Title:

Adjusting signals of sexual interest in the most recent naturally occurring opposite-sex encounter in two different contexts

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Running head: Adjusting signals of sexual interest

Abstract

Sexual signaling is subject to manipulation, and miscommunication may occur because of biased interpretations of signals, or because of strategical downplaying of sexual interest (playing hard-to-get). In this paper, we examined initial perceptions of cues from opposite sex partners along with participant reported own sexual attraction and signaled attraction in their most recent natural occurring potentially sexual opposite-sex encounter. Data on heterosexual Norwegian male and female students were collected in two largely different social contexts (during Regular Study Period, Spring 2015: $N = 224$ and during Freshmen Weeks, Early Fall 2015: $N = 211$). Results show no indication of women playing hard-to-get, or of strategically downplaying signals of sexual attraction. There was evidence of male sexual overperception in Study 1, but this effect was not replicated in Study 2 mainly due to increased levels of sexual attraction in single, freshmen women in that particular social context. For both sexes, reported levels of signaled attraction strongly reflected reports of own sexual attraction. Predictors for who ended up having sex after the encounter differed for women and men. For women, ending up having sex was predicted by the other's short-term mate value, being freshman, and level of perceived sexual interest from the other after the encounter. For men, ending up having sex was predicted merely by their history of casual sex. It is concluded that women and men adjust their signals of sexual attraction upward or downward relative to their felt attraction to prompt further communication and to gain more information.

Keywords:

Error Management Theory, Sex differences, Sexual misperception, Coyness, Communication

Public significance statement:

Meetings between potential romantic partners are fraught with ambiguity. This study investigates how people perceive cues from a potential partner and how one adjusts one's own signals to the situation. Both sexes adjusted their signals: men were in general moderately attracted but signaled less, women were in general not attracted but signaled more. These findings are relevant for a greater understanding of sexual misperception and the psychology of sexual harassment.

Introduction

When meeting someone in a potentially romantic or sexual situation, there is often a measure of uncertainty with regard to the other's sexual intentions. Various observable cues are used for making inferences about the other person's sexual interest, but these cues are often indirect or subtle, conveying considerable amounts of ambiguity. Although such ambiguity increases the risk of misperception, direct or unambiguous communications of sexual intent can also be detrimental to the mate value of the person taking the initiative if he or she is either rejected or earns a reputation of being sexually indiscriminate (i.e., promiscuous). Conveying unambiguous sexual interest might be efficient in achieving a short-term relationship for women, however, it is less efficient for men (Bendixen & Kennair, 2015; Schmitt & Buss, 1996). Moreover, some ambiguity in courtship communication can foster further communication between the parties, allowing for further information to be gained about the prospective mate's commitment or sexual interest, which may create a stronger foundation for evaluation and later decision-making (Jonason & Li, 2013).

Both men and women misinterpret sexual interest in dating situations, however, this occurs in different ways. There is substantial empirical evidence that men are more likely than women to perceive sexual intentions from the opposite sex's signals (Haselton & Galperin, 2013; La France, Henningsen, Oates, & Shaw, 2009). Men's tendency to overperceive is found across diverse methodologies such as in face-to-face single dyadic interactions in the laboratory (participant and observer ratings), videos and pictures of dyadic interactions, written scenarios, vignettes and statements, speed-dating dyadic interactions, naturalistic experiences, and experiments (Haselton & Galperin, 2013; La

France et al., 2009). Importantly, this pattern is equally strong in religious cultures as it is in secular and sexually liberal cultures (Bendixen, 2014).

Error management theory (EMT; Haselton & Buss, 2000; Haselton & Nettle, 2006), provides a framework for interpreting these results. Judgments and decisions are made under uncertainty across a number of domains, such as navigating the physical environment, cooperation with others, and intuiting the intentions of a potential partner. Based on signal detection theory (Green & Swets, 1966; Swets, Dawes, & Monahan, 2000), EMT describes how natural selection may have engineered psychological adaptations for judgment under uncertainty. In addition to making correct judgments (true positives and true negatives), two types of judgmental errors can be committed: a person may adopt a belief that is in fact not true (false positive) or fail to adopt a belief that is in fact true (false negative). Within domains in which the costs of errors have been asymmetrical over deep evolutionary time, selection may favor designs that make the less costly error of the two. When the reproductive costs of missed sexual opportunities were greater than the costs of pursuing uninterested mating partners, natural selection, according to EMT, would produce the adaptively biased systems that exist in the present as they led to survival and reproductive advantages for humans in the past. Pursuit might cover a variety of acts spanning from subtle sexual advances to simple capturing. However, the specific acts were not explicitly stated by the authors of EMT. One outcome of these adaptive biases is the decision to actively pursue sexual opportunities, even though this increases overall error rate. Because ancestral men, much more than women, could have increased their reproductive success by increasing their number of matings, a cognitive bias leading to greater beliefs that women are sexually interested

more often than they truly are (biased beliefs), or to act *as if* women were sexually interested, would produce more errors overall relative to a design that maximized correct classification rates. This tendency could still maximize the overall expected value of decisions, as it would have led to fewer high-cost errors at the expense of making more low-cost errors. On average, ancestral women experienced fewer costs from missed mating opportunities; and, hence, selection should not have favored the same tendency (Haselton & Buss, 2000).

Signal detection theory, on which EMT is based, does not explicitly distinguish belief thresholds from action thresholds. Such a distinction between cognitive and behavioral biases has been suggested by McKay and Efferson (2010). If that distinction is introduced, however, one may ask whether a man making sexual advances acts on genuine, though often inaccurate, biased *beliefs* about a woman's true sexual intent, or whether a man's actions are influenced by other factors, such as the perception of the costs of pursuing a woman versus passing up a possible opportunity to mate. If a man justifies his unwelcome advances on the grounds that the woman really did welcome them, is that a genuinely mistaken belief, or is that the socially acceptable excuse of a man who knows what costs he imposes on a woman, but does not care? Galperin and Haselton (2013) acknowledge that the core logic of EMT does not depend on whether a change in payoff causes a change in behavior through a change in belief or a change in the assessment of outcomes. The logic holds so long as psychological adaptations that lead the organism to make more errors overall (in belief, behavior, or both) also reduce overall costs to that organism (by pursuing uninterested potential mates or missed mating opportunities). Nevertheless, they maintain that other empirical evidence suggests that the

sexual overperception bias is rooted in biased beliefs. Still, being able to separate biases that are cognitive from those that are merely behavioral is important because this addresses the issue of whether adaptive biases predicted by EMT involve biases in cognition.

From EMT we hypothesize Male Sexual Overperception Bias (H1). We predict that men report more initial sexual interest from their partner (women) compared to the level of sexual attraction reported by women. This bias is expected to be lower or reversed in women; i.e., female sexual underperception (Bendixen, 2014; Haselton & Buss, 2000; Haselton & Galperin, 2013).

Recently, Perilloux and Kurzban (2015) questioned whether men's sexual overperception truly reflects a cognitive bias. They claimed that such a bias is unlikely because it would be associated with the costs of erroneous representations that serve as inputs into other decision-making systems, thereby distorting accuracy in those other domains. They suggested that men's *perceptions (cognitions)* should be relatively accurate (not perfectly accurate), whereas their *behavior* should be biased: "pursuing even low-probability/high-payoff opportunities." (Perilloux & Kurzban, 2015, p. 71). Applying the Dating Behavior Scale (DBS; Haselton & Buss, 2000), which measures intentions for various hypothetical behaviors, Perilloux and Kurzban (2015) reproduced the original findings, suggesting that men's ratings of women's sexual intent when engaging in DBS behaviors exceeded female participants' ratings when they hypothetically engaged in the same behaviors. Further, they asked men and women to rate separately the likelihood of (1) what women *actually* intend (i.e., what women actually *want* when they engage in the DBS behaviors), and (2) what women would

report that they intend (i.e., what they *say* they want). There was no sex difference in reports of what women actually intended performing the behaviors in question. However, men were more likely than women to believe that women would *say* their sexual intentions were lower than their actual intentions were while performing DBS behaviors, and the 'say' and 'want' scores differed significantly more for men than for women. Based on the above findings, Perilloux and Kurzban (2015) interpret these as indication of men's biased behavior, rather than biased beliefs, and find it unlikely that men have evolved information processing mechanisms to perceive sexual intent in women when there is none. If one assumes that men's perception of women's sexual intentions is accurate, women's explicit reports of their sexual intentions when hypothetically engaging in DBS behaviors must be due to some form of motivated underreporting or understating.

Attempts to reproduce Perilloux & Kurzban's findings have shown that manipulation of question order affects the responses (Murray, Murphy, von Hippel, Trivers, & Haselton, 2017). Women rated their sexual intentions lower when these questions appeared before rather than after questions about what women 'say' or 'want', indicative of a '*purer-than-thou*' effect (Engeler & Raghubir, 2017). Still, the above findings suggest that people tend to believe more sexual intent in women than women claim ('say'), and that women self-report less sexual intentions compared to what they report other women intend when performing the same hypothetical behaviors. The former may reflect stereotypical beliefs about women understating their sexual intent, the latter may reflect 'purer-than-thou' beliefs, or possibly strategically playing hard-to-get (i.e.,

coyness) *if* the above findings using hypothetical behaviors have their parallel in *actual* behavior. However, this has not yet been subject to study.

