# Sexual and Romantic Overperception among a Japanese Young Sample: A Replication of Haselton (2003) Replicating Sexual Overperception Bias

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Based on Error Management Theory, Haselton (2003) argued that men would have a cognitive bias to overperceive sexual interests in women. She demonstrated that US female undergraduates had more experiences of being misperceived of their sexual interests by men whilst such biases were not existent with male undergraduates. Bendixen (2014) replicated the findings with an undergraduate sample from a more gender equal society, Norway. We conducted a direct replication of Haselton (2003) with a sample from a less gender equal society, Japan, and found the same trend. In addition, we found that Japanese women were more likely to be overperceived of their romantic interests.

## Keywords

## Introduction

One of the most productive areas in evolutionary psychology is the study of mating psychology. Haselton (2003) introduced the concept of signal detection theory, or Error Management Theory as they call it (Haselton & Buss, 2000), into the field. Following the parental investment theory (Trivers, 1972), she argued that males, who usually have lower obligatory investment in parenting, owe more fitness cost from missed sexual opportunities than from wasted resources for unsuccessful courtship. It follows that men would be more likely to overperceive sexual interests in the opposite sex (hereafter, sexual overperception bias). On the other hand, females, whose reproductive speed is limited by larger parenting investments such as pregnancy and breastfeeding, have almost no marginal reproductive benefits by gaining additional mating opportunities. Therefore, women would not show such bias in sexual perception.

Haselton (2003) asked US undergraduates to report

their experiences of being overperceived or underperceived of their sexual interests by the opposite sex individuals. Results showed that women had more experiences of sexual overperception by men, supporting the hypothesis. Recently, Bendixen (2014) reported a successful direct replication of Haselton (2003) with a sample from more gender equal society, Norway.

Current study conducted a direct replication of Haselton (2003) with a sample from a less gender equal society, Japan. According to the World Economic Forum (2015), Japan ranked 101st among 145 countries in gender equality, which is significantly worse than the US (28th) and Norway (2nd). In addition, Japan belongs to an East-Asian culture, which is distinctively different from the US and Norway. As such, current study would provide data to examine cross-cultural robustness of men's sexual overperception bias.

## Methods

### Participants

We recruited participants through FAST-ASK (fast-ask. com), a commercial web-based survey service in Japan. We planned to collect 300 participants (150 males and 150 females) based on the power analysis. The expected power was over .95 with the effect size in the original study (Cohen's $f$ = 0.28). We recruited single 18 to 24 year olds without children for participation because we wanted to sample from young adults currently engaged in the mating market. The rationale and details of sample planning was pre-registered before data collection and can be found at Open Science Framework (OSF, https://osf.io/8cepf/).

The survey was conducted from February 9th to 10th, 2016. FAST-ASK monitors responded the questions via the Internet. In total, we collected responses from 330 participants (165 men and 165 women). Mean age was 21.98 years-old ($SD$ = 1.85). About half of the participants were students (53.9% of men and 42.4% of women).

### Materials

The original materials in English were translated into Japanese by the authors. In case we were uncertain of subtle nuances, we asked an English-Japanese bilingual individual for clarification. The original material composed of self-report items on mate value, an inventory of sociosexuality, and items asking experiences of sexual misperception.

There were some differences from the original study. We removed some sexual questions because FAST-ASK, which was designed for market surveys, did not accept strongly sexual questions. Specifically, we removed the entire sociosexuality inventory (Simpson & Gangestad, 1991) and a question asking self-report sexual attractiveness as a short-term mating partner.

