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Do men prefer women who are attracted to women? A cross-cultural evolutionary investigation

Abstract: The current study aims to investigate whether heterosexual men prefer women who experience same-sex attractions as partners across different cultural settings. Data from a sample of 949 Chinese heterosexual participants and a sample of 305 British heterosexual participants was used to investigate this hypothesis. Across the two samples, we found that men would prefer same-sex sexual attraction and contact in a partner more than women. Specifically, about one in four men in the Chinese sample and two in three men in the British sample have indicated a desire for their opposite-sex heterosexual partners to be additionally attracted to, and have sexual contact with same-sex individuals. In addition, across samples, heterosexual participants who have experienced same-sex attractions were more likely than those who did not indicate a preference for same-sex attraction and contact in an opposite-sex partner. Results were also compared with data from a previous study involving Greek-Cypriot participants – preferences for same-sex sexual attraction and contact in heterosexual partners were highest in the UK, moderate in Cyprus and lowest in China. The implications of these findings for the evolution of same-sex attraction were discussed.

Keywords: same-sex attraction; male choice hypothesis; homosexuality; sex differences

1. Introduction

Prevalence studies indicate that about one in five women experience some degree of attraction to individuals of the same-sex (Calzo, Masyn, Austin, Jun, & Corliss, 2017; Dickson, Paul, & Herbison, 2003; Gates, 2011; Laumann, Gagnon, Michael, & Stuart, 1994; Savin-Williams, Joyner, & Rieger, 2012). Such an attraction appears to impair reproductive success, rendering it a challenging puzzle from an evolutionary perspective. In this regard, there have been several attempts to elucidate the evolutionary origins of same-sex attraction (for a review see Bailey et al., 2016; LeVay, 2010). One of the most recent propositions argued that same-sex attraction in women has been favored by evolutionary selection forces because a considerable proportion of men finds it desirable in an opposite-sex partner (Apostolou & Christoforou, 2018a; Apostolou, Shialos, Khalil, & Paschali, 2017). The current research aims to test novel hypotheses emanating from such a formulation from a cross-cultural perspective.

2. The male-choice hypothesis

Throughout human evolutionary history, men have been vulnerable to cuckoldry: Due to the fact that the process of gestation occurs internally in a female's body, women (but not men) are always certain that their children are indeed their own (Buss, 2000a). As a consequence, in order to avoid the risk of investing substantial resources to care for other individuals' offspring, it is conceivable that men would have evolved adaptations geared towards mitigating such a likelihood (Buss, 2000a, 2017). Indeed, such adaptations are believed to be reflected in men's mating attitudes: For instance, men would typically prefer chastity and sexual restraint in a long-term partner (Buss 2017); while feelings of sexual jealousy would tend to motivate men to guard their partners against potential suitors, occasionally even engaging in punitive behaviors in order

to deter cheating and to decrease the risk of cuckoldry (Buss, 2000a; Goetz et al., 2008 see also Edlund & Sagarin, 2017; Scherer, Akers, & Kolbe, 2013). Another mechanism that has also been proposed to serve such a function is a preference among men for women who might experience some form of same-sex attraction (Apostolou et al., 2017).

More specifically, this mechanism was proposed to be more effective than others because men who are endowed with preferences for chastity in their partners will not always be effective in screening prospective mates for this trait, as it is not something that is readily observable. In addition, mate choice typically involves finding a compromise between people's desires and limitations (Apostolou, 2011; Li et al., 2002), and hence men may have to settle for women who are not necessarily chaste. Moreover, because men cannot be around all the time to guard their partners against other men, there is always the likelihood that their partners might cheat on them. Women may exploit such opportunities in order to gain benefits (e.g., such as gifts or good genes) from extra-pair partners (Buss, 2017), or in order to identify alternatives in view of potential mate-switching in the future (Buss et al., 2017). Furthermore, women may utilize such opportunities in order to attain sexual satisfaction beyond what their legitimate partner could offer. This is likely to happen, as some women may lose interest in their partner over time, while others may have partners who might gradually experience issues with sexual intercourse due to aging.

By the same token, a significant minority of men did have more than one established partner in pre-industrial societies (i.e., polygyny), and most likely during much of the human evolutionary history (Zeitzen, 2008). In such familial arrangements, males would have to divide their sexual attention among several women, which would then likely result in one or more wives not receiving an adequate amount of sexual satisfaction. Such a scenario might prompt some

women to seek for extramarital relationships. Women would likely also have evolved to be efficient in bypassing their partners' cuckoldry-protection mechanisms because cheating can be evolutionarily beneficial for females on certain occasions.

In light of these challenges, it is believed that men would similarly have evolved additional means of cuckoldry prevention strategies – more specifically, the desire for partners with same-sex attractions (Apostolou, 2016). Same-sex sexual contacts could potentially address some women's unfulfilled sexual needs and would yet not lead to conception, thereby eliminating the risk of cuckoldry for their male partners (Apostolou, 2016). Put it differently, because adaptations such as sexual jealousy and a preference for chastity in men might be inadequate to reliably prevent their females partners from cheating, there is always the likelihood that some will end up with mates who would do so. Nevertheless, if these women would rather cheat on their male partners by mating with other women instead of men, it would be beneficial in terms of doing away with the risk of investing in other individuals' offspring.