From the above concerns raised by Perilloux & Kurzban (2015), we hypothesize an alternative male bias that is rooted in behavior bias rather than in biased beliefs (Alternative Male Bias Behavior Hypothesis, H2). If men report that they pursue women (e.g., by sending signals of sexual attraction) regardless of the perceived cues to sexual interest of the opposite-sex partner, this would be indicative of biased behavior (Perilloux & Kurzban, 2015). One way to pursue would be to signal own sexual attraction. Women are not expected to do this.

Compared to conveying indirect or ambiguous signals, direct and distinct signaling of sexual interest to attract a mate may be a less optimal strategy. Coyness as a sexual strategy tactic for attracting mates was first identified by Darwin (1871) and reflects in the animal kingdom strategic reluctance to mate (McNamara, Fromhage, Barta, & Houston, 2009; Wachtmeister & Enquist, 1999). In humans, the assumed function is to create an impression of limited sexual availability in potential mates' minds, and thus may be an effective tactic for *increasing the demand* for the hard-to-get person (Jonason & Li, 2013). Within the framework of EMT (Haselton & Buss, 2000) the function of playing hard-to-get would be to both gain more information about potential mates and to test their level of commitment. It follows from Trivers' (1972) parental investment theory and Buss and Schmitt's (1993) sexual strategies theory that allocation of resources from both parents increases survival in human offspring, and that both men's and women's predominant sexual strategy for achieving this would be long-term committed relationships. Still, because the minimal obligatory offspring investment is markedly

higher for women, there are higher costs for women mating a man who provides low investment. Hence, to increase demand, women can limit their availability by signaling less interest in short-term encounters and by expanding courtship periods, thus both avoiding matings with non-investing men and gathering more information about potential investment interest and ability. A side effect of this information gathering might be tactics such as playing hard-to-get. Although men can also limit their availability, there are heavier costs for men than for women through the loss of potential mating opportunities. On the other hand, women should not be attracted to men who signal high availability as this may be a signal of future defection (Jonason & Li, 2013).

In a series of studies Jonason and Li (2013) assessed frequency of use and reasons for using hard-to-get tactics. They found that women used such tactics slightly more than men ($d = -0.17$), but that the various reasons for using hard-to-get tactics did not differ for women and men. When presented with hypothetical prospective opposite-sex mate (descriptions and pictures) for casual sex, men were significantly more likely than women to prefer the mate who often goes out with someone they just met (high availability), while women's preferences for casual sex partners was less associated with degree of availability. However, for a romantic long-term relationship, men were more likely than women to prefer a mate with low levels of availability. These findings correspond well to what has been reported in studies of self-promotion tactics, suggesting that signaling low availability is considered ineffective for women in short-term mating contexts (Bendixen & Kennair, 2015; Schmitt & Buss, 1996).

Finally, some evidence of coyness was provided by Murray and colleagues (2017, Supplementary Material) who asked a large sample of women how frequently they had

acted (1) *more* interested in sex than they really were, and (2) *less* interested in sex than they really were when dating someone (response alternatives were from 1 (*Never*) to 7 (*Always*). They were also asked how often they thought other women acted less or more interested. The women reported that, compared to how they really felt, they more often acted *less* than *more* interested, suggesting coyness (utilization of the hard-to-get tactic). However, reports of acting less *as well as* more interested were common. The participants also believed other women use these tactics and understate or underreport their sexual intentions more often than they do themselves.

From the above, we hypothesize that the women may play hard-to-get, i.e., they strategically act coy. We predict that women, but not men, rate their signaled sexual attraction lower than their own (felt) sexual attraction when reporting from their own opposite-sex encounters (Jonason & Li, 2013; Murray et al., 2017). We term this the Female Acting Hard-to-Get Hypothesis (H3).

An alternative to the female hard-to-get hypothesis could be that signals of sexual attraction will be contingent upon one's own level of sexual interest (Murray et al., 2017). Because information gained about the prospective mate's commitment or sexual interest may create a stronger foundation for evaluation (Haselton & Buss, 2000; Jonason & Li, 2013), we predict that those strongly attracted will curtail their signals, while those at the low end of sexual attraction will step up their signals to prompt further communication. We term this the Adjustment in Signaled Attraction Hypothesis (H4). Both men and women are expected to do so.

The Current Studies

We examined misperceptions of sexual intent in opposite-sex encounters, and tactical signaling of own sexual attraction using self-reports from *naturalistic dating contexts.* In two separate studies—the second carried out to replicate the first, but in a context of abundant mating opportunities (i.e., freshmen weeks)—undergraduate students reported on their *most recent* opposite-sex encounter, including ratings and qualitative descriptions of their perceptions of cues to others´ interest, ratings of how sexually attracted the participants themselves felt, and also ratings and qualitative descriptions of their signaled attraction toward their encounter partner. A distinction can be made between cues and signals. Signals are cues emitted for the purpose of communicating information. Those cues that are not signals are uncontrolled leakage of information. We posit that naturalistic approach of the most recent encounter permits better insight into the psychology of misperception and coyness (i.e., playing hard-to-get) than either the use of judgment of sexual intentions from a list of hypothetical behaviors women may perform to signal their sexual intent (Haselton & Buss, 2000; Perilloux & Kurzban, 2015) or recall of the relative frequency of acting less or more sexually interested (Murray et al., 2017).

Study 1

Methods

Participants

Participants were undergraduate students attending lectures in Social and Natural sciences at a Norwegian University in March/April 2015 (mid-term). Based on their pattern of responses to the misperception questions six cases were identified as outliers.

These were removed from the data along with participants who did not indicate strong

sexual preference for opposite-sex partners. The final sample eligible for analysis of

sexual misperception consisted of 141 heterosexual women and 83 heterosexual men

aged between 20 and 29 years. The average age of the women and men was 22.1 ($SD =$

2.0) and 23.3 ($SD = 2.1$), respectively. Half (50%) of the students reported 'Being

partnered' as their current relationship status (54% women, 42% men).

Procedure

Research assistants recruited participants during lecture breaks. Participant

instructions read: "The purpose of this study is to gain knowledge on the sexual interplay

between women and men and how we interpret cues from persons of the opposite sex.

The questionnaire covers questions on personal characteristics, your interpretation of

situations where you interacted with others, what you did, your sexual experiences,

attitudes, and fantasies." Questionnaires were handed out with a pre-stamped return

envelope and the participants completed the survey at home or in a private setting.

Participation was fully voluntary and anonymous. No incentives were given for

participation.

Measurements

Sexual attraction, interpreting cues and displaying signals. After reporting on

demographics, participants were presented with the following: "Take a minute and reflect

on the last time you were at a gathering, at a party, or at a disco interacting with a

member of the opposite sex that was not your intimate partner. We want you to consider

cues or signals that you picked up during the conversation (interaction) and how you

responded to those cues. These cues could indicate someone trying to be friendly (just

trying to be nice), showing sexual interest (hitting on you) or something else."

Participants rated the following: "Based on the cues s/he sent me I initially assumed s/he

was…" using a 7-point response scale with anchors -3 (*Just trying to be nice*) and 3

(*Definitely sexually interested*) and mid-point 0 (*Didn't know*). We have named this

Perceived (Initial) Interest. Then they were asked to write down a short qualitative

description of the cues they received. These were coded into four qualitative distinct

predefined categories reflecting the explicitness of the cues by two independent raters:[1]

The first category, *No sexual interest* (coded 1) contained 'dismissive', 'informed about

boy/girlfriend', 'nice and kind', 'friendly', 'general conversation', etc. The second

category, *Some sexual interest* (coded 2) contained 'Eye contact', 'smile and eye

contact', etc.). The third category, *Moderate sexual interest* (coded 3) contained 'Smiling

and body contact'', 'flirting', 'touching with compliments' etc., and the final category,

Strong sexual interest (coded 4) contained 'hard on', 'pinched my bottom', 'touched my

crotch', 'wanted to go to somewhere private', etc. The correlation with the 7-point

response scale Perceived (Initial) Interest was substantial ($r = .64$). Next, each participant

rated "How sexually attracted did you feel toward the other person?" on a 7-point

response scale with the anchors -3 (*I did not feel sexually attracted*) and 3 (*I felt sexually

attracted*), and mid-point 0 (*I didn't know*). We have named this Own Attraction.

Next the participants were asked: "What did <u>you</u> signal?" They rated their

responses on a 7-point scale with the anchors -3 (*That I was <u>not</u> sexually attracted),* and 3

(*That I was definitely sexually attracted*). We have named this Signaled Attraction. They

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[1] Interrater reliability, Kappa for Perceived (Initial) Interest was 0.65 (95% CI: 0.59, 0.72), suggesting substantial agreement (McHugh, 2012). Agreement between raters was approximately 80%. Disagreements were resolved by discussion.

were then asked to write down a short qualitative description of the signals they conveyed. These were coded into four qualitative categories of Signaled Attraction, similar to the coding of cues received.[2] The correlation with the 7-point response scale Signaled Attraction was substantial ($r = .67$). Finally, we asked the participants: "After you signaled, what did you learn about his/her intentions?" A 7-point response scale was used with the anchors -3 (*S/he was just trying to be nice*) and 3 (*S/he was definitely sexually interested*), and mid-point 0 (*I never knew*). This measure was named Perceived Interest After.

