

2017

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Recommended Citation

Gillath, O., Bahns, A. J., Burghart, H. A. (2017). Eye movements when looking at potential friends and romantic partners. *Archives of Sexual Behavior*. Advance online publication. <http://dx.doi.org/10.1007/s10508-017-1022-5>

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Eye Movements When Looking at Potential Friends and Romantic Partners

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This is the author's accepted version of the article:

Gillath, O., Bahns, A. J., Burghart, H. A. (2017). Eye movements when looking at potential friends and romantic partners. *Archives of Sexual Behavior*. Advance online publication.

<http://dx.doi.org/10.1007/s10508-017-1022-5>

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We gratefully acknowledge the contributions of Melanie Canterbury and Austen McGuire for assisting with the eye-tracking equipment and software, and we thank Megan Chen for creating the data visualizations displayed in Figures 2 and 3.

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ABSTRACT

Eye movements of 105 heterosexual undergraduate students (36 males) were monitored while viewing photographs of men and women identified as a potential mate or a potential friend. Results showed that people looked at the head and chest more when assessing potential mates, and looked at the legs and feet more when assessing potential friends. Single people looked at the photographs longer and more frequently than coupled people, especially when evaluating potential mates. In addition, eye gaze was a valid indicator of relationship interest. For women, looking at the head corresponded to greater interest in friendship, whereas for men looking at the head corresponded to less interest in friendship. These findings show that relational goals and gender may affect the way people scan their environment and search for relevant information in line with their goals.

Keywords: mating, friendship, eye-tracking, chest, waist-to-hip-ratio

INTRODUCTION

Humans are visual creatures, relying on vision more than on any other sense to interpret their environment (Cacioppo, Berntson, & Nusbaum, 2008; de Valois & de Valois, 1980). Vision facilitates the formation of social bonds in the immediate months after birth (Fantz, 1965), and is used to select mates and friends throughout life (e.g., Tovée, Maisey, Emery, & Cornelissen, 1999). These selection processes involve looking for signs that a partner matches one's needs, such as similarity (Montoya & Horton, 2013) or facial symmetry (Rhodes, Proffitt, Grady, & Sumich, 1998). Although some of these visual cues may be important for both mate and friend selection, the cues indicating a suitable potential mate (e.g., signs of fertility or access to resources) (Buss, 1989; Lyons, Marcinkowska, Moisey, & Harrison, 2016) are likely to be different from the cues indicating a suitable potential friend. This suggests that the visual search process for suitable mate-related cues will be different than the search for friend-related cues. Furthermore, men might be looking for different cues than women (Buss, 1989).

At the heart of both friendship and mate selection processes is attraction (Bleske-Rechek & Buss, 2001; Buss & Barnes, 1986). Attraction has many determinants, but research to date has primarily focused on similarity and perceived similarity (Morry, Kito, & Ortiz, 2011; Simpson & Harris, 1994), proximity (Schmukle, Liesenfeld, Back, & Egloff, 2007; Segal, 1974), reciprocity (Edlund, Sagarin, & Johnson, 2007; Shanteau & Nagy, 1979) and physical attractiveness (Brewer, Archer, & Manning, 2007; Hatfield & Sprecher, 1986). Not all of these predictors have the same importance for mate selection and friendship. For example, Johnson (1989) showed that similarity was important for adult friendship selection, whereas physical proximity was less important. Despite these differences, attraction seems to play a role in both mate and friend

selection (e.g., Cash & Derlega, 1978; Feingold, 1988). Here we focus on attraction based on visual cues.

Visual Cues

Which visual cues do people use to make judgments about a potential mate or friend? People use various cues, such as static signs (bone structure, feature size/shape), rapid signs (blushing, muscle movement), and artificial signs (eyeglasses, cosmetics) to make mate and friend selections, either consciously or unconsciously (Bahns, Crandall, Gillath, & Wilmer, 2016; Ekman, 1978; Gillath, Bahns, Ge, & Crandall, 2012). Among these cues are symmetry, waist-to-hip ratio (WHR), weight or waist circumference (Rilling, Kaufman, Smith, Patel & Worthman, 2009; Singh & Luis, 1995), breadth of shoulders or shoulder-to-hip ratio (SHR) (e.g., Dixson, Halliwell, East, Wignarajah, & Anderson, 2003; Hughes & Gallup, 2003; Shoup & Gallup, 2008), body shape (Rozmus-Wrzesinska & Pawlowski, 2005; Singh, 1993), facial features such as “babyfacedness” (prominence of cheekbones, jaw line, broadness of forehead) (Zebrowitz, Olson, & Hoffman, 1993), and hair (Hinsz, Matz, & Patience, 2001).

According to evolutionary psychology, symmetry, a central static cue, is thought to indicate good health and fertility (Thornhill & Gangestad, 1999; Tovée, Tasker, & Benson, 2000), which are important signs when a person is trying to find an appropriate mate that will facilitate the passing on of one’s genes. Participants tend to prefer targets who are more symmetrical. For instance, in a forced-choice experiment, male participants viewed either an unaltered body image or a modified version made to look more symmetric, and were asked to select the more attractive one. Symmetric images were selected at above chance levels (Tovée et al., 2000). Similarly, Rhodes et al. (1998) found that facial symmetry was positively correlated with ratings of attractiveness. Symmetry is a cue that carries the same meaning for both

genders—more symmetrical faces are deemed more attractive.

In contrast to symmetry, the attractiveness of different body shapes and sizes shows gender differences as well as cross-cultural differences related to socioeconomic context (e.g., Dixson et al., 2011b; Swami & Tovée, 2013). For example, in Western cultures, men and women find different body shapes to be most attractive. Women prefer men with a high SHR, reflecting broad shoulders, narrow hips, and a large muscular torso (Shoup & Gallup, 2008), whereas men prefer women with a low WHR and an hourglass-like body shape (Singh, Dixson, Jessop, Morgan, & Dixson, 2010). Men also tend to focus on women's breasts—with a preference for larger breasts, although size matters less than proportion (e.g., waist-to-bust ratio) (Voracek & Fisher, 2006). A recent study using artificial targets found waist size to be the best predictor of attractiveness (Brooks, Shelly, Jordan, & Dixson, 2015). Breast size was found to be important for attraction only in the context of low WHR and narrow waist size. This literature suggests that men and women might be interested in different cues and hence are likely to look at different body parts, and in turn scan the body differently.

Though relatively little work has been done to determine which cues are used more for friend selection versus mate selection, we expect these cues and in turn the search patterns to differ as a function of the type of relationship the observer has in mind. When selecting mates, men and women alike are likely to look for cues indicating health and fertility (such as symmetry, low WHR for female targets, or high SHR for male targets). In contrast, when selecting friends, women might be searching for cues related to personality and attitudes, whereas men might still be looking for signs that indicate fertility. Though it is not the only reason, one main reason men seek cross-sex friendships is to gain short-term sexual access (Bleske-Rechek & Buss, 2001).