In addition, same-sex sexual liaisons for a male's female partner could likewise present opportunities for the former to engage in extra sexual activities as well (Apostolou & Christoforou, 2018a; Apostolou et al., 2017). Such a scenario would be evolutionarily-beneficial for men, because they could increase their reproductive success without needing to allocate resources in acquiring an additional mate (Apostolou et al., 2017). Nonetheless, because a woman would risk missing out on gaining long-term access to her male partner's resources to another woman if such a sexual liaison is to be for the long term, she is predicted to be more open to short-term arrangements of such an affair (Apostolou et al., 2017).

On the other hand, because women are not confronted with the issue of parental uncertainty, they are likely to be more concerned about the continued provision of resources

from their male partners than the biological sex of any individual their partners might be involved with in an extramarital relationship (Apostolou et al., 2017). Similarly, due to the nature of gestation in humans, having simultaneous access to several men as a result of a male partner's homosexual affairs would not comparatively enhance a woman's reproductive success (Apostolou et al., 2017). On this basis, men are predicted to be more likely to prefer same-sex sexual attractions in a short-term than in a long term partner (Apostolou et al., 2017).

It is important to note that, women who experience same-sex attractions and are in a heterosexual relationship, will not only consider same-sex partners when choosing to cheat. Instead, it is contended that if they are to cheat, heterosexual women with such attractions are more likely to cheat with other woman than with other men in comparison to exclusively heterosexual women. Correspondingly, a recent study found that heterosexual women with same-sex attractions were more willing to cheat with other women than with other men, than heterosexual women without such attractions (Apostolou & Christoforou, 2018b).

On the basis of this theoretical framework, it was predicted that men would be more likely to find same-sex attraction in a partner desirable, and would be more likely to endorse homosexual activities in their female partners, while women are expected not to find same-sex attraction as desirable in a male partner and would be less inclined to indicate a preference for their male partners to have sex with other men (Apostolou et al., 2017). In addition, when engage in mating, people adopt a long-term strategy –they look for long-term partners- or a short-term strategy- they look for casual mates (Buss, & Schmitt, 1993). Men can benefit from the same-sex attractions of their partners through gaining access to additional women, but this is more likely to happen in a short-term than in a long-term relationship. The reason is that, in the latter, a woman risks losing her partner's long-term investment to another woman, so she may be less likely to

consent to her male partner having sex with her female partner. On this basis, men were predicted to prefer same-sex attraction more in a short-term than in a long term partner (Apostolou et al., 2017).

These predictions were tested in a recent study involving Greek-speaking participants and it was found that the vast majority of heterosexual women did indicate a preference for both short- and long-term partners who were only attracted to women and that they did not want their partners to have any sexual contact with other men (Apostolou et al., 2017). On the other hand, about one in five heterosexual men indicated a desire for their long term partners, and about one in three for their short-term partners to also be attracted to other women and that they would like them to have sex with these other women as well (Apostolou et al., 2017). These findings were subsequently replicated in a different sample of Greek-speaking participants (Apostolou & Christoforou, 2018a). However, because at present these two studies, conducted in a specific cultural context were the only evidence available in the literature, questions remain with regards to the validity of the findings in assessing the veracity of the theory. Thus, the current study aims to examine these findings in different cultural settings, in addition to testing novel predictions emanating from the theory.

2.1 Predictions to be tested

The potential benefits from having women who experience same-sex attractions as partners are expected to be similar across different cultural settings. In particular, because cheating in a romantic relationship appears to be a universal phenomenon (Schmitt, 2004), men across cultures are expected to increase their reproductive success more so than women by having sex with additional partners. On this basis, having a female partner who experiences

same-sex attractions is expected to be beneficial for men across different cultural settings. Hence, we expect that such a sex difference – with more men than women preferring same-sex sexual attraction in an opposite-sex partner – would be consistent across cultures.

The fitness-related contributions in relation to desirable traits in a partner can vary depending on the environmental context. For instance, good health is a more valuable trait in a period of plague than in an environment whereby most people are relative healthy. Accordingly, mate preferences are similarly believed to have been shaped by selection forces to be flexible and responsive to the prevailing environmental conditions as well (Buss, 2017). The benefits of same-sex sexual attraction in a male's female partner is likewise also likely to vary with the cultural context. For instance, in an environment whereby cheating is more common and where men could face a higher risk of cuckoldry, same-sex sexual attraction in a female partner would conceivably be more beneficial for men than otherwise. In this regard, we expect that there would be cross-cultural variation in men's preferences for same-sex attraction in female partners. In a nutshell, we predict that the fundamental sex difference, with more men preferring same-sex sexual attraction in an opposite-sex partner than women, would be consistent across cultures but with significant cross-cultural variation (H_1).

In addition, it is predicted that heterosexual individuals who also experience same-sex sexual attractions are more likely to prefer partners with a similar sexual orientation than their counterparts (H_2). The argument is that people tend to prefer mates who are similar to them (Buss, 2017; Wang & Apostolou, 2017). One of the key reasons is because similarity between partners is likely to promote effective cooperation in the relationship and could render such alliances more long-lasting than otherwise (Figueredo, Sefcek, & Jones, 2006). In sum, the current study aims to examine male preferences for same-sex sexual attraction and contact in an

opposite-sex partner, and if such preferences are influenced by the partner's own same-sex desires across different cultural contexts.

3. Study 1

The purpose of this study is to examine preferences for same-sex sexual attraction in the Chinese culture.

