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Romantic Love Modulates Attentional Attunement to Alternative Potential Mates

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ROMANTIC LOVE MODULATES ATTENTIONAL ATTUNEMENT TO
ALTERNATIVE POTENTIAL MATES

By

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ABSTRACT

Romantic love and sexual desire function to promote bonding between romantic partners and intimate physical contact between mating partners, respectively. In the current study, we examined how love and sexual desire might modulate attention to physically attractive alternative potential mates – that is, opposite-sex individuals other than one’s current romantic partner - in ways that might enhance or undermine relationship commitment. One-hundred twenty heterosexual individuals currently involved in a committed romantic relationship participated in a study that assessed the selective attentional processing of same and opposite-sex faces using a “face-in-the-crowd” task. We anticipated that, for participants less in love with their partners, feeling a surge of love would *decrease* attention only to attractive members of the opposite-sex. Furthermore, we anticipated that, for individuals with unrestricted sociosexuality, feeling a surge of sexual desire would *increase* attention only to physically attractive members of the opposite-sex. Results indicated that momentary experiences of romantic love reduced attention directed toward attractive members of the opposite-sex, especially among those reporting lower enduring levels of love for their partners. This decreased attention to desirable alternative partners might serve as an important relationship maintenance mechanism.

INTRODUCTION

Maintaining a harmonious romantic relationship often proves difficult, especially when lovers are forced to contend with attraction to alternative partners and relationships. To the extent that relationship partners can reduce their attraction to and desire for alternatives, their current relationship should become more stable and committed (see Rusbult & Buunk, 1993). In this paper, we suggest that two emotions central to mating, sexual desire and romantic love, may influence the attentional processing of attractive alternative partners in ways that might undermine or facilitate the maintenance of current romantic partnerships.

The attentional processing of attractive alternatives may have important implications for relationship maintenance. Attentional attunements and biases, whether conscious or not, set critical constraints on the social information available for further cognitive processing. Because one can only evaluate, remember, and act upon information to which one has attended, attention to potential mates shapes downstream processing and actions directed toward them. For example, having one's attention repeatedly captured by highly physically attractive members of the opposite sex may raise one's expectations and standards when choosing mates (Kenrick, Gutierrez, & Goldberg, 1989). Moreover, attending to attractive others may undermine satisfaction with a current relationship (Kenrick, Neuberg, Zierk, & Krones, 1994). Indeed, attention to alternatives can play a key role in early-stage relationship decisions.

Whereas attending to attractive others might undermine current romantic relationships, failing to notice attractive others may improve relationships. For instance, Miller (1997) found that self-reported vigilance toward desirable alternative partners was negatively correlated with satisfaction, investment, commitment, and adjustment in current dating relationships. Moreover, in Miller's study, those who spent less time examining magazine advertisements that contained attractive opposite-sex models were more likely to have remained with their current romantic partner when contacted two months later. Consistent with Miller's findings, Leik and Leik (1977) defined commitment as the stage of relationship development in which "the members are no longer attending to alternatives. The feeling of each partner is that the current relationship is to be maintained and alternatives are simply irrelevant," (p. 312). In sum, evidence suggests

that lack of attention to or awareness of attractive alternatives is beneficial to relationships.

While an emerging literature suggests that humans are, at a fundamental level, cognitively attuned to potential mates (e.g., Becker, Kenrick, Guerin, & Maner, 2003; Maner et al., 2003; Maner, Gailliot, & Dwall, 2007; Maner, Gailliot, Rouby, & Miller, 2007), far less research has focused on how these attunements might be modified in the context of an ongoing romantic relationship. If attentional processing of attractive alternatives is associated with relationship maintenance, it is vital to understand mechanisms that guide attention toward or away from alternatives. We suggest that momentary, emotional experiences of romantic love may promote inattention to attractive others. In contrast, we suggest that feelings of sexual desire, unconstrained by romantic love for one's current partner, may increase attentiveness to desirable potential mates. The current study will address these hypotheses by examining how transitory surges of love and sexual desire affect how strongly one's attention is initially drawn to attractive alternatives.

Attentional Processing of Physically Attractive Alternatives

The activation of specific motives has important implications for lower-order cognitive processes such as attention (e.g., Moskowitz, 2002). More precisely, when particular motives are active, attention may be drawn automatically toward motivationally-relevant stimuli (e.g., Fox, Russo, & Dutton, 2002). As emotion and motivation may be considered part of a single core phenomenon – what Buck (1999) called the *emotional-motivational system* – emotions may exert this same effect on attentional processes; emotions may guide attention toward relevant stimuli (e.g., Öhman & Mineka, 2001). In the context of the current research, we suggest that the emotions of sexual desire and romantic love may highlight (or minimize) distinct sets of mating-related cues, especially those related to alternative partners.

What sorts of cues might draw attention when people are experiencing sexual desire or romantic love? Physical cues may be especially subject to biased attentional processing when one is experiencing emotions linked with mating inasmuch as physical cues may signal a wealth of information about one's desirability as a mate (see Gangestad & Scheyd, 2005). Because physical cues reliably signal a number of desired characteristics in a mate (e.g., health, genetic quality, fertility), men and women have

come to prefer and find attractive distinct physical characteristics in members of the opposite sex (Buss & Schmitt, 1993; Gangestad & Simpson, 2000; Singh, 1993).

For instance, theories of “good genes” sexual selection suggest that women are especially physically attracted to men bearing signs of genetic fitness (e.g. low fluctuating asymmetry on bilateral features of the body; see Gangestad, Thornhill, & Yeo, 1994). By mating with a genetically fit man, a woman may increase the chance that high quality genes will be passed on to her offspring (Gangestad & Simpson, 2000; Scheib, 2001; Gangestad & Thornhill, 1999; Jones et al., 2001). For similar reasons, men tend to find attractive physical traits that are correlated with a woman’s level of health and fertility (e.g., Jasienska, Lipson, Ellison, Thune, & Ziomkiewicz, 2006; Singh, 1993, 1995). By mating with healthy, fertile mates, men increase their chances of successfully fathering offspring (e.g., Buss & Schmitt, 1993; Kenrick & Keefe, 1992). Thus there are reasons to suspect that mating-related emotions such as sexual desire and romantic love might bias the attentional processing of alternatives to one’s relationship who are especially physically attractive.

