVA. To further investigate the nature of priming effects, masked and unmasked priming conditions were analyzed separately. Additionally, orthogonal a-priori contrasts (self versus partner, and self + partner versus control) as well as post-hoc comparisons were conducted. Because the sample is composed of couples, dyadic data were tested for dependency (Gonzales & Griffin, 1997; Kenny, 1996). Correlational analyses showed that individual priming effects of dyad members were statistically independent and were therefore analyzed as individual cases without taking into account dyad membership.

Effects of the prime visibility manipulation. An analysis across all experimental conditions revealed that prime identity effects were modified by the manipulation of prime visibility, as indicated by a significant prime visibility $\times$ prime identity interaction, $F(2, 198) = 13.77$, $p < .001$, and a prime visibility $\times$ prime modality $\times$ prime identity interaction, $F(2, 198) = 9.81$, $p < .001$. These interaction effects indicate a reliable dissociation between masked and unmasked priming. The pattern of means will be discussed separately for both visibility conditions. The masking of primes also influenced the effect of prime modality. Masked face primes yielded more negative ratings than masked name primes, $F(1, 199) = 48.44$, $p < .001$. This effect is of little theoretical interest and may be due to a slightly disagreeable flickering caused by the successive presentations of the relatively large face masks, but not by name masks. A significant prime modality $\times$ prime identity interaction ($F(2, 198) = 8.53$, $p < .001$) was further examined in separate analyses of the two visibility conditions. No other significant effects or trends emerged.

Prime identity effects under low visibility. The results of masked priming conditions are presented in Figure 3, panel A. As expected, prime identity significantly influenced the liking ratings of Chinese letters ($F(2, 198) = 7.5$, $p = .001$). As indicated by the specific contrasts, the evaluation was more positive when primed with the names or faces of partners as compared with priming with the participants' name or face ($F(1, 199) = 14.82$, $p < .001$). This effect

FIGURE 2
Frequency distributions of individual discrimination performance indices
(Cohen's κ) in the name and face discrimination tasks
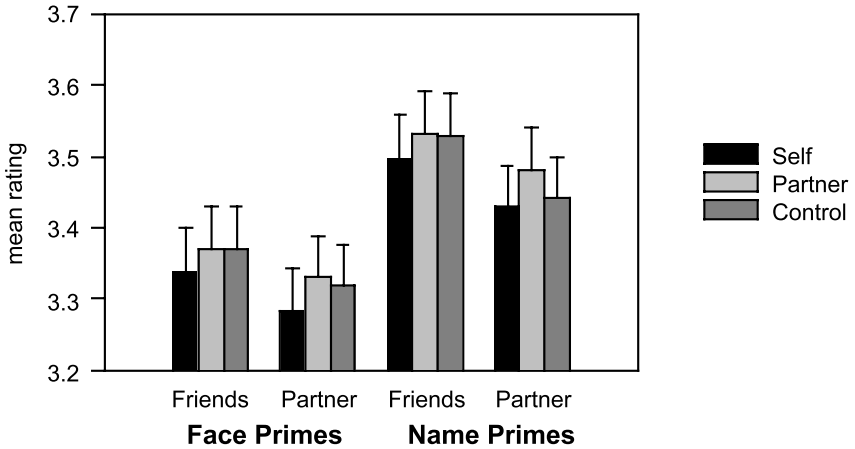
Name Discrimination

