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Counting members in my league: Mate value moderates economic effects of local operational sex ratio

Zilin YAN
Singapore Management University, zilin.yan.2016@phdps.smu.edu.sg

Counting Members in My league:

Mate Value Moderates Economic Effects of Local Operational Sex Ratio

by

Zilin Yan

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Thesis Committee:

Norman Li (Supervisor/Chair)

Associate Professor of Psychology

Singapore Management University

Guihyun Grace Park

Assistant Professor of Psychology

Singapore Management University

Kenneth Tan

Assistant Professor of Psychology

Singapore Management University

Singapore Management University

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Abstract

When local operational sex ratio skews toward a larger proportion of same-sex to opposite-sex individuals, should members of the surplus sex increase or decrease (economic) efforts on reproduction? Past research yielded mixed results. In light of the fact that modern humans are highly mobile and can relocate to communities that may offer better reproductive prospects, it may not always be a given that individuals facing same-sex skewed local community will become current-oriented with regard to reproduction; instead, they may contemplate whether their efforts will pay off and decide whether they prefer to wait for better situations later. The present research investigates a hitherto underexplored variable that critically underlie the now-or-later preference: mate value. Specifically, this research argues that the favorability of the context created by same-sex skewness depends on one's mate value (and sex), and when current reproductive opportunities are perceived as acceptable (unacceptable), individuals will become current-oriented (future-oriented) in their economic choices. Study 1 reanalyzed data from a past project and found support for the moderating effect of mate value in women's financial temporal discounting. Study 2 assessed women living in sex-skewed communities and examined their balance of reproductive and industrial goals. Study 3 further examined Singaporean students' responses to news articles highlighting sex ratio in

universities. Although many results did not achieve significance, the studies generally pinpointed that the comparison of one's mate value to opposite-sex members and the span of sex ratio imbalance are reasonable moderators that need further scrutiny.

Keywords: mate value, local operational sex ratio, work-family balance, temporal discounting, reproductive timing

CONTENT

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It was a long way from a draft to a thesis, especially I write in my second language. Fortunately, I have received great help from several scholars. Dr. Jose Jin Chuan Yong offered great patience on helping me sort out the structure of the early versions. He and my cohort Indra Alam Syah Bin Aziz were all involved in the design and data collection of Study 1. The committee members provided valuable feedback and my supervisor taught me how to propose and elaborate a project. I also would like to thank my old friend Xin Sun, who offered me great help on accessing literature. I truly appreciate all the help I received.

I felt frustrated several times during this journey. My parents spurred me to make it. My mother was relieved when she heard that I had passed the final defence. I am sorry to worry them.

The fictitious news article in the Appendix was polished by my local friends Yun Fang Wun and Yoke Ling Quek. I hope more researchers can adopt it in their projects.

Chapter 1: Introduction

Broadly speaking, economic decisions concern when and how we acquire or consume resources, which are influenced by our individual preferences and desires as well as our ability to get what we want in the given situation (Neel, Brown, & Sng, 2017). Whether we purchase, say, a car versus putting our money to another use depends not only on whether we want to own a car but also whether we can afford one now.

Similarly, according to V. H. Vroom's expectancy theory of motivation, the extent to which one attempts to pursue a mate should depend on the desirability of the target (i.e., valence), the likelihood of reciprocity given that (s)he also has other wooers (i.e., instrumentality), and the good image one can display by the moment (i.e., expectancy). No women are willing to mate with any male (Todd & Miller, 1999). A man who fancies a relationship with a woman he just met may need to devote resources—money, time, biological energy—to gain her attention and win her interest above and beyond that given to other suitors, and how much effort he must expend to attract a mate depends on how desirable he is as a mate. Similarly, to attract high quality men, a woman may spend money and effort on cosmetics, fashion, and fitness to make herself look more desirable. These economic preferences and behaviours driven by mating motives depend on mating prospects (Lec et al., 2017), which in turn hinge on some situational factors.

Past research has demonstrated the impacts of sex ratio on economic preferences and decisions but left evident inconsistency. I propose that the comparative position of one's desirability (i.e., mate value) is a possible resolution. The examination was triangulated across samples drawn from three countries and three operationalisations of sex ratio.

Chapter 2: Literature Review

Local Operational Sex Ratio

Research has shown that the local operational sex ratio (LOSR, Noë, 2017)—the ratio or skew of similar-aged, viable men to women in the local community (e.g., campus, workplace, neighbourhood)—is a significant determinant of mating behaviours (e.g., Hahn, Fisher, DeBruine, & Jones, 2014; Hesketh & Zhu, 2006; Pollet & Nettle, 2008). In the ancestral past where mobility between ecological locations was severely limited, people were unlikely to meet individuals other than those from their own tribe under cordial circumstances (Symons, 1979). Hence, if the LOSR is skewed, it is "global" in a subjective sense. A noticeably low ratio of opposite-sex to same-sex individuals therefore signalled a scarcity of available mates and thus, poor reproductive prospects. In such circumstances, decisions that increase one's intrasexual competitiveness and mating efforts may have constituted adaptive responses.

Consistent with this reasoning, studies have found that men respond to cues of same-sex skewness (i.e., more men than women) by discounting the future and preferring earlier, smaller incomes over delayed, larger incomes (Griskevicius et al., 2012), and people react to same-sex skewness by concentrating (versus diversifying) financial investment (Ackerman, Maner, & Carpenter, 2016). These studies suggest that it may be adaptive (i.e., people may have evolved) to desire and have resources immediately in hand, and to take greater financial risks, in order to come out on top or avoid falling below the horde as intrasexual competition increases and mating prospects become dimmer.

Local operational sex ratio and economic preferences. Given that LOSR indicates

the abundance of mates as well as rivals one has to contend with in the immediate environment, it makes sense that LOSR plays a significant role in people's mating prospects, strategies, and behaviours. Although anthropologists, psychologists, and sociologists have dedicated plenty of research to how LOSR alters mating decisions (Noë, 2017), only a rare few have examined the effects of LOSR on economic preferences, despite the critical linkages between mating and economic behaviours. Aside from studies using archival data (Durante, Griskevicius, Simpson, Cantu, & Tybur, 2012, study 1; Griskevicius et al., 2012, study 1), three experimental paradigms for manipulating perceived LOSR have been used in this emerging research. One presents arrays of mixed-sex headshots allegedly taken from a local dating website and of local university students (Ackerman et al., 2016, Study 1 & 3; Durante et al., 2012, Study 2; Griskevicius et al., 2012, Study 2), another presents a news article reporting about unbalanced operational sex ratio in local universities (Durante et al., 2012, Study 3 & 4; Griskevicius et al., 2012, Study 3 & 4), and the last one is a variation of the second in that the article talks about sex ratio in the entire nation (Ackerman et al., 2016, Study 2 & 4).

Research has generally found that same-sex skewness changes several economic decisions compared to a neutral condition where no information on sex ratio is presented, while opposite-sex skewness does not. As mentioned above, Griskevicius et al. (2012) discovered that men rather than women reacted to same-sex skewness by preferring earlier, smaller incomes over delayed, larger incomes. In the same vein, men who were exposed to a same-sex-skewed context borrowed more and saved less money compared to men who were exposed to an opposite-sex-skewed context or to women in general. Durante et al. (2012)

investigated the balance between industrial and reproductive goals and showed that women reacted to same-sex-skewed contexts by preferring career over family. Most recently, Ackerman et al. (2016) demonstrated that both sexes reacted to same-sex-skewed contexts by concentrating their financial investments. People tend to spread their investment across multiple options (i.e., bet hedging) to reduce the risk that if a single option fails, the entire investment sinks. Doing the opposite, which is to "put all eggs in one basket", indicates that those people would rather bear this risk in order to get potential higher yields (Ackerman et al., 2016).

Although these researchers all take the position that same-sex skewness indicates stiff intrasexual competition so that more effort is required to progress in current reproduction, the research thus far has not painted a consistent picture of increased current orientation (on reproduction) as a result of same-sex skewness. It was consistent for male that they were found to increase investment in current reproduction through preferences for immediate income (Griskevicius et al., 2012) and undiversified portfolios (Ackerman et al., 2016), but for female, the results could be indifference (Griskevicius et al., 2012) or current orientation (Ackerman et al., 2016). I tend to support Ackerman et al. (2016) in that women also need to consume financial resources for intrasexual competition, as evidenced by the expensive cosmetics valued by women to enhance attractiveness and retain the appearance of youth (Guéguen, 2012; S. E. Hill, Rodeheffer, Griskevicius, Durante, & White, 2012). As for Durante et al. (2012), it was not clear how did women balance recent goals (e.g., study vs. romance for students) and schedule reproductive effort (i.e., study hard now and focus on family later vs. secure a partner now and work hard later), if they were merely asked about

their balance of distant goals. Although Durante et al. (2012) did point out a possible direction by suggesting in the fourth study that same-sex skewness urged unpopular (i.e., low–mate value) women to prefer career and popular women to prefer family, the robustness and generalizability of this linear moderating effect of mate value is underexamined. Therefore, if I want to extend this line of research with limited funding, I would investigate female first.

Environmental variation in sex ratio over time. Psychological mechanisms evolved in ancestral times (Tooby & Cosmides, 1990) when humans lived in small villages of no more than a hundred and fifty individuals (R. A. Hill & Dunbar, 2003), and LOSR was likely fairly stable. In such contexts, ancestral humans often had no choice but to make do when facing an undesirable sex ratio (e.g., double their efforts in the face of stiff mating competition). Accordingly, humans may have evolved to respond to any major change in the social environment—such as a shift in LOSR—as a relatively long-lasting condition. This suggests that, on the one hand, it would be adaptive for people who are currently facing an unfavourable LOSR to increase their competitive efforts and risk-taking propensities, consistent with some past studies (Ackerman et al., 2016; Griskevicius et al., 2012).