Sexual Desire as a Psychological Mechanism Promoting Sexual Union

The ultimate evolutionary function of sexual desire is to promote sexual union with the goal of fertilization (Diamond, 2004; Fisher, 1988). Given this function, sexual desire is expected to facilitate psychological responses that increase the likelihood of intimate contact with a mate (e.g., Gonzaga, Turner, Keltner, Campos, & Altemus, 2006; Maner et al., 2005; Stephan, Berscheid, & Walster, 1971). Indeed, Ariely and Loewenstein (2006) showed that, when experiencing sexual desire, men find a wide range of sexual stimuli and activities more appealing, are more willing to engage in morally questionable behavior to obtain sexual gratification, and are more willing to engage in unsafe sex.

Because feelings of sexual desire are often triggered by physical characteristics in potential mates that might signal health, status, or some other adaptive benefit (A. Aron & Aron, 1991; Buss, 1994; Metts, Sprecher, & Regan, 1998; Shaver et al., 1988), we argue that, when in a state of sexual desire, physically attractive alternatives should become especially salient and “attention-grabbing.” Indeed, Maner, Gailliot, Rouby, and Miller (2007) found that when experiencing sexual desire (as opposed to happiness), participants who reported high interest in short-term relationships were slower to

disengage their attention from physically attractive members of the opposite sex. We hypothesize that, when experiencing sexual desire, a similar attentional bias toward physically attractive alternatives will occur among people in relationships: attention will automatically gravitate toward members of the opposite sex who are physically attractive. This heightened attentional attunement could facilitate efficient identification of desirable potential mates.

Romantic Love as a Psychological Mechanism Promoting Relationship Commitment

Feelings of romantic love and sexual desire are often intertwined, and sometimes the distinctions between them appear blurred. However, many theories hold that these two emotions evolved in separate contexts and have been designed for distinct purposes: sexual desire evolved in the context of sexual mating, whereas romantic love evolved in the context of pair-bonding (see Diamond, 2004). Some evolutionary theorists have argued that romantic love should not be considered an adaptation, but rather an *exaptation* of the infant-caregiver attachment system (e.g., Hazan & Zeifman, 1999), which underscores its evolutionary origin as separate from that of sexual desire. The ultimate function of romantic love is to forge a bond between mating partners, thereby increasing the likelihood that infants will receive care and provision from both parents (e.g., Mellen, 1982). From this perspective, love serves a commitment function, promoting psychological responses that strengthen and protect the connection between romantic partners (e.g., Frank, 1988; Gonzaga, Keltner, Londahl, & Smith, 2001; Sternberg, 1986).

Empirical data supports this proposed function of romantic love. For instance, Gonzaga, Keltner, Londahl, and Smith (2001) found that the momentary experience and display of love plays a critical role in signaling commitment and motivating commitment-related behaviors and perceptions. For example, couples who reported more love had more mutual influence on each other's life goals, shared more activities, and had higher overall relationship satisfaction. Those who reported more love were also more likely to perceive that their partner was trustworthy, and during an interaction, were more likely to engage in constructive, conflict-reducing behaviors and interpret teasing by their partners as playful rather than critical. Furthermore, Murray, Holmes, and Griffin (1996) argued that couples swept up in the experience of love tend to idealize their romantic partners by embellishing their partners' virtues and downplaying their faults. In their

study, the degree to which men idealized their partners predicted relationship dissolution over the course of a year. This suggests that love may motivate people to idealize their partners, which in turn facilitates commitment to the relationship.

If the evolutionary function of love is indeed to bind romantic partners together, people in love should attend to and prioritize cues appropriate to the context of long-term mating but not to cues relevant to other adaptive challenges (Ketelaar & Clore, 1997). When feeling in love, attractive alternatives should assume little relevance and become less salient. Consistent with this rationale, Simpson, Gangestad, and Lerma (1990) found that, as compared with single people, those involved in dating relationships actually perceive similarly-aged members of the opposite-sex as less physically attractive. In light of this evidence, we hypothesize that feelings of romantic love will reduce attention to alternatives who possess cues associated with propitious short-term mating opportunities, namely, those who are especially physically attractive.

Individual differences in relationship orientations

There are also reasons to suspect that the effects of emotional states on the attentional processing of alternatives to one's current relationship partner will depend on key individual differences. One such individual difference characteristic, sociosexual orientation, reflects the degree to which one prefers commitment and emotional closeness prior to engaging in sexual relations (Simpson & Gangestad, 1991). Those with a restricted sociosexual orientation tend to require more closeness before feeling comfortable engaging in sex. On the other hand, those with an unrestricted sociosexual orientation feel relatively more comfortable engaging in sex without commitment or closeness, and moreover, tend to place a higher premium on physical attractiveness in their partners (Simpson & Gangestad, 1991, 1992). These two sociosexual orientations reflect two contrasting mating strategies, one aimed at multiple short-term relationships (unrestricted) versus one aimed at a single long-term, committed relationship (restricted) (see Buss & Schmitt, 1993). Previous research (e.g., Maner et al., 2007) suggests that feelings of sexual desire have a greater impact on the cognitive processing of individuals with an unrestricted sociosexual orientation, perhaps because unrestricted individuals are more likely to view others as immediate sexual opportunities.

A second individual difference characteristic that might modify the attentional processing of alternatives is one's enduring sentiments of love for one's partner. While romantic love may sometimes be experienced as a relatively potent, yet transitory emotion, it may also be thought of as a stable, chronic emotional orientation towards one's relationship partner (Aron & Aron, 1991; Diamond, 2003; Gonzaga et al., 2006; Hatfield & Rapson, 1993; Sternberg, 1986).