Face Discrimination
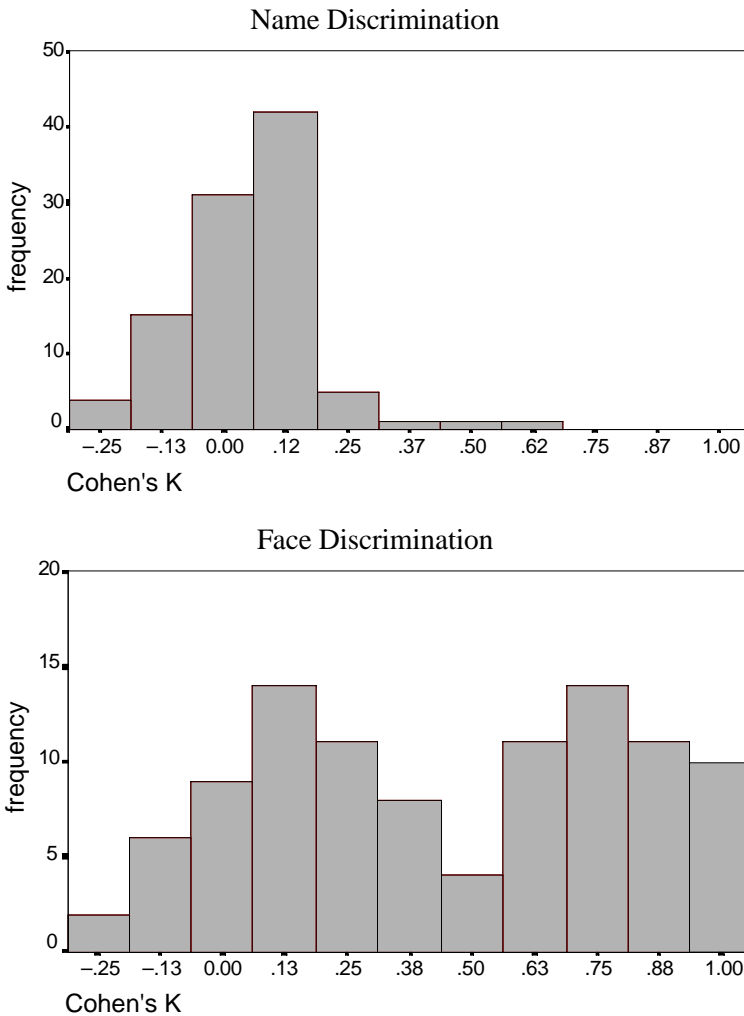
explains about 7 percent of the variance ($\eta^2 = .07$). The mean ratings for the control conditions were intermediate between the partner and self-priming conditions. Post-hoc comparisons showed that the partner–self difference was significant for both faces ($t(200) = 2.36$, $p = .019$), and names ($t(200) = 3.21$, $p = .002$). Moreover, ratings following the participants' face were less positive than those following the control face, $t(200) = 2.02$, $p < .05$. No other effects approached significance.

Correlational analyses were employed to determine whether the effects of masked priming were driven by those participants who performed better in

FIGURE 3
Mean ratings of liking for Chinese letters as a function of prime identity, prime modality, and relationship type. Panel A: masked primes; panel B: unmasked primes

Panel A: Masked Primes

Panel B: Unmasked Primes
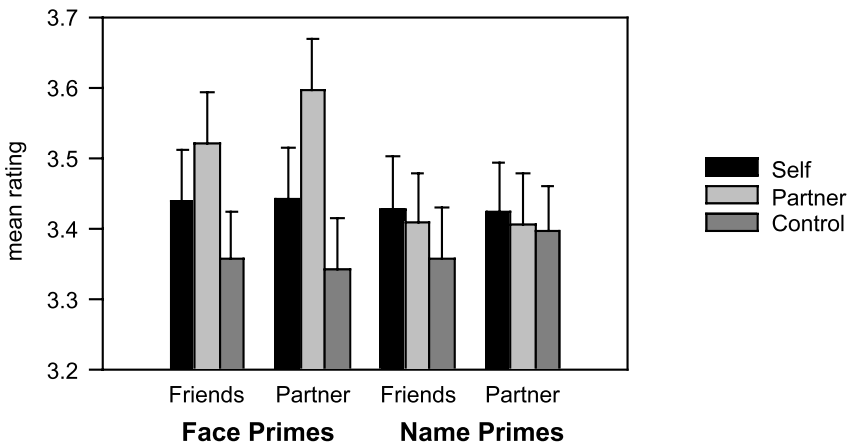
discriminating masked primes. Therefore, the correlations between the experimental effect (the difference between self and partner priming) and individual recognition performance were calculated for masked faces and names separately. Both correlations were close to zero and non-significant ($r = .03$ for names, and $r = .05$ for faces). There was no indication of any substantial non-linear relationships between recognition and priming effects. Thus, that the

priming results under low visibility conditions were caused by individual differences in recognizing the masked primes is not a valid interpretation.

