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Men (but not women) prefer to live in economically equal societies when it comes to mating: A five-study investigation

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ABSTRACT

It is generally believed that people prefer societies with economic equality. No studies thus far have systematically examined sex differences in this preference specifically concerning mating—an important life stage. Building upon theoretical frameworks of mating strategies (i.e., hypergyny), we hypothesized that men, in comparison to women, are less inclined to prefer and reside in a highly unequal society when it comes to mating. This could be because economically unequal environments lead men to expect poorer life quality after marriage than women. These hypotheses were confirmed across five studies using a mixed-method approach. In particular, we first provided evidence by focusing on fertile age populations and employing the panel data across 50 states of the USA from 2006 to 2019 (Study 1A), the most recent cross-sectional data at the county level of the USA (Study 1B), and a large-scale survey data on the individual migration records of American residents (N = 4,746,718, Study 2). In addition, we conducted two controlled experiments by manipulating mating motivation (Study 3) and economic inequality level (high versus low, Studies 3 and 4, N = 812, N = 418). Our studies, employing both archival data high in ecological validity and experimental evidence allowing causal inferences, show that men exhibit a stronger aversion than women toward economic inequality. Our findings contribute to a deeper understanding of how evolutionary mating strategies and sex differences jointly influence the economic inequality preference.

Income inequality, the gap in wealth distribution between the rich and the poor, has deepened globally over the past 40 years (Solt, 2016, 2020). Currently, the wealthiest 10 % of the world's population owns 76 % of global wealth, while the poorest half owns only 2 % (Chancel, Piketty, Saez, & Zucman, 2022). Given that scholars frequently discuss its adverse consequences across social, economic, political, and psychological domains (Buttrick & Oishi, 2017; Cingano, 2014; Muller, 1985; Wilkinson & Pickett, 2011), we might assume that people would prefer not to live in a highly unequal world.

Despite the general aversion toward economic inequality, the existence of sex differences is a possibility. An intuitive response might suggest that men could display a lesser degree of aversion to residing in an economically unequal society compared to women. This is because, throughout their lifespan, men tend to exhibit a diminished preference for egalitarianism (for reviews, see Croson & Gneezy, 2009; and Schunk & Zipperle, 2023). However, thus far, no studies have systematically examined sex differences in this preference, specifically concerning mating and marriage—an important life stage. Building upon theoretical frameworks of mating strategies (e.g., parental investment theory and hypergyny; Buss, 1995; Buss & Schmitt, 1993; Trivers, 1972) and multiple empirical pieces of evidence, we propose a contrasting argument in the present research. Specifically, we anticipate that men, in comparison to women, are less inclined to prefer and reside in a highly unequal society when mating is made salient.

1. Economic inequality and mating success for two sexes

Economic inequality, as a macro societal feature, has been empirically demonstrated to impact the lives of individuals. The prevailing view is that residents living under higher levels of inequality tend to experience reduced happiness and life satisfaction (e.g., Ngamaba, Panagioti, & Armitage, 2018; Wienk, Buttrick, & Oishi, 2022).

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Moreover, the higher the perceived level of economic inequality, the stronger the negative appraisal and aversion toward it (García-Castro, Rodríguez-Bailón, & Willis, 2020; Kiatpongsan & Norton, 2014; Schmalor & Heine, 2022b). One of the driving forces behind this phenomenon is that unequal societies increase anxiety about social rank and interpersonal distrust, subsequently leading to a range of detrimental psychological and behavioral consequences (Blake & Brooks, 2019a; Buttrick, Heintzelman, & Oishi, 2017; Buttrick & Oishi, 2017). Previous studies have identified several factors that could moderate people's aversion toward inequality, including individuals' current social position (García-Castro et al., 2020; Schmalor & Heine, 2022b), ideological and social mobility beliefs (e.g., Napier & Jost, 2008; Starmans, Sheskin, & Bloom, 2017), and perceived causes of economic inequality (Almås, Cappelen, Sørensen, & Tungodden, 2022). However, to our knowledge, none of the studies on moderating factors have systematically explored sex differences. Therefore, what remains largely unknown is sex differences in economic inequality preferences, particularly in the context of mating.