      Additional measures. Participants rated the other party's attractiveness (mate value) as potential (1) casual sex partner: "How attractive did you find the other person for short-term, casual sex (a one-night stand)?" and (2) long-term partner: "How attractive did you find the other person as a long-term marriage partner." A 7-point response scale was used with anchors 1 (*Well below average*) and 7 (*Well above average*). Similarly, participants rated their own level of attractiveness as a casual sex partner and long-term marriage partner. For measuring preference for casual, short-term sexual relations, we applied the revised 9-item *Sociosexuality Orientation Inventory* (SOI-R; Penke & Asendorpf, 2008). The nine items reflect three dimensions or domains: behavior, attitudes and desires/fantasies that each were internally consistent: Behavior ($\alpha = .87$), Attitudes ($\alpha = .84$), and Desire ($\alpha = .89$). Scaling and scoring followed the recommendations by Penke & Asendorpf (2008).

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[2] Kappa for Signaled Attraction was 0.69 (95% CI: 0.63, 0.75), suggesting substantial agreement (McHugh, 2012). Agreement between raters was approximately 80%. Disagreements were resolved by discussion.

All statistical analyses were performed using Stata MP version 15.1 for Mac (StataCorp, 2017). For interpreting effect sizes, we have used Cohen's (1988) conventions.

Results and discussion

Indicators of Sexual Misperception

To examine the Male Sexual Overperception Bias Hypothesis (H1) we compared the perceived initial interest from the opposite-sex party for each sex with sexual attraction as reported by the opposite sex. As can be seen from Table 1, men's perception of women's interest was higher than women's self-reports of their own sexual attraction, $t(222) = 6.11, p < .001, d = 0.84$). In comparison, women's perception of men's interest did not differ significantly from men's self-reported sexual attraction, $t(220) = 1.08$. Although this is not a direct test, this pattern of finding is indicative of sexual overperception in men.

These findings are supportive of Hypothesis 1; men clearly overperceive the women's interest while women's perceptions are not biased. We note that these are indirect tests, as these reported naturally occurring encounters did not permit studying dyads. The interpretation also rests on the assumption that women and men report accurately on their level of sexual attraction. Furthermore, we cannot rule out the possibility that some of the participants have reported on encounters with someone outside the student population. Still, the test may be considered relevant as long as the samples of men and women reflect their social context and that the social context is equal and representative for women and men.

Participant Sex and Relationship Status Effects on Perceived Initial Interest, Sexual Attraction, Signaled Attraction, and Perceived Interest After the Encounter

As evident from Table 1, the means for women and men's ratings of perceived initial interest from the opposite sex did not differ much between sexes, and for singles vs. partnered participants. A 2 (Participant sex) × 2 (Relationship status) ANOVA revealed a nonsignificant Participant sex effect, $F(1, 219) = 2.68$, and a marginally significant Relationship status effect, $F(1,219) = 3.55$, $p = .061$, $\eta_p^2 = .016$. Single participants rated the other person's initial interest slightly more 'sexual' than partnered participants, but perceived opposite sex interest was close to 'I didn't know' (neutral) across the four groups.

Regarding own sexual attraction men reported on average on the mid-point of the scale, whereas women on average reported their own sexual attraction in the lower end of the scale. This participant sex effect was significant and large, $F(1, 219) = 44.59$, $p < .001$, $\eta_p^2 = .169$. Compared to single participants, own sexual attraction was markedly lower among those partnered, $F(1, 219) = 56.42$, $p < .001$, $\eta_p^2 = .205$. Furthermore, women signaled (sent) moderately less attraction toward the other than men, $F(1, 220) = 10.65$, $p < .001$, $\eta_p^2 = .046$, and partnered participants ($M = -2.03$) signaled markedly less attraction than singles ($M = -0.54$), $F(1, 220) = 46.32$, $p < .001$, $\eta_p^2 = .174$.

The perceived interest from the opposite sex *after* the exchange of signals did not differ between women and men, $F(1, 220) = 1.19$, but singles reported the other party to be moderately more interested than those partnered, $F(1, 220) = 19.56$, $p < .001$, $\eta_p^2 = .082$. None of the analyses above revealed any Participant sex × Relationship status

interaction effects (i.e., the differences between women and men were not moderated by relationship status or vice versa).

Signaled Attraction as Predicted by Perceived Initial Interest

To test the Alternative Male Biased Behavioral hypothesis (H2), we regressed Signaled attraction on Perceived initial interest, Participant sex and Relationship status. The three predictors accounted for 34.9% of the variance in signaled attraction. Perceived initial interest evinced a strong and positive association with signaled attraction ($\beta = .37$, $t = 6.28$, $p < .001$). When perceived initial interest was accounted for, men signaled more attraction than women ($\beta = .24$, $t = 4.25$, $p < .001$) and singles more than those partnered ($\beta = -.35$, $t = -6.21$, $p < .001$). The model (unstandardized betas) suggests that men's scores were on average 0.88 ($SE = 0.21$) higher than women's, and those partnered scored on average 1.23 ($SE = 0.20$) lower than singles. The effect of perceived initial interest was not moderated by participant sex or relationship status, suggesting that the associations between perceived initial interest and signaled attraction were similar in these subgroups (r's ranged from .39 to .47). Additional analysis suggests that the effect of Perceived initial interest on Signaled attraction was curvilinear (added quadratic term, $t = -2.42$, $p < .05$). As shown in Figure 1, when initial cues clearly indicated sexual interest, both women and men levelled off their signaled attraction. However, when initial cues indicated 'just friendly' (negative scores) women and men signaled low levels of attraction, albeit men signaled more overall.

Because there was no evidence of men signaling high levels of sexual attraction regardless of perceived level of interest from the woman Hypothesis 2 was not supported. Evidently, both men's and women's signals of sexual interest were strongly contingent on

their initial perception of interest from the opposite-sex party. Those encountering sexually uninterested persons (initially perceived as friendly) signaled low attraction, while those meeting up with persons perceived as having some or strong sexual interest sent moderate signals of sexual attraction back (men more clearly than women).

Signaled Attraction as Predicted by Own Sexual Attraction

To test the Female Acting Hard-to-Get hypothesis (H3) and the Adjusting Signals of Sexual Attraction hypothesis (H4), we first regressed Signaled attraction on level of Sexual attraction, Participant sex and Relationship status. Then we regressed in Model 1 the *difference* in Signaled attraction vs. own Sexual attraction (i.e., Adjustment of signals) on Participant sex and Relationship status and accounting for own sexual attraction in Model 2. Positive scores reflect more sexual attraction relative to signaled attraction (i.e., curtailing one's sexual attraction). In the first regression, sexual attraction was a particularly strong predictor of signaled attraction ($\beta = .79$, $t = 14.71$, $p < .001$), men appeared to signal *less* attraction than women ($\beta = -.09$, $t = -2.01$, $p < .05$) when own sexual attraction was accounted for, while relationship status had no effect ($t = -1.44$). The effect of sexual attraction on signaled attraction was not moderated by participant sex or relationship status, suggesting that the association between the attraction one felt and level of signaled attraction was similar across the four subgroups (r's ranging from .61 to .81).

In the second regression (Adjustment of signals), men overall reported more sexual attraction than signaled attraction than did women in Model 1 ($\beta = .29$, $t = 4.35$, $p < .001$) . Post hoc paired-samples t-tests for women showed significantly *elevated* levels of signaled attraction relative to own sexual attraction, $t(140) = -2.62$, $p < .01$. Men on the

other hand, significantly *curtailed* their level of signaled attraction relative to own sexual attraction, $t(81) = 3.62$, $p < .01$. Singles and partnered participants did not differ in their overall level of adjustment. When own sexual attraction was accounted for in Model 2, men still adjusted (curtailed) their signals more than women ($\beta = .14$, $t = 2.01$, $p < .05$). As we can see from Figure 2, the more own sexual attraction women and men felt, the more they curtailed their signals (positive difference scores), and level of curtailing was marked for both sexes at high levels of sexual attraction. The association was moderate and similarly strong for women ($\beta = .41$) and men ($\beta = .37$), but at every level of own sexual attraction men appeared to curtail their signals more.

On average, women's signaled attraction was actually higher than their sexual attraction; it was *men* who curtailed their sexual attraction. There was no support for Hypothesis 3 that women play hard-to-get. However, degree of curtailing followed predictable patterns for both men and women supporting Hypothesis 4. With increasing level of sexual attraction, men and women increasingly curtailed their signals, with men doing this more at every level of sexual attraction than women. At low levels of own sexual attraction, women elevated their signals, and signaled more than they felt. For men, this makes sense based on Jonason and Li (2013) and research on the perceived efficiency of different self-promotion tactics (Bendixen & Kennair, 2015; Schmitt & Buss, 1996)—it might be counterproductive for men to actually signal their true sexual attraction, particularly if their level of attraction is high; as it might not be considered attractive. Women on the other hand—by not sending signals of total lack of sexual attraction—may keep the man's attention for longer, and maybe thereby get to assess him further or strategically increase his hope of having a chance (Jonason & Li, 2013). This

may be understood as a form of tactical misrepresentation of own sexual attraction that seems designed to effectively nurture further interaction with the opposite sex.

Study 2

Study 2 was conducted to see whether or not the general pattern of results from Study 1 would replicate in a context that increased the likelihood of sexual encounters and abundant mating opportunities. Specifically, Study 2 was carried out during the university's *introduction weeks of the academic year* (end of August), a period characterized by strong socialization and partying (organized freshmen rituals and mentor group affiliation). The questions posed were similar to Study 1, but we included information on freshman status (first year student) and posed additional questions on (1) who initiated the contact, and (2) the outcome of the encounter. Study 2 sets out to test the same hypotheses as in Study 1.