Prime identity effects under high visibility. The results for unmasked priming are presented in Figure 3, panel B. Again, the prime identity had a significant effect on ratings, $F(1, 199) = 21.54$, $p < .001$. However, the effect of prime identity was qualified by a significant interaction with the prime modality factor, $F(1, 199) = 12.22$, $p < .001$. When primed with faces, the mean ratings were most positive in the partner prime condition, less positive in the self-prime condition, and least positive in the control prime condition. When primed with names, the participants' names yielded the most positive ratings, followed by the partners' names, and the control stimuli. Both a-priori contrasts were significant, indicating that the partner–self difference for faces was more positive than for names, $F(1, 199) = 9.76$, $p < .001$. Post-hoc comparisons showed that this interaction was driven by faces ($t(200) = 3.44$, $p < .001$), and not by names. The advantage of the combined ratings of the self and partner conditions as compared with the control condition was more pronounced for face primes than for name primes, $F(1, 199) = 36.04$, $p < .001$. Post-hoc comparisons revealed that for priming with faces and names, the self and the partner conditions yielded either significantly more positive, or in the case of partner names, marginally more positive ratings than the control conditions.

Effects of relationship type. For masked and unmasked priming with names and faces, the type of relationship yielded no significant or marginally significant main effects or interactions.

Stability of priming effects. Because confounding factors such as trial position are balanced only across all trials, it was not possible to split the experiment into two parallel tests. Therefore, test–retest correlations were calculated to estimate the reliability of priming effects. Retest data were available for 66 participants. The test–retest correlations for ratings for each treatment condition were relatively high in each case (ranging between $r > .62$ and $r > .54$). These test–retest measures reflect the stability of composite scores, which include specific priming effects *and* individual answer tendencies. As a simple and straightforward method of removing the general answer tendencies, three difference scores (*self-partner*, *self-control*, and *partner-control*) were calculated, and then correlated between the two sessions.

After elimination of three outliers (with extreme values in the high visibility condition of the second session), the test–retest correlations of treatment differences for the remaining sample ranged from $r = -.06$ to $r = .28$. Only one test–retest correlation out of 12 reached statistical significance. Thus, the stability of priming effects was marginal at best.

Priming effects, relationship quality and personality. Only correlations of priming effects under low visibility with relationship satisfaction, anxiety, and the four attachment styles are reported. Correlations were calculated for friends and romantic partners separately. Only four out of the resulting 72 correlations (6 priming effect indices × 6 questionnaire measures × 2 relationship types) were significant and all were low ($|r| < .25$). Given the number of significance tests conducted, this number of significant correlations does not

exceed what would be expected under the null-hypothesis. Alternative calculation methods (e.g., ipsatized priming indices, partial correlations) were explored but did not support a substantial relation between specific priming effects and relationship quality or personality.

Discussion

The main findings of the study can be summarized as follows: (i) as expected, the subliminal activation of the cognitive representation of romantic partners and friends elicited an automatic positive affective reaction as indicated by the affective priming effects, (ii) this positive reaction was similar for partners and friends, and (iii) the affective priming effect was not related to individual differences in attachment styles or relationship satisfaction.

The role of affect in the RS of romantic partners and friends
The most important finding of the study is that the activation of the cognitive representation of romantic partners and friends by masked stimuli evoked a more positive affective reaction than the activation of the self-schema. This effect was obtained regardless of whether the person schemata were activated by faces or names. This result bolsters the view that a general positive evaluation is part of the significant other schema and is activated upon the mere activation of the schema. Because there is no truly neutral comparison standard, it is not clear whether the self–partner difference was caused by a less positive or by a slightly negative reaction towards self-related primes.