On the other hand, ancestral humans may not have been entirely stuck with any particular situation. As quick as a shift in LOSR can occur, a shift in the other direction could also happen just as easily. Perhaps, for instance, one's tribe consolidates with a friendly neighbouring tribe (Buss, Goetz, Duntley, Asao, & Conroy-Beam, 2017), whose men and women then get incorporated into the LOSR, but soon thereafter, a war against another tribe changes the number of men and women in the area. To the extent that there was some degree

of variability in LOSR across time, people may have evolved to wait out (probably not too long) unfavourable LOSR in hopes of better future conditions, consistent with other past studies (Durante et al., 2012). Moreover, modern humans live in dynamic times where many subgroups exist within large populations and we can relocate relatively easily. As such, people presently facing dim mating prospects are capable of awaiting or seeking alternative mating markets with relatively favourable prospects. The current research therefore proposes that a careful investigation of hitherto underexplored underlying factors, specifically mate value, should be scrutinized to clarify the nuanced effects of LOSR on economic preferences.

Mate Value in Mating

Mate value is one's overall reproductive worth, which is made up of (i.e., a composite of) various phenotypic aspects that promote successful reproduction, such as wealth and youth (see Mate Value Inventory for example, Kirsner, Figueredo, & Jacobs, 2003). In evolutionary terms, mate value indexes the capability of an individual to contribute to the shared reproductive outcomes within a relationship. One's mate value is thus determined by whether one possesses the traits valued by the opposite sex and one's relative standing among same-sex rivals in the *local* ecology (Buss et al., 2017). For example, female manicure hardly contributes to mate value because it is not valued by male, even if it may serve intrasexual competition. Like socioeconomic status, two people who reported same self-rated mate value may differ in actual mate value just because they are from different social strata. Hence it is hard to keep measurement invariance among heterogenous social groups. Overall, the higher a person's mate value is, the more capable he or she is at attracting mates, and by the same logic a person with high mate value is more difficult to attain and retain as a mate relative to

someone with low mate value (Conroy-Beam, Goetz, & Buss, 2016).

The dark side of mating a desirable person. Assuming everybody aims for potential mates who are as high in mate value as possible to maximize their own reproductive success, the end state would be one where everybody pairs with a partner similar in mate value (Bruch & Newman, 2018)—an outcome known as positive assortative mating (Kenrick, Groth, Trost, & Sadalla, 1993). Indeed, in societies where monogamy is the norm, positive assortative mating is the most pronounced manner in which people pair up (Buss & Barnes, 1986; Buss & Shackelford, 2008; Danel et al., 2017). If the pursuit of potential mates were cost-free, individuals would always bid for the best. However, being rejected by a high–mate value target who also fancies a better mate, which is very likely, can be costly (Baumeister, Wotman, & Stillwell, 1993) in terms of time (i.e., opportunity), material (e.g., money spent on expensive dinners), emotion (e.g., the painful experience of rejection) (Apostolou, Shialos, & Georgiadou, 2019), and social costs (e.g., reputational damage from gossip about one's overconfidence and failure). Therefore, individuals who screen potential mates for similarity in mate value not only minimize these costs but also avoid wasting resources on unacceptable current mating prospects—specifically, mates who are mismatched in mate value (Kenrick et al., 1993). According to life history theory (Ellis, Figueredo, Brumbach, & Schlomer, 2009; Giudice, Gangestad, & Kaplan, 2015; Kaplan, Hill, Lancaster, & Hurtado, 2000; Stephen, Nadine, & Ruth, 2008), these saved resources can be deployed to *growth* (i.e., advancement of one's somatic, material, or social states), which enhances one's mate value and in turn increases one's chances of *future* reproductive success.

Consistent with this view on mate value–matching in romantic relationships, Todd and

Miller (1999) showed using computer simulations that, in situations requiring mutual choice, which is typical of modern mating systems, the best mating outcomes occur when individuals aim for and seek out opposite-sex individuals with similar levels of mate value. This strategy yielded more pairings for the market overall, especially for couples with matched mate value. Simao and Todd (2002) increased the realism of simulation by adding mortality and the ability to switch targets and confirmed the superiority of using personal mate value as the aspiration level for approaching potential mates.

Since women are fertile only once per month, men's sexual attempts are invalid across a substantial amount of days. Thus, women's mate value bump periodically with the menstrual cycle. During ovulation, when women experience this bump, they pay more attention to attractive men (Anderson et al., 2010). Conversely, Bailey, Durante, and Geary (2011) demonstrated that men could detect a woman's ovulation from her physical appearance better when their self-rated mate value matches the woman's attractiveness. Furthermore, if the woman was partnered, which implies greater effort and cost to pursuit (i.e., poach), men's sensitive window of detecting ovulation moved toward less attractive women. These results suggest that men actively screen for mates they can afford. Recently, Bruch and Newman (2018) revealed that individuals tended to chat up users at most 25% more popular than themselves on a dating website, rather than consistently messaging the most desirable user.

Not only do the insights from positive assortative mating suggest that it is adaptive for people to proactively concentrate mating effort on potential mates at the same level, but they also suggest that it is adaptive for people to be cautious of forming relationships with others

who have significantly higher mate value. Although mate value indicates the capability (i.e., maximum performance) of an individual to contribute to the shared reproductive outcomes within a relationship, the actual contribution is voluntary and negotiable, let alone people usually disguise their flaws as a strategy of impression management (Buss et al., 2017; Haselton, Buss, Oubaid, & Angleitner, 2005). Therefore, couples with disparate mate values do exist (Danel et al., 2017), but such relationships are often characterized by an imbalance of relational investments—the inferior partner often has to invest excessively on maintaining the relationship (Buss & Shackelford, 1997) whereas the superior partner invests minimally (Baumeister & Vohs, 2004; Conroy-Beam et al., 2016; Jonason & Buss, 2012). Although humans evolved to achieve reproductive success through committed relationships, some individuals may also have a preference for and actually engage in casual, uncommitted relationships as a complementary strategy (e.g., infidelity, Buss, 2018; Pillsworth & Haselton, 2006). Such factors put the inferior partner in a vulnerable position across the lifespan of the relationship in which being with a partner who has higher mate value may not fruit. For instance, at the early stages of the relationship where little information is available to evaluate the commitment, one partner may be exploited if the other pretends to be committed but instead possesses an uncommitted mating mindset (Penke, Todd, Lenton, & Fasolo, 2008). At a later stage of a committed relationship where each partner's relationship contributions have reached equilibrium, the inferior partner may burnout after prolonged and intensive relationship maintenance. Hence, although high–mate value opposite-sex others carry appealing reproductive benefits, it can be risky to actually form a relationship with such individuals, if one's mate value is significantly lower.

In summary, although people generally have an ideal image of a partner and may find those with high mate value desirable (Regan, 1998), people usually seek partners who are matched in mate value (maybe slightly higher, according to Bruch & Newman, 2018; Conroy-Beam et al., 2016; Nowak & Danel, 2014), rather than attempting those out of their "league" (Lec et al., 2017). When it comes to economic decisions (e.g., buy a drink for some lady) that may influence one's life quality, it is reasonable for the person to be prudent. However, potential mates with similar levels of mate value are not available all the time. In ecological contexts signalling the availability of potential mates matched in mate value, people are likely to be current-oriented towards reproductive opportunities (e.g., buy a gift for boyfriend, even if she has to diet). In contrast, if the ecological context signals that potential mates are much higher in mate value, people may forgo reproduction in the current context and be oriented towards future potential.

Sex difference in receptivity to undesirable mates. Men and women's necessary investment in reproduction differ as women *have to* go through the laborious processes of internal gestation, childbirth, and lactation (Trivers, 1972). Moreover, women have to face countless health risks during this prolonged process. Due to these sex differences in the costs associated with reproduction, the costs associated with mating mistakes such as poor mate choice are especially pronounced for women. Thus, women evolved to be choosier and more sexually restricted than men (Kenrick et al., 1993) while men evolved to be more competitive over obtaining mates than women (Symons, 1979; Trivers, 1972, p. 140).

Correspondingly, a man with superior mate value may exploit (e.g., seek sexual access and thus impregnate) women with inferior mate value (Clark & Hatfield, 1989) because he is

able to withdraw from the relationship without incurring a large cost. A woman with superior mate value, however, may exploit (e.g., seek material tributes and thus tax, Goetz, Easton, & Buss, 2013) men with inferior mate value *only when* she can ensure zero sexual contact (Jonason & Buss, 2012); otherwise, an accidental pregnancy (e.g., through coercion, Goetz et al., 2013; Kanin, 1985) would lock her into an unsatisfactory relationship and greatly undermine her reproductive success (Jonason & Buss, 2012) and life satisfaction (Nowak & Danel, 2014). Therefore, a sex difference may exist over whether higher mate value individuals would exploit current mating opportunities with lower mate value targets—specifically, high–mate value men may be current-oriented despite a mismatch with low–mate value women, whereas high–mate value women may not be current-oriented when only low–mate value men are available.

The Moderating Effects of Mate Value and Sex

To the extent that one's sex and comparative mate value affect mating behaviours, these factors will also have important implications for preferences of the timing of economic payoffs, as such payoffs can serve current versus future reproduction. In general, increased mating competition in the present (versus future) requires more resources to be available right now. However, considerations of mate value (and sex) create a potentially more nuanced picture. Although more intrasexual competition over less potential mates (i.e., same-sex skewness) is clearly less favourable, the cost also depends on one's mate value and sex.