For individuals who have especially high enduring levels of love for their partner, attention might be sufficiently tuned away from attractive alternatives. Therefore, for these individuals, experiencing a transitory surge of love might not modify attention to attractive alternatives from baseline levels (due to a floor effect). In contrast, individuals who have lower levels of enduring love for their partner might still be attending to physically attractive alternatives. For these individuals, experiencing a transitory surge of love might significantly reduce attention to attractive alternatives from baseline levels. Thus we hypothesize that potent, yet transitory feelings of romantic love will reduce attention to attractive alternatives most strongly in those for whom alternatives pose the greatest threat (i.e., those with low enduring levels of love for their partners).

Overview of the Current Study

To examine the effects of romantic love and sexual desire on the attentional processing of physically attractive alternatives, we employed a modified version of the face-in-the-crowd task (e.g., Hansen & Hansen, 1988; Juth, Lundqvist, Karlsson, & Öhman, 2005). This paradigm has been used extensively in research focusing on attentional biases toward particular kinds of faces (e.g., Hansen & Hansen, 1988; Öhman, Lundqvist, & Esteves, 2001). In our modified version of the face-in-the-crowd task, participants first familiarized themselves with a particular target face and then searched for that face in an array that contained the target face and several distracter faces (target and distracter faces varied in sex and attractiveness throughout the experiment). Response latencies provided a measure of how quickly the participant's attention was drawn to the target face.

We predicted that, as compared with participants in the control condition, participants experiencing sexual desire would more quickly identify attractive opposite-sex target faces relative to average-looking opposite-sex target faces (when embedded in arrays consisting entirely of average-looking distracter faces). More specifically, we

predicted that this effect would be strongest among those with an unrestricted sociosexual orientation.

Additionally, we predicted that, as compared with participants in the control condition, participants experiencing a surge of romantic love would more slowly identify attractive opposite-sex target faces relative to average-looking ones (again, when embedded in arrays consisting entirely of average-looking distracters). We expected this effect to be most pronounced among participants reporting low levels of love for their romantic partners. We predicted that all effects would be specific to opposite-sex faces.

Method

Participants

One-hundred twenty undergraduates who described themselves as heterosexual and in a committed romantic relationship (46 men, 83 women) participated in exchange for course credit. Sixteen additional participants were excluded due to failing to follow instructions (i.e., they responded to less than 70% of experimental trials correctly) (12), prior knowledge of experimental hypotheses (3), or behaving inappropriately toward the experimenter (1).

Design and Procedure

All participants were run individually in private lab rooms. To disguise the purpose of the study, the experimenter told each participant that he or she would be completing two (ostensibly) unrelated studies, the first investigating visual processing and the second investigating memory. The experimenter then explained the instructions for the visual processing task, initiated the task on the computer, and left the room.

Participants then completed a block of practice trials on the face-in-the-crowd task. In these trials, stimuli consisted of neutral objects (e.g., hair drier, chair). The purpose of these practice trials was to familiarize participants with the task, thereby minimizing the time between the experimental manipulation and completion of critical trials. This served to ensure that the participants' emotional states would be highly salient during the completion of critical trials. Once each participant had completed the practice trials, the experimenter told the participant that he or she had finished the first study. To boost the plausibility of the cover story, the experimenter navigated through a

series of menus on the computer that were designed to appear as if the experimenter was terminating the visual task program.

The experimenter then introduced the task for the second study, which purportedly investigated memory. This task constituted the experimental manipulation and was intended to prime either feelings of sexual arousal, romantic love, or a control state, happiness. The experimenter explained that the study concerned “lucid memory” (see Pinel, Long, Landau, Alexander, & Pyszczynski, 2006), which was defined as the ability to “vividly recall the emotions associated with past events.” At this point, participants were randomly assigned to one of three emotional priming conditions: sexual desire, romantic love, or happiness (control condition). The emotional priming manipulations were based on previous studies (e.g., Lerner & Keltner, 2001; Fitzsimons & Bargh, 2003; Pinel et al., 2006). In the sexual desire condition, participants briefly described in writing five instances in which they felt highly sexually aroused, and then visualized and wrote about the single event in their life that made them feel the most sexually aroused. Participants in the love and happiness conditions instead visualized and wrote about a time in their life when they felt the most in love with their current romantic partner or most happy, respectively. The happiness control condition was designed to rule out the possibility that any differences in attentional processing between conditions would be attributable simply to positive versus neutral affect.¹

After participants completed the priming task, the experimenter re-entered the lab room and stated that he or she had made a mistake concerning the first experiment. The experimenter explained that he or she had forgotten to start the second half of the visual processing task and asked if the participant would mind completing that portion (no participants refused). The experimenter then started the second visual processing task, which actually contained the critical trials of the face-in-the-crowd task.

The face-in-the-crowd task contained photographs of (a) highly attractive men, (b) highly attractive women, (c) average-looking men, and (d) average-looking women. Eleven exemplars from each target category were included. All photographs were pre-tested by an independent group of undergraduate students ($n = 11$; 1 = *very*

¹ Because labeling state emotions reduces their impact on judgment (Keltner, Locke, & Audrain, 1993), participants did not self-report their emotions in a manipulation check. The manipulations employed in the current study have been successfully used in prior research (e.g., Gonzaga et al., 2006; Maner et al., 2007).

unattractive to 10 = *very attractive*). Average ratings were: attractive males ($M = 6.62$, $SD = 1.2$); average males ($M = 3.38$, $SD = .50$); attractive females ($M = 7.69$, $SD = .587$); average females ($M = 4.81$, $SD = .92$).²

In the face-in-the-crowd task, participants were first shown a “target” face and asked to familiarize themselves with it (target faces were selected randomly from a pool of several faces). On each trial, the target face was randomly embedded somewhere within a 3x3 array of other faces, the “crowd.” Thus there were nine possible positions in which the target face may have appeared and eight positions where distracter faces appeared (each distracter face was also selected randomly from a pool for each trial). Participants were instructed to locate the target face and click it with the mouse as quickly as possible once each trial began. Prior to the start of each trial, a fixation cross appeared at the center of the screen. Participants were instructed to visually focus and place the mouse cursor on the fixation cross (this procedure was implemented to reduce measurement error). After the fixation cross had been displayed for 2s, the trial commenced, and the array of faces containing the target face appeared. The latency between the start of the trial and the participant’s response was recorded. This response latency provided a measure of how quickly the participant’s attention was drawn to the target face. The stimulus array was replaced by a blank screen when the participant responded or after 4s, whichever came first (trials that timed out were scored as incorrect responses). There was a 4s intertrial rest period before the next fixation cross appeared.