Eye-Tracking and Relationship Selection

Recently, researchers have started using sophisticated methods such as eye-tracking (e.g., Lyons et al., 2016; Yang, Chen, Hu, Zheng, & Wang, 2015; for a review, see Kowler, 2011) to determine how people identify (and select) attractive potential relationship partners. Using eye-tracking allows researchers to bypass the various biases associated with self-report measures such as social desirability while closely following eye movement patterns when people scan for meaningful or informative visual cues. Monitoring first fixations (where people look first), number of fixations (how often they return to the same area of interest), and fixation duration (time spent looking at an area of interest) can reveal useful information about a person's search strategies and preferences (Dixson et al., 2011a; Hall, Hogue, & Guo, 2011; Hewig, Trippe, Hecht, Straube & Miltner, 2008; Lykins, Meana, & Kambe, 2006).

Existing work comparing men's and women's visual search processes when judging the attractiveness of opposite-sex persons identifies a number of gender differences. For example, men direct most of their attention to women's breasts (Dixson et al., 2011a; Hall et al., 2011; Hewig et al., 2008) and waist-hip region (Dixson et al., 2011a; Hall et al., 2011). Conversely, women pay special attention to men's legs (Hewig et al., 2008). Women's and men's search processes also share some similarities. For example, both genders tend to focus attention on the target's face (Hewig et al., 2008).

Whereas everyone looks at the face, there are inconsistent findings in the eye-tracking literature about how the face is regarded relative to the rest of the body. Hewig et al. (2008) found that both men and women looked at a target's face earlier, longer, and more often than other body parts when viewing pictures of clothed individuals. This special preference for the face was pronounced mainly among male participants viewing images of people they rated as

attractive. Lykins et al. (2006), in contrast, found that both men and women spent more time looking at the body compared to the face, particularly when viewing erotic (naked) as compared to non-erotic (clothed) images.

One way to interpret these seemingly conflicting findings is to consider that the visual search process may change depending on the type of image viewed or the goals activated. For example, viewing erotic images may activate sex system related goals (Birnbaum & Gillath, 2006), thereby directing perceivers' attention to the body more than the face (as in Lykins et al., 2006). However, this possibility remains speculative as the effect of perceivers' goals in directing eye gaze patterns has not yet been studied. Nevertheless, prior research using eye-tracking suggests that it is a useful methodology for obtaining non-self-report data on attraction, which could allow the detection of gender differences in search patterns as a function of context (e.g., image type or task instructions).

Current Study

In the present study, we examined whether the way people look at others changes as a function of the goal the perceiver has regarding the relationship and the perceiver's gender. We did this by instructing male and female participants to regard a target image as either a potential friend or a potential mate. We extend existing work (e.g., Dixon et al., 2011a) by using eye-tracking techniques to examine whether the way people look at others to make judgments of relationship interest differs as a function the potential role these others may play (as mates or friends).

Predictions

With regard to the effects of relational goals, we expected different gaze patterns (area of first fixation, and total fixation counts and duration for each body region) depending on the

expected relationship type. Specifically, we predicted that when evaluating potential mates both men and women would look for symmetry and body shape as signs of fertility. To evaluate symmetry, people are likely to focus on the face/head region. To evaluate body shape, people are likely to look at the torso—both the lower torso, which we define as the waist-hip region (including the waist, stomach, and hips; see Fig. 1) and the upper torso, which we define as the chest region (including the neck, shoulders, and breasts). We also tested the effects of perceiver gender and relationship status. With regard to perceiver gender, we expected that men and women would exhibit different gaze patterns, such that men compared to women would fixate more on sexual cues, including the chest and waist-hip region. With regard to relationship status, we expected single people (relative to coupled people) to spend more time looking at potential mates (Janssens et al., 2011; Maner, Gailliot, & Miller, 2009).

METHOD

Participants

After excluding 12 participants due to technical errors with the eye-tracking equipment, the analysis included 105 heterosexual undergraduate students (36 males), age 17-30 ($M = 19.09$ years, $SD = 1.56$). Most participants were White (82%), and either single (57%) or exclusively dating (37%). Participant ethnicity and relationship status were assessed at the end of the study.

Procedure

Participants were invited to participate in a study about social decision-making. Participants viewed photographs of clothed, college-aged individuals with neutral facial expressions, standing with their hands down to their sides. Participants were given specific instructions to consider the target image as either a potential friend or potential mate. They saw 10 images in each of two blocks—the friend block and the mate block; order of blocks was

randomized. Participants controlled how long they viewed each image by pressing the spacebar when they were ready to answer questions about the target image. Participants knew in advance they would be asked questions about the target's friendship or dating potential. Participants' eye movements were monitored throughout the study.

Twenty images were used, including 10 male targets and 10 female targets. All pictures were matched on attractiveness ratings (1 to 7 scale) from pretesting ($M = 3.86$, $SD = 0.13$).¹ There were 12 conditions in which the presentation order of the images varied. Images were presented at a visual angle of 15.2 degrees using DirectRT (Empirisoft Corporation, 2006) on an IBM PC computer. Images were centered at the top of the screen and presented over a black background. A fixation point was presented at the center of the screen at the beginning of each trial.

In the *friend block*, participants viewed 10 images (five men and five women).² After each image was cleared from the screen, participants answered four questions ($\alpha = .92$) pertaining to the target's friendship potential ("Would you be interested in becoming friends with this person?", "How much do you think you would like this person?", "How likely do you think it is that you might become friends/best friends with this person?") on a scale ranging from 1 (*not at all*) to 7 (*very much so*).

In the *mate block*, participants viewed 10 pictures of opposite-gender people; five of these were repeated from the friend block and five of them were new.³ After each image was cleared from the screen, participants answered four questions ($\alpha = .93$) pertaining to the target's attractiveness and potential as a dating/romantic/sexual partner ("How attractive do you consider this person to be?", "Would you be interested in dating this person?", "How likely do you think

it is that you and this person might become romantic/sexual partners?”) on a scale ranging from 1 (*not at all*) to 7 (*very much so*).

As we were interested in looking at gender differences in gaze patterns, the friend block included images of both men and women. Each participant viewed the same 10 images in the friend block regardless of participant gender. The sample included heterosexual participants; therefore, five images were of the preferred/opposite sex and five were of the non-preferred/same sex. In the mate block, each participant viewed 10 total images of the preferred gender (male participants viewed 10 images of females in the mate block, and female participants viewed 10 images of males in the mate block).