Other differences were that we added items about romantic misperception. The original material had a

relatively straightforward expression regarding the sexual perception. For instance,

> *Have you ever been friendly to someone of the opposite sex only to discover that he[she] misperceived your friendliness as a sexual come-on?*
> *(sexual overperception)*
> *Have you ever attempted to sexually "come-on" to someone of the opposite sex only to discover that he[she] had misperceived your sexual interest as friendliness?*
> *(sexual underperception)*

We were afraid that Japanese participants might hesitate to honestly answer such straightforward questions. Therefore, we added items asking the experience of being misperceived of their romantic interests. For instance,

> *Have you ever been friendly to someone of the opposite sex only to discover that he[she] misperceived your friendliness as a romantic approach?*
> *(romantic overperception)*
> *Have you ever attempted a romantic approach to some of the opposite sex only to discover that he[she] had misperceived your romantic approach as friendliness?*
> *(romantic underperception)*

The original material had two items each for overperception and underperception. On each item, participants were asked if they ever had such experiences (lifetime experience, Yes/No) and, if Yes, last year's frequency. For lifetime experience questions, if participants answered Yes to either of the two items, responses were coded as Yes. Otherwise, they were coded as No. For last year's frequency, sum of the responses to the two items were used in the analysis. We followed the original study and constructed four romantic misperception items and asked two questions for each item.

We also included a question asking the participants' self-rated "vegetarian-ness". Since mid 2000s, there is a "vegetarian men syndrome" buzz on Japanese media referring to sexual inactiveness of young men. As the original study reported significant positive relationships between sociosexuality and sexual misperception, we decided to explore whether vegetarian-ness (sexual inactiveness) was related to sexual misperception.

The order of the questions was as follows: 1) self-report mate value (8 items, physical attractiveness and status), 2) two items for sexual overperception, 3) two items for sexual underperception, 4) two items for romantic overperception, 5) two items for romantic underperception, 6) one item for self-report vegetarian-ness.

*Experimental Design*
The experiment had a 2 (sex of participants, between-subjects) by 2 (type-of-misperception, overperception vs. underperception, within-subjects) by 2 (context, sexual interest vs. romantic interest, within-subjects) mixed factorial design. Since there were two types of questions (lifetime experience and last year frequency), we had two ANOVAs [see Footnote 1]. For these ANOVAs, we predicted a significant sex by type-of-misperception

interaction and a significant simple main effect of type-of-misperception in women, showing women had more experiences of overperception than underperception. We also looked at sex by type-of-misperception by context 3-way interaction in order to exploratory analyze if the overperception bias was different between sexual and romantic context. We did not have any a priori predictions in regard to its presence and direction.

We also conducted an ANCOVA by introducing the participants' age, student/non-student status, self-report mate-value, and self-report sexual "vegetarian-ness" as covariates to the above mentioned 3-way ANOVA (see Footnote 2). Frequency responses were used as dependent variables. This was to see whether the additional variables had effects on the misperception. The approach followed the Bendixen (2014) and diverged from the original Haselton (2003) who conducted regression analyses. As we removed the most important candidate covariant (sociosexuality) from the material, the ANCOVA was rather exploratory and we did not have any specific prediction in regard to the effects of the covariates. We predicted the sex by type-of-misperception interaction in the same way as the ANOVAs mentioned above. The analysis plan was pre-registered on the OSF. Analyses were done with HAD software (Shimizu, Murayama, & Daibo, 2006).

## Results
*Replication Analysis*
Significant sex by type-of-misperception interactions were observed as predicted ($ps < .04$, Table 1). Simple main effects of type-of-misperception were significant only for women, indicating that women had more experience of overperception than that of underperception (Figure 1, S2; lifetime experience, $F(1, 328) = 12.987$, $\eta_p^2 = .073$, $p < .001$; last year's frequency, $F(1, 328) = 16.015$, $\eta_p^2 = .089$, $p < .001$). The interactions among sex, type-of-misperception, and context were not significant ($ps > .3$, $\eta_p^2s < .05$, Table 1).

The main effects of type-of-misperception were significant ($ps < .05$) suggesting overperception was more prevalent and frequent than underperception (Table 1). However, as Figure 1 showed, the effects were mainly due to women's enhanced overperception experiences.

*Exploratory Analysis*
Based on a factor analysis of the self-reported mate value items, we constructed Physical-mate-value score (three items, $\alpha = .91$) and Status-mate-value score (four items, $\alpha = .91$) by averaging the scores of respective items. The item asking self-report sexiness loaded weakly to each factor ($< .10$) and was removed from the ANCOVA mentioned below.