Participants completed eight blocks of trials, which consisted of 10 trials each. Each block’s stimuli consisted of a different combination of target-type and distracter-type (e.g., attractive male target, average male distracters; average female target, attractive female distracters). All stimulus photos (targets and distracters) appearing within a block were of the same sex. That is, male targets were always embedded within an array of male distracters, and female targets were always embedded within an array of female distracters. The mean latencies with which participants responded to each block of trials served as dependent variables.

² All stimulus faces were monochromatic and equated for size, brightness, and contrast. All photographs were cropped so that no hair or other extraneous features were visible. Each stimulus face was approximately 110 pixels wide and 165 pixels tall.

After finishing the face-in-the-crowd task, participants completed an electronic version of the *Sociosexual Orientation Inventory* ($\alpha = .82$) (SOI; Simpson & Gangestad, 1991). The SOI measures the extent to which one has unrestricted sexual attitudes and behavior, that is, one's attitudes concerning sexual relations without emotional closeness or commitment and one's behavioral tendencies to engage in such relations (e.g., With how many different partners have you had sex on one and only one occasion?). Higher scores on the SOI indicate a more unrestricted sociosexual orientation³. Participants also completed an electronic version of the *Perceived Relationship Quality Components Scale* ($\alpha = .92$) (PRQC; Fletcher, Simpson, & Thomas, 2000). The PRQC contains six subscales, each measuring a distinct component of relationship quality: satisfaction, intimacy, trust, passion, commitment, and love. We used the love subscale ($\alpha = .88$) as a measure of participants' enduring sentiments of love for their partner. Participants indicated how much they loved, adored, and cherished their partner (1= not at all, 7 = extremely)⁴.

Once participants completed these scales, the experimenter entered the lab room, probed participants for suspicion, and then initiated a written debriefing on the computer for the participant to read. Once participants had been fully debriefed, the experimenter thanked and dismissed them.

Results

Dependent Measures

Participants' mean response latencies for each combination of target type (i.e., attractive vs. average), distracter type, and stimulus person sex served as dependent variables. Incorrect responses, that is, trials in which the participant selected a face other than the target face or selected no face at all, were excluded from analyses (approximately 10% of all trials). Means and standard deviations for these dependent variables by emotional priming condition are presented in Table 1.

³ The experimental manipulation did not significantly affect scores on the love subscale, $F(2,117) = .446$, $p = .641$.

⁴ The experimental manipulation did not significantly affect SOI scores, $F(2,117) = .384$, $p = .684$.

Table 1: Mean reaction times (in milliseconds) by trial type and priming condition

Trial Type	Priming Condition:					
	Happiness (<i>n</i> = 43)		Romantic Love (<i>n</i> = 37)		Sexual Desire (<i>n</i> = 40)	
	M	SD	M	SD	M	SD
Attractive Target - Average Distracters	1498	347	1560	395	1489	358
Average Target - Average Distracters	1534	288	1589	350	1637	355
Attractive Target - Attractive Distracters	1706	396	1642	314	1781	436
Average Target - Attractive Distracters	1624	280	1622	249	1560	299

Note: All means and standard deviations pertain to trials containing opposite-sex stimuli.

Target-Based Analyses

Two omnibus analyses of variance (ANOVA) were conducted to test two hypothesized patterns of results. The first analysis examined whether the sexual desire prime (as compared with the happiness control) *increased* attentional attunement to attractive opposite-sex target faces relative to average ones, especially among participants with an unrestricted sociosexual orientation. The second analysis tested whether the romantic love prime (as compared with the happiness control) *decreased* attentional attunement to attractive opposite-sex target faces relative to average ones, especially among participants reporting low levels of enduring love for their partners.

In both analyses, mean response latencies toward (1) attractive opposite-sex targets when embedded in average-looking distracters and (2) average-looking opposite-sex targets when embedded in average-looking distracters served as repeated measures. Thus a significant difference in reaction times between the two types of response latencies reflects the effect of the target face's attractiveness.

In the first analysis, participant sex⁵, emotional priming condition, and SOI score served as between-subjects factors (with SOI entered as a continuous factor). No effects reached significance, indicating that participants experiencing sexual desire did not attend to attractive opposite-sex target faces differently than those experiencing love or happiness.

⁵ Because no higher-order terms involving participant sex were statistically significant, they were dropped from the model. Only the main effect of participant sex was included.

In the second analysis, participant sex⁶, emotional priming condition, and the love subscale score taken from the PRQC served as between-subjects factors (with love score entered as a continuous factor). A main effect of target-face attractiveness, $F(1,113) = 7.293, p < .01$, indicated that participants attended to attractive target faces more quickly than average target faces. In addition to this effect, we observed the predicted three-way interaction between priming condition, love score, and target attractiveness, $F(2,113) = 6.048, p < .01$. No other significant effects were observed.

Multiple regression was used to investigate the precise nature of this interaction. The difference in mean response latencies for locating attractive versus average-looking opposite-sex target faces (when all distracters were average-looking) served as the dependent variable. Higher scores on this variable indicate faster response latencies toward attractive target faces relative to average ones. In other words, higher scores on this variable reflect greater attentional attunement to attractive targets relative to average targets.

The difference in response latencies between attractive versus average-looking targets was first regressed on participant sex, emotional priming condition, love score, and the centered interaction between priming condition and love score. Results confirmed the hypothesized interaction between the love prime and love score ($\beta = .374, p < .01, \text{partial } r = .266$).

To evaluate the nature of this interaction, we examined the conditional main effects of the love prime at high versus low levels of self-reported love (i.e., ± 1 SD above or below the mean). Among participants who reported low enduring levels of love for their partners, the love prime significantly decreased attention to attractive opposite-sex targets ($\beta = -.261, p < .05, \text{partial } r = -.184$), see Figure 1. However, for participants who reported high levels of enduring love for their partner, the love prime increased attention to attractive opposite-sex targets, though this effect was marginally significant ($\beta = .270, p = .052, \text{partial } r = .182$), see Figure 1. All effects of the love prime were specific to opposite-sex targets; the love prime had no effects on attention to same-sex stimuli among any participants (all β 's $< .03, p$'s $> .85$).