Given the apparent differences in opportunities for mating between Study 1 and Study 2, we specifically wanted to examine to what extent this affected aspects of participant's sexual psychology such as level of sexual attraction, signaled attraction, judgments of partner mate value and orientation toward short-term sexual relations. In addition, we wanted to examine factors that predict who ends up having sex in the most recent opposite-sex encounter, and to what extent these factors were different for women and men. To achieve this, we studied how well singles' self-reported sexual attraction and signaled interest predicted who ended up having sex following the encounter, and to what extent how much sexual interest (before and after) they perceived from the other party affected the probability of ending up having sex. We also examined to what extent ending up having sex was predicted by the respondent's preference for short-term sexual

relations as well as with the perceived mate value of the partner. In general, we would expect own sexual (and signaled) attraction along with cues to sexual interest from the other part to increase the probability ending up having sex in both men and women. However, because men are less discriminating and have lower minimum standards than women (Buss & Schmitt, 1993; Regan, 1998) sex differences are expected in what factors predict who ends up having sex following the encounter. Sex differences in minimum standards for casual sex would result in men being relatively more often chosen, and women being the choosing party. We predict that, (1) that perceptions of opposite-sex partner's short-term attractiveness increases *women's* likelihood of having sex, and (2) that *men* with attractive features for short-term mating have increased likelihood of having sex.

Methods

Participants, Procedure, and Measurements

Participants were undergraduate students attending lectures in Social and Natural sciences at a Norwegian University in August / September 2015. Three cases were identified as outliers based on their pattern of responses to the misperception questions. These were removed from the data along with participants who did not indicate strong sexual preference for opposite-sex partners. The final sample eligible for analysis of sexual misperception consisted of 135 heterosexual women and 76 heterosexual men aged between 19 and 30 years. The average age of the women and men were 21.6 (SD = 2.2) and 22.2 (SD = 2.4) respectively. Less than half (45%) of the students reported 'Being partnered' as their relationship status (47% women, 40% men) at the time of the encounter. Half (51% of women and men) of the students reported their academic status

as 'Freshman' (i.e., being enrolled this semester). The procedure was identical to the one applied to Study 1. Measurements were identical to Study 1 with two additions: Before any questions regarding cues and signals, we asked who initiated the encounter ("Who took contact first"). Response alternatives were 1 = *I did* and 2 = *The other person*. Following these questions, we asked about the outcome of the encounter (*No further contact / Became acquainted / Became friends / Kissed / Had sex / Became boyfriend or girlfriend)*. Multiple responses were optional. Among singles, 31% percent women (22 of 70) and 20% men (9 out of 45) reported they 'Had sex' following the most recent encounter.

Results and Discussion

Indicators of Sexual Misperception

To test the Male Sexual Overperception hypothesis (H1) we compared, similar to Study 1, men's Perceived initial interest from the opposite-sex party with women's self-reported Sexual attraction and vice versa (Table 2). Men's perception of women's initial interest was not very different from women's self-reported sexual attraction, $t(209) = 1.11$, indicating no sexual overperception bias in men. Similarly, women's perception of men's interest were only slightly lower than men's self-reported sexual attraction, $t(209) = -1.10$, indicating no overall underperception bias in women. When we re-ran the above analyses omitting freshmen students ($n = 107$), men's perceived initial interest ($M = -0.24$) was significantly higher than self-reported attraction by women ($M = -1.09$), $t(102) = 2.12$, p < .05, $d = 0.43$). On the other hand, women's perceived initial interest ($M = -0.27$) was significantly *lower* than the self-reported sexual attraction by men ($M = 0.76$), $t(102) = 2.72$, p < .01, $d = -0.56$).

Unlike Study 1, Hypothesis 1 was not supported in Study 2. Neither men's nor women's perception of the opposite sex showed bias; rather, they corresponded closely to

the opposite sex' reported sexual attraction. Further, sex differences in sexual attraction and signaled attraction were smaller or nonsignificant in Study 2. As the additional analyses of non-freshmen students in Study 2 and the above comparison analyses suggest, the lack of support for Hypothesis 1 may be attributable to contextual differences between Study 1 and Study 2 with regard to the relative presence of women and men, and of freshmen and non-freshmen. Women, but not men, found the other party significantly more attractive as a mate in Study 2 compared to Study 1. This accounted for some of the study differences in levels of own and signaled sexual attraction.

Apparently, the social contexts in which the studies were carried out affected single women's own and signaled attraction, while men's perceived opposite sex interest was unaffected by the social context. If cost asymmetry was the only factor, men should have adjusted, and continued to perceive more sexual interest than women signaled. The first study was carried out during a study-intensive period (the weeks before Easter), when the students have become familiar with the university and the city. We would denote this as the "normalized" state or "baseline." The social context of Study 2 was characterized by a high proportion of freshmen, including students who recently had moved away from home for their studies, and who were experiencing high levels of socializing through arranged parties and gatherings (i.e., Freshmen rituals). Unmeasured aspects of differences in social context related to partying, making new friendships and relationships, and lax daughter guarding might have affected the female sexual psychology more than the male sexual psychology (Perilloux, Fleischman, & Buss, 2008). These findings might also reflect a relative change in experienced/subjective operational sex ratio between the two studies, possibly activated by a high relative

proportion of male mentors for female-dominated groups that may have provided

sufficient signals to female sexual competition to affect mate preferences toward less

choosiness in Study 2 (Hahn, Fisher, DeBruine, & Jones, 2014; Kandrik, Jones, &

DeBruine, 2015; Moss & Maner, 2016; Okami & Shackelford, 2001).

Participant Sex and Relationship Status Effects on Perceived Initial Interest, Own

Sexual Attraction, Signaled Attraction and Perceived Interest After the Encounter

A 2 (Participant sex: Women = 0 vs. Men = 1) × 2 (Relationship status: Singles =

0 vs. Partnered = 1) ANOVA on perceived initial interest revealed a significant

Participant sex effect, $F(1, 206) = 3.91$, $p < .05$, $\eta_p^2 = .019$, suggesting that women

perceived slightly more initial interest from the opposite sex than did men. However,

partnered participants did not perceive sexual interest differently from single participants,

$F(1, 206) = 0.01$. As seen from Table 2, on average men reported their own sexual

attraction close to the mid-point of the scale and significantly higher than women

reported their own, $F(1, 206) = 16.97$, $p < .001$, $\eta_p^2 = .076$. Compared to singles ($M =$

0.53), partnered participants ($M = -1.61$) reported markedly less sexual attraction, $F(1,$

$206) = 57.25$, $p < .001$, $\eta_p^2 = .217$. The effect of relationship status was qualified by sex,

$F(1, 206) = 4.48$, $p < .05$, $\eta_p^2 = .021$, suggesting that the participant sex difference in

sexual attraction was stronger for partnered than for single participants.

Counter to our general expectation, men did not report significantly more signaled

attraction than women, $F(1,206) = 2.67$, $p = .104$.[3] However, those who had a partner (M

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[3] Subsequent analyses showed that the lack of sex difference was attributable to the influential effect of freshman status on signaled attraction for women and men. Omitting freshmen students from the analysis revealed a similarly strong sex difference as those reported in Study 1, $F(1,99) = 8.00$, $p < .01$, $\eta_p^2 = .075$ (Women: $M = -1.13$; Men: $M = -0.08$). Further, the sex difference in sexual attraction was clearly strengthened when omitting freshmen from the analyses, $F(1,99) = 19.64$, $p < .001$, $\eta_p^2 = .166$ (Women: $M = -1.09$; Men: $M = 0.76$).

= -1.51) signaled significantly less sexual attraction than those who were single (M =

0.14), $F(1,206) = 38.11$, $p < .001$, $\eta_p^2 = .155$. The effect of relationship status was

qualified by sex, $F(1,206) = 4.51$, $p < .05$, $\eta_p^2 = .021$, suggesting that signaled attraction

differed more for single vs. partnered women than for single vs. partnered men.

Finally, our analysis of perceived interest from the opposite sex *after* the exchange of

signals showed that women perceived more opposite sex interest than men, $F(1, 206) =$

10.46, $p < .001$, $\eta_p^2 = .048$. Relative to single participants, perceived interest after the

encounter was marginally lower among those partnered, $F(1, 206) = 3.75$, $p = .054$, $\eta_p^2 =$

.018.

Signaled Attraction as Predicted by Perceived Initial Interest

As for Study 1, we tested the Alternative Male Biased Behavior hypothesis (H2)

and regressed signaled attraction on level of perceived initial interest, participant sex, and

relationship status. All predictors produced significant effects, accounting for 30.4% of

the variance in signaled attraction. Perceived initial interest evinced a moderately strong

and positive association with signaled attraction ($\beta = .32$, $t = 4.69$, $p < .001$). Over and

above the effect of perceived initial interest, men signaled more than women ($\beta = .13$, $t =$

2.17, $p < .05$) and those partnered signaled less than singles ($\beta = -.44$, $t = -7.40$, $p <$

.001). The model suggests that men scored on average 0.49 ($SE = 0.22$) higher than

women, and those partnered scored on average 1.61 ($SE = 0.22$) lower than singles

(unstandardized betas). The effect of perceived initial interest was not moderated by sex

or relationship status, suggesting that the associations between perceived interest and

signaled attraction were similarly strong across these subgroups. Similar to Study 1,

additional analysis suggests the effect of initial perceived interest was curvilinear ($t = -$

2.45, $p < .05$) and that both women and men levelled off their signaled attraction at high levels of Initial perceived interest (as illustrated in Figure 1).

The above findings replicate those of Study 1, and Hypothesis 2 (male biased behavior) was neither supported in Study 2. Respondents' signaled attraction were clearly contingent on their perception of initial signaled interest of the other party. Specifically, men meeting uninterested women signaled very little attraction.