Eye-tracking hardware and software

All eye gaze data were collected using the Eye-Trac 6.NET User Interface program (Applied Science Laboratories, Boston, MA) on a separate PC and analyzed using ASL Results Plus software, which reduces data to a list of fixations and time points. We were interested in five areas of interest (AOI): head, chest, waist-hip region, legs, and feet (see Fig. 1). Fixations occurring outside the selected regions were not of interest in this study and were disregarded. We analyzed the number of fixations in each AOI (fixation count) and the duration of fixations in each AOI in seconds (fixation duration). We also documented the point of first fixation for each image (i.e., which body region was fixated on first).

RESULTS

Effect of Relational Goals on Eye Movements

Our primary goal for the analysis was to test whether participants looked at certain regions of the body first, longer, or more often for judgments of mate or friendship potential, and whether these effects were different for men and women. A chi-square analysis that tested

whether the location of the first fixation point varied according to the relational goal activated revealed that it did, $\chi^2(4) = 55.14, p < .0005$. Participants' first glance was more likely to be on the head, chest, or waist-hip regions when evaluating mate potential, and the first glance was more likely to be on the legs or feet when evaluating friendship potential. This pattern was the same (and the chi-square was significant) for both men and women.

To test the effects of relational goal and participant gender on fixation counts and fixation duration, a series of multilevel models (MLM) was estimated in SPSS using the linear mixed models command. Separate models were estimated using fixation counts and fixation durations for each of the five body regions (head, chest, waist-hip, legs, feet). Eye gaze patterns for each trial were treated as repeated measures, meaning that separate residual variances were estimated for each unique combination of image and instructions (friend or mate). Likelihood ratio tests determined that this complex covariance structure was a better fit to the data than the simpler model including only one residual variance estimate. Intraclass correlations (ICC) from the null models confirmed the nested structure of the data and the appropriateness of MLM.⁴

The full models included random intercepts and fixed slopes for relational goal at Level 1 (0 = potential friend, 1 = potential mate), participant gender at Level 2 (0 = men, 1 = women), and the cross-level interaction. All models also included a Level-1 covariate for image order (1 = first image shown, 0 = not first image shown).⁵ Table 1 presents a summary of these analyses. The parameter estimates for the intercepts (fixed effects) give the overall mean of fixation count and fixation duration for each body region; all intercepts were significantly different from zero. The variance estimates for the intercepts (random effects) were also all significantly different from zero, indicating that there was significant variation in eye movements across participants.

There was also a significant effect of picture order in all models, indicating that participants looked at the first image more than subsequent images.

Central to our hypothesis, we found significant effects of relational goal on eye gaze patterns in four of the five body regions, including the head, chest, legs, and feet. A visual representation of how eye gaze varied by relational goal can be seen in Figs. 2a and 2b for fixation count data and in Figs. 3a and 3b for fixation duration data.⁶ Participants looked longer and more often at the head for judgments of mating potential (see Table 2 for descriptive statistics). Participants also fixated more often on the chest for judgments of mating potential. By contrast, participants looked longer and more often at the legs and feet for judgments of friendship potential. None of these effects were moderated by participant gender. As can be seen in Table 2, men paid particular attention to the chest and waist-hip regions. Men looked at the chest longer and more often than any other part of the body. The second most looked at area for men was the waist-hip region. Women also looked most often at the chest, however the second most looked at area for women was the head. These different patterns are consistent with the gender differences we predicted based on previous eye-tracking research.

Judgments of Relationship Potential

A series of multilevel models examined the effects of eye gaze, relational goal and participant gender on participants' self-reported judgments of relationship potential. Separate models were estimated for each of the five body regions (head, chest, waist-hip, legs, feet). As before, judgments of relationship potential for each trial were treated as repeated measures, meaning that separate residual variances were estimated for each unique combination of image and instructions (friend or mate). Likelihood ratio tests determined that this complex covariance structure was a better fit to the data than the simpler model including only one residual variance

estimate. Intraclass correlations (ICC) from the null model confirmed the nested structure of the data and the appropriateness of MLM.⁷

The full models were estimated with random intercepts and fixed slopes for fixation count⁸, relational goal (0 = potential friend, 1 = potential mate), and participant gender (0 = men, 1 = women) as well as all possible interaction terms. Table 3 presents a summary of these analyses. The parameter estimates for the intercept (fixed effects) give the overall mean of relationship potential judgments; in general interest was quite low. The variance estimates for the intercept (random effects) were significantly different from zero, indicating there was significant variation in judgments of relationship potential across participants. In all models, there was a significant effect of relational goal such that participants expressed less interest in the targets they considered as potential mates as compared to the targets they considered as potential friends (see Table 4 for descriptive statistics). There was also a significant interaction of relational goal and participant gender in all models, indicating that the reduced interest in potential mates compared to potential friends was more pronounced among men than among women.

Eye gaze as measured by fixation counts was positively related to relationship interest when the gaze was directed at the waist-hip region, chest, or legs (although the effects for chest and legs were only marginally significant.) The effect for the waist-hip region was moderated by participant gender. Tests of the simple effects revealed that the slope was positive and significant for women ($B = .08$, $SE = .02$, $p = .001$) and nearly zero and nonsignificant for men ($B = .002$, $SE = .02$, $p = .89$).

Additionally, as evidenced by a significant interaction of eye gaze and relational goal, fixating on the head region was positively related to relationship interest for potential friends ($B = .06$, $SE = .02$, $p = .02$) but not for potential mates ($B = .01$, $SE = .02$, $p = .45$). This effect was

further qualified by a three-way interaction of eye gaze, gender, and relational goal in the model for the head region. Follow up tests revealed that, for women, fixating on the head region indicated greater relationship interest for potential friends ($B = .06, SE = .03, p = .03$), but was unrelated to relationship interest for potential mates ($B = .01, SE = .02, p = .45$). By contrast, for men, fixating on the head region was negatively related to relationship interest for potential friends ($B = -.09, SE = .03, p = .004$), and unrelated to interest for mates ($B = -.01, SE = .02, p = .75$).

Relationship Status

Additional analyses were conducted to determine whether gaze patterns varied as a function of relationship status. Multilevel models were estimated with relationship status (0 = coupled, 1 = single), participant gender (0 = men, 1 = women), relational goal (0 = friendship potential, 1 = mate potential) and all possible interaction terms as predictors of total fixation count and total fixation duration (fixations summed across all five body regions). The analysis of total fixation duration revealed a marginally significant interaction of relationship status and relational goal ($B = .39, SE = .21, p = .055$). Single people spent more time looking at the body than did people who were currently in a relationship. This difference was especially pronounced when evaluating potential mates, $t(838) = 4.30, p < .001$, as compared to potential friends, $t(825) = 2.31, p = .02$, (see Table 5 for descriptive statistics).