We conducted an ANCOVA by introducing age, student/non-student status, Physical-mate-value, Status-mate-value, and vegetarian-ness as covariates to the 3-way ANOVA mentioned above. The dependent variable was last year's frequency. Main effects of covariates and interaction terms with the type-of-misperception and each covariate were included in the model (S3). Only the main effect of Status-mate-value reached significance ($F(1, 324) = 7.23$, $\eta_p^2 = .02$, $p = .008$). The interaction between Status-

**Table 1.** Sex by type-of-misperception by context ANOVAs.

| Lifetime experience | df1 | df2 | $F$ | partial $\eta^2$ | 95%CI | Cohen's $f$ | $p$ |
|---|---|---|---|---|---|---|---|
| sex | 1 | 328 | 0.045 | .000 | .000, .012 | 0.012 | .832 |
| context | 1 | 328 | 3.522 | .011 | - | 0.104 | .061 |
| misperception | 1 | 328 | 5.333 | .016 | - | 0.128 | .022 |
| sex*context | 1 | 328 | 0.088 | .000 | - | 0.016 | .767 |
| **sex*misperception** | **1** | **328** | **7.768** | **.023** | **-** | **0.154** | **.006** |
| context*misperception | 1 | 328 | 0.562 | .002 | - | 0.041 | .454 |
| sex*context*misperception | 1 | 328 | 0.562 | .002 | - | 0.041 | .454 |

| Last year's frequency | df1 | df2 | $F$ | partial $\eta^2$ | 95%CI | Cohen's $f$ | $p$ |
|---|---|---|---|---|---|---|---|
| sex | 1 | 328 | 0.813 | .002 | .000, .024 | 0.050 | .368 |
| context | 1 | 328 | 0.507 | .002 | - | 0.039 | .477 |
| misperception | 1 | 328 | 9.901 | .029 | - | 0.174 | .002 |
| sex*context | 1 | 328 | 0.408 | .001 | - | 0.035 | .523 |
| **sex*misperception** | **1** | **328** | **6.315** | **.019** | **-** | **0.139** | **.012** |
| context*misperception | 1 | 328 | 1.549 | .005 | - | 0.069 | .214 |
| sex*context*misperception | 1 | 328 | 0.857 | .003 | - | 0.051 | .355 |

Note. Predicted interactions are indicated by bold fonts.
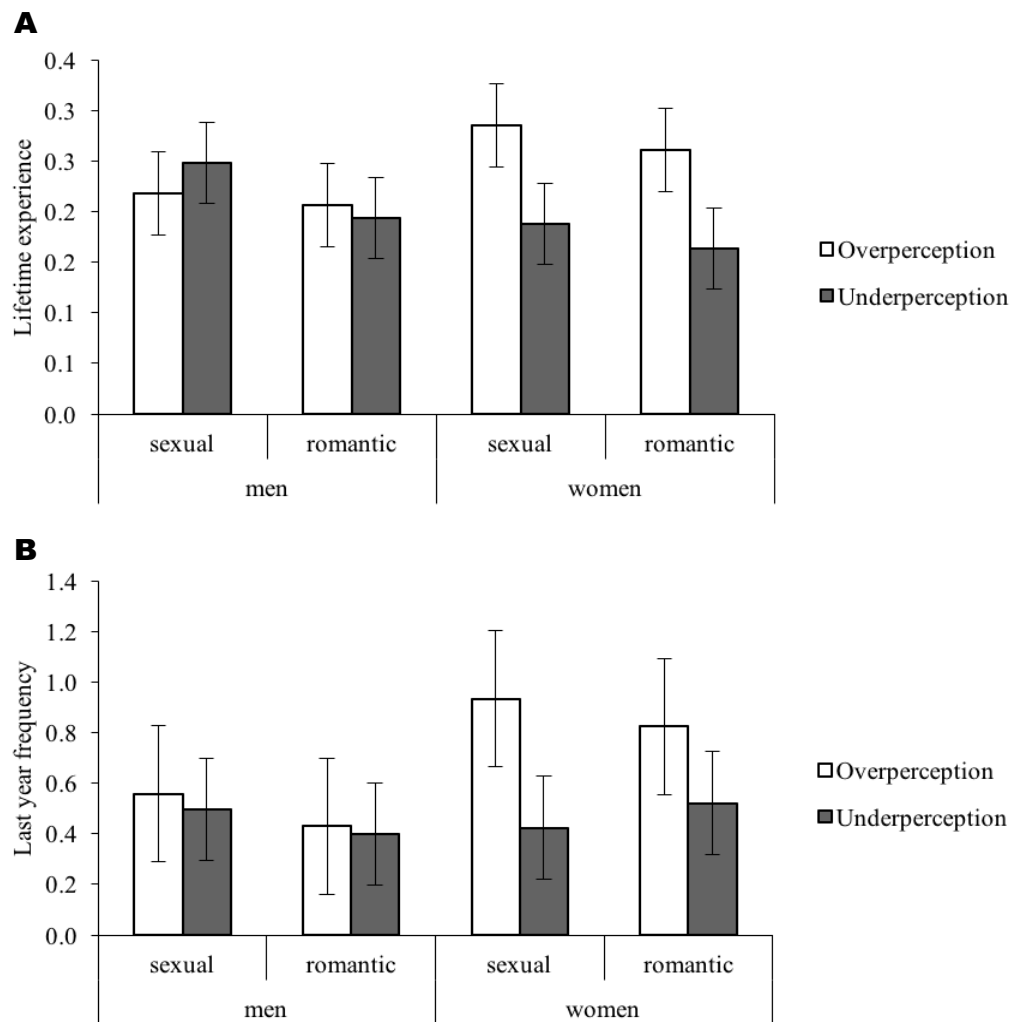