Signaled Attraction as Predicted by Own Sexual Attraction

We re-ran the relevant tests from Study 1 for the Female Acting Hard-to-Get hypothesis (H3) and the Adjusting Signals of Sexual Attraction hypothesis (H4). In the first regression, sexual attraction again was the principal predictor of signaled attraction ($\beta = .82$, $t = 17.71$, $p < .001$). When accounting for the effect of sexual attraction, men appeared to signal *less* attraction than women did ($\beta = -.10$, $t = -2.39$, $p < .05$), while relationship status had no effect ($t = -0.64$). Similar to Study 1, the association between sexual attraction and signaled attraction was not moderated by sex or relationship status.

In the second regression (difference scores), relative to women, men on average reported more sexual attraction than signaled attraction ($\beta = .25$, $t = 3.62$, $p < .001$). In addition, singles reported less attraction than partnered participants did ($\beta = -.18$, $t = -2.67$, $p < .01$). The effect of participant sex was not moderated by relationship status (and vice versa). Post hoc paired-samples t-test for women reported levels of signaled attraction no different from sexual attraction, $t(134) = -0.70$. Men on the other hand, significantly curtailed their level of signaled attraction relative to their own sexual attraction, $t(75) = 4.22$, $p < .001$, and, at every level of own sexual attraction, men suppressed their signals more than women. The association between level of own sexual

attraction and the degree of curtailing was linear, moderate, and similarly strong for women ($\beta = .51$) and men ($\beta = .44$). Hence, both men and women downplayed their signals at high levels of sexual attraction. These findings paralleled those of Study 1 (as illustrated in Figure 2).

The above findings do not support the Female Acting Hard-to-Get hypothesis (H3). As in Study 1, women's own sexual attraction did not show any overall difference from their signaled attraction. However, the Adjusting Signals hypothesis (H4) was again strongly supported. Women signaled more attraction at low levels of own attraction, while both men and women curtailed their signals at high levels of sexual attraction. Again, this adjustment of signals seems designed to effectively nurture further interaction with the opposite sex (Jonason & Li, 2013).

Predicting Who Ended up Having Sex in Study 2

We first examined all relevant predictors for who ended up having sex for single participants. These predictors included freshman status, who took initiative in establishing contact, perceived interest before and after, sexual and signaled attraction, own short-term mate value, the other party's short-term and long-term mate value, and each of the three sociosexuality dimensions (Behavior, Attitudes, Desire). As can be seen from Table 3, freshmen women, women who met attractive men for short-term relationships, women who perceived high interest from the man after the encounter, and women who were sexually attracted to the man (and signaled accordingly) were more likely to report ending up having sex. For single men, having a history of many short-term sexual partners (SOI-behavior) and perceived sexual interest from the woman after the encounter were both associated with higher likelihood of reporting ending up having

sex. The effect of being a freshman and the opposite-sex partner's short-term mate value on ending up having sex differed significantly between women and men. Hence, separate logistic regressions models for women and men were applied for predicting ending up having sex.

For single women, the most parsimonious model included three predictors: The other's short-term mate value ($z = 2.25$, $p < .05$), being a freshman ($z = 1.96$, $p < .05$), and level of perceived sexual interest from the other *after* the initial encounter ($z = 2.79$, $p < .001$) all increased the probability of reporting ending up having sex. Relative to non-freshmen women, freshmen women's odds of ending up having sex was 3.7 times higher. Notably, freshman status had some moderating effect on the effect of the other's short-term mate value on likelihood of ending up having sex ($z = -1.84$, $p = .065$). As illustrated in Figure 3, the other's mate value appeared to affect the probability of ending up having sex more strongly for freshmen than for non-freshmen single women.

Although single women's own sexual attraction, their signals of attraction, SOI-behavior and SOI-attitudes were all significantly associated with the outcome, none of these variables had any effect over and above the variables in the above model. The predictors accounted for substantial variance (McFadden $R^2 = 0.469$), and the model correctly classified 81.2% of the cases with an equal number of false positives and negatives. For single men, only SOI-behavior had any influence on the outcome ($z = 2.63$, $p < .01$) and the model correctly classified 77.8% of the cases with a higher rate of false negatives (under-identifying those who ended up having sex). The variance accounted in this model for was about half that of the model of women (McFadden $R^2 = 0.216$).

The above findings are in line with our predictions that perceptions of opposite-sex partner's short-term attractiveness increases *women's* likelihood of having sex, and that *men* with attractive features for short-term mating have increased likelihood of having sex. Single women who ended up having sex reported having met a man that they perceived as more attractive for short-term sexual relations. In addition, they perceived the signals from him indicating a clear sexual interest after the initial encounter. Finally, these women were more likely to be freshmen. None of these factors had a significant effect on men's likelihood of ending up having sex. This dovetails neatly with recent findings from the casual sex regret literature, where there was a particularly strong sex differentiated effect of taking the initiative on casual sex action regret (Kennair, Wyckoff, Asao, Buss, & Bendixen, 2018). They found less casual sex regret among women who took the initiative. These was no such effect for men. Probably, in light of the current results, less regret when women take initiative may be due to relatively higher mate value of the man they decided to have sex with. The only relevant factor for men was their unrestricted sexual behavior; their history of casual sex behavior, or their number of past partners. These findings strongly support the sexual strategy theory's predictions (Buss & Schmitt, 1993; Regan, 1998), suggesting that women, being the choosier sex, act upon their partner preferences and mate with men with characteristics matching these preferences.

Additional Comparisons Across Studies: Partner's Mate Value, Sociosexuality, Sexual Attraction, and Signaled Attraction

Because the two studies were carried out in contexts that differed largely with respect to mating opportunities—Study 1 during the spring term, when most students

prepare for their exams, and Study 2 shortly after the 'Freshmen' weeks in the beginning of the fall semester—we wanted to examine the extent to which our findings were affected by the increased opportunities for mating in Study 2. In particular, we wanted to examine (1) the extent to which own mate value (short-term and long-term), the mate value of the other party (short-term and long-term) as reported by the participant, and participants' sociosexuality (SOI-Behavior, SOI-Attitudes, and SOI-Desire) differed across studies, and (2) how this may have affected observed sex differences in Sexual attraction and Signaled attraction between Study 1 and Study 2.

To examine study differences, we performed three-way factorial ANOVAs with Mate value (own and other's short-term and long-term) and each dimension of Sociosexuality as dependent variables and Study, Participant sex and Relationship status as predictors. (The Means and SDs for the seven outcomes across the groups are presented in Appendix A and Appendix B.) Across the seven comparisons, significant study differences were found for the other's short-term mate value and SOI-attitudes only, suggesting that relative to Study 1, participants in Study 2 found their opposite-sex party more attractive for casual sex, $F(1, 424) = 6.43$, $p < .05$, and their attitudes toward casual sex were less restricted, $F(1, 424) = 14.73$, $p < .001$). The study difference in the opposite-sex party's short-term mate value was moderated by participant sex, $F(1, 423) = 8.69$, $p < .01$. Compared to women in Study 1 ($M = 3.25$), women in Study 2 ($M = 4.04$) found the man markedly more attractive for casual sex, while men's scores of the woman's short-term mate value did not differ across studies ($M = 4.89$ and $M = 4.72$ for Study 1 and Study 2, respectively). Notably, the other party's long-term mate value, own short-term and long-term mate value did not differ between studies, nor did SOI-behavior

or SOI-desire. However, some interactions did involve Study: The Participant sex effect for the other's long-term mate value was moderated by Study, $F(1, 427) = 5.77$, $p < .05$. In Study 1, men ($M = 4.14$) found their partner significantly more attractive as a marriage partner than women ($M = 3.13$). In Study 2, this sex difference was markedly reduced (Means were 3.83 and 3.56 for men and women, respectively). Hence, while women in Study 2 appeared to find their partner more attractive with regard to both short-term and long-term relationships, men found their partner slightly less attractive in Study 2.[4]

To examine how strongly study differences in the other party's mate value affected participants' sexual attraction, signaled attraction, and observed differences across studies, we regressed sexual attraction and signaled attraction separately on Study, Participant sex and Relationship status (Model 1), adding partner's short-term and long-term mate value in Model 2. Interactions and nonlinear effects are reported throughout. In Model 1, Sexual attraction was higher in Study 2 ($\beta = .18$, $t = 4.68$, $p < .001$), men were more attracted than women ($\beta = .29$, $t = 7.18$, $p < .001$) and partnered participants were less attracted than singles ($\beta = -.45$, $t = -11.27$, $p < .001$). Single women in Study 2 were markedly more sexually attracted than any of the other three groups of women, producing a significant three-way Study × Participant sex × Relationship Status interaction effect, $\beta = .18$, $t = 2.13$, $p < .05$. In Model 2, both short-term ($\beta = .35$, $t = 7.11$, $p < .001$) and long-term mate value of the other party ($\beta = .17$, $t = 3.88$, $p < .001$) predicted sexual attraction over and above the effect of the Model 1 predictors. Adding Mate value reduced the effect of the Model 1 predictors to some extent (Study: $\beta = .13$, $t = 3.71$, $p < .001$,

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[4] Women also made more interrelated evaluations of their partner's short-term vs. long-term mate value than men, particularly in Study1 (Women: $r = .57$ and $r = .31$; men: $r = .21$ and $r = .17$ for Study 1 and Study 2, respectively).