The analysis of total fixation counts also revealed a significant interaction of relationship status and relational goal ($B = .95, SE = .46, p = .04$). Single people had more total fixations on the body than did people in a relationship when evaluating potential mates, $t(887) = 2.17, p = .03$, but not when evaluating potential friends, $t(916) = 0.31, p = .76$. However, this effect was qualified by participant gender ($B = -1.59, SE = .79, p = .046$). Single women compared to

coupled women had more total fixations when evaluating potential mates, $t(603) = 1.81, p = .07$, but the effect of relationship status was not significant for men's evaluations of potential mates, $t(281) = 1.04, p = .30$. There were no significant effects of relationship status on first fixations.

DISCUSSION

The current study examined eye movements of men and women as they viewed images of potential mates and potential friends. We hypothesized that eye movement patterns would be influenced by the perceiver's relational goals, that is, whether target images were to be evaluated as potential friends or mates. The results supported our hypothesis and coincide with previous eye-tracking research (e.g., Dixson et al., 2011a; Hall et al., 2011; Hewig et al., 2008; Lykins et al., 2006). Specifically, our results support the role of context in these decisions (e.g., Yarbus, 1967). Gaze patterns were affected by relational goals. Participants looked at the head and chest more when evaluating potential mates, whereas participants looked at the legs and feet more when evaluating potential friends.

Both men and women looked longer and more often at the head when evaluating potential mates. We propose that looking at the head provides people with cues of good genes. This possibility is consistent with research showing that people rely on facial features such as symmetry (Tovée et al., 1999) and facial masculinity (cheek-bone prominence and longer lower-relative to upper-face) (Lyons et al., 2016; Scheib, Gangestad, & Thornhill, 1999) to judge attractiveness and select mates. Regardless of the specific cue attended to in the face, previous research suggests that women are more likely to focus on men's head/face than other body regions (e.g., Buss, 1989; Scheib, 2001), which is consistent with what we found in the current study. The head was the second most looked at region for women (second only to the chest).

In some respects, our findings are in line with Hewig et al. (2008) and depart from Lykins et al. (2006). In our study, we found that both men and women looked at the head/face more often when evaluating potential mates compared to potential friends. These results differ from those of Lykins et al. perhaps because of the major differences in the images used. The current study used images of clothed students standing with their hands down to the side and a neutral expression, whereas Lykins et al. used both erotic and non-erotic images. The current study extends the design of Lykins et al. by including multiple areas of interest dividing the body into the chest, waist-hip region, legs, and feet, which may also account for differences in the findings. However, these results were generally consistent with the findings of Hewig et al., who found that both men and women looked at a target's face earlier, longer, and more often than the rest of the body. We know from previous research that individuals use facial symmetry as a cue when assessing attractiveness (Rhodes et al., 1998). Our findings showed more frequent fixations on the head/face specifically when making judgments about a potential mate, which possibly indicates a greater importance for facial symmetry when selecting mates as compared to friends.

Not only is the face area more frequently viewed, it is also identified by previous research as an area where more first glances occur for both genders (Hewig et al., 2008) along with the breast or waist (only for men) (Dixson et al., 2011a). We found a similar effect, although our study extended this work by demonstrating that first glances can be influenced by relational goals. We found that people fixated first on the head, chest, or waist-hip region when evaluating potential mates, but fixated first on the legs or feet when evaluating potential friends. We found no significant gender differences in the area of first fixation.

Both men and women looked more often at the chest region for judgments of mate potential compared to judgments of friendship potential. We propose that the chest region carries

cues that can help people make decisions regarding potential mates. In particular, we propose that people are looking at the chest region in order to assess body shape. Women look for men with a high SHR, reflecting broad shoulders, narrow hips and a large muscular torso (Dixson et al., 2003; Dixson, Grimshaw, Ormsby, & Dixson, 2014; Shoup & Gallup, 2008). These are signs of physical strength, health, and ability to protect the woman and children. Men, conversely, look for women with a low WHR and an hourglass-like body shape (Singh et al., 2010), which are signs of reproductive fitness, and ability to have more children.

Our analysis also revealed an interesting effect of relational goal for gaze patterns in the leg and foot regions, such that participants viewed the legs and feet longer when making judgments about potential friends as compared to potential mates. Gillath, Bahns, Ge, and Crandall (2012) found shoes to be an accurate artificial sign used to make judgments about a person's personality. Our finding extends this work by suggesting that people might use artificial signs, like shoes, to inform their judgments of relationship potential and that these cues could potentially be used differently depending on the goals of the interaction or relationship. Future research should investigate whether the kind of personality-related information that can be gleaned from shoes or clothing is especially important in the context of friendship selection.

The pattern of gender differences we observed replicates the findings of previous eye-tracking studies. We found that men looked longer and more frequently at the chest compared to any other body region, which is consistent with previous findings in the eye-tracking literature (Dixson et al., 2011a; Hall et al., 2011; Hewig et al., 2008) and propositions in evolutionary psychology (Buss, 1989). We also found that men focused special attention on the waist-hip region, which is consistent with prior research demonstrating men's tendency to look for WHR cues when evaluating women's attractiveness (Dixson et al., 2011a; Hall et al., 2011).

Importantly, however, our study is the first to vary the relational context of these judgments. As mentioned above, looking at the chest seems to be especially important for judgments of mate potential.

Eye gaze patterns in the current study corresponded to self-reported judgments of relationship interest in some respects but not in others. Overall relationship interest was quite low, especially for judgments of mate potential and especially for men. We suspect that this is likely due to the fact that the targets were all fairly low in attractiveness. The fact that men's self-reported interest in potential mates was particularly low is consistent with the well-established finding that men place greater emphasis on physical attractiveness than women do in judgments of romantic attraction (Feingold, 1990).

Despite relatively low levels of interest overall, looking at the chest and legs was an indicator of greater relationship interest for both men and women. For women only, looking at the waist-hip region also indicated greater relationship interest. For men, fixating on the waist-hip region may not be a valid indicator due to their low overall interest in the targets. Looking at the head was particularly diagnostic of interest in friendship; however there was a gender difference in the meaning of this gaze. For men, paying greater attention to the head corresponded to less interest in friendship, suggesting that men were looking at targets' heads with a critical gaze. For women, by contrast, paying greater attention to the head was a marker of greater interest in friendship. In some respects, the self-report data seem to be inconsistent with the eye-tracking data; both men and women looked at the head more for potential mates than for potential friends although fixations on the head only corresponded to self-reported attraction for judgments of friendship potential. It is possible that looking at the head was nondiagnostic of self-reported attraction for judgments of mating potential because overall interest in mating

relationships was quite low (i.e., a floor effect in self-reported attraction for potential mates may explain why eye gaze patterns were unrelated to attraction). Future research needs to replicate these findings before bold conclusions could be drawn.

