Love Is in the Gaze: An Eye-Tracking Study of Love and Sexual Desire

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Abstract
Reading other people's eyes is a valuable skill during interpersonal interaction. Although a number of studies have investigated visual patterns in relation to the perceiver's interest, intentions, and goals, little is known about eye gaze when it comes to differentiating intentions to love from intentions to lust (sexual desire). To address this question, we conducted two experiments: one testing whether the visual pattern related to the perception of love differs from that related to lust and one testing whether the visual pattern related to the expression of love differs from that related to lust. Our results show that a person's eye gaze shifts as a function of his or her goal (love vs. lust) when looking at a visual stimulus. Such identification of distinct visual patterns for love and lust could have theoretical and clinical importance in couples therapy when these two phenomena are difficult to disentangle from one another on the basis of patients' self-reports.

Keywords
social neuroscience, sexual desire, love, eye tracking, interpersonal relationships, intentions, open data, open materials

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When you are on a date with a person you barely know, how do you evaluate that person’s goals and intentions regarding a long-term relationship with you? This question is bidirectional. How does your date know whether you aspire to be in a long-term or short-term relationship with him or her? What is being said regarding goals and intentions may not constitute a particularly trustworthy source of data because one's speech can be controlled to hide one's true intentions in order to reach a goal. This article focuses on a different source of information regarding a person's goals and intentions: eye gaze.

Eye gaze is a surprisingly rich source of information about one's interest, intentions, and goals. For instance, prior research indicates that specific goals and intentions influence a person's gaze direction and allocation of social attention (Argyle & Cook, 1976; Baron-Cohen, 1995; Böckler, van der Wel, & Welsh, 2014; Emery, 2000; Jones, Main, DeBruine, Little, & Welling, 2010; Mason, Tatkow, & Macrae, 2005; Rupp & Wallen, 2007), and a growing number of studies support the idea that goal-directed actions and intentions are functionally coupled with selective visual processing before action (e.g., Land & Lee, 1994; Land, Mennie, & Rusted, 1999). Moreover, decoding and understanding the language of the eyes is a skill that plays a major role in social cognition and interpersonal interaction (Baron-Cohen, 1995; Emery, 2000).

Although a large number of studies have investigated the importance of eye gaze in different settings and have demonstrated that the gaze direction of an interlocutor likely influences a viewer's construal through its effects on allocation of spatial attention (Haxby, Hoffman, & Gobbini, 2000; Macrae & Bodenhausen, 2000; Macrae, Hood, Milne, Rowe, & Mason, 2002), little is known about...
the pattern of gaze when it comes to differentiating love from lust (i.e., sexual desire). Building on the notion of a functional coupling of goal-directed actions and intentions with selective visual processing before action, we hypothesized that gaze direction differentiates love from lust.

Love and lust have existed throughout human history (Cacioppo & Hatfield, in press; Hatfield & Rapson, 2002), but sexual desire has long been a neglected stepchild in scientific research on interpersonal attraction (Cacioppo & Cacioppo, 2013; Hatfield & Rapson, 1990). The disinterest in sexual desire has begun to change, and a growing body of evidence has demonstrated a tight correlation between the subjective feeling of romantic love and the subjective feeling of sexual desire. For instance, neuroimaging studies have shown that love and lust share common mechanisms. Specifically, these two phenomena share neural regions of activation within the cortical areas that are involved in self-representation, goal-directed actions, and body image (middle frontal gyrus, superior temporal gyrus, temporo-parietal junction, and occipito-temporal cortices; Cacioppo, Bianchi-Demicheli, Frum, Pfaus, & Lewis, 2012; Cacioppo & Cacioppo, 2013) and within subcortical brain areas associated with positive emotions, euphoria, reward, motivation, and addiction (e.g., striatum, thalamus, hippocampus, anterior cingulate cortex, and ventral tegmental area).