Participant sex: $\beta = .15$, $t = 3.76$, $p < .001$, and Relationship status: $\beta = -.34$, $t = -9.21$, p $< .001$). The effects of the other party's short-term and long-term mate values were both moderated by participant sex ($p < .10$). Post-hoc comparisons of correlations for women and men suggest that sexual attraction was more strongly correlated with the other party's short-term ($r_{women} = .60$, $r_{men} = .33$, Fisher's $z = 3.46$, $p < .001$) and long-term mate value ($r_{women} = .47$, $r_{men} = .22$, Fisher's $z = 2.91$, $p < .01$) for women. In addition, both measures of mate value predicted sexual attraction in a curvilinear way (significant quadratic terms).[5] The effect of the other party's short-term mate value on sexual attraction is illustrated in Figure 4 separately for Study 1 and Study 2 (Similar effects were found for long-term mate value, albeit less strong). Evidently, in both studies, women reported being less sexually attracted than men when meeting a low-to-moderately attractive person of the opposite-sex, but both men and women reported equally strong sexual attraction when meeting a highly attractive partner.

Subsequent analyses were performed on *signaled* attraction. These reproduced closely the findings of own sexual attraction above with some notable exceptions. First, in Model 2, once the effect of the other person's mate value (short-term and long-term) were accounted for, men no longer signaled more attraction than women (this difference was significant, $\beta = .14$, $t = 3.19$, $p < .01$, in Model 1, with men scoring 0.53 units above women). Second, participant sex did not moderate the effect of partner's short-term mate value on signaled attraction. Finally, when meeting a very attractive person, women

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[5] Correlations for the squared short-term and long-term products were $r = .64$ and $r = .50$ for women, and $r = .38$ and $r = .24$ for men.

appeared to signal equal or more sexual attraction than men. Still, when meeting a low-to-moderately attractive partner, women signaled markedly less than men.

General Discussion

In two separate studies, we examined misperceptions of sexual intent in opposite-sex encounters and tactical signaling of own sexual attraction using self-reports from two different naturalistic dating contexts by asking men and women to report on their most recent opposite sex encounter. In particular, we searched for evidence that women play hard-to-get or act coy by signaling less sexual attraction than they feel in opposite sex encounters and that men may pursue women regardless of cues to sexual interest. If women generally act coy this would possibly account for the phenomenon known as male sexual overperception bias (Haselton & Buss, 2000). We did not find any indication of general female coyness, or that women curtail or underreport their sexual attraction in either study. Instead, we found that both men and women adjusted their signals of sexual attraction based upon their perceived initial interest of the other, and upon their own sexual attraction. Women, who generally reported low levels of sexual attraction, actually inflated their signals. Hence, our finding may explain Murray and colleagues' (2017) finding that women reported having acted either less or more interested in sex than they really were when dating someone in the past.

The above findings of adjustment of signals of sexual attraction relative to self-reports of felt attraction may partly reflect a coordination problem where payoffs are highest if you seek to mirror the other party's signals. Adjustment of signals may prompt further communication between the parties, leaving more time for interpretation and judgment. Strong attraction (more prevalent in men) combined with no adjustment

towards a party showing no interest would most likely be quite intimidating and off-putting (Bendixen & Kennair, 2015; Jonason & Li, 2013). Severe lack of attraction (more typical in women), combined with no upward adjustment of signals towards a more interested party, is likely to lead to being discarded and abandoned for someone else before one has had enough time to assess the other.

In the current study, participants were asked about how strongly (along a 7-point response scale) and what type (providing a qualitative description) of sexual attraction signals they sent. Signaling sexual attraction is merely one of many possible ways of pursuing sexual access. While the concept "pursuit" was not explicitly mentioned in the questionnaires, we believe sending signals of sexual attraction is a fundamental aspect of sexual pursuit. Evidently, the qualitative descriptions identified flirting, seduction and solicitation behaviors for cues that were categorized as moderate or strong by independent raters. Moreover, this measure correlated substantially with strength of signals in both studies. Consequently, it is likely that the signals of sexual attraction measure has picked up some form of pursuit.

Challenges Related to Self-Reported Sexual Attraction

Is it possible that the reported low levels of sexual attraction in women is due to a lower ability *recognizing* sexual attraction, or that they are less likely to report *honestly* about their attraction following opposite sex encounters compared to men? Possible evidence of the former is found in a meta-analysis showing weaker correlations between self-reported and genital measures of sexual arousal for women than for men (Chivers, Seto, Lalumière, Laan, & Grimbos, 2010). Still, reporting one's sexual *arousal* may be both different from, and more difficult than, reporting on one's sexual *attraction*. Hence,

we find sex differences in arousal recognition a less convincing explanation. However, lack of recognition seems plausible under two assumptions. Firstly, that it is less risky for a woman to appear to be oblivious to a man's sexual advances than to reject him explicitly. Secondly, following the logic of evolved self-deception (Trivers, 2000), the most effective deception is the one that the deceiver believes, and that therefore a woman can, when required, sidestep a man's advances more effectively if she is not fully aware of the degree of her own sexual attraction. Also, one cannot refute the possibility that women, relative to men, are less likely to report sincerely on their own sexual attraction and more likely to conceal their true sexual motivation due to expected societal negative reactions or some form of sexual double standard (Kreager & Staff, 2009). However, given the degree of anonymity during responding (participants were instructed to keep their responses private, and could return the questionnaire in a prepaid envelope by mail) and the gender similarity in level of reported casual sex behavior, we do not anticipate dishonest or strongly biased responses due to social desirability issues in either sex. In addition, in general, women participants admitted to signaling greater sexual attraction than they felt.

The procedure and measurements applied to our two studies provided a more direct test of female sexual attraction and coyness than studies that have applied judgment of women's sexual intentions based on hypothetical behavior. Coyness can express itself in one or both of two ways: reporting less sexual attraction than one feels and signaling less sexual attraction. We relied on women's reports to estimate both from their most recent opposite-sex encounter. The possible functions and proximate causes of coyness should result in predictable patterns in these estimates. If coyness functions

either to avoid unwanted advances while reducing offence, or to evade censure by daughter, sister, or mate-guarding relatives and partners, then it is more important to reduce signals of sexual attraction than to downplay felt attraction in later (anonymous) reports to third parties. The overall findings from our two studies (including the qualitative reports of signals sent) give us no reason to assume that women's reports of signaled sexual attraction are biased or reflecting coyness. At least not in the context of one of the world's most sexually liberal and gender egalitarian nations (Grøntvedt & Kennair, 2013). Partnered participants' sexual attraction and signaling was markedly lower than single's in both men and women. This is consistent with previous findings (Cole, Trope, & Balcetis, 2016). The validity of reports is further underscored by the analyses of other factors affecting level of felt and signaled sexual attraction, such as the level of perceived initial interest, and the mate value of the opposite-sex party.

Study Limitations and Future Research

This study employed the naturalistic encounter-paradigm from earlier studies on misperception. Further, it was expanded with more details of what was perceived and signaled – and in Study 2, whether the outcome was sexual or not. As such we believe the current findings improve our understanding of the complex processes involved in encounters between potential sexual or romantic partners. However, we fully acknowledge that there are several limitations inherent in this methodological approach. We will address a few of them here, but strongly recommend that future studies develop a diverse set of methods to discover the mechanisms involved in the complex interplay involved in encounters between potential romantic partners.

The current results might not necessarily generalize to less gender egalitarian or less secular societies with less sexual liberty. It might be that the specific cultural context influences our results, as women have less to lose in the current culture. On the other hand, women from this liberal culture are shown to worry more than men about their sexual reputation following casual sex (Kennair, Bendixen, & Buss, 2016). Still, level of sexual regret has been found to reproduce cross-culturally, at least across Western nations varying in relevant features such as religiosity and sexual liberty (Bendixen, Asao, Wyckoff, Buss, & Kennair, 2017). Whether the current findings reproduce cross-culturally needs to be examined in future studies with samples from nations varying in gender equality and sexual liberalism.

We also need to consider possible random sample differences versus effects of context. We chose freshmen/introduction weeks specifically, because we wanted to be able to gather enough reports about positive sexual outcomes; our expectation was that there would be more sex during this period. Further research needs to consider this longitudinally: collecting a sample to replicate the context features during freshmen weeks, then follow up the same students several months later in a more normalized context, and finally test whether any changes mirror the findings of the current study. Also, measuring experienced or subjective operational sex ratio across the study period would provide more insight into contextual factors affecting changes in judgments of partner mate value and sexual attraction reports in men and women.

An important caveat to consider when assessing the findings using our methodology is the high cognitive load put on the respondents answering questions in retrospect on opposite sex encounters that took part some (unknown to us) time ago.

However, memory may be facilitated with shorter pre-defined reference periods (e.g., the past month), and researchers are advised to time the last encounter by asking how many days ago the encounter took place.

Further, any retrospective report could be distorted by hindsight bias: For instance, single people, or people who end up having sex may retrospectively misinterpret their mate's behavior as indicating sexual interest. Still, at the present we are not aware of any other methodology that could address coyness or playing hard-to-get better without studying couples who interact in experimentally controlled environments, which on the other hand introduces ecological validity issues. Further, we are more concerned about sex differences in mating strategies than with the specific rates of the behavior. If the rates of the actual behavior did not differ, then we would still have to explain why men and women differ in what they remember more vividly. According to Conway and Pleydell-Pearce (2000), one of the functions of autobiographical memory is to make most memorable those events that are relevant to the person's motives. Sex and relationship status differences in hindsight bias could then be plausibly linked to differences in motives related to sexual strategies for these groups. In signal detection theory, the optimal location of the decision criterion is determined by base rates, sensitivity, and the subjective evaluation of the possible outcomes. If our data reflected retrieval biases driven by base rates, then our original interpretation applies. If retrieval biases are driven by sex differences in the subjective evaluation of the possible outcomes, those subjective evaluations would be motivations that influence the decision threshold, and thus behavioral choices, which is the central claim of Error management theory (Galperin & Haselton, 2013). Sex differences in sensitivity are not relevant to the

argument because low sensitivity does not generate bias, it only amplifies biases

generated by base rates and subjective evaluations (Lynn & Barrett, 2014). Therefore, sex

differences in sensitivity cannot explain sex differences that result in biases on opposite

sides of neutral.