The fundamental premise of evolutionary psychology posits that humans are motivated to achieve aims that would have contributed to inclusive fitness in our evolutionary past, with men and women employing distinct strategies to achieve these goals (Buss, 2005). That is, despite sharing the same spacetime and facing similar environmental conditions, men and women often display psychological and behavioral distinctions resulting from the unique survival and reproductive challenges encountered throughout evolution. According to Sexual Selection Theory and Parental Investment Theory (Darwin, 1871; Trivers, 1972), the high biological costs associated with pregnancy, childbirth, and nursing make women more cautious and selective in their choice of partner. Women prefer those who can provide sufficient resources and protection, prioritizing a partner's social status and resource availability (Buss, 1989; Ellis, 1992). Consequently, although men invest less in reproduction and the rearing of offspring compared to women (Trivers, 1972), they must exert greater efforts to strategically acquire and display personal characteristics, such as social status and resources, that are desired by women (Gangestad & Simpson, 2000).

Meanwhile, economic inequality not only renders one's social position and rank prominent (Goya-Tocchetto & Payne, 2022; Wang, Li, Huang, Yi, & Ren, 2020) but also heightens people's anxiety about these factors (Blake & Brooks, 2019b; Schmalor & Heine, 2022b), as mentioned above. Importantly, residing in a society characterized by high economic inequality can impact men's and women's reproductive success differently, partially due to the distinct effects of rank and status on the reproductive success of each sex (Blake & Brooks, 2019a; Brooks, Blake, & Fromhage, 2022). In particular, economic inequality increases competition among men, especially among younger and poorer men (Brooks et al., 2022; Daly, 2017), for high-status climbing and wealth, which could ultimately lead to reproductive success (Hopcroft, 2006; Von Rueden & Jaeggi, 2016). In contrast, women's reproductive success is often less contingent on their own status and more on their partner's status (e.g., Huber, Bookstein, & Fieder, 2010; Pérusse, 1993). Consequently, in such a society, women are more inclined than men to employ strategies aimed at attracting high-quality mates, particularly those with greater status and wealth, even though women might also strive for status attainment and reproductively relevant resources themselves (Blake & Brooks, 2019a; Netchaeva & Rees, 2016; Wang, Chen, & Chen, 2022). Given the divergent influence of economic inequality on reproductive success among the two sexes, men and women could show varied preferences for economic inequality, a point to be elaborated on in the following section.

2. Economic inequality and expected life quality via mating for two sexes

In order to provide a clearer understanding of the social positions of men and women of average income and the subsequent changes due to marriage in societies with high (versus low) economic inequality, we have included diagrams (see Figs. 1A-1C). Societies with high and low economic inequality (i.e., GINI[1]) are often symbolized by pyramid- and olive-shaped pattern, respectively (Fig. 1A, left and right; Chauvel, 2023; Li & Gorshkov, 2021). Initially, the starting point (pre-marriage) for individuals with average incomes in both societies are relatively the same. The circumstances that follow marriage often vary between the two sexes. Across historical and contemporary societies, the practice of hypergyny (women marrying men of higher status or greater wealth) is a widespread phenomenon (Barthes, Godelle, & Raymond, 2013; Betzig, 1986; Brooks et al., 2022; Cashdan, 1996; Chudnovskaya & Kashyap, 2020; Dickemann, 1979). This trend endures even in gender-equal regions of today where gender disparities are relatively minor and the proportion of women achieving high educational degrees matches or surpasses that of men (Chudnovskaya & Kashyap, 2020; Qian, 2017). This is because women prefer to mate with men who are more capable of acquiring resources and often possess higher social positions as mentioned earlier. In other words, men tend to fulfill the role of resource providers and often form relationships with women possessing lower status and wealth (e.g., Buss, 1989; Hopcroft, 2021; Nettle & Pollet, 2008). This would affect the mating success and life quality after marriage differently for two sexes.