   Why is the affective reaction towards the self less positive than towards the partner? We assumed that the partner schema is more positive because of idealization (Murray, Holmes, & Griffin, 1997) and that the self-schema contains more negative material. Further, it is known that self-ratings of personality tend to be more negative than ratings by acquaintances (Asendorpf & Ostendorf, 1998). Whereas individuals tend to rate themselves more positively than the average of their reference group, this effect is reduced if concrete people serve as comparison standards (Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995). However, there are also alternative processes that could account for the more negative reaction to self-related material, especially if presented subliminally. For example, Macrea, Bodenhausen, and Milne (1998) successfully used a subliminal presentation of the participants' surnames to induce self-awareness, a state that is often reported to be negatively toned (Fiske & Taylor, 1991).

   The differential priming effect for the self and the other schema was statistically reliable, but small. For a comparison, the priming effect of angry versus happy faces reported by Murphy and Zajonc (1993) was about 20 times stronger. There are several possible explanations for this. First, the contrast between an angry and a happy expression is much more pronounced than between a positive significant other and the self. The inclu-

sion of a clearly negative significant other should markedly increase the magnitude of priming effects. Second, the affective content of emotional expressions is likely to be less ambiguous and more directly accessible than the affective evaluation of persons. According to the model of Burton, Bruce, and Johnston (1990), names and faces first activate the person identity representation, and only subsequently activate attributes of this person.

Were effects caused by controlled rather than automatic processes?

An important issue for the interpretation of the results is whether the participants were aware of the presence of masked primes. Although the assessment of positive affect towards the partner was fairly indirect, the ratings may have been influenced by voluntary answer strategies when the primes were recognized. In the discrimination tasks, about 10 percent of the sample showed substantial discrimination for names, and about half of the sample for faces *when the task required focusing on masked primes*. During the decisive masked priming task, however, the participants were told that no primes were present. The post-experimental interview indicated that this diversion maneuver was efficient, because only four participants of 211 reported having been suspicious about or having seen names or faces during that task (and were excluded from the analysis).

Yet, it may be argued that the weak effects of masked primes were driven by some participants who were aware of them but failed to report this in the post-experimental interview. If this explanation were correct, one should expect a positive relation between priming effects and recognition of masked primes in the discrimination task. However, this relation was found to be non-significant.

On various grounds, Cheesman and Merikle (1986) have criticized the use of explicit discrimination tasks as an objective measure of awareness. For example, such tasks may be too conservative as a measure of unconscious perception because participants could use conscious as well as unconscious information to discriminate among the stimuli. As an alternative approach, they proposed establishing unconscious processing by demonstrating a qualitative difference in the effects of stimuli presented below or above the subjective threshold of awareness. Two such dissociations were observed in the present study. First, in the unmasked priming condition, control primes always yielded lower ratings than self and partner primes. In the masked priming conditions, however, control primes always yielded intermediate ratings. Second, whereas in the masked priming conditions partner primes yielded more positive ratings than self-primes in face and name priming, in unmasked priming the self–partner discrepancy was much stronger for face priming, and no difference was found for name priming. These differences indicate that the visibility manipulation reliably modified the prime identity effect and provide strong evidence that the effects of masked primes reflect unconscious and automatic rather than conscious and controlled processes.

Effects of visible names and faces

Although no specific hypotheses were made for this control condition, the results warrant some comment. Several studies have shown that individuals are able to correct for influences of mood or affect on judgments if they become aware of them (e.g., Schwarz & Clore, 1983). One might therefore have expected that individuals would recognize the influence of the primes on their judgment and correct or overcorrect for it. Furthermore, this process should lead to quite similar results for name primes and face primes. However, the marked effect of the prime modality on ratings suggests a different process.

The results are compatible with the hypothesis that, under high visibility conditions, the ratings of Chinese letters were influenced by both the prime stimuli and the activated person schemata; under low visibility conditions, however, ratings were influenced only by the activated person schemata. It seems plausible that the amplitudes of positive reactions increase from an unknown face to the participant's face to that of a friend or partner (only the latter yielded ratings above the midpoint of the rating scale). As opposed to faces, first names are not intricately linked to a specific person. It is possible to like a person but not his or her first name, or vice versa. The effects of name priming may then be explained by a mere exposure effect of the names themselves (Kunst-Wilson & Zajonc, 1980), with the extremely familiar own name eliciting more positive ratings than the familiar partner's name, followed by a neutral word.