4. Method

4.1 Participants

Participants completed an online survey. Such a method was chosen because participants would likely offer more honest responses in relation to the sensitive questions that were put forth to them (Kreuter, Presser, & Tourangeau, 2008). The survey link was forwarded to university students and employees in different disciplines. Each participant received a small monetary payment after the completion of the survey (i.e., the amount was allocated randomly from 2.0 ¥ (yuán) to 10.0 ¥ (yuán) (\$0.32 to \$3.3). Participants were informed beforehand that the amount of payment was not fixed. Thus, individuals have agreed to participate in the study knowing that not everybody would have been paid the same, and that the amount one could obtain was randomly allocated.

Overall, 1,021 Chinese people took part in the study. With respect to sexual orientation, 79.2% of the participants indicated that they were attracted exclusively to opposite-sex individuals, 13.7% were attracted predominantly to opposite-sex individuals who occasionally

have also experienced same-sex sexual attractions, 2.9% indicated that they were attracted to both sexes equally, 1.5% indicated that they were interested in those who have predominantly same-sex attractions but were occasionally also attracted to opposite-sex individuals, while 2.6% have reported being exclusively attracted to same-sex individuals. Given that the study was designed to assess the preferences of heterosexual people, only the responses of participants who indicated that they were heterosexual were included. To this end, data from 949 heterosexual Chinese participants (543 women, 406 men) were included in the analyses. The mean age of women was 24.19 ($SD = 4.18$), and the mean age of men was 24.90 ($SD = 5.48$).

4.2 Materials

The survey questionnaire (made up of three sections) was written in Chinese, and was constructed using the software “sojump,” which is the most widely used tool in China for collecting data online. In order to make cross cultural comparisons possible, the same instrument employed by Apostolou et al. (2017) was employed in the current study. In order to ensure equivalence, the instrument was translated in Chinese and back-translated to English. More specifically, in the first section, participants were asked to indicate their preference for the statement “I would prefer as long-term mate an individual who is attracted:” which was then followed by a similar question that was posed in relation to a short-term mate (Apostolou et al., 2017, p. 376). Participants could choose one of the following options as a response: “Only to members of the opposite-sex,” “Predominantly to members of the opposite-sex but occasionally to members of the same-sex,” “To both sexes equally,” “Predominantly to members of the same-sex but occasionally to members of the opposite-sex,” and “Only to members of the same-sex”

(Apostolou et al., 2017, p. 376). The order of presentation of the partner type and the five options was randomized across participants.

In the second section, participants were asked to respond to the following statement “When I am in a long-term relationship, I would prefer that my partner has sexual contacts with individuals of the same-sex:”, and to another similar one focusing on a short-term relationship (Apostolou et al., 2017, p. 376). In both statements, participants were provided with three possible answers: “never,” “occasionally” and “frequently” (Apostolou et al., 2017, p. 376). The order of presentation of the two statements and the three options was likewise randomized across participants. In the third section, participants were asked to respond to a situation in which their mates (both short and long term ones) were discovered to have engaged in sexual activities with a person who is either of the same sex or is a member of the opposite sex (Apostolou et al., 2017). One could respond by indicating his/her choice on “a five-point Likert scale ranging from 1-totally disagree to 5- totally agree” in relation to whether he/she “would get sexually excited” in that situation (Apostolou et al., 2017, p. 374). The order of presentation for the two scenarios was likewise randomized across participants. Participants’ age, sex, sexual orientation and marital status were also obtained.

5. Results

In order to examine whether men and women preferred as partners opposite-sex individuals who experienced same-sex attractions, we estimated the frequencies in relation to their preferences for both short-term and long-term mates. The results are presented in Tables 1 and 2, where we can see that about 13% of heterosexual men preferred long-term mates who

were not exclusively attracted to the opposite-sex (the numbers were higher for short-term partners at 21%). The majority of these men indicated that they would prefer women who were predominantly attracted to the opposite-sex but were also occasionally interested in same-sex individuals as partners. The respective percentages for women were similar to that of men.

Subsequently, we made similar calculations separately for participants who were exclusive heterosexual and those who were heterosexual but reported having some same-sex sexual attractions. From Tables 1 and 2, we can see that, the percentages of male and female participants in the exclusive heterosexual group who indicated a preference for partners with same-sex sexual attractions, were lower than the respective percentages of those who did report such an attraction themselves. For instance, about 40% of heterosexual women who have reported some same-sex sexual attractions indicated that they would prefer their long-term partners with a similar sexual orientation. Yet, although the overall sample was fairly large, there were only 26 men and 114 women who have indicated that they were heterosexuals who have also experienced same-sex sexual attraction. Slightly more participants endorsed such preferences in the short term scenario as compared to the long term one. In addition, more male than female exclusive heterosexuals indicated that they preferred as partners individuals who would also experience same-sex attraction. For instance, about 8% of exclusive heterosexual men, but only about 3% of exclusively heterosexual women, indicated that they preferred a long-term partner who is heterosexual but has some same-sex sexual attractions (Table 1).