Finally, although our measure of signaled sexual attraction reported by the

participants may reflect some form of pursuit and level of eagerness, we did not ask about

pursuit or eagerness directly in the questionnaire—only indirectly through conveyed

signals. These signals may not have been very costly, and future studies ought to consider

measuring these or similar constructs more directly. This would increase precision and

provide a better test of the male behavioral bias hypothesis.

Conclusion

Employing reported recall of naturally occurring encounters with the opposite

sex, we found, in a normalized context, that men, but not women, assumed higher levels

of sexual interest than the level of attraction that was reported by the opposite sex. This

provides some evidence of male sexual overperception. During freshman weeks, due to a

substantial number of freshmen women who reported being more sexually attracted, this

effect was not replicated in Study 2. While men, in general, signal more sexual attraction

than women, men seem to curtail signals of attraction toward women that they perceived

as having low sexual interest. There was no indication that women downplay their sexual

signals relative to their own reported sexual attraction. Rather, both men and women

were found to adjust their signals upward or downward relative to their reported

attraction, possibly as a means to prompt further communication and to gain more

information. There were sex differences in what predicted who ended up having sex. For

men, a history of sexual activity increases likelihood of having sex; for women, how sexually attractive they perceive their partner seems to be the primary predictor. Despite limitations, the current study advances our knowledge of the complex interplay between what one perceives, experiences and signals in potential romantic meetings.

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Table 1

Self-Reported Interest and Attraction Means and SDs for Women and Men, Singles and Partnered, Study 1

| | Women (*n* = 141) | | | Men (*n* = 83) | | |
| | *M* (*SD*) | | | *M* (*SD*) | | |
Variable	Single	Partnered	All	Single	Partnered	All
Perceived Interest (I)	0.35 (1.91)	-0.17 (2.04)	0.07 (1.99)	-0.10 (1.93)	-0.63 (2.14)	-0.33 (2.02)
Own Attraction	-1.08 (1.86)	-2.51 (1.13)	-1.85 (1.66)	0.55 (1.61)	-1.26 (1.60)	-0.22 (1.83)
Signaled Attraction	-0.97 (1.78)	-2.16 (1.20)	-1.61 (1.60)	0.04 (1.76)	-1.74 (1.56)	-0.71 (1.89)
Perceived Interest (A)	0.52 (1.90)	-0.67 (2.06)	-0.12 (2.07)	0.25 (1.90)	-1.00 (2.04)	-0.28 (2.04)

Note. I=Initial, A=After

Table 2

Self-Reported Interest and Attraction Means and SDs for Women and Men, Singles and Partnered, Study 2

| | Women (*n* = 135) | | | Men (*n* = 76) | | |
| | *M* (*SD*) | | | *M* (*SD*) | | |
Variable	Single	Partnered	All	Single	Partnered	All
Perceived Interest (I)	0.08 (1.84)	-0.03 (1.79)	0.03 (1.81)	-0.53 (1.77)	-0.47 (1.94)	-0.50 (1.81)
Own Attraction	0.34 (1.93)	-2.11 (1.51)	-0.82 (2.13)	0.84 (1.57)	-0.53 (1.91)	0.32 (1.83)
Signaled Attraction	0.18 (1.81)	-1.80 (1.36)	-0.76 (1.89)	0.07 (1.55)	-0.90 (1.84)	-0.32 (1.71)
Perceived Interest (A)	0.73 (1.76)	0.06 (2.09)	0.41 (1.94)	-0.29 (1.67)	-0.67 (1.79)	-0.41 (1.73)

Note. I=Initial, A=After

Table 3

Bivariate Associations (Pearson's r) and Fisher's z for the Difference in Correlation for Predictors of Ending up Having Sex (No/Yes), Single Participants.

Predictor	Women (n = 69)	Men (n = 45)	Fisher's z
Freshman (0 = No, 1 = Yes)	.31**	−.09	2.08*
Initiative (1 = Self, 2 = Other)	.11	.05	0.31
Perceived Interest (I)	.20	.22	−0.11
Own Attraction	.44**	.27	0.99
Signaled Attraction	.43**	.23	1.14
Perceived Interest (A)	.48**	.32*	0.97
Own Male Value (ST)	.28*	.22	0.32
The Other's Mate Value (ST)	.47**	−.12	3.20**
The Other's Mate Value (LT)	.06	−.01	0.10
SOI-Behavior	.27*	.46**	−1.12
SOI-Attitudes	.34**	.33*	0.06
SOI-Desire	.23	.01	1.14

Note. I=Initial, A=After, ST = Short-Term, LT = Long-Term.
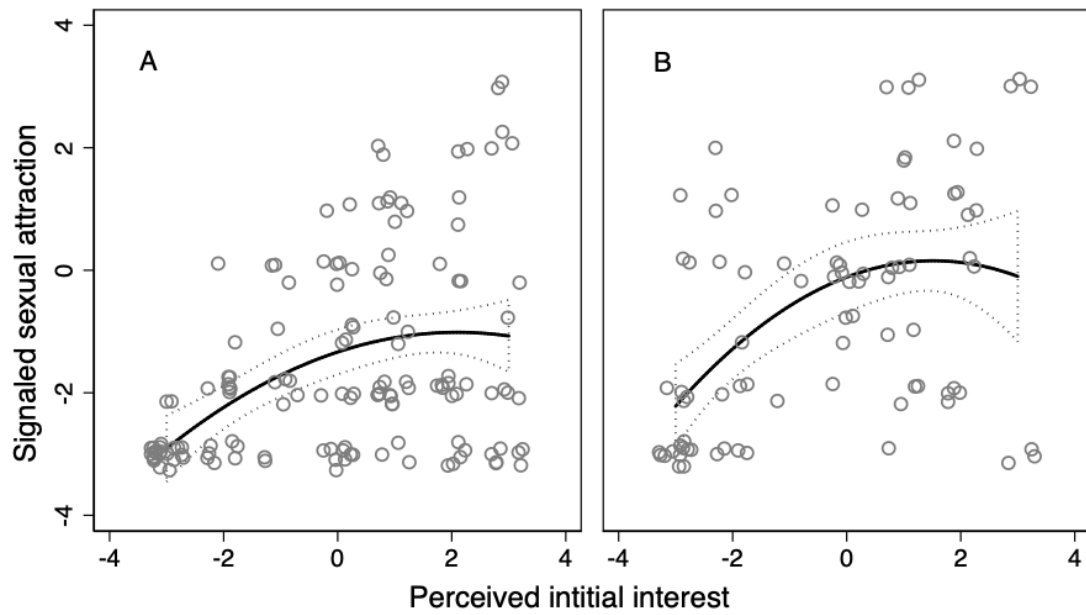
* $p < .05$, ** $p < .01$.

Figure 1. Level of signaled sexual attraction as a function of level of perceived initial

interest. Scatter plots and predicted fitted values [95% CIs]. Panel A: Women (*n* = 141);
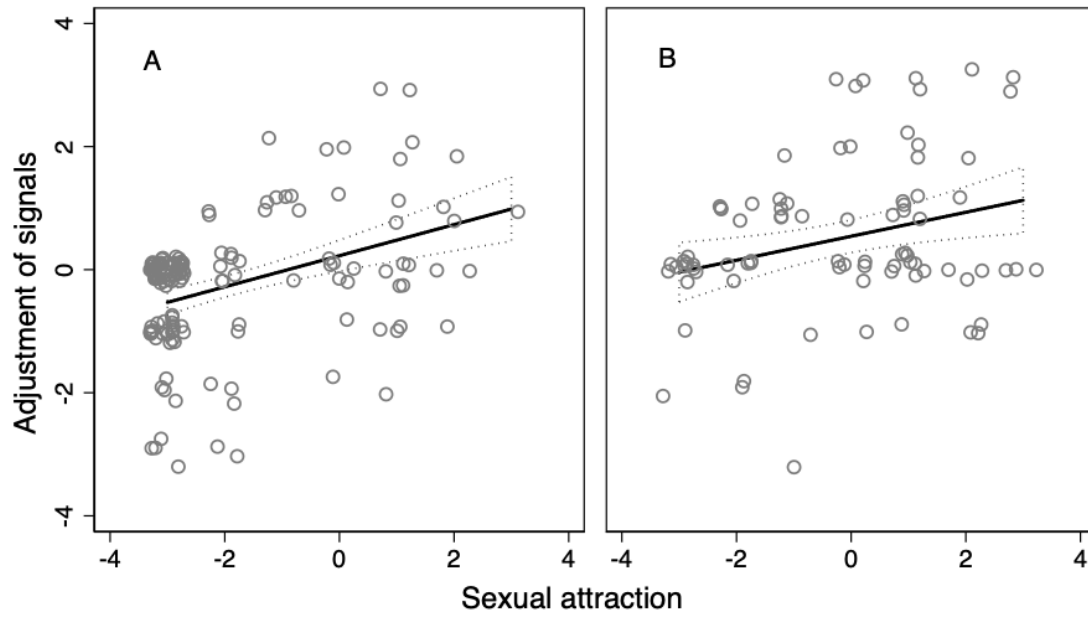
Panel B: Men (*n* = 83).