⁶ Because no higher-order terms involving participant sex were statistically significant, they were dropped from the model. Only the main effect of participant sex was included.

Conditional main effects of the love prime: Target-based analyses

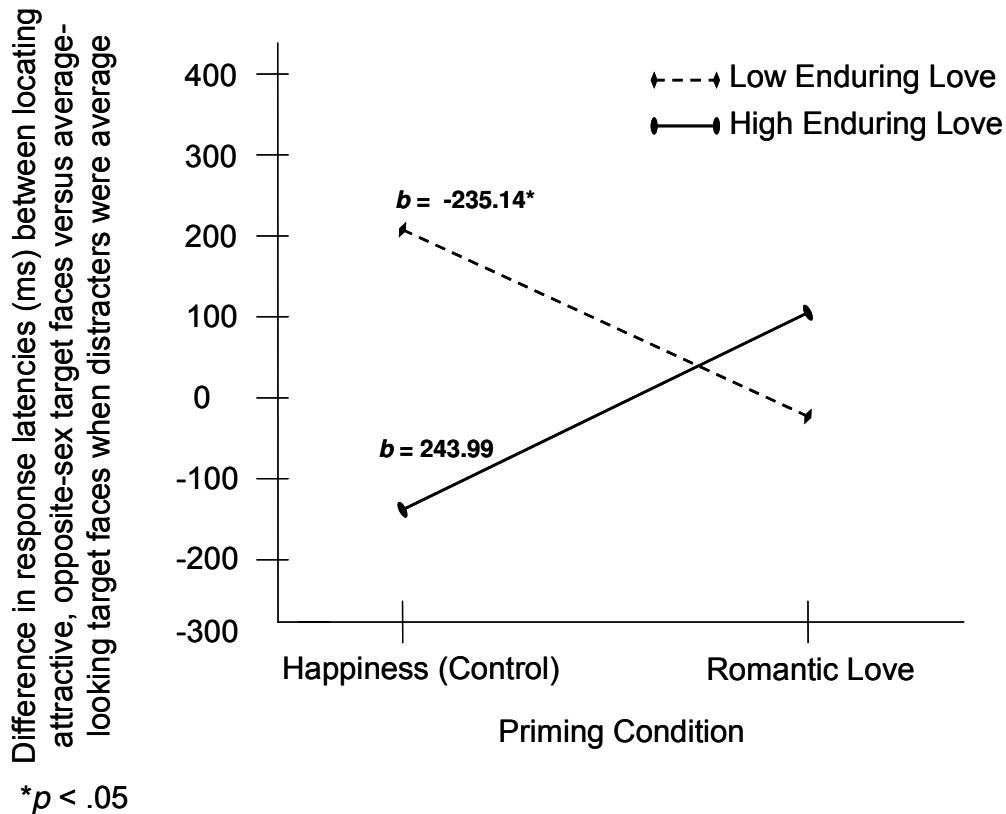


Figure 1: Conditional main effects of the love prime at high versus low levels of enduring love (± 1 SD above or below the mean) for the target-based analyses

Distracter-Based Analyses

In the target-based analyses, the attractiveness of the distracter faces was held constant thus isolating the potential effects of target-face attractiveness on participants' reaction times. In the next set of analyses, we held the attractiveness of the target faces constant and instead examined the effects of the attractiveness of distracter faces on reaction times. These distracter-based analyses provide another view of how participants attentionally processed the physical attractiveness of faces. We tested for the same hypothesized patterns of results as described in the target-based analyses, except that response latencies toward distracter faces replaced response latencies toward target faces as dependent variables.

An omnibus analysis of variance (ANOVA) was conducted to test whether the sexual desire prime (as compared with the happiness control) increased attentional

attunement to attractive opposite-sex distracter faces relative to average-looking ones, especially among participants with an unrestricted sociosexual orientation. No effects reached significance, indicating that participants experiencing sexual desire did not attend to attractive opposite-sex distracter faces differently than participants experiencing love or happiness. This is consistent with the null effects observed in the target-based analyses.

A second omnibus analysis of variance (ANOVA) tested whether the romantic love prime (as compared with the happiness control) decreased attentional attunement to attractive opposite-sex distracter faces relative to average-looking ones, especially among participants with low levels of enduring love for their partners. A two-way interaction between distracter attractiveness and participant sex, $F(1, 113) = 16.623, p < .01$, indicated that men's attention was captured by attractive distracters to a greater extent than average ones. A two-way interaction between distracter attractiveness and condition approached significance, $F(2, 113) = 2.027, p = .136$, as well as a three-way interaction between distracter attractiveness, condition, and love score, $F(2, 113) = 1.468, p < .235$.

Multiple regression was used to further investigate the interactions that approached significance. The difference in mean response latencies for locating attractive target faces among attractive distracters versus attractive target faces among average-looking distracters served as the dependent variable. Higher scores on this variable indicate faster response latencies toward target faces when embedded in average-looking distracter faces relative to attractive distracter faces. In other words, higher scores on this variable reflect greater attentional capture by attractive distracter faces.