However, love and lust are not identical (Diamond, 2004; Diamond & Dickenson, 2012; Hatfield & Rapson, 2005). Love is not a prerequisite for sexual desire, and sexual desire does not necessarily lead to love. Love and lust can exist by themselves or in combination, and to any degree (Cacioppo & Cacioppo, 2013). In one study of 500 individuals conducted in the mid-1960s by Tennen (1999), 61% of the women and 35% of the men agreed with the statement, “I have been in love without feeling any need for sex,” and 53% of the women and 79% of the men agreed with the statement, “I have been sexually attracted without feeling the slightest trace of love.” From a psychological viewpoint, sexual desire and love may not differ in their constituent components (e.g., valence) as much as in their goal (Hatfield & Rapson, 2005). Sexual desire is oriented toward consummation of a sexual encounter (Hatfield & Rapson, 2005). More specifically, sexual desire is characterized by an increase in the frequency and the intensity of sexual thoughts and fantasies toward a target (an increase that can be either spontaneous or evoked by the target), as well as by an increase in wanting and seeking to attain a potentially short-term pleasurable goal. In contrast, love is characterized by wanting and seeking to maintain a long-lasting relationship with a significant other (Hatfield & Rapson, 2005).

Fisher (1998), an anthropologist, has suggested that love and sexual desire stem from two functionally independent social-behaviors systems with distinct evolutionary functions and neural bases. Consistent with this notion, a recent functional MRI quantitative meta-analysis showed that activation in two specific brain regions can help dissociate love from desire. First, the anterior region of the insula is activated more by love (than by sexual desire; Cacioppo et al., 2012; Cacioppo et al., 2013), whereas the posterior region of the insula is activated more by sexual desire (than by love; Cacioppo et al., 2012). This posterior-to-anterior distinction between sexual desire and love within the insula is in accord with a broader principle of brain organization: Posterior regions are involved in current, concrete sensations, feelings, and responses, whereas anterior regions are more involved in relatively abstract, integrative representations. Second, the ventral striatum, an area known to be activated for inherently pleasurable experiences (e.g., rewarding experiences related to sex and food), is specifically more activated for sexual desire than for love, whereas the dorsal part of the striatum, an area involved in the process of conditioning by which things paired with reward or pleasure are given inherent value, is more activated by love than by sexual desire. This ventral-to-dorsal dissociation between sexual desire and love is in line with reward theories, which distinguish between the various hedonic experiences of reward (i.e., wanting vs. liking; Berridge, 1996); wanting is related to the processing of the immediate reward value of a stimulus via dopaminergic neurotransmission in the ventral striatum (Cacioppo et al., 2012; Cacioppo & Cacioppo, 2013; Wyvell & Berridge, 2000).

These neural dissociations between love and lust suggest that these two phenomena may, in turn, sustain separable behaviors and automatic attention processes, with the visual features of a person’s body being a focus in the case of sexual desire and the visual clues regarding a person’s mental state (i.e., eyes and face) being a focus in the case of love. To date, no study has investigated whether an observer exhibits differential eye-gaze patterns when looking at a novel individual with the intention or goal of love versus lust, although a recent animal study of courtship behavior is consistent with our hypothesis regarding sexual desire. Specifically, Yorzinski, Patricelly, Babcock, Pearson, and Platt (2013) used a miniaturized telemetric gazer tracker to investigate freely moving peahens’ (*Pavo cristatus*) visual attention during courtship. Results showed that when gazing at males’ frontal displays, peahens spent significantly more time looking at the males’ legs, lower eyespots, lower fishtail feathers, and dense feathers than at the males’ scale feathers, upper eyespots, upper fishtail feathers, heads, and crests.
To test our hypothesis in humans, we performed two experiments: one testing whether the visual pattern related to the perception of romantic love differs from that related to sexual desire (Study 1) and one testing whether the visual pattern related to the expression of romantic love differs from that related to sexual desire (Study 2). The identification of distinct visual patterns for love versus lust (sexual desire) in humans could have theoretical and clinical importance in couples therapy when these two phenomena are difficult to disentangle from one another on the basis of patients' self-reports or gross behavioral observation.

