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Article in *Evolution and Human Behavior* · June 2020

DOI: 10.1016/j.evolhumbehav.2020.06.002

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# **Ultimate and proximate factors underlying sexual overperception bias: A reply to Lee et al. (2020)**

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## **Funding information**

This research was supported by the Netherlands Science Foundation 016.VIDI.185.036, the Templeton World Charity Organization TWCF0267 and the European Research Council (ERC) under the European Union's Horizon 2020 Program for Research and Innovation Grant 804582 (to M.E.K.).

Why do men often overestimate the chances of women feeling attracted to them? This landmark question, known as the “sexual overperception bias”, has been subject of numerous investigations (e.g., Abbey et al., 1982; Shotland & Craig, 1988). Recently, Lee et al. (2020) showed that initial differences between sexes in the perception of sexual interest disappeared when controlling for two mediating factors: sociosexual orientation (i.e., willingness to engage in uncommitted sex) and projection of own interest onto the partner. Without questioning the importance of these factors in the perception of sexual attraction, we argue that apart from these *proximate* explanations, the crucial difference between *proximate* and *ultimate* explanation has remained overseen in their manuscript. As a consequence, the authors’ conclusion that sex differences disappear after controlling for mediating variables, is unwarranted. In the remainder of this reply, we clarify our argument that Lee et al. seem to describe a mechanism through which sex differences in overperception can arise, and thus do not question the *ultimate* explanation offered by Error Management Theory (Haselton & Buss, 2000; Haselton, 2003; Haselton & Galperin, 2013). This theory suggests that, from an evolutionary perspective, men benefit more than women from overperceiving sexual interest.

While a proximate explanation focuses on how a certain phenomenon works (mechanistically), an ultimate explanation addresses the question of why the phenomenon exists from an evolutionary point of view (Tinbergen, 1963). These explanations are distinct and of equal merit, crystallized in the “proximate ultimate distinction” (Tinbergen, 1963; see also Mayr, 1963). Crucially, these explanations are complementary, so one does not negate the other. For example, consider the following statements: male birds sing (1) due to an increase in circulating testosterone; or (2) to attract mates. Both statements could be correct. The first describes the responsible mechanism; whereas, the latter addresses the adaptive value (MacDougall-Shackleton, 2011). So let us consider the following question: in the case where we find that differences in circulating testosterone explain singing of male birds, would we be justified in concluding that male birds do not sing to attract mates? This example demonstrates the problem that we see in the conclusion of Lee et al.

Lee et al. provide a proximate explanation for the sexual overperception bias and cast doubt on the validity of previously described sex differences in sexual overperception bias. In their study, the authors conducted statistical analyses with sociosexual orientation and self-interest projection as

mediators. Their results showed that when accounting for these, the overperception effect disappears, prompting the authors to conclude that “the *sex difference [in the sexual overperception bias] can be completely explained by the mediators [...]*.” We believe that this strong claim is not justified. It is well known that men have higher sociosexuality scores than women (Penke & Asendorpf, 2008), a pattern replicated in Lee et al.’s data (publicly available here <https://osf.io/je4h7/>). Specifically, when conducting a Welch *t*-test on their impressive sample of 1184 participants comparing the two sexes, we found that men reported higher sociosexuality scores than women (Figure 1A;  $t(1170) = -12.03, p < .001, d = 0.70$ ). In similar vein, self-reported attraction towards the partner was higher in men than in women (Figure 1B;  $t(1199) = -10.31, p < .001, d = 0.59$ ). It is not surprising that sex differences in the overperception bias disappeared when adding these mediating variables, as the sex differences in the mediators are confounding their main analysis.

What Lee et al. did illustrate is that sex differences in the sexual overperception effect possibly arise due to sex differences in sociosexual orientation and attraction to the partner. Therefore, these mediating factors could be interpreted as a potential mechanism through which sex differences in sexual overperception bias arise. Indeed, this is in line with previous work by Howell et al. (2012), that clearly distinguished mechanism from function, suggesting that sociosexual orientation is likely a mechanism through which sex differences predicted by Error Management Theory (Haselton & Buss, 2000; Haselton, 2003) arise. Given our re-analysis of Lee et al.’s data we agree with the mechanistic interpretation of similar findings as given by Howell et al. (2012), and believe that the results do not challenge the adaptive value of the sex differences in sexual overperception bias as posited by Error Management Theory.

Returning to our earlier hypothetical question, if male bird song and testosterone are associated, does this imply that there is no relationship between singing and reproductive success? In short, no. To challenge an ultimate explanation, it is necessary to offer an alternative ultimate explanation and not a proximal one. In the case of sexual overperception, different selection pressures might have translated into higher sexual desire and interest in partners for men than for women. Importantly, if these variables explained overperception, as Lee et al. suggest, this would solely provide the *how* in observed sex differences in the sexual overperception effect, but does not offer any intuition

regarding the mechanisms' ultimate function. In fact, the increased sociosexuality and interest in men compared to women are predicted by Error Management Theory (see also Sexual Strategies Theory: Buss & Schmidt, 1993). Therefore, we argue that Lee et al. provided evidence of a potential *mechanism* for Error Management Theory's *ultimate* theory of sexual overperception bias (Haselton & Buss, 2000). According to Error Management Theory, since male reproductive success is limited by the number of sexual partners, it is less costly to misjudge sexual interest when there is none, than to miss an opportunity. From an evolutionary perspective, one of these is costlier than the other. As a consequence, natural selection favoured mechanisms leading to the overperception of sexual desire in men (Haselton, 2003; but see Kokko, 2003). As we have argued, higher sexual desire in men could very well be one of these mechanisms, which shows that the results of Lee et al. are perfectly in line with the ultimate explanation offered by Error Management Theory (Haselton & Galperin, 2013).