For men, mating and establishing a family can be particularly challenging in societies characterized by high economic inequality. A disproportionate distribution of wealth in these societies frequently indicates higher variability in wealth distribution among men. This is due to the persistence, even in today's world, of wealth, status, and resources being disproportionately controlled by men (Catalyst, 2021; de Beauvoir, 2010; Walby, 2010). As a result, in such societies, there would be a few men at the top with concentrated resources, and these men tend to attract a lot of women,[2] with most other men facing fiercer competition. Furthermore, the gap between various economic resource levels, including those between men and women, could be wider in such societies. Due to more intense competition, hypergyny, and a larger gap in economic resources, men in these societies would typically find partners of much lower economic status compared to those in societies with low economic inequality. This would potentially lead to a more pronounced reduction in household income and overall life quality after marriage (as illustrated in Fig. 1B, left). Conversely, for men with the average income in societies with low inequality (as shown in Fig. 1A, right), although hypergyny still exists, they face less intense intrasexual competition and tend to mate with women with a less low status. Thus, the reduction is less pronounced (as depicted in Fig. 1B, right).

Women in societies characterized by high (as opposed to low) economic inequality and earning an average income (Fig. 1C, left) have the potential to enhance their quality of life and status through mating or marriage. In fact, a society characterized by high economic inequality offers more potential mates with higher status and resources. However, simultaneously, women in such societies also encounter more intense competition from other women when targeting these high-quality men (Blake & Brooks, 2019a; Wang, Chen, Chen, & Yang, 2021), leading to greater risks. Conversely, for women in societies with low economic inequality (as indicated in Fig. 1C, right), the potential to substantially

[1] The Gini coefficient is an index that measures the level of income or wealth distribution inequality, with values ranging from 0 to 1. Lower values indicate a more equal distribution, while higher values signal greater inequality. This coefficient, which offers a quantified approach to assessing the degree of economic inequality in a society, is determined by calculating the ratio of the area between the Lorenz curve and the line of perfect equality (Gini, 1921).

[2] This is because men with high status/resources may reproduce with multiple women simultaneously, despite issues of legality and morality if this occurs in monogamous societies. Alternatively, these men could divorce, remarry, and reproduce again with younger mates than their previous ones through serial monogamy (De la Croix & Mariani, 2015).

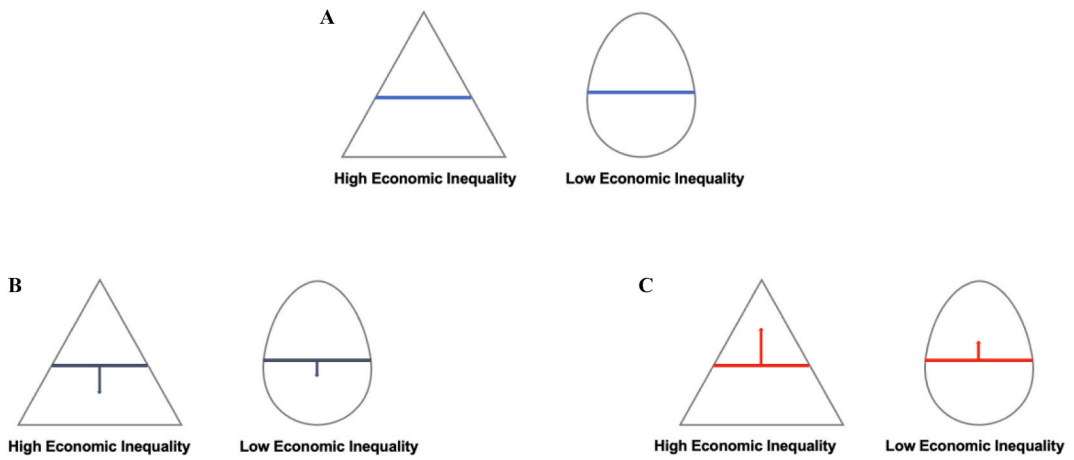

Fig. 1. A. Illustrations of the positions where most people are located in (the blue lines) before mate selection. B. Illustrations of changes in qualities of life among men via mate selection (the gray lines). C. Illustrations of changes in qualities of life among women via mate selection (the red lines). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)
Notes: Building on the conventional characterizations of societies with varying degrees of economic inequality by economists, societies with high and low economic inequality are often symbolized by pyramid- and olive-shaped distribution patterns, respectively (Fig. 1A, left and right; Chauvel, 2023; Li & Gorshkov, 2021).

enhance their quality of life through marriage is lower than that in high inequality societies since the number of high-quality men is lower. Considering both factors (higher-quality men but fiercer competition for them), women may not necessarily exhibit a stronger aversion to living in a society marked by high (as opposed to low) economic inequality, as these two factors could potentially cancel out each other.