General Method

Subjects

A total of 20 healthy heterosexual college students (13 women, 7 men; mean age = 22.15 years, SD = 3.38 years) participated in Study 1. Eighteen of the subjects were right-handed, and 2 were left-handed (Edinburgh Handedness Inventory; Oldfield, 1971). Three of these 20 subjects chose not to perform Study 2, which occurred a few weeks after Study 1. The desired sample size was estimated using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009), which indicated that 16 subjects were required in order to have 95% power to detect a statistically significant difference. The data-collection stopping rule was to recruit at least 16 subjects and to stop by the end of the quarter, provided that number had been reached (or to continue otherwise). All subjects were French speakers with normal or corrected-to-normal vision. They reported that they were taking no medication, did not have any chemical dependencies, and did not have prior or current neurological disorders or symptoms of psychiatric disorders. A semistructured interview with the subjects also provided information about their feelings of anxiety and depression (Zigmond & Snaith, 1983), loneliness (de Grace, Joshi, & Pelletier, 1993), and sexual desire (Spector, Carey, & Steinberg, 1996). All subjects had scores in the normal range (anxiety: M = 8, SD = 4.16; depression: M = 4, SD = 2.06; loneliness: M = 24, SD = 4.90; sexual desire for a partner: M = 50, SD = 14.04; solitary sexual desire: M = 15, SD = 8.92). All subjects provided written informed consent to participate in the experiments, which were approved by the local Committee for Protection of Human Subjects.

Procedure

In both studies, the subjects performed computer tasks in which they viewed a series of photographs of persons they had never met before. Each experiment included a behavioral part and an eye-tracking part, which were performed in different sessions in order to avoid any motor interference between tasks. In the behavioral part, the subjects were asked to look at each photograph and indicate as rapidly and as precisely as possible whether they perceived the photograph as eliciting feelings of sexual desire (yes or no) or romantic love (yes or no). Subjects responded “yes” by pressing the “K” key on the keyboard with the index finger of the right hand and responded “no” by pressing the “L” key on the keyboard with the middle finger of the right hand.

In the eye-tracking part, the subjects performed the same task but were instructed to simply think about their response rather than make a motoric response. As in previous eye-tracking studies (e.g., Kellerman, Lewis, & Laird, 1989), no reaction times were recorded during the eye-tracking sessions to avoid the possibility that subjects might look at the response keyboard rather than the stimuli during the task.

Stimuli

The stimuli in both experiments were photographs of people (couples in Study 1, single individuals in Study 2; the stimuli can be viewed at http://dx.doi.org/10.7910/DVN/26134, Harvard Dataverse Network). To control for visual features across the stimuli, we presented all photographs in black and white and at the same size (200 × 500 pixels). Facial expressions in the photographs were matched across Studies 1 and 2.

Apparatus and measures

The experiments were run using E-Prime 2.0 Pro (Psychology Software Tools, Inc., http://www.pstnet.com/eprime.cfm?ID=124). The dependent measures in the behavioral tasks of Studies 1 and 2 were the percentage of “yes” responses and reaction time. Eye movements in the eye-tracking sessions were recorded using the Tobii T60 eye tracker (Tobii Technology, Inc., Danderyd, Sweden) and Tobii Studio Version 2.3.2 (Psychology Software Tools, Inc., http://www.pstnet.com/hardware.cfm?ID=107). Three dependent measures were used in the eye-tracking sessions: (a) the mean number of fixations, (b) the total duration of all fixations (in seconds), and (c) the time to the first fixation (i.e., the time in seconds from the onset of the stimulus until the start of the first fixation); these measures were calculated for two visual areas of interest (face and body). Only eye-tracking data for photographs that had received a “yes” response during the behavioral task were included in analyses to ensure that the measured eye movements reflected the intended experimental condition (i.e., romantic love vs. sexual desire). All measures were calculated separately for each subject and condition, and
outliers (responses more than 3 SD from the grand mean) were removed from analysis (0.94% of the data).