If, in a same-sex-skewed situation, one could find matching (i.e., in their "league") opposite-sex members, then conditions are still acceptable for her/him to focus on current reproduction and prefer economic options aiding current reproduction. However, if one's

mate value is too low to match the available opposite-sex members in the situation, (s)he may be better off saving up efforts on acquiring and maintaining a partner and to instead aspire for greater future potential. These individuals may prefer a greater amount of future resources over immediate resources. In contrast, if one's mate value is higher than the available opposite-sex members, then it is unfavourable for those who desire a committed relationship; however, it may be favourable for those who are more sociosexually unrestricted (Simpson & Gangestad, 1991, 1992) and open to short-term relationships. As men are more open to and reproductively benefit more from unrestricted mating, high–mate value men rather than women are expected to become current-oriented in this situation. See Table 1 for summary.

Table 1

Direction of Shift in Economic Preferences Driven by Reproduction

		Mate value of *local* opposite sex	
		High	Low
Personal mate value	High	Current-oriented	Ambivalent / Current-oriented
	Low	Future-oriented	Current-oriented

Note. Female and male reaction is divided by the slash.

Chapter 3: The Present Research

Taken together, past research has shown that unbalanced LOSR may induce shifts in reproduction-driven economic decisions, but those studies have critically omitted key individual difference variables including comparative mate value and sex. The present research focused on women and hypothesized that mate value moderates the effects of LOSR on the trade-off between current reproduction and future potential, and thus, economic preferences. Specifically,

H1: When available men's mate value matches that of the women, same-sex skewed context drives these women to prefer immediate reward and focus on current reproductive goals rather than future reproductive goals.

H2a: When available men's mate value is perceived to be higher, women prefer delayed reward and focus on current industrial goals rather than future industrial goals.

H2b: When available men's mate value is perceived to be lower, little shift will be observed for women in reaction to the same-sex skewness.

Through three studies, the present research aims to offer a more nuanced view of the link between LOSR and economic preferences. Study 1 reanalysed data that had been collected before the write up of this thesis. Since it asked subjects to imagine a hypothetical situation, Study 2 instead aimed to provide novel empirical data using participants living in actual sex-skewed communities (i.e., universities known for sex ratio imbalance). Study 3 adopted the LOSR manipulation method from past research (Ackerman et al., 2016; Durante et al., 2012; Griskevicius et al., 2012) to test predictions on Singaporean students, who were also not sampled in past research, like Chinese students in Study 2. Study 1 examined

financial temporal discounting, which was investigated by Griskevicius et al. (2012); Study 2 and 3 examined the balance between reproductive and industrial goals (see Durante et al., 2012) together with temporal discounting.

Chapter 4: Study 1

This study presented participants with profiles on a "dating platform" and planned to examine whether the appearance of the profile owner and the number of same-sex viewers have an impact on financial temporal discounting.

Method

Design and sample. The data came from a class project where I collaborated with two classmates. The study employed a 2 (target appearance: unattractive vs. attractive) × 2 (user sex ratio: balanced vs. female-biased) × 2 (temporal discounting: baseline vs. post-manipulation) mixed design, where temporal discounting was measured twice. We recruited female online Qualtrics survey respondents through Amazon Mechanical Turk (Mturk), where we advertised the project as "Person Perception and Preferences Study". We deterred participation with mobile devices because we cannot assure that people could read the stimuli on small screens. Respondents who proceeded after seeing the consent form were recognized as granting their consent of participation. In the end, Qualtrics recorded 750 responses, 606 of which completed the survey and spent at least 2 minutes on it. These respondents got USD 1 for compensation. The study was approved by the Institutional Review Board of Singapore Management University (SMU) under serial number IRB-17-111-A109(917).

Procedure.

Trait measures. Respondents first completed 7 trait measures. The order of measures and items within a measure were randomized. We adopted the Intrasexual Competition Scale (Buunk & Fisher, 2009), Revised Sociosexual Orientation Inventory (Penke & Asendorpf, 2008), Scale for Social Comparison Orientation (Gibbons & Buunk, 1999), Sexual Drive

Questionnaire (Ostovich & Sabini, 2004), Mating Importance Scale (Yong, 2017) adapted from Ferris, Lian, Brown, Pang, and Keeping (2010) Importance of Performance to Self-Esteem Scale), a mate value measure (from Kirkpatrick, Waugh, Valencia, and Webster (2002)'s Measure of Self-Perceived Mate Value, Yong (2017) selected 9 items that had greatest factor loadings in past studies), and Global Self-Esteem Scale (Rosenberg, 1965). We also set up a questionnaire asking childhood (i.e., to 8 years old) household income and familial harmony.

Manipulation. Respondents were asked to pretend that they were users on a dating platform. The task here was to read 12 profiles of men and rate attractiveness on a 7-point Likert scale. Each profile consists of three panels: the left features a photo of a male Caucasian, the middle presents a brief self-introduction, and the right lists small icons of female viewers' profile photos. The focal photos had been rated on their attractiveness and we selected the most and least attractive ones for the two levels of attractiveness. Aside from this factor, we also manipulated user sex ratio by showing different numbers of viewers: 0, 1, or 2 (i.e., balanced) vs. 13, 14, or 15 (i.e. female-biased). Each profile occupied an individual page and the order of profiles was randomized.

Temporal discounting tests. Respondents were required to choose between a series of binary monetary options (i.e., small and immediate vs. large and delayed). The nine items were identical to the small magnitude set, which range from $11 to $35, in Kirby (2009) questionnaire. An attention-check item (i.e., large and immediate vs. small and delayed) was added as suggested by Myerson, Baumann, and Green (2014). We duplicated the test by randomly adding/subtracting 1 to/from the amount of money or number of days through an

Excel spreadsheet and put this version before the manipulation as a baseline. Items within each session were presented in random order.

Reflection of the manipulation. We listed the profile photos in one page and asked participants how confident they were about asking each target out for a date. They responded on a 7-point Likert scale. Later, respondents answered through a slider on how many viewers had been presented on each profile.

We asked about gender, age, sexual orientation, romantic status, race, ethnicity, nationality, and place of residence. In the end, they were debriefed and received a completion code to apply for the compensation on Mturk.

Results

The final sample size was reduced to 127 by several inclusion criteria. Qualified respondents were heterosexual women between 18 and 30 (those likely to participate in mating market), residing in western countries where Caucasian is the majority, those who chose the immediate and large option on the attentional-check item of temporal discounting tests, those whose standard deviation for the trait measures rated on 7-point scales (47 items in total) was greater than 1, and those who spent at least 7 minutes on the survey. Most respondents were in their mid-twenties, $M = 25.5$, $SD = 2.85$, *Median* and *Mode* = 26.

Manipulation check. Taking recalled number of viewers as the dependent variable, user sex ratio and target appearance were submitted to a general linear model (GLM). The interaction was significant, $F(1, 123) = 4.253$, $p = .041$, $\eta_p^2 = .033$, but user sex ratio successfully altered recalled number of viewers in both levels of target appearance (unattractive vs. attractive), $F(1, 123) = 145.215$ vs. 228.320, ps $< .001$, $\eta_p^2 = .541$ vs. $.650$,

see Table 2. The same model was used for mean rating of target's attractiveness and only target appearance had a significant effect, $F(1, 123) = 119.195$, $p < .001$, $\eta_p^2 = .492$. As planned, attractive photos got higher ratings, $M = 3.824$ vs. 1.761, $SD = 1.241$ vs. .842. The Pearson correlation between target appearance and the mean score of the mate value measure was close to zero, $r(127) = .036$, $p = .689$.

Table 2

Conditioned Descriptive Statistics of Recalled Number of Viewers

		Target appearance	
		Unattractive	Attractive
User sex ratio	Balanced	$M = 2.588$, $SE = .499$, $n = 34$	$M = 2.613$, $SE = .522$, $n = 31$
	Female-biased	$M = 11.448$, $SE = .540$, $n = 29$	$M = 13.606$, $SE = .506$, $n = 33$

The change in how many delayed options were chosen in the two temporal discounting tests was calculated as the dependent variable. User sex ratio, appearance of targets, and the mean score of the mate value measure were submitted to a GLM. The main effect of user sex ratio was not significant but the three-way interaction was significant, $F(1, 119) = .087$ vs. 4.762, $p = .768$ vs. .031, $\eta_p^2 = .001$ vs. .038. When targets were unattractive, an excessive amount of opposite-sex viewers significantly altered temporal discounting for respondents with low mate value and insignificantly altered temporal discounting for respondents with high mate value (see Figure 1), $F(1, 119) = 6.544$ vs. .040, $p = .012$ vs. .842. When targets were attractive, an excessive amount of viewers (marginally)

significantly altered temporal discounting for respondents with low or intermediate mate value (see Figure 2), $F(1, 119) = 4.304$ vs. 3.617, $p = .040$ vs. .060. However, these shifts were in different directions. Low-mate value respondents selected less delayed options if they saw unattractive opposite-sex individuals, $b = -.452$, $SE = .177$, but they selected more delayed options if they saw attractive opposite-sex individuals, $b = .422$, $SE = .204$. Similarly, respondents with intermediate mate value selected a bit more delayed options only if they saw attractive individuals, $b = .249$, $SE = .131$.