Although not one of our main points of interest, we did look at the effects of the participants' relationship status on visual search pattern. We found that single people compared to coupled people looked longer and more often at potential mates and potential friends, although the difference was more pronounced for potential mates. In particular, single women took extra care in evaluating potential mates. This finding suggests that single people (especially women) are more concerned with mating. This potentially reflects a stronger need or desire to find a mating partner, which coupled people already have.

Limitations

There were a few limitations to the current study. First and foremost, the images were not matched across conditions for factors such as contrast, luminance, or spatial frequency. If these are not controlled for, one cannot be sure that the results are not due to "attentional grabbing"—for example, higher contrast areas of images being more interesting to the visual system than low contrast areas. That said, the likelihood that low-level factors such as contrast would over-power high-level factors such as the human body is rather small (Hall et al., 2011). For example, faces are nearly as "basic" a stimulus as there is in terms of having clear neural substrates (Kanwisher, McDermott, & Chun, 1997). Even infants have been shown to preferentially fixate on faces over other high-contrast stimuli, suggesting that perception of the human form has adaptive significance that overshadows perception of color or brightness (Fantz, 1961). Second, our study was heavily based on Westernized body shape preferences, which are not necessarily universal

(see Tovée, Swami, Furnham, & Mangalparsad, 2006; Wetsman & Marlowe, 1999), and hence further replications in other cultures should be obtained before our results can be generalized.

Conclusion

Despite these limitations, we identified a distinct difference in the eye movements accompanying the decision-making processes of men and women as they looked at potential friends and mates. Participants viewed the head and chest more often when assessing potential mates compared to potential friends. Conversely, participants (especially women) looked at the legs and feet longer and more frequently when assessing potential friends compared to potential mates. This indicates a difference in the visual cues used when assessing potential friends as compared to potential mates. Together, these results highlight the role of context, suggesting that people scan others for cues differently depending on the role others may play in their lives. Furthermore, people tend to look at different areas first depending on the relational context.

COMPLIANCE WITH ETHICAL STANDARDS

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed consent: Informed consent was obtained from all individual participants included in the study.

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NOTES

¹ Male ($M = 3.84$, $SD = 0.12$) and female ($M = 3.89$, $SD = 0.14$) images did not differ on attractiveness, $t(18) = 0.85$, $p = .41$. Images presented as potential friends ($M = 3.88$, $SD = 0.14$) and potential mates ($M = 3.86$, $SD = 0.13$) did not differ in attractiveness, $t(18) = 0.30$, $p = .77$.

² Exploratory analyses looked for possible effects of target image gender in the friendship block. Both male and female subjects were more likely to look at the legs of women compared to men, and female subjects but not male subjects were more likely to look at the waist-hip region of women compared to men.

³ Exploratory analyses included an indicator variable for whether pictures were repeated or new. There were some significant effects; in each case, participants looked more at the new pictures than the repeated pictures. Importantly, the effects of relational goal as reported in Table 1 remain significant when controlling for the repeated/new covariate with one exception—the effect of relational goal on looking at legs changes from significant to marginally significant for the fixation count analysis and from significant to nonsignificant for the fixation duration analysis.

⁴ Item-specific ICCs from the null models with the more complex covariance structure are available in the online supplementary material; however the usual interpretation of ICC is untenable in this special case. For a more useful point of reference, overall ICCs from the null models with a single residual variance estimate for fixation count and fixation duration, respectively are: head (.31, .29), chest (.34, .20), waist-hip (.32, .19), legs (.27, .08), feet (.18, .09).

⁵ Image order was included as a covariate because exploratory analyses determined that participants tended to spend more time looking at the first image compared to subsequent images, perhaps to familiarize themselves with the task since there were no practice trials. Block order was also tested as a covariate, but in the interest of parsimony it was not retained in the final model. There were some significant effects; in each case, participants looked at the images more when the friend block was presented first. Importantly, all effects of relational goal remain significant when controlling for block order.

⁶ Choice of color scale used in the data visualizations was guided by the goal of accentuating the differences in looking patterns identified by the MLM analysis. Readers should refer to the significance tests presented in Table 1 to evaluate whether relational goal reliably influenced eye gaze for a given body region.

⁷ Item-specific ICCs from the null model with the more complex covariance structure are available in the online supplementary material; however the usual interpretation of ICC is untenable in this special case. For a more useful point of reference, the overall ICC from the null model with a single residual variance estimate is .26.

⁸ The same series of multilevel models was conducted using fixation duration data; these analyses replicated the findings from the models using fixation counts in every way. Details are available in the online supplementary material.

Table 1

Effect of participant gender and relational goal (friend/mate) on eye movements

Fixation Count	Head		Waist-hip		Chest		Legs		Feet	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Fixed Effects										
Intercept	1.61***	0.21	1.54***	0.20	2.78***	0.27	1.54***	0.16	0.32***	0.07
Level 1 Variables										
Relational goal	0.31**	0.09	-0.002	0.08	0.24*	0.10	-0.14*	0.07	-0.10**	0.03
Picture order	0.33*	0.16	0.56***	0.16	1.14***	0.21	0.79***	0.14	0.14*	0.06
Level 2 Variables										
Participant gender	0.35	0.24	-0.17	0.24	0.09	0.31	-0.20	0.18	0.09	0.06
Cross-Level Interaction										
Goal x gender	0.10	0.14	0.15	0.15	0.11	0.17	-0.11	0.13	0.02	0.05
Random Effects										
intercepts (t_{00})	1.08***	0.17	1.08***	0.17	1.82***	0.28	0.55***	0.09	0.07***	0.01
Fixation Duration	Head		Waist-hip		Chest		Legs		Feet ^a	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Fixed Effects										
Intercept	0.86***	0.12	0.45***	0.08	1.03***	0.13	0.38***	0.05	0.10***	0.02
Level 1 Variables										
Relational goal	0.16**	0.06	-0.04	0.03	0.01	0.05	-0.06*	0.02	-0.04**	0.01
Picture order	0.18*	0.09	0.19**	0.06	0.46***	0.11	0.20***	0.05	0.05**	0.02
Level 2 Variables										
Participant gender	0.19	0.14	-0.13	0.09	-0.07	0.14	-0.10	0.05	0.02	0.02
Cross-Level Interaction										
Goal x gender	0.07	0.09	0.01	0.06	0.06	0.09	-0.06	0.05	-0.01	0.02
Random Effects										
intercepts (t_{00})	.36***	0.06	0.13***	0.02	0.38***	0.06	0.04***	0.01	0.01***	0.001

Note. *B* = unstandardized regression coefficient, *SE* = standard error, Relational goal (0 = potential friend, 1 = potential mate),

Participant gender (0 = men, 1 = women), Picture order (0 = not first, 1 = first).