Furthermore, 19% of heterosexual men but only about 7% of heterosexual women indicated that they would like their long-term partners to have sex with same-sex individuals, with the respective percentages to be about 21% and 12% for short-term partners (Tables 1 and 2). This sex difference was also evident in the exclusive heterosexual group, and was even more

pronounced in the short-term partner scenario. Likewise, slightly more participants endorsed such preferences in the short-term scenario as compared to the long-term one. As evidenced in Table 3, 31% of men but only 12.3% of women indicated sexual excitement in relation to their long-term partners having sexual contact with other women. Moreover, 38.6% of men but only 15.3% of women have indicated to be highly or moderately sexually excited about their partners having sexual contact with other individuals of the same sex as them. Participants who indicated having some same-sex sexual attractions reported higher scores than those who did not.

In order to further investigate preferences for same-sex attraction, we divided participants into four groups: Those who have indicated a tendency for same-sex sexual attraction and contact in a short-term and in a long-term partner; those who have indicated a tendency for same-sex sexual attraction and contact in a short-term partner but not in a long-term partner; those who did not desire same-sex attraction and contact in both short-term and long-term partners, and another group which consisted of any other possible permutations.

The results are presented in Table 4 – about 75% of male participants did not prefer same-sex sexual attraction in any partner type, about 12% indicated a preference in both short-term and long-term partners, and about 11% of them desiring such a tendency in their short-term but not long-term partners. With respect to partners having same-sex sexual contact, about 74% of male participants indicated that they neither desired it in a short-term nor a long-term partner, while about 12% indicated that they would desire it in both partner types, and about 8% would prefer such an occurrence with a short-term but not a long-term mate.

5.1 Contingencies

In order to examine whether the observed differences in percentages were statistically significant, we performed multinomial logistic regression analyses, where the preference for one's partner's sexual attractions was entered as the dependent variable, and the participants' sex, age, and sexual orientation (exclusive heterosexuals and heterosexuals with same-sex sexual attractions) were entered as the independent variables. We performed the analyses twice, once for the short-term and once for the long-term mate situation. Because the model in relation to the long-term mating scenario could not be fitted as there were very few observations in some categories, participants in the following categories were combined into one overarching category: "To both sexes equally," "Predominantly to members of the same-sex but occasionally to members of the opposite-sex," and "Only to members of the same-sex". The results indicated sex to be a significant predictor of the partner's sexual orientation [$\chi^2(2, N = 891) = 11.97, p = .003$].

The Wald statistic indicated only one significant difference between categories (the significance levels for the odds ratios by means of the Wald statistic are reported in parenthesis). More specifically, the odds ratio indicated that men, as opposed to women, were 2.51 ($p < .001$) times more likely to prefer a partner who was predominantly attracted to members of the opposite-sex but occasionally to members of the same-sex, as compared to one who was attracted exclusively to members of the opposite-sex. The effect of sexual orientation was also significant [$\chi^2(2, N = 891) = 11.97, p < .001$], with exclusively heterosexual participants being 21.32 ($p < .001$) times more likely than heterosexual participants with some same-sex attractions to prefer individuals with similar sexual orientation as long-term mates. Participants' age did not have a significant effect.

With respect to the short-term mate scenario, the model could not be fitted because there were very few observations in several categories, and hence the sexual orientation categories were similarly combined as indicated previously. The results indicated sex to be a significant predictor of one's preference for partner's sexual orientation [$\chi^2(2, N = 891) = 6.61, p = .037$]. The odds ratio indicated that men, as opposed to women, were 1.72 ($p = .001$) times more likely to prefer a partner who was predominantly attracted to members of the opposite-sex but also occasionally to members of the same-sex, instead of one who was attracted exclusively to members of the opposite-sex. The effect of sexual orientation was also significant [$\chi^2(2, N = 891) = 11.97, p < .001$], with exclusively heterosexuals being 21.32 ($p < .001$) times more likely than heterosexuals with same-sex sexual attractions to prefer individuals with a similar sexual orientation as short-term mates. Participants' age was likewise not a significant factor in this instance.

In relation to the long term mate scenario, multinomial regression analyses were performed. However as the model could not similarly be fitted due to the small number of observations in the "frequently" category, we collapsed the "occasionally" and the "frequently" categories into a single category. The results indicated that the sex was a significant predictor of one's preference for partner's same-sex sexual contact [$\chi^2(1, N = 891) = 39.41, p < .001$]. The odds ratios indicated that men, as opposed to women, were 4.14 ($p < .001$) times more likely to prefer their partners to have sex with same-sex individuals "occasionally-frequently" as compared to "never." Sexual orientation was also a significant factor in this instance [$\chi^2(1, N = 891) = 15.60, p < .001$], with exclusively heterosexuals being 3.25 ($p < .001$) times more likely to prefer their partners to have sex with same-sex individuals "never" than "occasionally-frequently." Participants' age was not a significant factor.

Similar analyses were conducted with respect to the short-term mate scenario, and the results indicated that the sex was a significant predictor of one's preference for his/her partner's same-sex sexual contact [$\chi^2(1, N = 891) = 45.28, p < .001$]. The odds ratio indicated that men, as opposed to women, were 4.24 ($p < .001$) times more likely to prefer their partners to have sex with same-sex individuals "occasionally-frequently" than "never." Sexual orientation was also a significant factor [$\chi^2(1, N = 891) = 20.05, p < .001$], with exclusively heterosexual individuals being 3.49 ($p < .001$) times more likely to prefer their partners to have sex with same-sex individuals "never" than "occasionally-frequently." In line with the previous analyses, participants' age did not appear to be a significant factor.