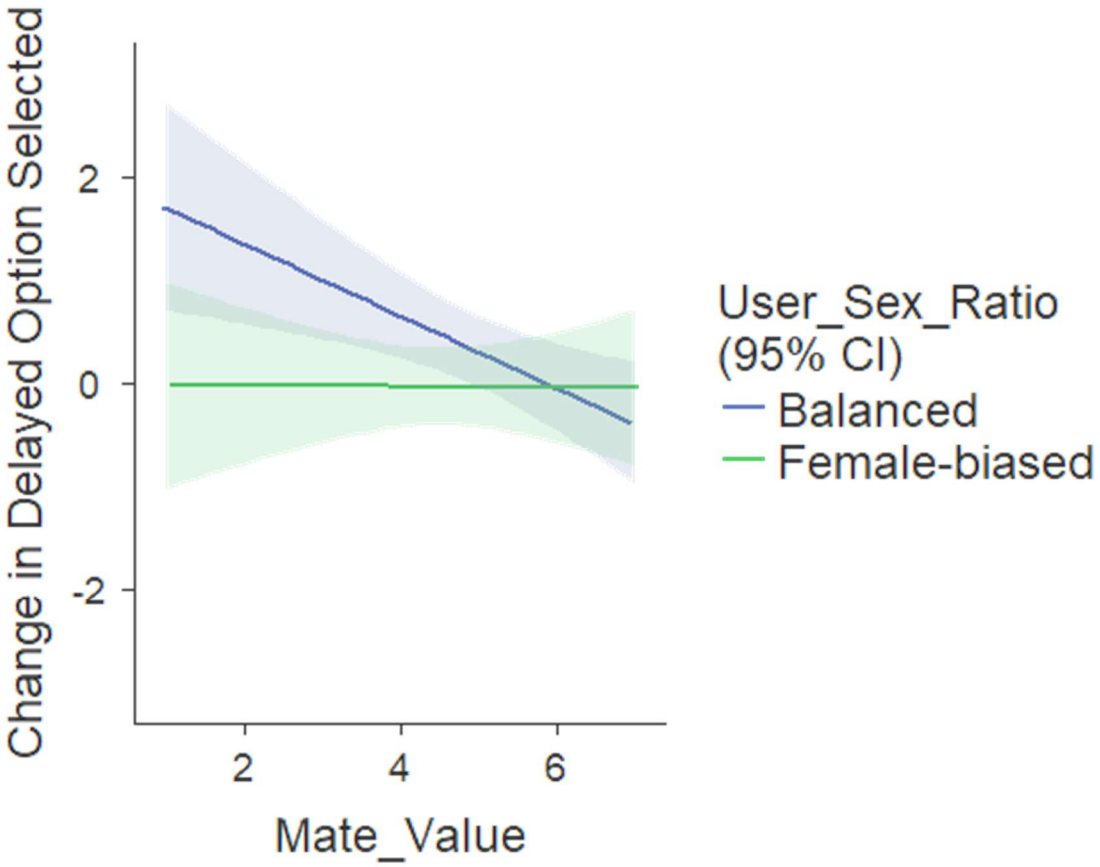

Figure 1. The interaction between mate value and user sex ratio on temporal discounting when targets were unattractive.

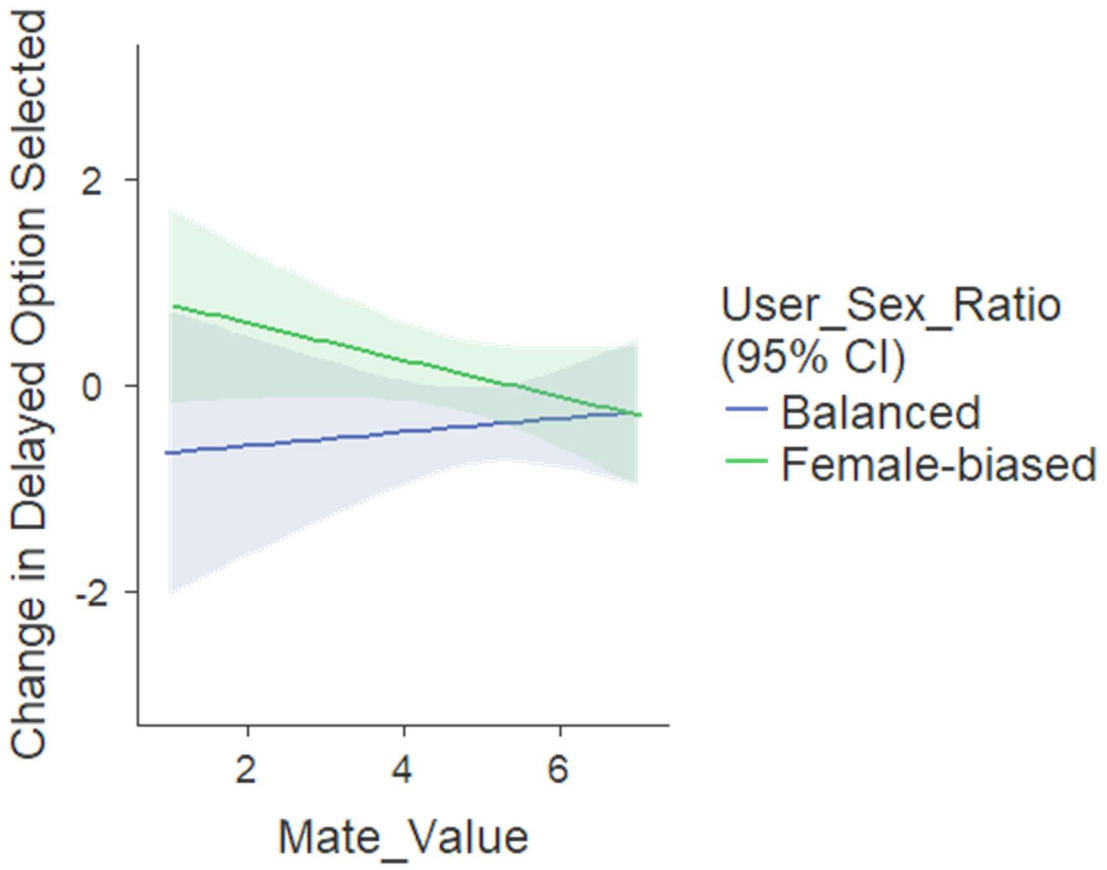

Figure 2. The interaction between mate value and user sex ratio on temporal discounting when targets were attractive.

Discussion

The manipulations of target appearance and user sex ratio were valid. User sex ratio itself could not predict the perceiver's change in temporal discounting, which was in line with Griskevicius et al. (2012). Nevertheless, in reaction to same-sex skewness on the dating platform, women low in mate value became current-oriented when facing unattractive men, supporting H1. They also became future-oriented when facing attractive men, supporting H2a. Women high in mate value did not shift in reaction to the sex ratio skewness, supporting H2b. Facing attractive men, however, women high in mate value did not change their orientation in reaction to same-sex skewness, which is not congruent with H1. In summary,

H1 was partly supported, whereas H2 was fully supported.

Many respondents complained that the compensation was too low. Recently (i.e., early June of 2018) I enquired senior scholars from other institutions and found that we should have pay USD 3 for each. The low return might constrain the sample, especially in its socioeconomic background.

Chapter 5: Study 2

This study reminded half participants they were living in a same-sex skewed campus and planned to examine whether it influence their balance of goals and financial temporal discounting.

Method

Design and sample. The present study employed a 2 (LOSR saliency: high vs. low) × 2 (direction of sex ratio imbalance: same-sex vs. opposite-sex) between-subjects design. Female participants were recruited from Beijing Normal University (BNU), where there are about 2.33 times more females than males, and Beijing University of Posts and Telecommunications (BUPT), where the ratio is approximately 0.34. I planned to manipulate the saliency of sex ratio rather than collecting data from various universities so that I can make within-community comparisons and tease out inter-university differences. Since the first- and second- year undergraduate students in BUPT are located at a suburban campus and BNU did not have a suburban campus, these two grades were excluded. Data was collected during the graduation season so that graduating students were excluded. BNU has a teaching track for undergraduate students where they must work for public schools for at least 6 years. They were also precluded because their career is highly restricted. Moreover, an age limit was set at 25 to keep the sample homogeneous and restricted to conventional college students. Data collection stopped by June 1st, because final examinations take place in mid-June. The exact plan is shown in Table 3.

Table 3

Planned sample size

Manipulated saliency	Females from BNU	Females from BUPT
High	25 master, 25 undergraduate	ibid
Low	ibid	ibid

All contents were presented to participants in simplified Chinese and the unit for monetary questions was Ren-min-bi (i.e., Chinese Yuan, CNY). Participants who had complete records and present authentic information received CNY 15 (BNU students) or 16 (BUPT students) for compensation. The study was approved by the Institutional Review Board of SMU with serial number IRB-18-068-A058(418).

Procedure. An anonymous link named "Female University Student Economic Preferences Survey Participation Form" was disseminated among BNU students through WeChat, which is the most popular social media platform in Chinese, and the online forum of BNU (www.oiegg.com). Individuals who opened the link were screened for sex, heterosexuality, age, and grade. After passing these items, they read the consent form. If a person agreed, she was required to leave the email address assigned by the university to receive the survey link. The link was sent to each registered participant through email. In this letter, participants were instructed to not use mobile devices and to spend 15 minutes of concentrated time on the survey. As for BUPT students, instead of screening them *a priori*, they were able to open the survey link and read the consent form at will, but they were required to email the researcher a photo of their student card. This procedure was used to deter people who are not studying in the two universities. It was simplified for BUPT students because female students are fairly scarce there. All identifiable information was deleted before the analysis of data.

On the first page of the survey, participants were reminded to keep the content seen in the survey confidential and not to discuss the contents or their responses with each other. The first block of the survey randomly assigned participants to the different conditions of LOSR saliency. One condition contained four questions asking for the name of their campus and school and the corresponding student sex ratios, whereas questions in the other condition asked for the name of two non-dormitory buildings on campus where one spent most of the day and the primary activity one engaged in at each place. The second and third blocks were financial temporal discounting and the balance between reproductive and industrial goals. The order of the two blocks was randomized.