* $p < .05$, ** $p < .01$, *** $p < .001$.

^a One image from the mating block was excluded for the analysis of fixation duration on the foot region because variance was virtually zero for this image and the model failed to converge when it was included.

Table 2

Eye gaze patterns by relational goal, participant gender, and body region

		Fixation Count				Fixation Duration			
		Potential Friend		Potential Mate		Potential Friend		Potential Mate	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Head	Men	0.77 _a	1.46	1.16 _b	2.04	0.43 _a	0.96	0.57 _a	1.12
	Women	1.11 _a	1.76	1.40 _b	2.23	0.60 _a	1.15	0.76 _b	1.45
	Total	1.00 _a	1.67	1.32 _b	2.17	0.54 _a	1.09	0.70 _b	1.36
Chest	Men	1.74 _a	2.21	1.90 _a	2.66	0.84 _a	1.26	0.85 _a	1.39
	Women	1.63 _a	2.25	1.81 _a	2.44	0.71 _a	1.93	0.66 _a	1.26
	Total	1.66 _a	2.24	1.84 _b	2.51	0.75 _a	1.73	0.72 _a	1.30
Waist-hip	Men	1.50 _a	2.24	1.43 _a	2.13	0.51 _a	0.96	0.49 _a	0.86
	Women	1.13 _a	1.80	1.13 _a	1.73	0.37 _a	1.00	0.31 _a	0.68
	Total	1.25 _a	1.97	1.22 _a	1.87	0.42 _a	0.99	0.37 _a	0.75
Legs	Men	1.16 _a	1.90	1.11 _a	1.61	0.36 _a	0.67	0.36 _a	0.68
	Women	1.13 _a	1.92	0.90 _b	1.34	0.41 _a	1.73	0.26 _b	0.48
	Total	1.14 _a	1.91	0.97 _b	1.44	0.39 _a	1.47	0.29 _b	0.56
Feet	Men	0.24 _a	0.53	0.24 _a	0.64	0.07 _a	0.18	0.11 _a	0.48
	Women	0.36 _a	0.97	0.22 _b	0.59	0.11 _a	0.35	0.07 _a	0.31
	Total	0.32 _a	0.85	0.23 _b	0.61	0.09 _a	0.31	0.08 _b	0.37

Note. For the fixation count and fixation duration panels separately, means sharing the same subscript in a row do not significantly differ. Significance tests comparing potential friends and potential mates come from the multilevel models reported in Table 1.

Table 3

Judgments of relationship potential as a function of looking patterns on a specific body region, relational goal, and participant gender

	Head		Waist-hip		Chest		Legs		Feet	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Fixed Effects										
Intercept	2.04***	0.09	1.98***	0.09	2.00***	0.09	2.01***	0.09	2.06***	0.09
Level 1 Variables										
Fixation count	0.01	0.02	0.07**	0.02	0.03†	0.02	0.05†	0.03	-0.02	0.06
Relational goal	-1.23***	0.06	-1.33***	0.06	-1.34***	0.07	-1.31***	0.06	-1.28***	0.06
FC x goal	0.08**	0.03	-0.02	0.03	-0.01	0.02	-0.01	0.03	0.08	0.08
Level 2 Variables										
Gender	-0.09	0.15	-0.15	0.15	-0.10	0.15	-0.10	0.15	-0.06	0.15
Cross-Level Interactions										
FC x gender	-0.01	0.03	-0.07*	0.03	-0.01	0.02	-0.03	0.04	0.07	0.09
Goal x gender	0.45***	0.10	0.36**	0.10	0.29**	0.11	0.31**	0.10	0.29**	0.09
FC x goal x gender	-0.21***	0.05	-0.06	0.04	-0.02	0.04	-0.03	0.05	-0.10	0.15
Random Effects										
Between subjects intercepts (t_{00})	.40***	0.06	0.40***	0.06	0.41***	0.06	0.41***	0.06	0.41***	0.07

Note. *B* = unstandardized regression coefficient, *SE* = standard error, FC = fixation count, Relational goal (0 = potential friend, 1 = potential mate), Participant gender (0 = men, 1 = women).

*** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$.

Table 4

Judgments of Relationship Potential by Relational Goal and Participant Gender

Participant Gender	Potential Friends		Potential Mates	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Men	3.67 _a	1.13	2.09 _b	0.89
Women	3.41 _a	1.21	2.15 _b	1.15

Note. Means in a row sharing the same subscript do not significantly differ.

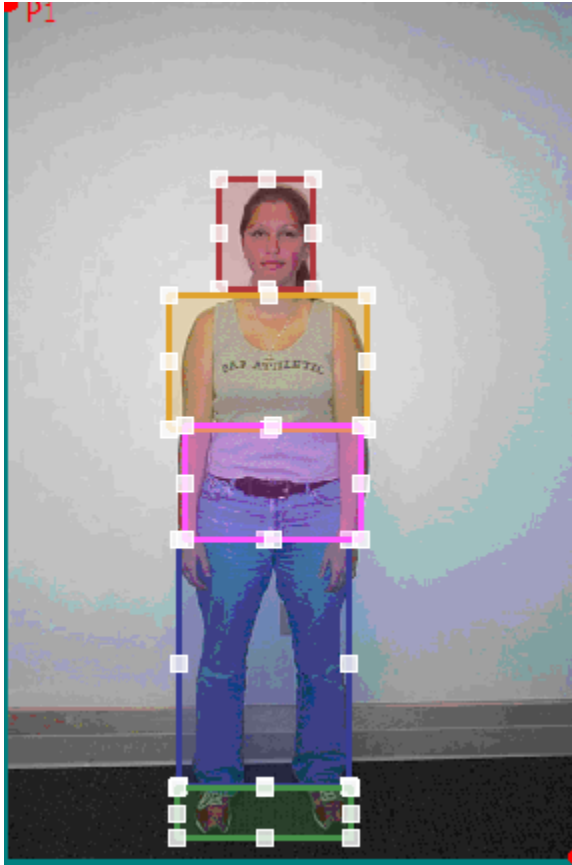
Table 5

Eye gaze patterns by relational goal, participant gender, and relationship status