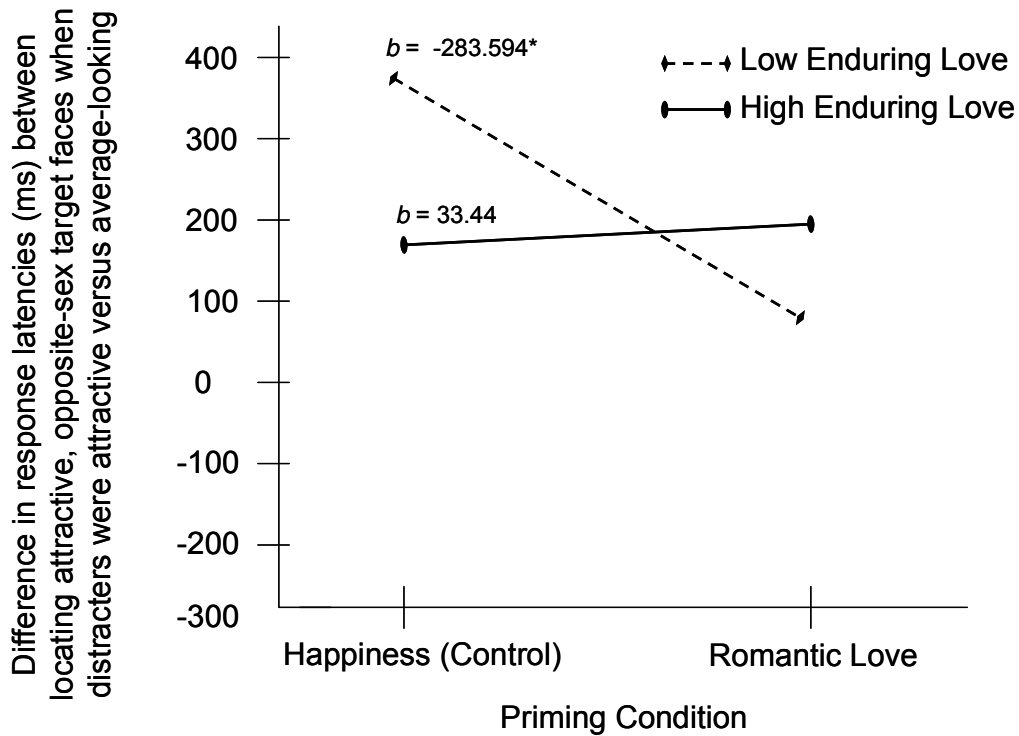
This dependent variable was regressed on participant sex, emotional priming condition, love score, and the centered interaction between priming condition and love score. Results confirmed the effect in which men's attention was captured to a greater extent by attractive distracters than average distracters, ($\beta = .365, p < .01, \text{partial } r = .358$).

A two-way interaction between the love prime and love score was marginally significant, ($\beta = .203, p = .107, \text{partial } r = .151$). Although not significant, we chose to further explore the nature of this interaction to learn if it complemented the previously

found effect of the love prime, in which the love prime decreased attention to physically attractive faces, especially among those who reported low levels of enduring love for their partners. We examined the conditional main effects of the love prime at high versus low levels of enduring love (i.e., ± 1 SD above or below the mean). Among participants who reported low levels of enduring love for their partners, the love prime significantly decreased attention to attractive opposite-sex distracter faces ($\beta = -.258$, $p < .05$, partial $r = -.186$), see Figure 2. There was no effect of the love prime among those who reported higher levels of enduring love for their partners ($\beta = .03$, $p = .822$), see Figure 2. This is consistent with findings from the earlier target-based analyses.

Again, all effects of the love prime were specific to opposite-sex distracter faces; the love prime had no effects on attention to same-sex stimuli among any participants (all β 's $< .16$, p 's $> .23$). A main effect of participant sex was found on attention to same-sex stimuli in the distracter-based analysis, ($\beta = -.284$, $p < .01$, partial $r = -.277$), but this effect was opposite that found in the analysis for opposite-sex stimuli; in the distracter-based analyses, men were significantly faster to locate target faces when distracters were attractive and of the same sex than when distracters were average-looking and of the same sex.

Conditional main effects of the love prime: Distracter-Based Analyses



* $p < .05$

Figure 2: Conditional main effects of the love prime at high versus low levels of enduring love (± 1 SD above or below the mean) for the distracter-based analysis

Discussion

The current findings suggest ways in which momentary, emotional experiences of romantic love modulate the attentional processing of physically attractive others by those in ongoing romantic partnerships. Findings suggest that momentary experiences of love reduce attention to physically attractive members of the opposite sex, especially among those who have lower enduring levels of love for their current partners. First, the love prime caused those who reported lower levels of enduring love for their partners to locate physically attractive target faces more slowly relative to average-looking target faces. This indicates that, when these participants were experiencing a momentary surge of love, their attention was drawn less powerfully to physically attractive members of the opposite sex. Moreover, the love prime caused participants who reported lower levels of enduring love for their partners to locate target faces more quickly when

distracter faces were physically attractive relative to when distracter faces were average-looking. This finding also indicates that when these participants were experiencing a surge of love, they were less attuned to physically attractive members of the opposite sex – the love prime caused them to be less distracted by the physically attractive faces while they searched for target faces.

Why might the love prime have had especially strong effects among participants who reported lower, rather than higher, levels of enduring love for their partners? One possibility is that the attention of participants who had higher levels of enduring love for their partners was already sufficiently tuned away from physically attractive alternative mates. That is, perhaps the lack of effects among participants with high enduring levels of love reflected the presence of a floor effect. Participants who reported lower levels of enduring love were presumably more attentive to attractive alternatives and, as a result, were affected more strongly by the love priming procedure. The pattern of data is consistent with this argument: participants in the happiness (control) condition who reported high levels of love for their partners located average-looking target faces more quickly than attractive ones – their attention seemed already to be tuned *away* from attractive alternatives. On the other hand, participants in the happiness condition who reported lower levels of love for their partners located attractive target faces more than 200 ms faster than average-looking target faces – their attention seemed to be tuned *toward* attractive alternatives. However, the effects of the love prime caused this pattern to reverse: after undergoing the love priming procedure, those highly in love located attractive faces relatively faster than average-looking ones, whereas those less in love located attractive faces relatively slower than average-looking ones.⁷ This same pattern of effects was also found in the distracter-based analysis.