Financial temporal discounting. Participants were asked to choose between a series of binary monetary incomes, where one was immediate but small and the other was delayed but large. The 28 questions were adapted from Kirby (2009) questionnaire and an attention-check item (i.e., immediate and large vs. delayed and small) was added (Myerson et al., 2014). To balance the purchasing power between the two currencies (i.e., USD vs. CNY), the numbers were adapted by multiplying 3.85, which was the purchasing power parity conversion factor for private consumption in 2016 (The World Bank, 2017). The order of these questions was randomized.

Balance between reproductive and industrial goals. In section 1, the instruction read: "Please indicate which is more important to you currently." Four item-pairs were presented for rating on a 7-point scale with each pair of items serving as opposite-side anchors : (a) having a boyfriend—having academic achievement, (b) spending quality time with my (prospective) boyfriend—having good grades, (c) having a happy and well-adjusted romantic

relationship—reaching my full academic potential, and (d) get romantically involved—get scholarships and awards. In section 2, the instruction emphasized the future instead. Again, four item-pairs were presented: (a) having a family—having a career, (b) spending quality time with my future children—having a satisfying job, (c) having a happy and well-adjusted family—reaching my full career potential, and (d) get married—get promoted.

The fourth block included questions on the potential mechanisms proposed by Durante et al. (2012). Participants indicated how much they agree or disagree with six statements: (a) It is hard for me to find or retain a boyfriend; (b) It is difficult for me to find or retain a husband; (c) It is hard for me to reach and keep outstanding academic position; (d) It is difficult for me to create and keep enviable career; (e) It is important for me to have a job/career in which I can make a lot of money; (f) It is important for me to have a job/career in which there is virtually NO limit on how much money I might be able to make. The order of items within each section was randomized.

The fifth block contained double manipulation checks. The first one asked participants about the uniqueness of their university and requested them to write down three features. The second one presented a list of prestigious universities (see Table 4) and asked for the first taxonomy that come into mind.

Table 4

Salient Taxonomies of the Listed Universities

Name	Sex ratio	Dominant discipline	Location
East China Normal University	Female-biased	Art and humanity	Other

Renmin University of China	Female-biased	Art and humanity	Beijing
Beijing Foreign Studies University	Female-biased	Art and humanity	Beijing
BNU	Female-biased	Art and humanity	Beijing
BUTP	Male-biased	Science and technology	Beijing
Shanghai Jiao Tong University	Male-biased	Science and technology	Other
South China University of Technology	Male-biased	Science and technology	Other
Huazhong University of Science and Technology	Male-biased	Science and technology	Other

Note. The order of these universities was randomized.

The sixth block administered the 4-item Mate Value Scale (Edlund & Sagarin, 2014) and the first 7 items from Self-Perceived Mating Success Scale (Landolt, Lalumière, & Quinsey, 1995). The seventh block introduced the concept of mate value and presented two graphic questions: the first question asked participants to give their self-rating of mate value relative to same-sex students in the current campus (see Figure 3); the second question asked participants for the perceived relative mate value between the two heterosexual groups in the current campus (see Figure 4).

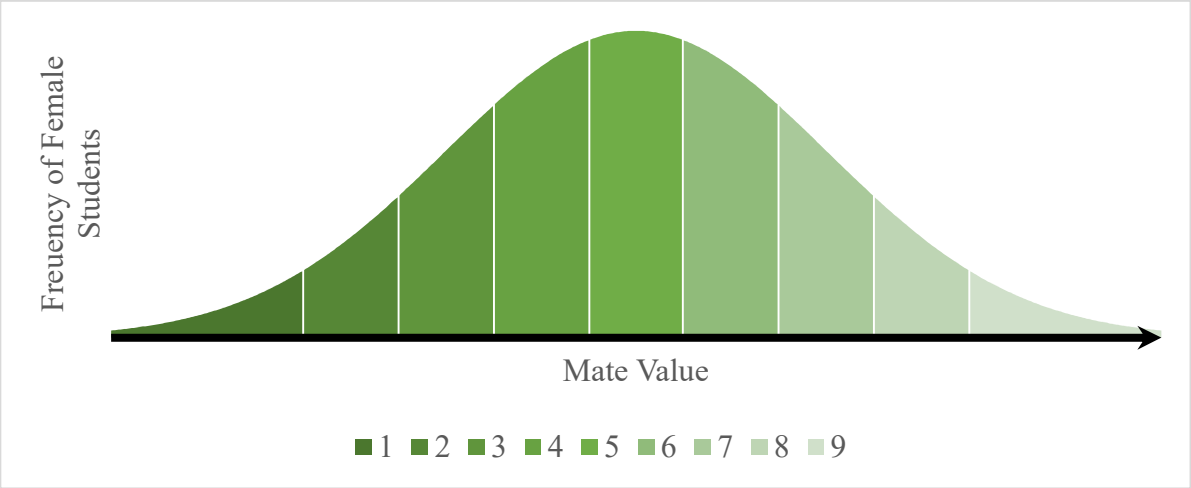

Figure 3. Illustrative diagram for self-rated mate value. The normal distribution is divided into 9 intervals where the 7 intervals in the middle have equal width of .5 standard deviation. A respondent was required to select the interval she belongs to.

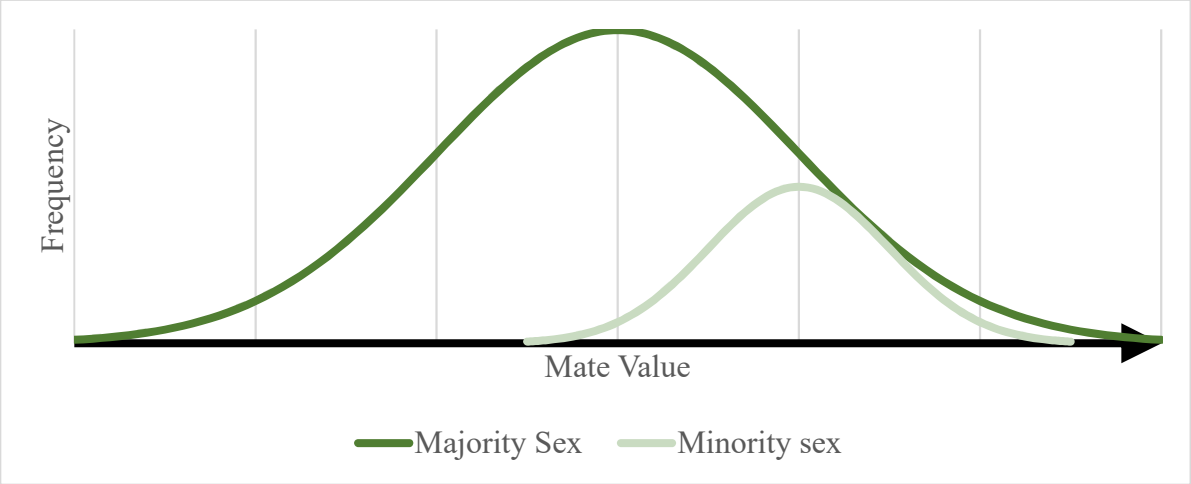

Figure 4. A diagrammatic option for relative mate value between sexes. This one implies that the average mate value of the minority sex is 1 standard deviation higher than the majority sex. A respondent was required to select the diagram best represents the relative positions of the sexes.

The eighth block collected demographic information including sex, grade, heterosexuality, age, ethnicity, city of origin, monthly household income, number of household members, and romantic status. The last page of the survey explained the purpose

of this study and thanked participants.

Results and Discussion

Qualtrics recorded 151 valid cases, where 113 participants came from BNU and 38 came from BUPT. I coded the characteristics of university and the taxonomy of universities as 1 if sex ratio was mentioned and 0 otherwise. A one-tailed Fisher's exact test indicated marginal significance for the first but not the second manipulation check item, χ^2 (1, 151) = 2.812 vs. 1.503, p = .066 vs. .170, φ = .136 vs. .100. As planned, women who had been reminded of LOSR were more likely to mention sex ratio as the uniqueness of their university. The Spearman correlation between the two mate-value-related graphic questions was close to zero, ρ(151) = -.051, p = .536. Only the BNU sample was analysed because the BUPT sample was unfortunately too small.

The four items for study-romance balance (i.e., current goals) and the four items for work-family balance (i.e., future goals) were respectively averaged. This procedure was supported by confirmatory factor analysis that two factors fitted better than one, *CFI* = .987 vs. .717, *TLI* = .981 vs. .604, *RMSEA* = .055 vs. .255. A difference score was thus calculated with higher score indicating that the individual prefer study harder now and then focus on family later (i.e., future orientation). The relative local mate value was mapped to a 9-point scale (i.e., 1=1, 2=3, 3=5, 4=7, 5=9). A matching score was calculated to reflect the difference between personal mate value and this recoded variable. A higher value means the individual regarded herself as having higher mate value in comparison to an average local man. This matching score was then recoded to three levels (i.e., lowest through -2 = 1, -1 through 1 = 2, 2 through highest = 3) to generate another independent variable (i.e., comparative mate

value). The general linear model did not yield a significant two-way interaction on balance of goals, $F(2, 107) = .421$, $p = .658$, $\eta_p^2 = .008$. As hypothesized in H2b, thinking the campus was same-sex skewed did not lead women who believe their mate values were higher than an average local man to change their preference, $F(1, 107) = .140$, $p = .709$.

The number of delayed options chosen in the temporal discounting test was counted as an indicator for temporal discounting. The general linear model also did not yield a significant interaction, $F(2, 107) = .795$, $p = .454$, $\eta_p^2 = .008$. However, the plot seemed to indicate that women with disadvantageous mate value displayed a need to compensate by preferring immediate income, while other women did not (see Figure 5).