Replication across relationship types

No differences were found in the affective reactions to the activation of the cognitive representation of romantic partners versus friends. Although no strong differences were expected, one might think that romantic partnerships are more important and more intimate than friendships and should therefore elicit a more positive affective priming effect. However, such differences were probably not large in the present sample. Although it is difficult to compare the closeness of different relationship types, the long mean duration of friendships of 6 years may indicate relatively close friendships compared with the romantic partnerships with a mean duration of 3.4 years. Thus, all priming effects observed for romantic partners could be perfectly replicated for friends, a result that indicates the robustness of priming effects.

Priming effects, relationship quality, and personality

The number of significant correlations between individual differences in priming effects and relationship quality or personality was at the level expected under the null-hypothesis. As a safeguard against an erroneous interpretation of spurious correlations, the design of the study allows for some internal replication. Individual differences in affective reactions elicited by faces should be consistent with those elicited by names. However, there was no similarity in the correlation patterns of the two priming modalities. The most parsimonious interpretation of the observed

pattern of correlations is therefore that they reflect random fluctuations of uncorrelated data.

Non-significant correlations can occur for a variety of reasons. Because trivial explanations such as a restriction of variance do not apply in the present case, zero-correlations may have been caused by the low reliability of the priming measures. The very low test–retest correlations of priming effects bolster this interpretation. However, this estimator of reliability may have been inadequate because in the retest session, participants were no longer naive with respect to masked priming and may have behaved differently from the first session. And even though the reliability of priming effects may have been low, they were sufficient to yield reliable treatment effects that replicated within participants for different prime modalities (names and faces) and between participants for different types of relationship (friends and partners).

An alternative and much more interesting interpretation of the null findings for individual differences in affective priming effects consists of accepting the null hypothesis that there *are* no meaningful individual differences at this level. From this view, automatic schema-triggered evaluation as assessed in the affective priming paradigm is structurally independent from processes such as the evaluation of relationship satisfaction or the evaluation of the relationship partner in the sense of Bartholomew (1990). Affective priming may reflect a quick but general evaluation that is directly linked to the representation of objects or persons (e.g., Fazio et al., 1986; Fiske, 1981).

The positive or negative evaluation of the relationship partner as postulated in adult attachment theory, however, may require access to a more complex knowledge structure than the mere representation of the partner. Baldwin, Fehr, Keedian, Seidel, and Thomson (1993) presented evidence for differences between groups of secure and avoiding individuals when they primed the interaction part of their relationship schema. After prompting an interaction context (e.g., 'If I trust my partner, then my partner will …'), secure individuals were faster in recognizing words implying positive outcomes (e.g., care), whereas avoidant individuals were faster in recognizing negative outcomes (e.g., hurt). In an analogous way, the priming approach could be used to systematically explore which parts of the relationship schema have to be accessed to activate those aspects of relationship evaluations that play a central role in relationship functioning.

In sum, the present study demonstrated the usefulness of the affective priming paradigm by Murphy and Zajonc (1993) in the study of relationship schemata. Specifically, this approach provided evidence that the evaluation of significant others is stratified. The automatic positive affective reaction towards significant others as apparent in the affective priming effect seems to tap an evaluation of the significant other that is an integral part of the RS. However, this form of evaluation seems not to be identical with the concept of evaluation as it is used in the context of relationship satisfaction or adult attachment theory. Whereas the former appears to be limited to a binary 'on–off' or perhaps to three distinct values (negative,

neutral, positive), the latter is more finely grained. Whereas the priming response is readily triggered upon the mere activation of a significant other schema, the more complex form of evaluation may require an activation of larger parts of relationship schemata (e.g., attributes of significant others, episodic knowledge, or relationship scripts). Future research may profit from extending this approach to further explore the precise structure and functioning of the affective content of relationship schemata.

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