3. The present studies

Taken together, we hypothesized that in the context of mating, men, compared to women, would show increased aversion to living in economically unequal society. Given that our theory specifically concerns mating and marriage effects, our predictions are specific to reproductive-aged individuals and conditions where mating is made salient. In addition, this effect, if it occurs, could be explained by the expected life quality via marriage.

To test this hypothesis, we designed 5 studies using a mixed-method approach. In particular, we focused on fertile age populations and employed the panel data across 50 states of USA from 2006 to 2019 (Study 1A), the most recent cross-sectional data at the county level of USA (Study 1B), a large-scale survey data that includes the individual migration records of 4,746,718 American residents (Study 2). In addition, to provide more direct causal evidence, we conducted two controlled experiments that directly manipulated mating motivation (Study 3) and economic inequality level (high versus low, Studies 3 and 4). The data for Studies 1 A, 1B, and 2 were sourced from databases publicly available for researchers to analyze and utilize. All experiments reported in the current research have received ethical approval from the corresponding author's affiliated university and participants have given consent. The data can be accessed via https://osf.io/e5cjx/?view_only=c9b35674b4f342e8a24c0bf5e3e1f56b.

4. Study 1A. Evidence from the U.S. state-level panel data 2006 to 2019

In study 1A, the panel data across 50 U.S. states from 2006 to 2019 were employed for analysis. Originated from econometrics, panel data analysis might provide information on the foci variables across units (i.e., states) and over time (i.e., years) (e.g., Auten, Sieg, & Clotfelter, 2002). Moreover, compared with cross-sectional analysis, panel data analysis could control for time-invariant unobservable variables, reduce endogeneity, and provide multiple reasonable outcomes (e.g., Becker & Woessmann, 2013).

We expected that high level of economic income inequality of a state (indexed by high Gini coefficient) could predict women making up a higher proportion in fertile age populations in that state, reflected by lower operational sex ratios (abbr. *OSR*), and thus supports our hypothesis that reproductive men, compared to women, prefer not to live in unequal societies. To examine the unique contribution of Gini coefficient to *OSR*, we controlled several confounding variables, such as sex ratio at birth, mean education level, economic development level, and the population proportions of main economic sectors across 50 U.S. states.

4.1. Method

4.1.1. Main variables

Predictor. Gini coefficient (abbr. *GINI*), also known as the Gini index or Gini ratio, is a measure of statistical dispersion intended to represent income inequality or wealth inequality within a nation or a population (e.g., state), ranging from 0 (*absolutely even*) and 1 (*absolutely uneven*). To match the data of *OSR* temporally and spatially, the *GINI* data of 50 U.S. states from 2006 to 2019 were utilized in the analysis.

Outcome Variable. *OSR* is defined as the local ratio of sexually receptive men to receptive women (Emlen & Oring, 1977). Importantly, this index differs from adult sex ratio which simply includes all adults, including those who are non-reproductive (i.e., the elderly). Following previous research (Del Giudice, 2012; Schmitt, 2005), *OSR* in our study is the ratio of the men to women aged 15 to 49 of 50 U.S. states for each year from 2006 to 2019. Notably, a lower *OSR* corresponds to a higher proportion of reproductive-aged women compared to reproductive-aged men.

4.1.2. Control variables

Sex Ratio at Birth (abbr. *SRB*), *Higher Educational Attainment* (or *Mean Education Level*), *Real GDP* Per Capita, and *Population Proportion of Main Economic Sectors*. Please see Supplementary Materials for details.

4.1.3. Data source

Please see Supplementary Materials for details.

4.2. Results

As predicted, the *GINI* is negatively correlated with the *OSR* ($r = -0.563$, $p < .001$), such that the U.S. states with higher income inequality have lower *OSR*. This means increased income inequality

predicts more reproductive-aged women and fewer reproductive-aged men. *Table* 1 showed the descriptive and the correlation results. Further two-way fixed model[3] showed that *GINI* negatively predicts *OSR*, even after controlling for all the potential confounding variables ($\beta = -0.16$, $p = .038$, for details, see *Model* 1 of *Table* 1s in Supplementary Materials). Please see Supplementary Materials for further robustness testing.