Figure 2. Adjustment of signals (level of own attraction – level of signaled attraction) as a function of own sexual attraction. Negative adjustment scores: signals > attraction; positive adjustment scores: signals < attraction. Scatter plots and predicted fitted values [95% CIs]. Panel A: Women ($n = 141$); Panel B: Men ($n = 83$).
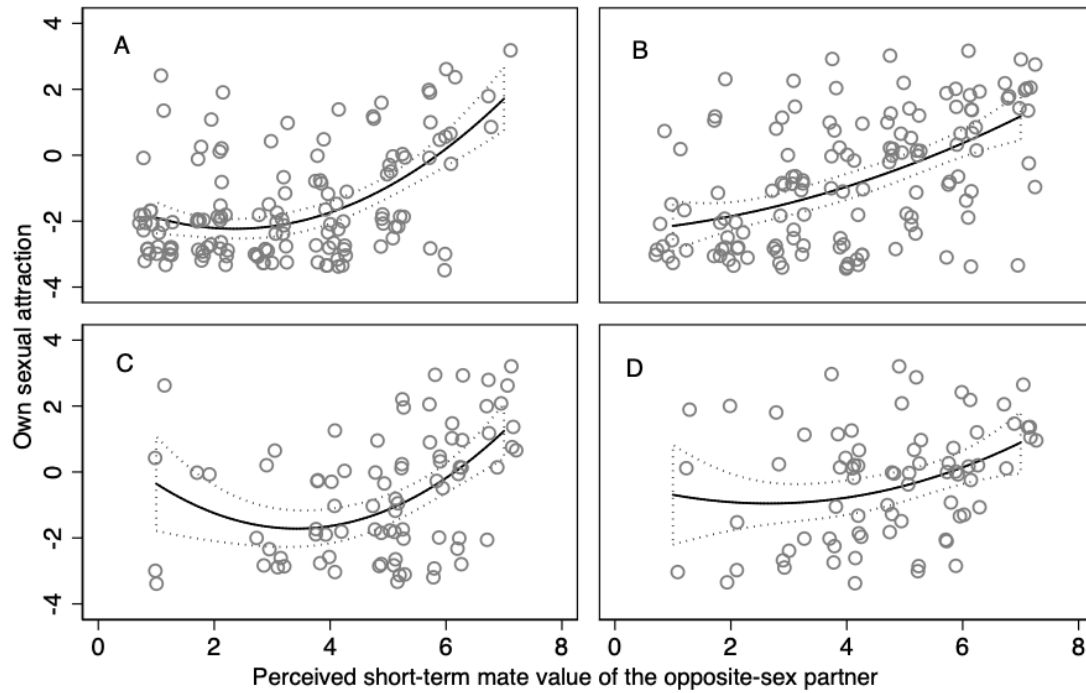
Figure 3. Level of own sexual attraction as a function of the short-term mate value of the opposite-sex partner. Scatter plots and predicted fitted values [95% CIs]. Panel A: Women Study 1 (*n* = 137); Panel B: Women Study 2 (*n* = 134); Panel C: Men Study 1 (*n* = 82); Panel D: Men Study 2 (*n* = 76).
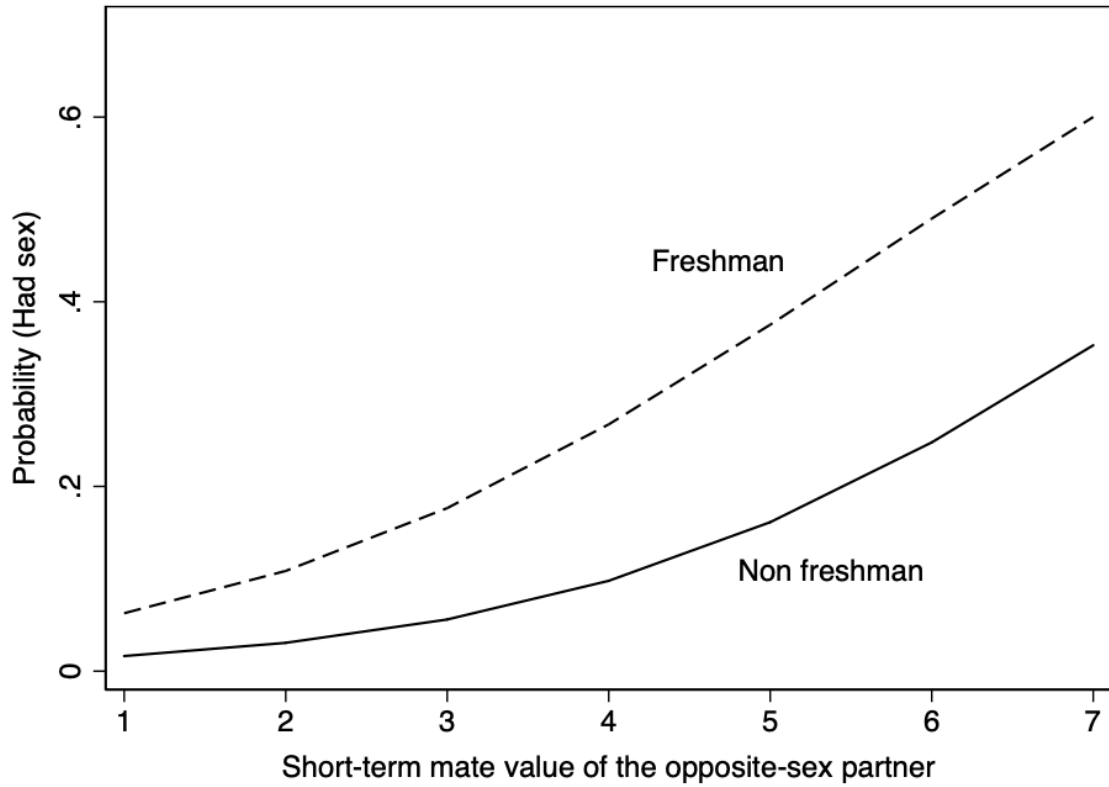
Figure 4. Estimated probability of ending up having sex for freshmen ($n = 40$) and non-

freshmen (n = 30) single women as a function of perceived short-term mate value of the

opposite-sex partner.

Appendix A.

Means and SDs for Women and Men, Singles and Partnered, Study 1

	Women (N=141)			Men (N=83)		
	Single	Partnered	All	Single	Partnered	All
Variable	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Other's Mate Value (ST)	3.56 (1.76)	2.97 (1.57)	3.25 (1.68)	5.04 (1.61)	4.68 (1.41)	4.89 (1.53)
Other's Mate Value (LT)	3.25 (1.61)	3.03 (1.41)	3.13 (1.51)	4.25 (1.39)	4.00 (1.46)	4.14 (1.42)
Own Mate Value (ST)	3.85 (1.47)	3.83 (1.55)	3.84 (1.51)	3.85 (1.68)	4.11 (1.21)	3.96 (1.49)
Own Mate Value (LT)	5.03 (1.15)	5.59 (0.92)	5.33 (1.06)	5.68 (1.11)	5.43 (1.01)	5.57 (1.07)
SOI-Behavior	3.19 (2.02)	2.32 (1.34)	2.72 (1.74)	3.23 (2.28)	2.50 (1.43)	2.92 (1.99)
SOI-Attitudes	5.09 (2.27)	4.65 (2.31)	4.85 (2.29)	6.04 (2.36)	6.24 (2.03)	6.13 (2.21)
SOI-Desire	4.34 (1.77)	2.22 (1.19)	3.21 (1.83)	5.59 (1.71)	4.14 (1.81)	4.97 (1.88)

Note. ST = Short-Term, LT = Long-Term, SOI = Sociosexual Inventory

Appendix B.

Means and SDs for Women and Men, Singles and Partnered, Study 2

Variable	Women (n=135)			Men (n=76)		
	Single	Partnered	All	Single	Partnered	All
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Other's Mate Value (ST)	4.57 (1.77)	3.47 (1.65)	4.04 (1.79)	4.91 (1.53)	4.37 (1.50)	4.72 (1.55)
Other's Mate Value (LT)	4.07 (1.55)	3.00 (1.32)	3.56 (1.54)	4.16 (1.51)	3.37 (1.54)	3.83 (1.58)
Own Mate Value (ST)	4.15 (1.68)	3.89 (1.53)	4.03 (1.61)	3.62 (1.64)	4.07 (1.80)	3.80 (1.70)
Own Mate Value (LT)	4.82 (1.45)	5.50 (1.17)	5.14 (1.36)	5.16 (1.24)	5.87 (1.25)	5.45 (1.28)
SOI-Behavior	3.33 (1.95)	2.73 (1.51)	3.05 (1.77)	3.01 (2.13)	3.12 (1.97)	3.06 (2.04)
SOI-Attitudes	5.99 (2.34)	5.64 (2.18)	5.82 (2.26)	6.75 (1.82)	6.66 (2.09)	6.72 (1.91)
SOI-Desire	3.93 (1.90)	2.58 (1.15)	3.29 (1.73)	4.79 (1.88)	5.10 (1.98)	4.92 (1.90)

Note. ST = Short-Term, LT = Long-Term, SOI = Sociosexual Inventory