In the behavioral sessions of Study 1 and Study 2, stimuli were presented in a random order using E-Prime automatic randomization. For the eye-tracking sessions of Study 1 and Study 2, the stimuli were presented in a random order prepared manually by one of the authors (M. B.), as Tobii technology did not allow an automatic randomization of the stimuli.

**Study 1 Method**

**Stimuli**

The stimuli in Study 1 consisted of 120 photographs of heterosexual couples (young adults) scanned from random online advertisements. No nude or erotic images were included. These photographs of couples represented models in the same age range as subjects (18–30 years old) who were facing the camera, touching faces, or gazing at each other. Two of the authors (S. C. and M. B.) selected a total of 200 nonerotic photographs of heterosexual couples that could be categorized as suggesting either a romantic relationship (n = 100) or a sexual-desire relationship (n = 100). Then, 16 heterosexual volunteers (9 women, 7 men; mean age for women = 25.3 years, SD = 2.5; mean age for men = 24.71 years, SD = 3.39), students from the University of Geneva who did not participate in the subsequent parts of the study, rated the intensity of sexual desire evoked in each of the 200 photographs on a scale from 0 (none) to 6 (very much). The 60 photographs with the lowest scores (M = 1.06, SD = 0.25) were used as stimuli evocative of romantic love, and the 60 photographs with the highest scores (M = 3.27, SD = 0.43) were used as stimuli evocative of sexual desire. The ratings of the two categories of photographs were significantly different, t(59) = 25.68, p < .001; 95% confidence interval (CI) = [2.04, 2.38], d = 6.28.

**Experimental paradigm**

The behavioral part of Study 1 included two blocks. In each block, all 120 photographs were presented, in random order. A different instruction was given to the subjects for each block. In one block, the subjects were asked to look at each photograph and decide as rapidly and as precisely as possible whether they perceived the photograph as eliciting feelings of sexual desire. To make sure that all the subjects understood the concept of sexual desire in a similar manner, at the beginning of the experiment we provided each subject with the following oral definition of sexual desire: “the presence of feelings of sexual interest, and of sexual thoughts or fantasies related to the image depicted in the photograph.” In the other block, the subjects were asked to look at each photograph and decide as quickly and as precisely as possible whether they perceived the photograph as eliciting feelings of romantic love, which was described as a sentimental and tender state of longing for union with another that was not necessarily associated with sexual feelings. The order of these experimental instructions was counterbalanced across subjects. In both blocks, each trial began with central presentation of a 250-ms fixation cross. The target stimulus was then presented for 500 ms. Finally, during the intertrial interval, a blank screen was presented for 1,500 to 2,500 ms (determined randomly).

In the subsequent eye-tracking session, the subjects were exposed to only two randomly selected photographs from each category (romantic love and sexual desire). In one block of trials, subjects were asked to sit quietly, look at the photographs, and think about whether they perceived each photograph as eliciting feelings of sexual desire (yes or no). In the other block of trials, subjects were asked to sit quietly, look at the photographs, and think about whether they perceived each photograph as eliciting feelings of romantic love (yes or no). As in the behavioral session, the order of these experimental instructions was counterbalanced across subjects. Each trial consisted of a 1,500-ms presentation of a blank screen followed by a 1,500-ms presentation of the target stimulus. One photograph was presented on each trial, and the next trial followed immediately after the previous target stimulus was presented.

For the behavioral analyses, the within-subjects factors were stimulus dimension (photos selected a priori to be evocative of romantic love vs. sexual desire) and task dimension (decisions about feelings of romantic love vs. sexual desire), and the between-subjects factor was gender of the subject. In the eye-tracking analyses, two visual areas of interest in the images were specified a priori: the face and the body. Thus, in these analyses, the within-subjects factors were stimulus dimension (photos selected a priori to be evocative of romantic love vs. sexual desire), task dimension (decisions about feelings of romantic love vs. sexual desire), and visual area of interest (face vs. body), and the between-subjects factor was gender of the subject.