The rates in Tables 1 and 2 suggested that participants were more likely to preferred same-sex sexual attraction and contact in a short-term than in a long-term partner. In order to examine whether these differences were statistically significant, we applied the McNemar-Bowker test, which is used to determine if there are differences in relation to a categorical dependent variable between two related groups. The dependent variable was the answer to each question in Tables 1 and 2, and the independent variable was the type of partner (e.g., short-term/long-term). The analysis was performed twice, once for each question. The results were statistically significant for both the sexual preferences of one's partner ($p < .001$) and for one's partner having sex with other individuals ($p = .004$).

A four-way mixed design ANCOVA was conducted in order to examine the effects of participants' feelings of sexual excitement in response to their partners' homosexual acts. Participants' responses to the sexual excitement question were entered as the dependent variable, the type of partner (long-term/short-term) was entered as the within-subjects independent factor, and participants' sex (woman/man), age and their sexual orientation (exclusively

heterosexual/heterosexual with same-sex sexual attractions) were entered as the between-subjects independent variables.

The results indicated that there was a significant main effect of sex [$F(1,886) = 19.96, p < .001, \eta_p^2 = .022$], with men indicating higher sexual excitement ($M = 1.94, SD = 1.25$) than women ($M = 1.54, SD = 1.11$). In addition, there was a significant main effect of sexual orientation [$F(1,886) = 5.95, p = .015, \eta_p^2 = .007$], with heterosexual participants with some same-sex sexual attractions indicating higher sexual excitement ($M = 1.81, SD = 1.17$) than exclusively heterosexual participants ($M = 1.70, SD = 1.19$). There was also a significant interaction between the type of relationship and sex [$F(1,886) = 19.96, p < .001, \eta_p^2 = .022$], with women indicating similar scores for a long-term ($M = 1.51, SD = 1.11$) and a short-term partner ($M = 1.57, SD = 1.12$), whereas men indicated greater sexual excitement in such a situation involving a short-term ($M = 2.03, SD = 1.26$) rather than a long-term partner ($M = 1.87, SD = 1.21$).

6. Study 2

The purpose of this study is to examine preferences for same-sex sexual attraction and contact in the British cultural context.

7 Method

7.1 Participants

A total of 390 participants completed an online survey. Emails (with the link to the online survey embedded) were sent to various departments across several universities in the United Kingdom to solicit participation, while the study was also advertised on the subject pool system and on the weekly bulletin of a British University. Participants had to read key information pertaining to the study and to then make an informed decision to partake in it before the commencement of the survey. One of two sets of a participant's data was discarded because of double submission (as evidenced by the same participant code) – only the more recent set of data for this participant was retained. The responses from another participant who contacted the researchers to indicate that he would not actually consider having a short-term relationship but has tried to respond to the questions as honestly as he could, were included in the analyses in light of the fact that the questions utilized in the study were meant to be hypothetical in any case.

Because the study was designed to assess the preferences of heterosexual people, only the responses of participants who indicated that they were heterosexual were included in the analyses. Three participants who might be unsure about their exact sexual preferences and have indicated themselves as being both exclusive heterosexual and predominantly heterosexual were classified as predominantly heterosexual (and their data were included in the analyses) while two others who have chosen options indicating interest in both heterosexuality and bisexuality/homosexuality were classified as bisexuals (and their data were excluded from the analyses). Thus, data from a total of 305 heterosexual British people who have taken part in this research (193 women, 112 men) were included in the analyses. The mean age of women was 27.15 ($SD = 11.01$), and the mean age of men was 24.86 ($SD = 9.69$).

With respect to sexual orientation, 54.6% of the participants indicated that they were attracted exclusively to opposite-sex partners, 23.6% were attracted predominantly to opposite-

sex individuals but also reported having occasional same-sex sexual attractions, 11.3% indicated that they were attracted to both sexes equally, 3.8% indicated that they were attracted predominantly to members of the same-sex but also occasionally to those of the opposite-sex, while 6.7% reported being exclusively attracted to same-sex individuals.

7.2 Materials

The survey questionnaire was in English and had the same question items as the one in the Study 1.

8. Results

Similar to Study 1, in order to examine whether men and women would prefer opposite-sex individuals who also experience some same-sex sexual attractions as partners, we estimated participants' responses to the question about their preferences for a short-term and for a long-term mate respectively. The results are presented in Tables 1 and 2 – more than 50% of heterosexual men preferred long-term partners who were not exclusively attracted to the opposite-sex. The numbers were higher (e.g., more than 60%) when a short-term mate was the focus. The respective percentages were much lower for women. Moreover, the percentages were much higher for both men and women who indicated having some same-sex sexual attractions, than for men and women who did not experience such an attraction (see Table 1 and 2). The percentages were higher for male participants than for female participants and for short-term than for long-term partners (see Table 1 and 2).

About 19% of heterosexual men but only about 4% of heterosexual women indicated that they would like their long-term partners to have sex with same-sex individuals, with the respective percentages to be about 30% and 11% for short-term partners (Tables 1 and 2). About 48% of men but only about 7% of women found the notion of their long-term partners engaging in same-sex sexual activities highly or moderately sexually exciting (Table 3). Similarly, about 57% of men but only about 11% of women, found the notion of their short-term partners engaging in homosexual acts highly or moderately sexually exciting (Table 3).