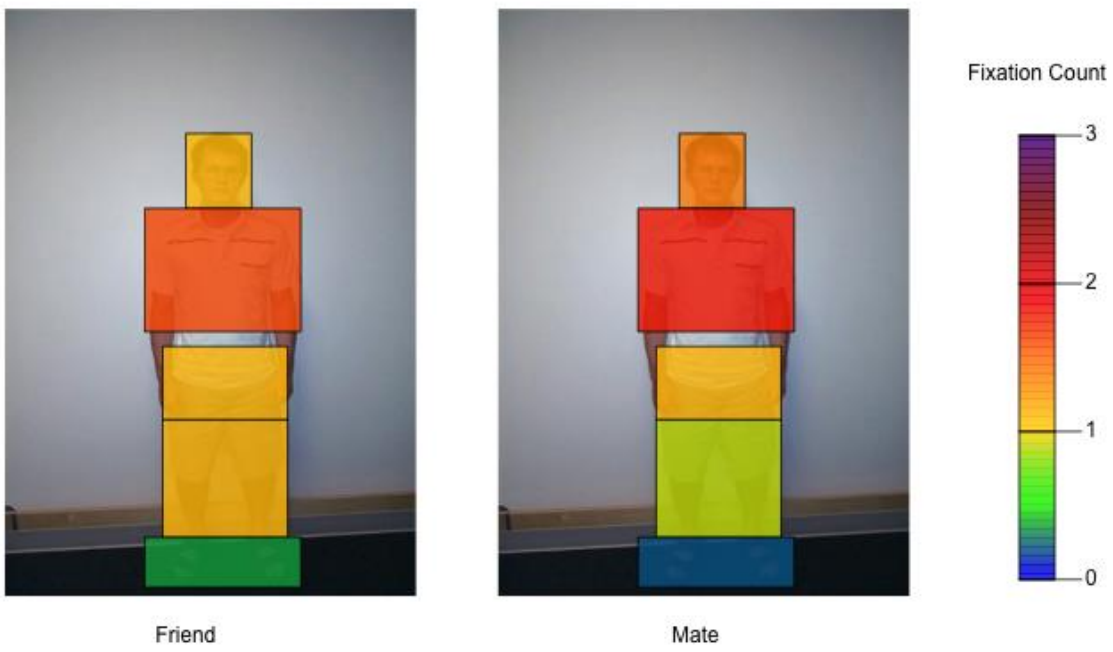
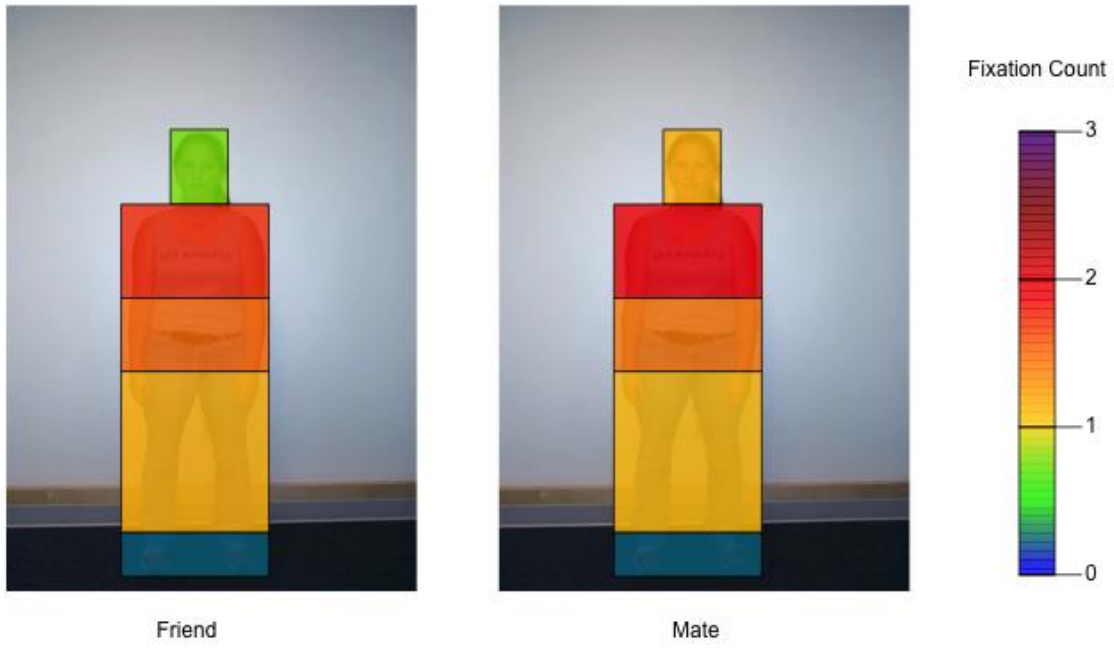
		Fixation Count		Fixation Duration	
		Potential Friend	Potential Mate	Potential Friend	Potential Mate
Men	Single	5.86 _a (6.86)	6.16 _a (7.50)	2.42 _a (3.11)	2.63 _a (3.48)
	Coupled	4.55 _a (4.40)	5.31 _a (5.21)	1.81 _a (1.84)	1.97 _a (2.04)
Women	Single	5.17 _a (5.89)	5.86 _a (6.46)	2.43 _a (5.45)	2.43 _a (3.17)
	Coupled	5.58 _a (6.55)	4.99 _a (5.38)	1.91 _a (2.52)	1.64 _b (1.95)
Total	Single	5.43 _a (6.27)	5.96 _a (6.84)	2.43 _a (4.71)	2.50 _a (3.28)
	Coupled	5.30 _a (6.05)	5.08 _b (5.33)	1.88 _b (2.34)	1.73 _b (1.98)

Note. Tabled values are means for total fixation counts and total fixation durations (the sum of all five areas of interest). Standard deviations are in parentheses. Means sharing the same subscript in a column comparing single and coupled individuals do not significantly differ. Significance tests for simple effects come from independent samples t-tests comparing single and coupled participants.