**Study 2 Method**

**Stimuli**

In Study 2, the stimuli consisted of 80 photographs (40 males and 40 females) of attractive individuals who were gazing toward the camera. Each subject viewed only the 40 photographs of members of the opposite gender. As in Study 1, the photographs represented body models in
the same age range as the subjects (18–30 years old). The photos were scanned from random advertisements in online fashion magazines (for examples, see Fig. S1 in the Supplemental Material available online). No nude or erotic pictures were included in the stimuli. The same stimuli were used in the behavioral and the eye-tracking parts of Study 2.

**Experimental paradigm**

Each session of Study 2 included four blocks. In each block, 40 photographs were presented. The subjects were instructed to look at each photograph and decide as rapidly and precisely as possible whether the person in the photograph could elicit feelings of romantic love in them (instruction A) or to look at each photograph and decide as rapidly and precisely as possible whether the person in the photograph could elicit feelings of sexual desire in them (instruction B). As in Study 1, the order of these instructions was counterbalanced (ABBA or BAAB) across subjects. Each trial began with central presentation of a 500-ms fixation cross, which was followed by a 1,500-ms target stimulus. Successive trials were separated by an intertrial interval during which a blank screen was presented for 1,500 to 2,500 ms (randomly determined).

A similar procedure was followed in the subsequent eye-tracking session. As in the eye-tracking part of Study 1, each trial consisted of a 1,500-ms presentation of a blank screen followed by a 1,500-ms presentation of the target stimulus. One photograph was presented on each trial, and the next trial followed immediately after the previous target stimulus was presented.

For the behavioral analyses, the within-subjects factor was task dimension (decisions about feelings of romantic love vs. sexual desire) and the between-subjects factor was gender of the subject. The within-subjects factors for the eye-tracking analyses were task dimension (decisions about feelings of sexual desire vs. romantic love) and visual area of interest (face vs. body), and the between-subjects factor was gender of the subject.

**Study 1 Results**

**Behavioral results**

There were no significant interactions involving gender. Therefore, we collapsed the data across gender and performed 2 (stimulus dimension) × 2 (task dimension) analyses of variance (ANOVs).

Analyses of the decision data revealed the expected significant Stimulus Dimension × Task Dimension interaction, $F(1, 19) = 53.21, p < .001, \eta^2 = 0.54$; photos selected to be evocative of sexual desire were evaluated as evocative of sexual desire more often ($M = 79.93\%$, $95\% CI = [70.71, 89.15]$) than were photos selected to be evocative of romantic love ($M = 26.02\%, 95\% CI = [18.98, 33.06]$), and photos selected to be evocative of romantic love were evaluated as evocative of romantic love more often ($M = 79.77\%, 95\% CI = [69.12, 90.42]$) than were photos selected to be evocative of sexual desire ($M = 57.98\%, 95\% CI = [46.61, 69.34]$). In addition, the analysis revealed main effects of stimulus dimension, $F(1, 19) = 23.54, p < .001, \eta^2 = 0.22$, and of task dimension, $F(1, 19) = 24.23, p < .001, \eta^2 = 0.22$. These results indicate that the manipulations were effective. The analysis of reaction times revealed no significant effects (for descriptive statistics, see Table S1 in the Supplemental Material). Thus, the speed of processing was similar in the two conditions.

**Eye-tracking results**

There were no significant interactions involving gender for any of the three eye-tracking measures (mean number of fixations, total duration of all fixations, and time to first fixation). We therefore collapsed the data across gender and performed a 2 (task dimension) × 2 (visual area of interest) ANOVA for each dependent variable.