Similar to Study 1, in order to further investigate preferences for same-sex attraction, participants were similarly divided into four different groups. The results are presented in Table 4 – about 67% preferred same-sex sexual attractions in short-term but not long-term or for both partner types, with the respective percentage for women being about 47%. With respect to same-sex sexual contact, about 30% of male participants indicated that they would only desire in short-term but not long-term or for both partner types, with 12% of women indicating similar preferences.

8.1 Contingencies

Analyses similar to those in study 1 were performed. Results indicated that the sex was a significant predictor of one's preference for partner's sexual orientation in the long-term mate scenario [$\chi^2(2, N = 303) = 26.70, p < .001$]. The odds ratio indicated that men, as opposed to women, were 4.62 ($p < .001$) times more likely to prefer a partner who was predominantly attracted to members of the opposite-sex and who was also occasionally interested in members of the same-sex as compared to a partner who is attracted exclusively to members of the opposite-sex. The effect of sexual orientation was also significant [$\chi^2(2, N = 303) = 39.81, p < .001$],

where exclusively heterosexual individuals were 6.17 ($p < .001$) times more likely than heterosexual individuals with some same-sex sexual attractions to prefer as individual with a similar sexual orientation as long-term mates. Participants' age was not a significant factor.

In the same vein, results indicated the sex to be a significant predictor of one's preference for partner's sexual orientation in the short term mate scenario [$\chi^2(2, N = 303) = 32.10, p < .001$]. The odds ratio indicated that men, as opposed to women, were 5.29 ($p < .001$) times more likely to prefer a partner who was predominantly attracted to members of the opposite-sex but also occasionally to members of the same-sex than one who was attracted exclusively to members of the opposite-sex. Sexual orientation was also found to be a significant predictor [$\chi^2(2, N = 303) = 84.22, p < .001$], where exclusively heterosexual participants were 11.89 ($p < .001$) times more likely than heterosexual participants with same-sex sexual attractions to prefer individuals with a similar sexual orientation as long-term mates. As before, participants' age was not a significant factor in this instance.

Binomial regression analyses were similarly performed in relation to the scenario of one's long-term partner having sex with other individuals. As there were no reported observations in the "frequently" category, the dependent variable had only two categories (e.g., "never" and "occasionally.") The results indicated that sex was a significant predictor of one's preference for partner's same-sex contact [$\chi^2(1, N = 304) = 19.20, p < .001$]. The odds ratio indicated that men, as opposed to women, were 6.33 ($p < .001$) times more likely to prefer their partners to have sex with same-sex individuals "occasionally" than "never." Sexual orientation was also found to be a significant predictor [$\chi^2(1, N = 304) = 6.35, p = .012$], with exclusively heterosexual participants being 3.01 ($p < .001$) times more likely to prefer their partners to have

sex with same-sex individuals “never” than “occasionally.” Participants’ age was likewise not a significant factor.

Similar analyses were conducted with respect to the short-term partner scenario, and results indicated that sex was a significant predictor of one’s preference for partner’s same-sex sexual contact [$\chi^2(1, N = 304) = 17.01, p < .001$]. The odds ratio indicated that men, as opposed to women, were 3.73 ($p < .001$) times more likely to prefer their partners to have sex with same-sex individuals “occasionally” than “never.” Sexual orientation was analogously found to be a significant factor in this scenario [$\chi^2(1, N = 304) = 6.11, p = .013$], with exclusively heterosexual participants being 2.33 ($p < .001$) times more likely to prefer their partners to have sex with same-sex individuals “never” than “occasionally.” Similar to the above findings, participants’ age was not a significant factor.

As indicated in Tables 1 and 2, participants appeared to prefer same-sex sexual attraction and contact in a short-term partner as compared to a long-term one. In order to examine whether these differences were statistically significant, the McNemar-Bowker test was similarly conducted as was the case in study 1. The results were statistically significant for both the sexual preferences of one’s partner ($p < .001$) and one’s partner having sex with same-sex individuals ($p < .001$).

As in Study 1, a four-way mixed design ANCOVA was conducted in order to examine the effects of participants’ extent of sexual excitement with regards to their partners’ engagement in homosexual activities. A significant main effect of sex was found [$F(1,300) = 97.73, p < .001, \eta_p^2 = .240$], with men indicating higher sexual excitement ($M = 2.58, SD = 1.21$) than women ($M = 1.37, SD = 0.73$). In addition, there was a significant main effect of sexual orientation [$F(1,300) = 7.92, p = .005, \eta_p^2 = .026$], with heterosexual participants who also reported having

some same-sex sexual attractions indicating higher sexual excitement ($M = 1.94$, $SD = 1.08$) than exclusively heterosexual participants ($M = 1.76$, $SD = 1.11$). Finally, there was a significant main effect of the type of relationship [$F(1,300) = 3.89$, $p = .049$, $\eta_p^2 = .013$], with participants giving higher scores when it has involved a short-term ($M = 1.90$, $SD = 1.22$) rather than a long-term partner ($M = 1.74$, $SD = 1.22$).

9. Cross-cultural comparisons

In order to examine cultural effects, data from 1,509 Greek-Cypriots in Apostolou et al. (2017) study was adopted as a means of comparison. More specifically, multinomial logistic regression analyses were performed whereby the preferences for one's partner's sexual orientation was entered as the dependent variable, and participants' sex, age, sexual orientation and the nature of the sample (e.g., Chinese, British, Greek-Cypriot) were entered as independent variables. The analyses were performed twice, once for the short-term and once for the long-term mate scenario, and the results are presented in Table 5.