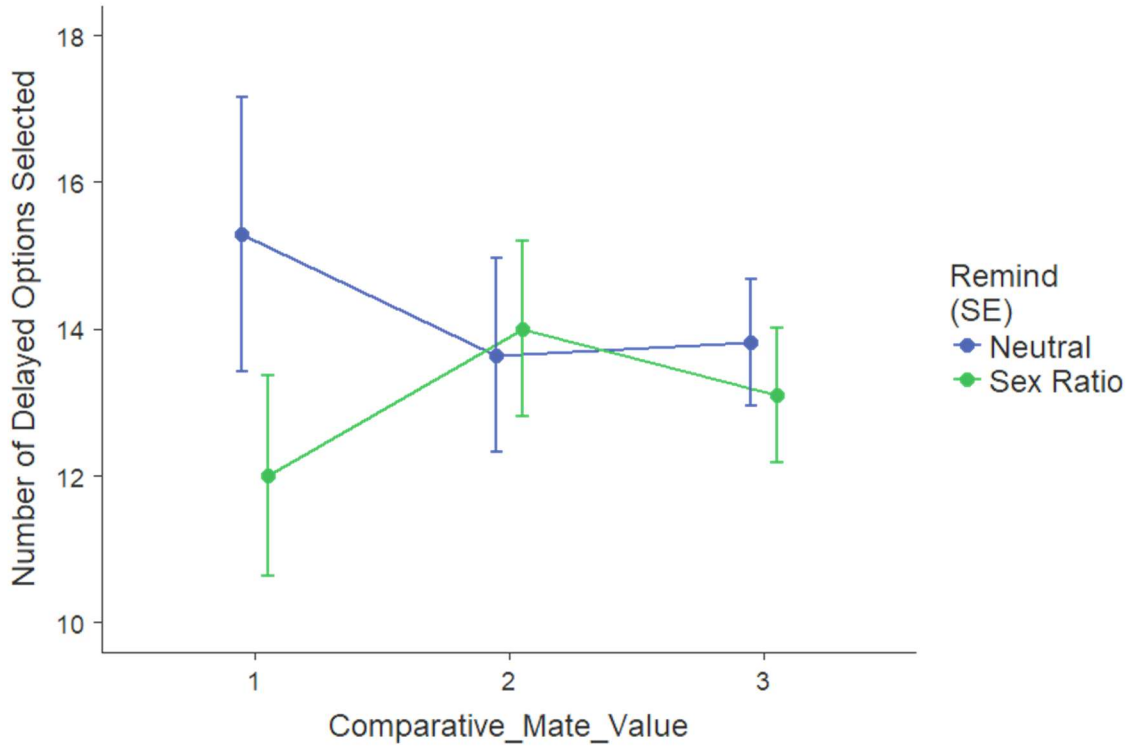

Figure 5. The interaction between sex ratio reminding and mate value matching on temporal discounting.

In an attempt to replicate Durante et al. (2012)'s Study 4, I examined the general

linear model for an interaction between manipulation and personal mate value. The interaction was insignificant, $F(1, 109) = 1.405$, $p = .238$, $\eta_p^2 = .013$, though the direction of interaction was consistent with the target study (see Figure 6).

In summary, this study supported H2b but not H1 or H2a.

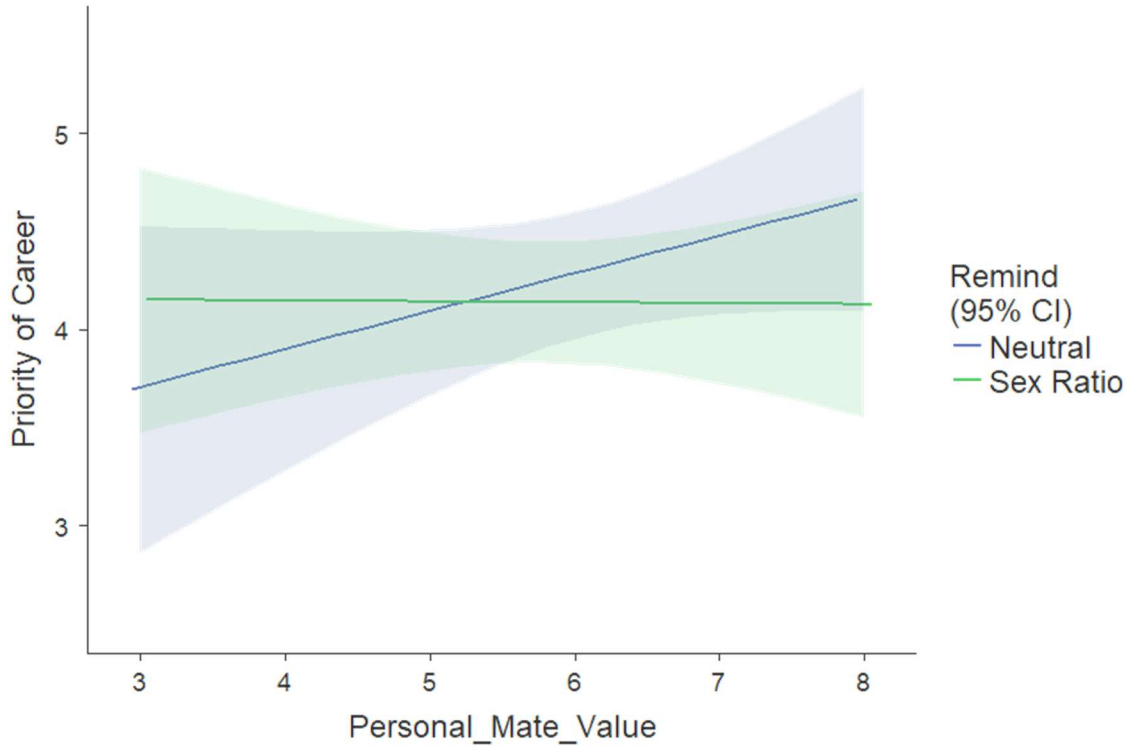

Figure 6. The interaction between personal mate value and same-sex skewness on future goals for BNU female students.

Chapter 6: Study 3

This study presented fictitious articles highlighting local versus remote same-sex skewness and planned to examine whether it influence their balance of goals and financial temporal discounting.

Method

Design and sample. The study employed a 2 (same-sex skewness: local vs. remote) × 2 (temporal discounting: baseline vs. post-manipulation) mixed design, where temporal discounting was measured twice. Female students from SMU were recruited through the subject pool system for an online survey "Economic preferences – online survey for females only" that was expected to take fifteen minutes. Participants who completed the surveys and passed the attention-check items were rewarded 1 credit. The study was approved by the Institutional Review Board of SMU with serial number IRB-18-106-A088(918).

Procedure. The link for a registration sheet was available on the subject pool system. Registration involved a Qualtrics survey that presents the consent form and ask for participants' email (if they wish to participate), which is an identifier for the subject pool system. After participants entered their email, they were assigned a computer-generated ID. They were asked to note down this ID in order to use later in the focal survey. They were redirect to the focal survey once they completed this sheet.

On the first page of the focal survey, participants were reminded to keep the content seen in the survey confidential and not discuss the contents or their responses with each other. If they agreed, they would be instructed to type in the assigned ID given by the registration sheet.

The first block was a temporal discounting test. It was duplicated from block four by randomly adding/subtracting 1 to/from the amount of money or number of days through an Excel spreadsheet. This block was framed as practice trials to prepare participants for later questions. One of the two attention-check items was embedded here: one contrasts "$70 today" versus "$25 in 139 days", where the former option is rational; the other contrasts "$00 today" versus "$54 in 9 days", where the latter option is rational. The unselected attention-check item was embedded in block 4. The order of all 19 items were randomized.

The second block manipulated participant's perception about the sex ratio. They read one of two (by random assignment) untitled fictitious news articles highlighting that some colleges have more female students than male students. One was copied from Durante et al. (2012)'s research with only one modification that the source was switched to *The New York Times*, which is a reputable newspaper in the US. The other was adapted for Singaporeans and was presented as a fictitious article (see Appendix) allegedly taken from *The Straits Times*, which is a reputable newspaper in Singapore. Moreover, it was modified to emphasize that the unbalanced sex ratio is campus-specific (i.e., SMU and National University of Singapore only). Inspired by researchers' emphasize on the proximity of rewards and threats (e.g., Durante, Griskevicius, Hill, Perilloux, & Li, 2011; S. E. Hill & Durante, 2011), I believe it makes a proper contrast compared to past research which took a male-biased article as the other condition. The articles were presented in graphical format to retain fonts and prevent participants from copying. The task was framed as a reading comprehension test, because three questions would follow the text. The first question asked the location of the press. The second question asked participants to name a university mentioned in the text. The

third question asked participants to propose a title.

The third block contained another dependent variable (i.e., balance of goals) identical to Study 2. The fourth block was another temporal discounting test. For each trial, participants were required to indicate their preference between a small, immediate income and a large, delayed income. These were the 9 items from the large magnitude set and the 9 items from the medium magnitude set of Kirby (2009) questionnaire. To balance the purchasing power between the two currencies (i.e., USD vs. SGD), the numbers were adapted by multiplying 1.17, which was the purchasing power parity conversion factor for private consumption in 2016 (The World Bank, 2017). The order of all 19 items was randomized.

The fifth block was about mate value. The first one was identical to the graphic question in Study 2 using Figure 3. The second question asked participants for the perceived relative mate value between the two heterosexual groups in the current campus on a 5-point scale: female is significantly lower than male, female is slightly lower than male, female and male are approximate, female is slightly higher than male, female is significantly higher than male.

The sixth block collected demographic information including sex, homosexuality, age, ethnicity, nationality, religion, grade, monthly household income, number of household members, and romantic status. The last page of the survey debriefed and thanked participants.