Analysis of the number of fixations revealed a significant interaction between task dimension and visual area of interest, $F(1, 19) = 31.74, p < .001, \eta^2 = 0.42$; subjects were more likely to fixate on the face when making decisions about romantic love than when making decisions about sexual desire, and the same subjects were more likely to look at the body when making decisions about sexual desire than when making decisions about romantic love (Fig. 1; see Table S2 in the Supplemental Material). The main effect of task dimension was not significant. The significant main effect of visual area of interest, $F(1, 19) = 18.59, p < .001, \eta^2 = 0.39$, indicated that there were more eye fixations toward the face ($M = 2.53$, $95\% CI = [2.157, 2.893]$) than toward the body ($M = 1.25$, $95\% CI = [1.1898, 1.312]$; Fig. 1).

Analysis of the total duration of all fixations revealed similar effects: a significant interaction between task dimension and visual area of interest, $F(1, 9) = 24.07, p = .001, \eta^2 = 0.72$; a significant main effect of visual area of interest, $F(1, 9) = 10.19, p = .01, \eta^2 = 0.52$; and a significant main effect of task dimension, $F(1, 9) = 8.79, p = .02, \eta^2 = 0.62$. Subjects spent more time looking at the face than at the body; they also spent more time looking at the body when making decisions about sexual desire than when making decisions about romantic love and spent more time looking at the face when making decisions about romantic love than when making decisions about sexual desire (Fig. 1; see Table S3 in the Supplemental Material).

Analysis of the time to the first fixation revealed a significant main effect of visual area of interest, $F(1, 19) = 4.02, p = .06$.
Behavioral results

The behavioral analyses showed no significant interaction between task dimension and gender. Therefore, we collapsed the data across gender and performed a one-way ANOVA with task dimension as a within-subjects factor. Results revealed no main effect of task dimension on decisions (romantic love: $M = 42.99\%$, 95% CI = [34.92, 51.07]; sexual desire: $M = 48.29\%$, 95% CI = [39.61, 56.97]), $F(1, 16) = 2.87, p = .11$, $\eta^2 = 0.03$, or on reaction time (romantic love: $M = 813.51$ ms, 95% CI = [743.12, 883.89]; sexual desire: $M = 770.44$ ms, 95% CI = [697.82, 843.06]), $F(1, 16) = 3.39, p = .08$, $\eta^2 = 0.02$. Together, these data reinforce the comparability of the two conditions.

Eye-tracking results

Again, there were no significant interactions involving gender for any of the three eye-tracking measures (number of fixations, total duration of all fixations, and time to first fixation). We therefore collapsed the data across gender and performed a 2 (task dimension) × 2 (visual area of interest) ANOVA for each of the three dependent variables.

Analysis of the number of fixations revealed a significant interaction between task dimension and visual area of interest, $F(1, 16) = 6.76, p = .02$, $\eta^2 = 0.03$; subjects were more likely to visually fixate on the body than on the face, and this difference was greater when they were viewing the photographs to make decisions about sexual love.

$p < .001$, $\eta^2 = 0.39$; time to the first fixation toward the face ($M = 0.42$ s, 95% CI = [0.27, 0.57]) was longer than time to the first fixation toward the body ($M = 0.19$ s, 95% CI = [0.11, 0.27]), $F(1, 8) = 7.13, p = .03$, $\eta^2 = 0.37$. No other test was statistically significant.
desire, in contrast to romantic love (see Table S4 in the Supplemental Material). No other significant effect was found.

Analyses of the total duration of all fixations (see Table S5 in the Supplemental Material) and of time to first fixation (see Table S6 in the Supplemental Material) did not reveal any other significant results.

**General Discussion**

There is a large body of evidence demonstrating the importance and saliency of the human face. Human faces, for instance, have been shown to convey information critical for social interactions, to capture attention in unique ways (Palermo & Rhodes, 2007), and to evoke a stronger involuntary orienting response than other visual objects do (e.g., Morand, Grosbas, Caldara, & Harvey, 2010; see the review by Palermo & Rhodes, 2007). Nevertheless, visual attention as indexed by eye gaze was differentially allocated to the face versus the body as a function of the task dimension (related to love vs. sexual desire).