We did not anticipate that the love prime (relative to the happiness control) would increase attention to attractive opposite-sex target faces among participants who reported high levels of enduring love for their partners, although this effect was only marginally significant. One possible explanation for this (marginal) effect is that, for participants who are highly in love with their partners at baseline and also experiencing a momentarily heightened level of love, viewing attractive members of the opposite-sex

⁷ Note that only the conditional main effect of the love prime at a low level of self-reported love (-1 SD) was statistically significant.

may not represent a serious relationship threat, and thus it is “okay to look.” Previous research has shown that relationship-maintenance mechanisms, such as devaluation of alternatives, are only engaged when the relationship threat level is calibrated with the couples’ level of relationship commitment (Lydon, Meana, Sepinwall, Richards, & Mayman, 1999; Lydon, Fitzsimmons, & Naidoo, 2003). In other words, relationship maintenance mechanisms might only be engaged when relationship threats are serious enough to warrant a defense, yet not so serious that they bypass defenses altogether. It may be the case in the current study that viewing attractive faces of the opposite sex did not present a serious enough relationship threat to warrant a defense for participants highly in love at baseline and also experiencing a momentarily heightened level of love. In fact, feeling especially committed and close to their partners may have given these participants the “green light” to attend to the attractive opposite-sex faces, as they presented virtually no threat to their relationships.

All of the aforementioned effects were found only when the target and distracter faces were reproductively relevant; no effects of the love prime were found on attention to same-sex stimuli. The specificity of these effects underscores their mating-related functions, as the ultimate evolutionary function of romantic love has been theorized to forge a bond between mating partners (e.g., Mellen, 1982).

These findings are consistent with previous research on love, physical attractiveness, and relationship maintenance. For instance, Simpson, Gangestad, and Lerma (1990) found that, as compared with single people, those involved in dating relationships perceive similarly-aged members of the opposite-sex as less physically attractive. This finding might represent a possible mediator between the effects of love on attention to alternative mates documented in the current study. That is, feelings of love might cause people to perceive alternative mates as less physically attractive, thereby reducing attention directed toward them. Because attention toward alternative mates shapes downstream cognition and action directed toward them, this reduced attention toward alternative mates might act as a first line of defense in the maintenance of romantic relationships.

Results from the current study are also consistent with research showing a direct connection between attention to alternatives and relationship maintenance. For instance, Miller (1997) found that the length of time participants spent attending to

advertisements containing attractive opposite-sex models was predictive of relationship dissolution over a two-month period. The current study builds upon this finding in that feelings of love were shown to reduce attention to alternatives, and according to Miller's research, this decreased attention should in turn decrease relationship dissolution. Thus the current study is (to our knowledge) the first to document a potentially relationship-enhancing effect of romantic love at such an early stage of cognitive processing (i.e., attentional orienting).

Limitations and Future Directions

Previous studies have documented effects of sexual desire on attentional processes similar to those investigated in the current study (e.g., Maner et al., 2007), and thus the lack of significant results involving the sexual desire prime in the current study warrants further discussion. One key difference between previous studies and the current study is that the current study included only participants in committed relationships, and thus characteristics of the samples of these studies might be responsible for the lack of effects involving the sexual desire prime. For instance, it may be that the effects of sexual desire in previous studies were driven primarily by participants who were single. Also, in previous research the effects of sexual desire were found primarily among participants with an unrestricted sociosexual orientation. Because the current study only included participants in committed relationships, there is a possibility of restricted range in sociosexuality (to the degree that sociosexuality covaries with relationship status), which might account for the null results. One final possibility is that the instructions given to participants in the sexual desire condition in the current study were not specific enough; participants were instructed simply to recall and write about the single episode in their lives in which they felt the most sexually aroused. Thus some participants may have recalled sexual experiences with their current romantic partner, whereas other participants might have recalled experiences with someone other than their current partner. Sexual desire felt for one's current partner might not heighten attention to physically attractive others in general, and this might explain the null findings involving the sexual desire prime.

Although the current study reveals a great deal about the effects of momentary experiences of love on attention to physically attractive alternative mates, many questions remain. For instance, does love help couples maintain their relationships by

way of inattention to alternatives? Though connections between the current study and prior research (e.g., Miller, 1997) suggest that this may be so, the current study does not directly test this hypothesis. Future research might more directly test the possibility that inattention to alternatives mediates (or partially mediates) the relationship between love and relationship maintenance. In particular, future research might treat attentional processing as an independent, rather than dependent, variable. Manipulating attention toward or away from attractive alternatives (for an example of how this might be done, see MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002) and then examining the effects of this manipulation on measures of relationship quality in the moment and over time would be an especially effective test of the attention-as-mediator hypothesis.

Another limitation pertains to the individual differences we chose to investigate in the current study. Sociosexual orientation and enduring levels of love are but two of the individual differences that may influence attention to potential mates. For instance, people may differ in the extent to which they prioritize physical attractiveness in their schemas of the ideal relationship partner (e.g., Fletcher, Simpson, & Thomas, 2000; Fletcher, Simpson, Thomas, & Giles, 1999), and this may influence the extent to which their attention to physically attractive potential mates might be modified by emotions like romantic love and sexual desire.

Integrating Social Cognitive and Evolutionary Approaches

In conducting this research, we have drawn on two distinct approaches to psychological research that, to date, have not yet been fully integrated: those of evolutionary psychology and social cognition. Research within the domain of evolutionary psychology has tended to focus on “higher-order” forms of social information processing, such as explicit judgments, preferences, and biases in decision-making (e.g., Buss, 1989; Kenrick, Sundie, Nicastle, & Stone, 2001; Li & Kenrick, 2006). Evolutionary psychological theories have at times failed to inspire research concerning relatively lower-order cognitive processes, such as attention and automatic, implicit evaluations (although there are exceptions; e.g. Kurzban, Tooby, & Cosmides, 2001; Maner et al., 2007). These lower-order cognitive mechanisms are of central importance as they may influence higher-order processes in a bottom-up fashion. In other words, they are the building blocks of higher-order reasoning and action (e.g., Haselton & Nettle, 2006; Klein, Cosmides, Tooby, & Chance, 2002; Kurzban et al., 2001). In

contrast, social cognitive approaches have employed rigorous methods to examine these early stages of cognition, but have lacked an overarching theoretical framework that accounts for the functions that underlie cognitive biases and the effects of specific stimulus content. In integrating these two approaches, we hope to establish a framework for investigating basic adaptive cognitive mechanisms that govern human social perception in various domains of social life.