Results and Discussion

The survey recorded 196 completed cases. One respondent wanted to withdraw after debriefing. Three respondents did not correctly comprehend the fictitious articles. Four respondents answered the survey more than once. There were four men and five homosexual

women. Three respondents failed attention-check items. Therefore, the final sample had 176 cases. Participants were around 20 years old (range from 18 to 24). The Spearman correlation between the two mate value items was small but marginally significant, $\rho(176) = .162$, $p = .032$. These women inclined to project their own mate value onto the relative status of same-sex members in the campus, probably because this sample was more homogeneous.

The dependent variable balance of goals was generated as in Study 2. Again, the two-factor model was better, *CFI* = .980 vs. .777, *TLI* = .971 vs. .688, *RMSEA* = .071 vs. .231. The relative local mate value was mapped to a 9-point scale (i.e., 1=9, 2=7, 3=5, 4=3, 5=1). Similarly, the trilevel matching score was also generated. The general linear model did not yield a significant three-way interaction among grade (it brings two missing values), manipulation, and comparative mate value, $F(2, 162) = 1.410$, $p = .247$, $\eta_p^2 = .017$. A visual inspection indicates that only first-year students showed a pattern that was consistent with the theory (see Figure 7), while same-sex skewness induced little change in others. Knowing the campus was same-sex skewed tended to led women who believed their mate values were lower than an average local man to prioritize future reproduction (H2a), while it led women who believed their mate value matched local men to prioritize current reproduction (H1), $F(1, 162) = 2.527$, $p = .114$. Consistent with Study 2, women who felt advantageous did not change upon local same-sex skewness (H2b), $F(1, 162) = .167$, $p = .683$. Given that year 3 and year 4 students were leaving SMU, they may have less concern about operational sex ratio in this campus.

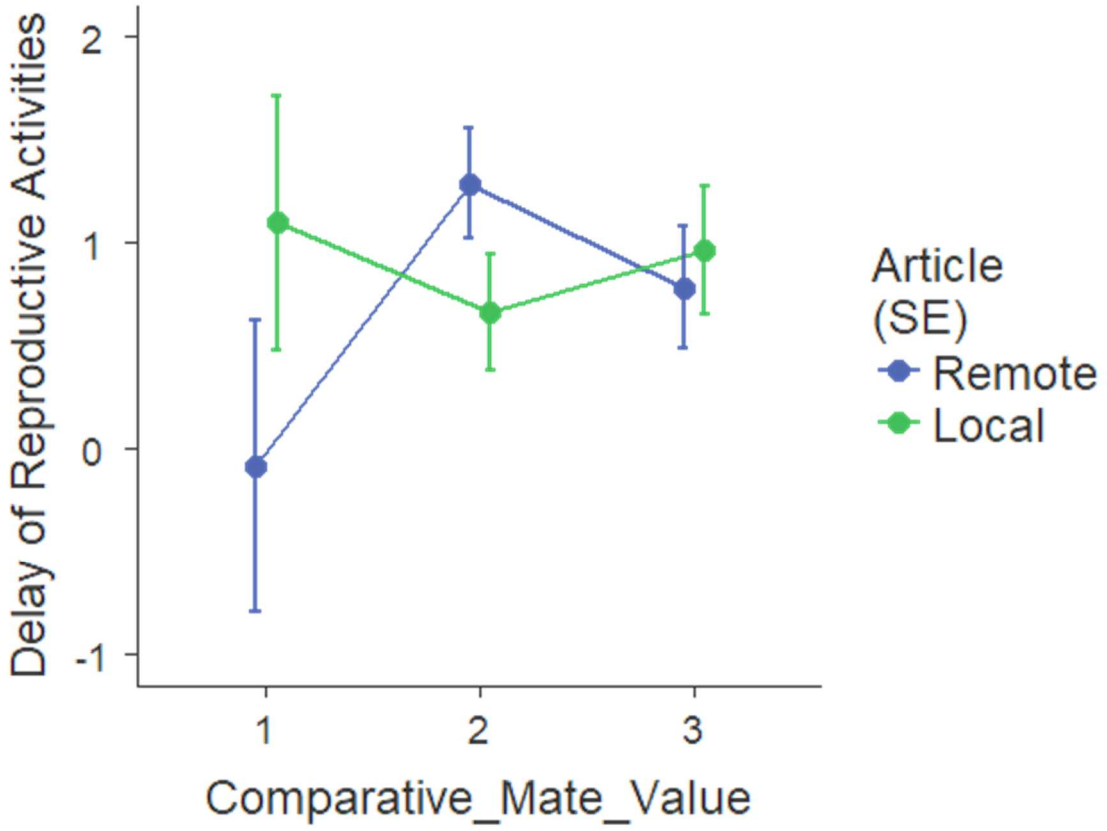

Figure 7. The interaction between the locality of same-sex skewness and mate value matching on balance of goals for first-year students.

The number of delayed options chosen in the temporal discounting tests was counted and the change score was calculated as an indicator for temporal discounting. The general linear model also did not yield a significant interaction between manipulation and the trilevel matching score, $F(2, 170) = .472$, $p = .624$, $\eta_p^2 = .006$. However, the plot again seemed to indicate that women with disadvantageous mate value displayed a need to compensate by preferring immediate income, while other women did not (see Figure 8).

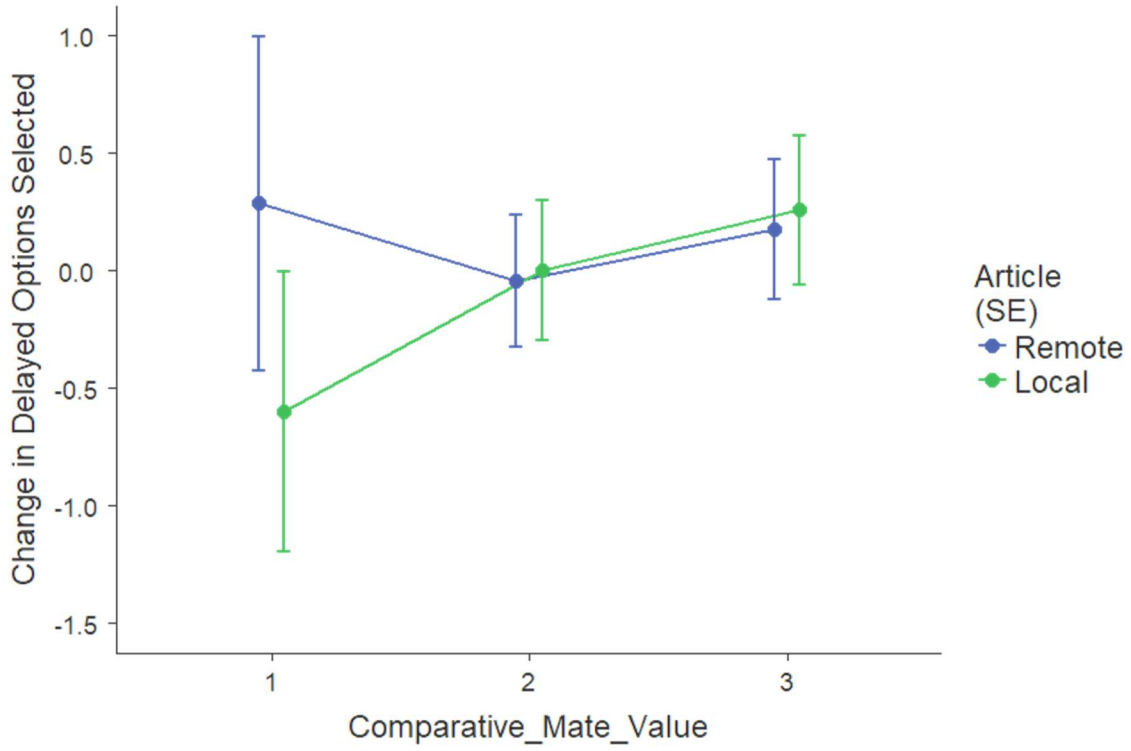

Figure 8. The interaction between the locality of same-sex skewness and mate value matching on temporal discounting.

In an attempt to replicate Durante et al. (2012)'s Study 4, I examined the general linear model for an interaction between manipulation and personal mate value. Like in Study 2, the interaction was insignificant, $F(1, 172) = 1.547$, $p = .215$, $\eta_p^2 = .009$, though the direction of interaction was again consistent with the target study (see Figure 9).

In summary, this study did not find predicted patterns in temporal discounting but found conditional and weak support for all hypotheses in the balance of goals. The anticipated time to be stuck in the situation was identified as a boundary condition for same-sex skewness.