Figure 1



Figures 2a and 2b



Figures 3a and 3b

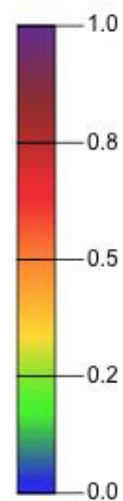


Friend

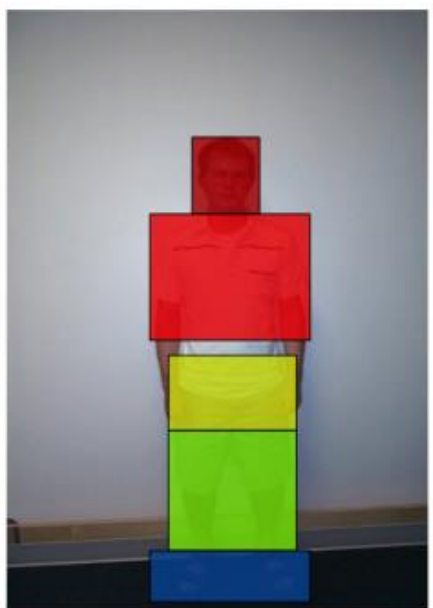


Mate

Fixation Duration



Friend



Mate

Fixation Duration

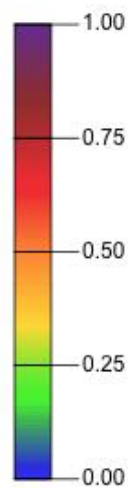


Figure Captions

Figure 1. The five body regions defined as areas of interest

Figure 2a. Male participants' mean fixation counts by body region in looking at women as potential friends and potential mates

Figure 2b. Female participants' mean fixation counts by body region in looking at men as potential friends and potential mates

Figure 3a. Male participants' mean fixation duration by body region in looking at women as potential friends and potential mates

Figure 3b. Female participants' mean fixation duration by body region in looking at men as potential friends and potential mates

SUPPLEMENTARY MATERIAL

Intraclass correlations from the null models with the more complex variance structure

Image + instructions	Head		Waist-hip		Chest		Legs		Feet		Attraction
	FC	FD	FC	FD	FC	FD	FC	FD	FC	FD	
P121.M	0.15	0.15	0.36	0.50	0.35	0.51	0.20	0.05	0.16	0.01	0.34
P15.M	0.38	0.49	0.13	0.13	0.25	0.38	0.12	0.05	0.13	0.00	0.51
P158.M	0.23	0.18	0.31	0.10	0.35	0.25	0.27	0.15	0.15	0.11	0.26
P27.M	0.16	0.16	0.26	0.34	0.45	0.39	0.16	0.15	0.10	0.17	0.29
P30.M	0.43	0.46	0.32	0.25	0.24	0.16	0.23	0.19	0.26	0.13	0.42
P46.M	0.57	0.49	0.39	0.33	0.42	0.21	0.35	0.24	0.26	0.38	0.49
P64.M	0.32	0.15	0.26	0.37	0.15	0.13	0.32	0.29	0.27	0.23	0.31
P74.M	0.06	0.08	0.06	0.07	0.09	0.14	0.19	0.21	0.18	0.38	0.44
P83.M	0.28	0.28	0.47	0.43	0.17	0.23	0.16	0.16	0.13	0.09	0.56
P99.M	0.20	0.36	0.24	0.22	0.27	0.28	0.26	0.16	0.13	0.09	0.43
T114.F	0.40	0.33	0.37	0.31	0.54	0.42	0.12	0.06	0.12	0.05	0.28
T114.M	0.45	0.26	0.35	0.23	0.39	0.37	0.19	0.04	0.21	0.38	0.44
T124.F	0.54	0.44	0.40	0.43	0.39	0.33	0.24	0.10	0.16	0.04	0.20
T124.M	0.28	0.33	0.37	0.10	0.36	0.38	0.47	0.57	0.29	0.38	0.36
T128.F	0.49	0.52	0.23	0.42	0.42	0.37	0.14	0.00	0.13	0.07	0.21
T128.M	0.43	0.26	0.48	0.33	0.43	0.42	0.34	0.21	0.29	0.23	0.34
T134.F	0.32	0.23	0.33	0.19	0.42	0.37	0.34	0.25	0.06	0.07	0.21
T134.M	0.35	0.33	0.41	0.45	0.57	0.54	0.42	0.29	0.88	1.00	0.45
T136.F	0.41	0.52	0.49	0.41	0.25	0.35	0.40	0.36	0.33	0.23	0.25
T136.M	0.24	0.16	0.41	0.16	0.26	0.11	0.35	0.36	0.26	0.17	0.28
T5.F	0.32	0.31	0.22	0.16	0.37	0.25	0.07	0.05	0.15	0.08	0.16
T5.M	0.57	0.41	0.36	0.21	0.43	0.43	0.24	0.06	0.64	0.86	0.52
T50.F	0.29	0.23	0.26	0.21	0.37	0.37	0.12	0.06	0.15	0.17	0.21
T50.M	0.49	0.42	0.28	0.10	0.35	0.09	0.34	0.04	0.11	0.01	0.58

T53.F	0.41	0.15	0.39	0.03	0.23	0.02	0.26	0.01	0.12	0.07	0.14
T53.M	0.32	0.27	0.54	0.14	0.38	0.28	0.33	0.44	0.29	0.38	0.31
T54.F	0.43	0.29	0.38	0.15	0.61	0.66	0.29	0.15	0.07	0.06	0.17
T54.M	0.31	0.35	0.35	0.33	0.19	0.21	0.17	0.14	0.13	0.05	0.38
T77.F	0.37	0.32	0.35	0.42	0.40	0.22	0.24	0.18	0.05	0.06	0.13
T77.M	0.30	0.19	0.35	0.52	0.45	0.44	0.41	0.40	0.27	0.38	0.29

Note. Tabled values are item-specific ICCs for each unique combination of image and instructions (friend or mate). Images with extension ‘.M’ were presented as potential mates and images with extension ‘.F’ were presented as potential friends. FC = fixation count and FD = fixation duration. The dependent variables are FC, FD, and attraction.

SUPPLEMENTARY MATERIAL

Alternate Table 3 using fixation duration data

Judgments of relationship potential as a function of looking patterns on a specific body region, relational goal, and participant gender

Fixation Duration	Head		Waist-hip		Chest		Legs		Feet	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Fixed Effects										
Intercept	2.06***	0.09	2.04***	0.09	2.04***	0.09	2.04***	0.09	2.07***	0.09
Level 1 Variables										
Fixation duration	0.01	0.03	0.07	0.06	0.03	0.03	0.08	0.07	-0.11	0.11
Relational goal	-1.23***	0.06	-1.30***	0.06	-1.32***	0.06	-1.31***	0.06	-1.28***	0.06
FD x goal	0.13**	0.04	-0.02	0.07	-0.02	0.04	-0.04	0.08	0.27†	0.16
Level 2 Variables										
Gender	-0.05	0.15	-0.08	0.15	-0.06	0.15	-0.09	0.15	-0.07	0.15
Cross-Level Interactions										
FD x gender	0.04	0.04	-0.06	0.07	0.02	0.04	-0.07	0.09	0.10	0.13
Goal x gender	0.44***	0.10	0.36***	0.10	0.31**	0.10	0.31**	0.10	0.28**	0.09
FD x goal x gender	-0.34***	0.08	-0.16	0.10	-0.06	0.06	-0.09	0.13	-0.19	0.36
Random Effects										
Between subjects intercepts (t_{00})	0.40***	0.06	0.41***	0.06	0.41***	0.07	0.41***	0.06	0.41***	0.07