The odds ratio indicated that the Chinese sample was 2.60 ($p < .001$) times and Greek-Cypriots sample 2.11 ($p < .001$) times more likely than the British sample to desire exclusive heterosexuals rather than heterosexuals who had some same-sex sexual attractions as long-term mates. In addition, across samples, men were 4.87 ($p < .001$) times more likely than women to prefer their long-term mates to be heterosexuals who also have some same-sex sexual attractions than to be exclusively heterosexuals. Finally, exclusively heterosexual participants were 11 ($p < .001$) times more likely than heterosexual participants who had also indicated some same-sex sexual attractions to prefer those who were exclusively heterosexual as long-term mates.

Moreover, the Chinese was 3.61 ($p < .001$) times and the Greek-Cypriots 7.78 ($p < .001$) times more likely than the British to prefer their short-term partners to be exclusively heterosexuals than to be heterosexuals who also had some same-sex sexual attractions. In addition, across samples, men were 3.02 ($p < .001$) times more likely than women to prefer heterosexuals who also had some same-sex sexual attractions as short-term mates than those who were exclusively heterosexuals. Furthermore, exclusively heterosexual participants were 9.35 ($p < .001$) times more likely than heterosexual participants who had some same-sex sexual attractions to prefer individuals with an exclusively heterosexual orientation as short-term mates.

Similarly, with respect to sexual contact of a short-term partner with a same-sex mate, the sample factor was not significant. Sex was however a significant predictor, with men being 6.49 ($p < .001$) times more likely than women to indicate that they would prefer their long-term partners to have sexual contact with another individual of the same sex “occasionally-frequently” than “never.” Exclusively heterosexual participants were likewise 2.96 ($p < .001$) times more likely than those with some same-sex sexual attractions to indicate that they would prefer their long-term partners to “never” rather than “occasionally-frequently” engage in sexual activities with a member of the same sex. There was no significant finding with respect to a short-term partner having sexual contact with a same-sex mate. In addition, men were 5.29 ($p < .001$) times more likely than women to indicate a preference for their long-term partners to have sexual contact “occasionally-frequently” than “never” in such an instance. Moreover, exclusively heterosexual participants were 3.12 ($p < .001$) times more likely than heterosexual participants who had some same-sex sexual attractions to indicate that they would prefer their long-term partners to have sexual contacts “never” than “occasionally-frequently.”

Using the same approach as was utilized for the main analyses above - with the exception of the sample being additionally included as a between-subjects independent variable on this occasion – a five-way mixed design ANCOVA was conducted in order to examine the effects of participants' extent of sexual excitement with regards to their partners' engagement in homosexual activities. There was a significant main effect of sex [$F(1,1739) = 176.74, p < .001, \eta_p^2 = .092$], with men indicating higher sexual excitement ($M = 2.42, SD = 1.38$) than women ($M = 1.41, SD = 0.98$). In addition, there was a significant main effect of sexual orientation [$F(1,1739) = 16.50, p < .001, \eta_p^2 = .009$], with heterosexual participants who also had some same-sex sexual attractions indicating higher sexual excitement ($M = 1.89, SD = 1.21$) than exclusively heterosexual participants ($M = 1.81, SD = 1.25$). There was also a significant main effect of the type of relationship [$F(1,1737) = 5.93, p < .001, \eta_p^2 = .009$], with participants giving higher sexual excitement scores when it was related to a short-term partner ($M = 1.90, SD = 1.37$) than to a long-term one ($M = 1.75, SD = 1.27$). There was no significant main effect of the sample.

10. Discussion

Consistent with the original hypothesis, in line with Greek-Cypriots in general, most heterosexual women in both Chinese and British samples appear to find same-sex sexual attractions and contact undesirable in a partner, whereas a considerable proportion of male counterparts has responded positively about such a trait in their partners. More specifically, about one in four men in the Chinese sample and two in three men in the British one, indicated a preference for same-sex sexual attractions in an opposite-sex partner, and for their partners to have sexual contact with same-sex mates. There were also cultural differences, with participants

in the British sample indicating a desire for their heterosexual partners to experience same-sex sexual attraction more than those in the Greek-Cypriot and Chinese samples. In addition, same-sex sexual attraction was preferred more in a short-term than in a long-term partner, while heterosexual individuals who reported same-sex sexual attraction were significantly more likely to also desire a partner with a similar sexual orientation than exclusively heterosexual individuals.

The significant differences across samples were confined predominantly to attraction - the desire for same-sex sexual attraction in an opposite-sex partner found to be least prevalent in the Chinese sample and greatest in the British one, with the prevalence rate of the Greek-Cypriot sample falling in between. Cultural factors such as Confucian ethics and the focus on family may partially explain why Chinese participants were least likely to prefer this trait in an opposite-sex partner: In the Chinese culture, considerable importance is placed on family (Peng, 2014); hence, Chinese people may see same-sex attraction as threatening to this societal ideal. In a similar vein, same-sex attraction is disapproved and penalized according to the Christian dogma (Boswell, 1980); thus, Greek-Cypriots, generally being more religious than British people, might be less likely than the latter to indicate such an attraction in an opposite-sex partner. In addition, as people in the UK are more open toward same-sex sexual attraction, it is likely that they might also be more inclined to freely express their preferences for such an attraction in a partner.