In Study 1, decisions that involved love elicited more frequent eye fixations on the face than on the body; this difference was attenuated for decisions that involved lust, as a result of an increase in the frequency of eye fixations on the body and a decrease in the frequency of eye fixations on the face. When subjects made a personal evaluation about whether a person in a photograph could be regarded as someone toward whom they could feel lust or love (Study 2), judgments that involved lust elicited more eye fixations toward the body, relative to the face, than did judgments that involved love. In both studies, therefore, the number of fixations to the face, relative to the number of fixations to the body, was greater for decisions involving love than for decisions involving lust. These findings are consistent with the functional-coupling hypothesis, which posits that visual attention reflects, in part, the features of a stimulus that are most relevant to a person's intentions or goals.

Although little is currently known about the science of love at first sight or how people fall in love, these patterns of response provide the first clues regarding how automatic attentional processes (such as eye gaze) may differentiate feelings of love from feelings of sexual desire toward strangers. The differential automatic attentional processing we found cannot be entirely attributed to a difference in low-level visual properties across conditions, as all stimuli were visually similar. Rather these data suggest that the differences in attentional processing reflect differences in the visual features that are most relevant when thinking about love versus lust.

Given these results, one may consider love and lust as points on a spectrum from integrative representations of affective visceral and bodily sensations (lust) to more abstract and intellectual representations of feelings incorporating mechanisms of reward expectancy and habit learning (love). This conceptualization is in line with the extant neuroimaging studies showing such a dissociation between love and lust, as well as with theories of simulations and embodiment suggesting that the way people feel or experience different emotions is based on differing integrations of their own past bodily and emotional experiences. Prior work has shown that mutual eye gaze is one of the most reliable markers of love between couples (Hatfield & Sprecher, 1986; Kellerman et al., 1989). The current study extends this research by showing that subjects fixate visually more frequently on a person's face, relative to the person's body, when they are thinking about or feeling love rather than lust. Conversely, bodily sensations play an important role in sexual desire, and subjects in our research fixated more frequently on the body, relative to the face, when they were thinking about or feeling sexual desire than when they were thinking about or feeling love.

In sum, the functional-coupling hypothesis posits that visual attention reflects the features of a stimulus that are most relevant to a person's intentions or goals. We extended this hypothesis to social intentions and demonstrated that a person's eye gaze reflects the person's goal of love or desire when looking at another person. By identifying eye patterns that are specific to love-related stimuli and sexual-desire-related stimuli, this study may contribute to the development of a biomarker that differentiates feelings of romantic love and sexual desire, two distinct subjective experiences that are often difficult to disentangle from one another on the basis of what individuals are willing to report. The extent to which the ratio of eye fixations to the face relative to eye fixations to the body may serve as a biomarker for love versus lust, at least within subjects, is a question for future research, but the present eye-tracking results may serve as a basis for a low-cost approach to identifying when individuals are looking at images of people through lustful versus loving eyes. An eye-tracking paradigm may offer a new avenue of diagnosis for clinicians' daily practice or for routine clinical exams in psychiatry and couples therapy.

**Author Contributions**

S. Cacioppo and J. T. Cacioppo developed the study concept. All authors contributed to the study design. Testing and data collection were performed by M. Bolmont. M. Bolmont and S. Cacioppo performed the data analyses. S. Cacioppo and J. T. Cacioppo interpreted the results and drafted the manuscript; M. Bolmont provided critical revisions. All authors approved the final version of the manuscript for submission.
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Supplemental Material
Additional supporting information may be found at http://pss.sagepub.com/content/by/supplemental-data

Open Practices

The data and materials for these experiments have been made publicly available via Harvard Dataverse Network and can be accessed at http://dx.doi.org/10.7910/DVN/26134. The complete Open Practices Disclosure for this article can be found at http://pss.sagepub.com/content/by/supplemental-data. This article has received badges for Open Data and Open Materials. More information about the Open Practices badges can be found at https://osf.io/tvyxz/wiki/view/ and http://pss.sagepub.com/content/25/1/3.full.

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