To their merit, Lee et al. discuss the fact that their mediating variables may be proximate explanations for sex differences in overperception, but they end up rejecting this view. However, we find their reasoning difficult to follow. The authors seem to argue that EMT predicts a domain-specific sex difference at the proximal level, which would then result in sex differences in perception of sexual interest. While we agree that this is an implausible explanation, we disagree that this proximate explanation could be drawn from the EMT framework. Instead, EMT is primarily concerned with the ultimate causes of behavior, and remains "virtually silent" about the proximate causes (Haselton & Galperin, 2013, p. 249). As a more plausible explanation, Lee et al. suggest that sex differences in perception of sexual interest could be the result of sex-specific selection on variation in (a) sociosexuality and (b) attraction to partners. These two factors would in turn result in sex differences in perception of sexual interest. It is our contention that the authors might be referring to sexual dimorphism when suggesting that domain-specific differences are predicted by EMT. However, sex differences can be defined as average differences between men and women on a continuous scale (McCarthy et al., 2012), rendering the need for a domain-specific difference unmerited. Thus, it would still be possible that both of the mediators, which exhibit sex differences, are proximate explanations for sex differences in the perception of sexual interest that are expected under EMT.

In addition, the authors posit a more parsimonious explanation for projection of one's own interest onto potential partners. Specifically, they state that projection would lead to increased mating success regardless of sex. However, this contrasts with two important points. First, it does not account for the general sex difference in interest in potential partners: men tend to be attracted more often to a potential partner than women (e.g. Kurzban & Weeden, 2005). Second, this argument disregards the fact that women suffer higher reproductive costs, such as losing paternal support, if they choose a suboptimal partner, as opposed to men. Crucially, this discrepancy is central to EMT (Haselton & Buss, 2000), and has been demonstrated in women of reproductive age compared to post-menopausal women (Cyrus et al., 2011). Thus, we are not fully convinced that this alternative explanation is warranted.

To conclude this commentary, we want to emphasize that distinguishing proximate and ultimate explanations in psychology remains crucial. Unfortunately, conflating evolutionary function with mechanism is an often encountered yet crucial mishap. To understand and explain behavior, we need to answer both the *proximate* and the *ultimate* questions (MacDougall-Shackleton, 2011). Therefore, researchers would benefit by acknowledging the distinction between these two explanations: they are two sides of the same coin, yet fundamentally different. As Scott-Phillips and colleagues (2011, pp. 45) pointedly stated “[*Scientific*] progress will be quicker and more efficiently achieved if the underlying theory, including the proximate–ultimate distinction, is properly applied.”

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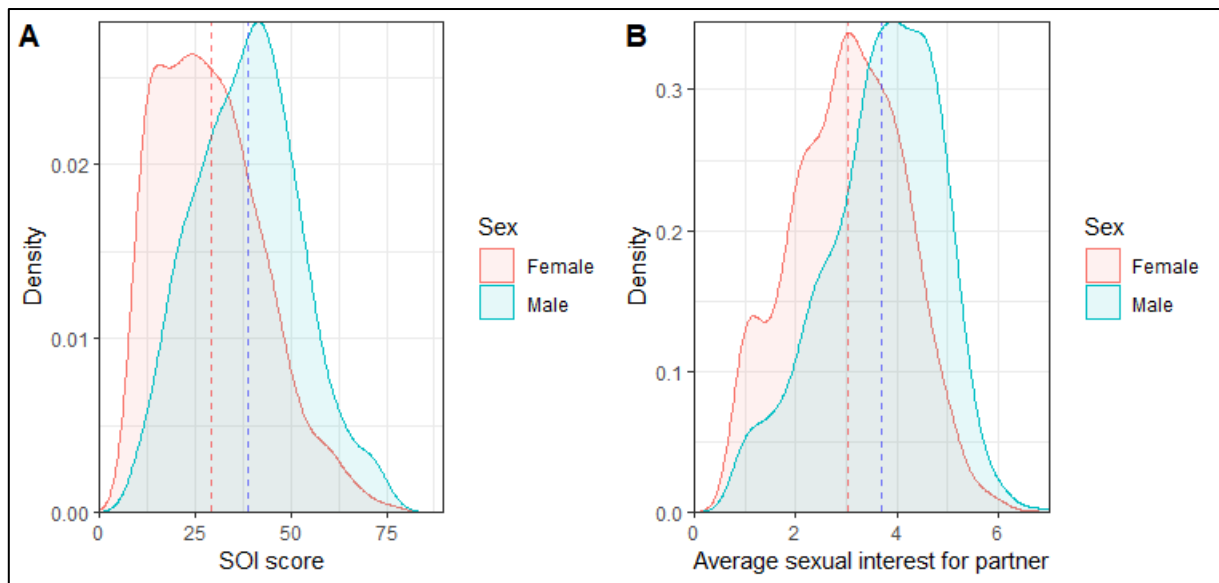


Figure 1 – Distribution of (A) sociosexual orientation scores and (B) average interest in partners for men and women in the dataset of Lee et al. Dashed lines show the mean SOI (left) and sexual interest (right) per sex.