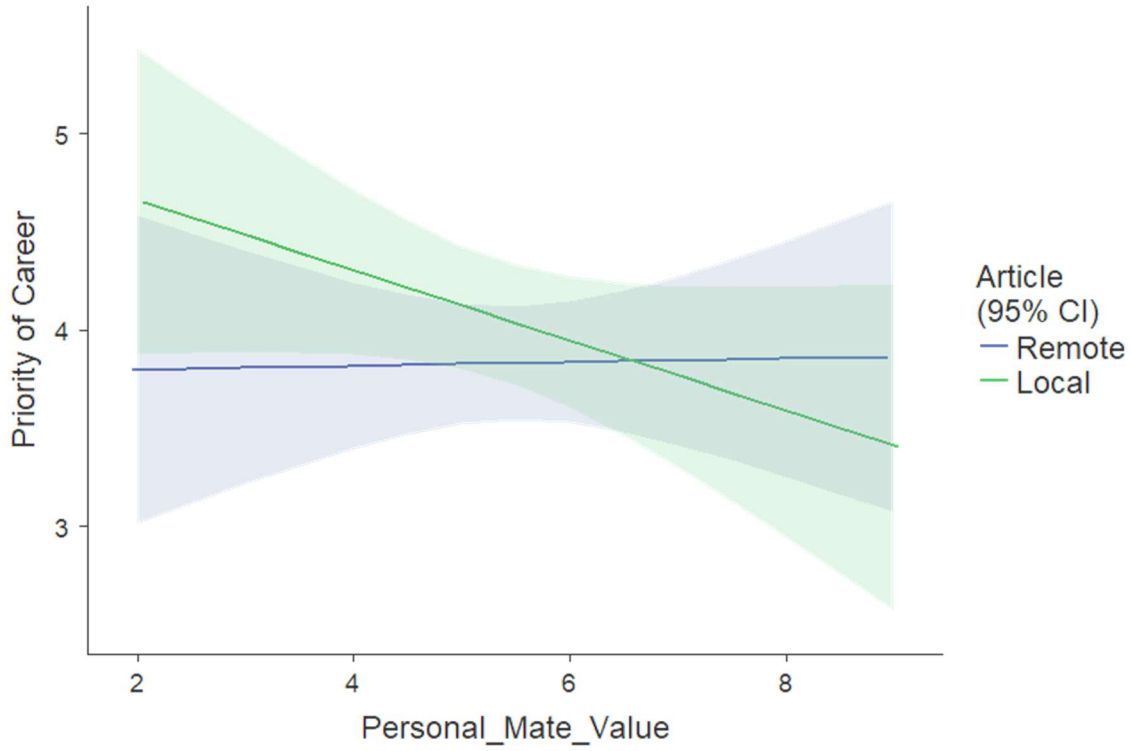

Figure 9. The interaction between personal mate value and the locality of same-sex skewness on future goals.

Chapter 7: General Discussion

This research was proposed to resolve the inconsistency in past research on the economic effects of LOSR in female. Mate value was theorized as the key moderator. The general idea was that the matching of mate value between oneself and local opposite-sex members, when encountering same-sex skewness, would create a focus on current reproduction and a preference for economic options that possibly facilitates current reproductive effort. In contrast, encountering mate value mismatch should have the opposite effect.

Study 1 found that, when encountering same-sex skewness, only women with relatively low mate value preferred small, immediate income over large, delayed income when potential mates were also unattractive, but preferred large, delayed income when potential mates were attractive. In contrast, women with high mate value did not change. On the timing of reproductive activities (i.e., dating for now and child raising for future), Study 2 and 3 did not discover significant results, though the patterns were consistent with H2b in that little change was driven by same-sex skewness when women had higher mate value than local men. However, Study 3 showed that one's time horizon may be important in the mating context as only first-year students appear to have generated a pattern that supported the three hypotheses. Regarding temporal discounting, the two studies were consistent in that women who had lower mate value than local men tended to prefer immediate income because of same-sex skewness, while other women did not appear to change. When summarized (see Table 5), the outcome of hypothesis testing appears to fall below the average level of published research. Therefore, this thesis is inconclusive of whether comparative mate value

moderates people's economic reactions to same-sex skewed local community.

Table 5

Summary of Hypothesis Testing

		Mate value of *local* opposite sex	
		High	Low
Personal mate value	High	H1: no support / (Study 3)	H2b: Study 1, 2, 3 / Study 2, 3
	Low	H2a: Study 1 / (Study 3)	H1: Study 1 / (Study 3)

Note. Financial temporal discounting and balance of goals are divided by a slash. Parentheses indicate conditioned support.

Across the studies, I categorized romantic status into 5 levels: I have a committed relationship; I would say I am in a relationship, but we are not very committed; I would say I am single, but I am interested in a particular person; I am single, but I am looking forward to having a relationship; I am single, and I would like to remain single. I have tried to exclude the last group in analyses as they were less likely to be affected by sex ratio changes, but I did not get meaningful results. I have also tried the mating importance in Study 1, it did not moderate the magnitude of the effects either. Moreover, I was advised to conduct meta-analysis for the studies. It requires 3 entries per analysis, but Study 1 did not contain balance of goals (because the data was collected before I proposed this research) and Study 2 did not measure temporal discounting in the repeated manner (because I thought I could save the workload of participants and thus payment). Besides, dropping the condition where female personal mate value is higher than local men did not significantly change the outcome of

interactions. In summary, I have tried the reasonable tactics suggested by my committee members in the defence but unfortunately none improved the results.

Getting the person one desires most is one of the typical fantasies in adolescence and emerging adults, but they often soon learn that the mating system does not operate in this unilateral manner (Todd & Miller, 1999). Their self-evaluation of mate value tends to converge over years of mating interactions (Simao & Todd, 2002; Todd & Miller, 1999). I have seen no research telling how long this period would be, but my knowledge is that equilibrium often is not reached even in early 20s, especially for the educated population. If many members in the samples had not clearly recognized their mate value (i.e., at which level is their "league" located), certainly they could not calibrate upon this clue. Therefore, age or life stage should be a factor that deserves attention of future researchers, instead of being something simply summarized in the sample description.

Although the timing of reproductive activities did not show a robust pattern in Study 2 and 3, the three studies depicted a potential trend in which women with disadvantageous mate value are apt to cope with same-sex-skewness through financial solutions. Hence, the present research refuted Griskevicius et al. (2012)'s view that financial solution does not matter to women. Instead, the results suggest that it may matter to women with disadvantageous mate value (even when household income per capita is controlled for). Furthermore, this research aligned more with Durante et al. (2012) view that money matters to women under same-sex skewness when mate value is taken into account. The insignificance of results brought a question for the representativeness of student sample. On one hand, they are still under the umbrella of family and have not yet learned the critical role of money in one's life. On the

other hand, these educated samples have low incidence of containing people with really low mate value (i.e., range restriction). However, it remains a question that how to scale mate value when future researcher come up with a heterogeneous sample as per Study 1. Objective mate value is a composite of multiple characteristics so that it cannot be represented by a single objective number as income does. Researchers usually use self-rating method, but it is confined by the individual anchor or reference point: the “low”, “intermediate”, and “high” for a truly low–mate value person might be totally different to the notion for a truly high–mate value counterpart.

As discussed in the Introduction, people have reasons to either actively (i.e., increase mating efforts as posited by previous researchers) or passively (i.e., wait out for future potential) cope with same-sex skewness in the local community. Therefore, temporal prospects (i.e., how long will I remain in this sex-ratio-unbalanced place) should be formally considered in future research. If the imbalance is anticipated to be transient, researchers should expect little change caused by sex ratio. Thus, a post hoc justification for why high–mate value participants in Study 1 did not change their temporal discounting might be that they found our “dating platform” lousy (say, regarding the interface) and they did not care about whatever happened there.

In the Introduction, I discussed some sexual differences to offer a rationale for why female would behave in a particular manner. Unfortunately, it turned out that the results only weakly supported my theory. Although it is not difficult to fill the male half for Study 1 and 2, the SMU campus was truly female-biased and this imbalance was greater in psychology classes, which supply our subject pool system. Hence it requires a collaborator from Nanyang

Technological University, which is slightly male-biased, to feasibly convince the male participants that they do face same-sex skewness. Given that the results of female were not supportive, I wonder if it worth to try male or I should aim for a lower journal.

A major methodological drawback for present studies was that they used online surveys that could be completed at anytime and anywhere, whereas previous studies generally collected data in laboratory. Hence, some of the predicted nuanced effects might not have emerged given the huge noises and the small sample sizes. Since this research has pinpointed that mate value and temporal prospect are reasonable candidates of moderator, it should offer researchers some confident to devote more insights and manpower into this line of research.

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Appendix

The Fictitious Article for The Straits Times

THE STRAITS TIMES

TITLE

Zhang Wenting

SINGAPORE - Varsity students today should expect to see more females than males in campus, according to sociological research.

There was once a time when the average university student could look around campus and expect to see an even number of males and females in a class. Those times are changing rapidly, however, according to new sociological research. Whether it's in class, at work, or at clubs, female students in some universities today should expect to see more women for every guy.

According to the National University of Singapore (NUS)'s Registrar's Office, the male to female ratio of full-time undergraduates in the campus is 0.8:1 in recent years. The same ratio applies to the Singapore Management University (SMU). However, the numbers of female and male students for Nanyang Technological University and other local universities are nearly equivalent. This balance represents the base rate of 15 to 24-year-old individuals living in Singapore, as recorded by Singapore Department of Statistics and Central Intelligence Agency of the United States (The World Factbook 2017).

Interestingly, most students in the two universities do not appear to notice the skew unless made explicit. SMU Professor David Chua asked students to observe people around them for five minutes, before Bhuvan Sharma, a first-year student, noticed the trend. "Everywhere I looked, there were groups of women," said Sharma. "I was surprised that there were so many girls and so few guys. I guess I need to get used to this."

Experts expect this trend to continue in the future. "Looking at the sex ratio of students in post-secondary institutions, it is clear that more women will be applying to prestigious local universities in the next few years," said Michelle Zhong, an Associate Professor at the Lee Kuan Yew School of Public Policy. Regarding the situation of NUS and SMU, Prof Zhong notes that, according to the word cloud analysis on social media, it probably reflects the attractiveness of programmes in the two universities to female students—especially those with good academic results and are more likely to get admitted. "Previously, the programmes attracted an equal number of boys and girls. There is nothing wrong with the current situation, but it will definitely have an impact on people's lives."

The high number of women is likely to influence both academic and recreational lives of varsity students. However, this trend in sex ratio is unique to universities. Moreover, as these university students graduate and enter society, it is unlikely that they will continue to see more women than men of similar age. Prof Zhong pointed out that she “wouldn’t be surprised if some female students ends up working in an office with many male colleagues”.

Dr Gary Johnson, a population and development specialist at Asia Research Institute, notes that the sex ratios in the two universities differed significantly from the past and are likely to change in the future. Students in those schools, however, should expect to be surrounded by an abundance of women.