Accordingly, it is expected that these factors would likewise play a part in one's desire for same-sex sexual contact in a heterosexual partner. However, no significant cultural difference was found. One possibility is that same-sex sexual attraction is not something that is discussed and studied in China and is to a smaller extent in Cyprus. As a consequence, many people in these cultural settings may not be able to distinguish between different types of same-sex sexual

attraction. On the other hand, the absence of cross-cultural variations might also be due to the questions relating to same-sex sexual contact being more straightforward and less open to different interpretations. In general, there is a multitude of factors that vary between cultures that could affect the preference for same-sex sexual attraction and/or one's willingness to acknowledge it. Undoubtedly, the role of cultural factors on preferences for same-sex attraction and contact require further investigation.

The current findings suggest that, across cultures, there is a substantial proportion of heterosexual men who do find a certain level of same-sex sexual attraction and engagement in their partners desirable. Such a preference is likely to have played a role in the evolution of same-sex attraction in women. More specifically, if similar male preferences were present during human evolutionary history, selection forces would have favored such a sexual orientation in women. It is highly likely however that men's desire for female heterosexual partners with same-sex sexual attractions is not the only reason for the observed high prevalence of female same-sex sexual attraction in the population – other factors could likely have been influential as well.

More specifically, Apostolou (2016) proposed that factors such as arranged marriage may have weakened negative selection pressures on same-sex attraction in women, allowing for this trait to increase in prevalence in the population. Kuhle and Radtke (2013) proposed that same-sex attraction has been positively selected to enable women to secure alloparenting help. Kanazawa (2017) alternatively argued that same-sex sexual attraction has evolved to reduce conflict between women in polygynous marriages (but see Apostolou, 2017). Future research needs to assess the merits of each hypothesis, and provide a synthesis that will enable a better understanding of the evolutionary origins of same-sex sexual attraction in women.

Furthermore, because men tend to prefer more sexual variety and would typically like to have different partners as compared to women (Buss, 2017), it could be argued that the observed preference for some same-sex sexual attraction in heterosexual women is not an idiosyncratic preference but rather a different form of expression of the male preference for sexual variety. For instance, men who desire sexual variety, would likely find it attractive that their heterosexual mates are somewhat attracted to and would engage in sexual activities with other women. Future research could examine whether the desire for sexual variety is predictive of men's desires for same-sex sexual attraction and contact in their female partners by including a measure of men's desire for sexual variety. Regardless of the underlying mechanism at play for same-sex sexual attraction in a male's female partner, such a widespread preference in men is likely an influential factor in the evolution of same-sex attraction in women.

Findings have also indicated that people generally were fonder of those with a similar sexual orientation (e.g., heterosexual individuals with some same-sex sexual attractions). Such findings are attributed to the preference for similarity - people tend to be attracted to others who have similar traits (Buss, 2017). It is conceivable that such an argument can also explain why several heterosexual women indicated a preference for some degree of same-sex attraction in their partners across different samples. That is to say, these women did not want their male partners to be exclusively attracted to other men, but would instead like them to experience some same-sex attraction. This preference is also likely to have an important effect for the evolution of same-sex attraction in men.

More specifically, due to male preferences for same-sex attraction and other factors such as mate choice being regulated, the number of heterosexual women who experience same-sex attraction would likely increase in the population. But these women would tend to prefer men

who are similar to them as partners - that is, they are also attracted somewhat to those of the same sex. These female preferences could in turn affect the fitness of men who possess such a sexual orientation. For example, heterosexual men who also have some same-sex sexual attractions might stand a better chance of getting a mate if a considerable part of the potential pool of available women would likewise share such a sexual orientation. In effect, same-sex attraction in men would correspondingly increase in the population, which would then in turn strengthen the positive selection pressures that were placed on same-sex attraction in women (as there would be more men who would desire it). Such a feedback loop would likely lead to a greater number of heterosexual women (and subsequently men) experiencing same-sex attraction in the population in the long-term. Nevertheless, due to the nature of how mating naturally works in humans which limits the capacity of women to exercise choice and thus the impact of female preferences on male traits, such self-reinforcing cycle probably was not the primary driving force behind the relative high prevalence of same-sex attraction in heterosexual men (about 7% see LeVay, 2010).

One limitation of the current research is that the samples might not be representative of the general population, and hence the observed prevalence rates may not reflect the true population prevalence rates. Furthermore, there is always the likelihood that some participants might have misunderstood the questions, or would inaccurately report their sexuality due to a variety of reasons. Such errors, if real, could account for the observation that some participants have preferred for their mates to be attracted predominantly or only to members of the same-sex. Such preferences do not make sense evolutionarily, and could most likely have been a product of such measurement errors. Lastly, some participants might honestly have been unaware of their own true desires. One reason could be due to a lack of experience. For instance, some young men

might not have dated heterosexual women who have possessed some same-sex sexual attraction before, and hence could not have been fully aware of their positive perception of such traits in their partners. Such misconceptions could then lead to an underestimation of the prevalence rate of the male preferences for same-sex sexual attraction and contact.

In sum, results have provided evidence that, across different cultural settings, a considerable proportion of heterosexual men and a smaller proportion of heterosexual women would prefer same-sex sexual attraction and contact in his/her partner. Further research and cross-cultural replication studies will be helpful in gaining a better understanding of the evolutionary origins and implications of such preferences.

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