APPENDIX A

Sociosexual Orientation Inventory

Please answer the following questions honestly. Remember, your answers are totally confidential, and there are no right or wrong answers.

With how many different partners have you had sex within the past year? _____

How many different partners do you foresee yourself having sex with during the next 5 years? _____

With how many different partners have you had sex on one and only one occasion? _____

How often do (did) you fantasize about having sex with someone other than your current (most recent) dating partner?

Never
1 2 3 4 5 6 7
At least once a day

Sex without love is OK.

Strongly Disagree
1 2 3 4 5 6 7
Strongly Agree

I would have to be closely attached to someone (both emotionally and psychologically) before I could feel comfortable and fully enjoy having sex with him or her.

Strongly Disagree
1 2 3 4 5 6 7
Strongly Agree

I can imagine myself being comfortable and enjoying casual sex with different partners.

Strongly Disagree
1 2 3 4 5 6 7
Strongly Agree

APPENDIX B

Perceived Relationship Quality Components Scale

The Perceived Relationship Quality Component (PRQC) Inventory consists of 18 items. Each perceived relationship quality component is assessed by three questions. Each statement is answered on a 7-point Likert-type scale (ranging from 1 = *not at all* to 7 = *extremely*). Instructions are to rate the current partner and relationship on each item. Component categories are shown as subheadings (which are omitted when the scale is administered).

Relationship Satisfaction

1. How satisfied are you with your relationship?
2. How content are you with your relationship?
3. How happy are you with your relationship?

Commitment

4. How committed are you to your relationship?
5. How dedicated are you to your relationship?
6. How devoted are you to your relationship?

Intimacy

7. How intimate is your relationship?
8. How close is your relationship?
9. How connected are you to your partner?

Trust

10. How much do you trust your partner?
11. How much can you count on your partner?
12. How dependable is your partner?

Passion

13. How passionate is your relationship?
14. How lustful is your relationship?
15. How sexually intense is your relationship?

Love

16. How much do you love your partner?
17. How much do you adore your partner?
18. How much do you cherish your partner?

APPENDIX C

Human Subjects Approval Memorandum



Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2763
(850) 644-8633 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 10/10/2005

To:
Aaron Rouby
MC 1270

A handwritten signature in black ink, appearing to read "Thomas L. Jacobson".

Dept.: PSYCHOLOGY DEPARTMENT

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Social cognitive processes in romantic relationship maintenance contests

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Human Subjects Committee at its meeting on **8/10/2005**. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If the project has not been completed by **8/9/2006** you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. The principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

cc: Jon Maner
HSC No. 2005.607

APPENDIX D

Human Subjects Approval Memorandum (Reapproval)



Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8633 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 8/24/2006

To:
Aaron Rouby
MC 1270

Dept.: **PSYCHOLOGY DEPARTMENT**

From: **Thomas L. Jacobson, Chair**

A handwritten signature in black ink, appearing to read "Thomas L. Jacobson".

Re: **Use of Human Subjects in Research**
Social cognitive processes in romantic relationship maintenance contests

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Human Subjects Committee at its meeting on **8/9/2006**. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If the project has not been completed by **8/8/2007** you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. The principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

cc: Jon Maner
HSC No. 2006.0687-R

APPENDIX E

Informed Consent Form

INFORMED CONSENT FORM

I freely and voluntarily and without element of force or coercion, consent to be a participant in the research project entitled "Information Processing." This research is being conducted by Jon Maner, Ph.D., a Professor of Psychology at Florida State University. I understand that the purpose of his research project is to understand basic cognitive processes including judgment, attention, memory, and evaluation. I understand that if I participate in the project, I may be asked to recall and write about an emotional event from my life. I understand that I may be asked to view, categorize, or remember pictures or text involving various people, words, events, and objects. I understand that I will also be asked to answer questions involving my attitudes about objects, words, romantic relationships, my personality, and my past sexual history.

I understand that I must be at least 18 years of age in order to participate. The total time commitment will be about 30-60 minutes and I will be compensated by receiving .5-1 credit point for my time. I understand that my participation is totally voluntary and I may stop participation at anytime. If I decide to stop participation, I will still be entitled to the extra credit point. All my answers to the questions will be confidential to the extent allowed by law and will not be connected to me by name or other identifying information. In addition, my name will not appear on any of the results. No individual responses will be reported. Only group findings will be reported. I understand that all data relevant to the study will be kept in a locked file cabinet in the researcher's laboratory space for 10 years.

I understand that there is a possibility of a minimal level of risk involved if I agree to participate in this study. I might experience anxiety when completing some of the questionnaires and thinking about my attitudes toward relationships. The research assistant will be available to talk with me about any emotional discomfort I may experience while participating. I am also able to stop my participation at any time I wish.

I understand that there are benefits for participating in this research project. First, I may gain insight into how and why I respond to others in particular ways. Also, I will be providing researchers with valuable insight into these issues.

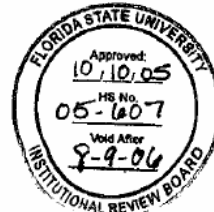
I understand that this consent may be withdrawn at any time without prejudice, penalty, or loss of benefits to which I am otherwise entitled. I have been given the right to ask and have answered any inquiry concerning the study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Dr. Jon Maner, Florida State University, Department of Psychology Room 323a, 645 - 1409, for answers to questions about this research or my rights. Group results will be sent to me upon my request. If I have questions about my rights as a subject/participant in this research, or if I feel I have been placed at risk, I can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Office of the Vice President for Research, at (850) 644-8633.

I have read and understand this consent form.

Name/Sign
Date

Researcher contact information:
 Aaron Rouby rouby@psy.fsu.edu
 Saul Miller smiller@psy.fsu.edu
 Jon Maner maner@psy.fsu.edu



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BIOGRAPHICAL SKETCH

David Aaron Rouby was born January 7, 1983 in Little Rock, Arkansas. He earned a Bachelor of Arts degree in Psychology from Ouachita Baptist University in 2005. He entered the Department of Psychology at Florida State University in 2005 to pursue a doctoral degree in social psychology. His research has been published in the *Journal of Personality and Social Psychology*.