**Figure 1.** Mean scores for lifetime experience (A) and last year frequency (B) of misperception. Error bars are S.E.

mate-value and type-of-misperception was not significant. Controlling for the covariates, the interaction between sex and type-of-misperception was still significant ($F(1, 323) = 5.28$, $\eta_p^2 = .02$, $p = .02$).

## Discussion

Current study successfully replicated men's sexual overperception bias (Haselton, 2003) among young Japanese sample. Specifically, we found that young Japanese women had more experiences of being overperceived of their sexual and romantic interest by men. It replicated the reports from the US (Haselton, 2003) and from Norway (Bendixen, 2014). The original study by Haselton (2003) was conducted in the US, a Western society with moderate gender equality (ranked 28th among 145 countries, World Economic Forum, 2015). Recent direct replication by Bendixen (2014) was conducted in Norway, a Western and a highly gender equal society (2nd in gender equality). Current study was conducted in Japan; an East-Asian society with limited gender equality (101st). In addition, our sample composed of both students and non-students whereas the preceding studies used undergraduate samples. Given the variety of backgrounds of these studies, our results strengthen the cross-cultural robustness of men's sexual overperception bias.

While preceding studies looked only at sexual overperception, current study also examined romantic misperception. The 3-way interaction among sex, type-of-misperception, and context was not significant, suggesting that overperception bias in romantic context was not significantly different from that in sexual context. However, when we conducted 2-way sex by type-of-misperception ANOVAs separately for each context, overperception bias did not reach significance level in romantic context (S1, *ps* < .1). Romantic overperception might be weaker than sexual overperception. This should be clarified by future research.

Analysis of covariance showed significant main effect of self-reported mate-value on overall experience of misperception. This was slightly different from Haselton (2003) who reported that mate value was associated only with experience of overperception. Also, Bendixen (2014) did not find any significant effects of mate-value on misperception. Currently, we have no explanations for the differences. It should be noted that if we apply Bonferroni correction by dividing the alpha (.05) by the number of covariate terms introduced in the model (10), the effect was slightly above significance level ($p = .008 > .005$). As such, we should take the results as preliminary and await future research.

## References

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## Footnote

Footnote 1. We pre-planed to conduct six ANOVAs. Because they produced similar results, we reported only two of them in the text. See S1 for the factorial design and the results of the other four ANOVAs.

Footnote 2. We added student/non-student status as a covariate following reviewer's suggestion even though it was not included in the pre-registered analysis plan.

## Appendix

Materials, pre-registered replication plan, supplementary analyses are available at Open Science Framework (https://osf.io/8cepf/).