5. Study 1B. Evidence based on county-level cross-sectional data in the United States

In study 1B, we aimed to replicate the findings of Study 1A at a more refined level, i.e., U.S. county level. In particular, we employed the most updated data of the U.S. at the county level that is available (i.e., year 2010, $N = 3143$, and year 2020, $N = 3143$), and used cross-sectional approach for each year in this study.[4] We predicted that in regions with higher economic inequality, there were fewer reproductive-aged men but more reproductive-aged women.

5.1. Main variables and control variable

These are almost identical to the ones in Study 1A, except that the variables are all at county-level (rather than state-level) and reflect the situation in the year 2010 and 2020, respectively.

5.2. Data source

Please see Supplementary Materials.

5.3. Results and discussion

Conceptually replicating the findings of Study 1A at the county-level, *GINI* negatively predicted *OSR* (year 2010: $\beta = -0.29$, $p = .004$; year 2020: $\beta = -0.26$, $p = .025$), indicating that in regions with higher economic inequality, there were fewer reproductive-aged men but more reproductive-aged women (for details, see *Models* 1 of *Tables* 4 s and 5 s in Supplementary Materials; for descriptive and correlation results, see *Tables* 2 s and 3 s in Supplementary Materials).

To further examine the unique contribution of economic inequality, while regression analyses were conducted, we entered *SRB*, mean education level, the population proportions of *Primary* and *Secondary* sectors, and Ln Real *GDP* per capita as the control variables (for details, see Supplementary Materials). *GINI* negatively predicted *OSR* after controlling for the confounding variables (year 2010: $\beta = -0.30$, $p < .001$; year 2020: $\beta = -0.37$, $p < .001$) (*Models* 2 of *Tables* 4 s and 5 s in Supplementary Materials). Please see Supplementary Materials for further robustness testing.

Therefore, in Studies 1 A and 1B, using different approach and analyses, we have consistently found that in regions with higher economic inequality, there were fewer reproductive-aged men but more reproductive-aged women. It is noteworthy that the *OSR*, as an indicator reflecting the overall characteristics of a population in reality, represents the local ratio of men to women of reproductive age and does not equate to a preference for living in a society. In other words, despite the ecologically valid evidence provided by Studies 1 A and 1B, the *OSR*

Table 1
Means, standard deviations, and correlations.

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. *OSR*	1.02	0.04	1										
2. *GINI*	0.46	0.02	−0.563**	1									
3. *SRB*	1.05	0.01	0.199**	−0.188**	1								
4. Mean Education Level	0.59	0.06	0.248**	−0.088*	0.092*	1							
5. LnPerRealGDP	10.84	0.26	−0.056	0.287**	0.066	0.547**	1						
6. Goods Producing_pop.	0.20	0.04	0.212**	−0.432**	−0.025	−0.374**	−0.540**	1					
7. Services Producing_pop.	0.75	0.03	−0.221**	0.447**	−0.025	0.294**	0.320**	−0.842**	1				
8. Government_pop.	0.05	0.02	−0.068	0.144**	0.083*	0.262**	0.527**	−0.614**	0.091*	1			
9. Primary_pop.	0.03	0.02	0.580**	−0.395**	0.109**	0.017	−0.060	0.421**	−0.558**	0.038	1		
10. Secondary_pop.	0.17	0.04	−0.108**	−0.241**	−0.092*	−0.420**	−0.555**	0.846**	−0.593**	−0.694**	−0.127**	1	
11. Tertiary_pop.	0.80	0.04	−0.212**	0.432**	0.025	0.374**	0.540**	−1.000**	0.842**	0.614**	−0.421**	−0.846**	1

Notes: *M* and *SD* are used to represent mean and standard deviation, respectively; * indicates $p < .05$, ** indicates $p < .01$, the same below.

[3] Please see Supplementary Materials for why two-way fixed model was chosen

[4] Due to the random rotational method of sampling in the American Community Survey (ACS), the 1-year estimated data at the county level in the United States exhibits significant deviations. For the ACS 5-year estimated data at the county level, the missing cases are quite evident. Both datasets are insufficient to support effective panel data analysis. Thus, we have selected two recent time points from the U.S. Census, namely the data sets from the years 2010 and 2020, for cross-sectional analysis.

used in these two studies can merely be considered as a proxy for a preference for living in a certain society at a group level.

6. Study 2 State-level income inequity and individuals' moving behavior

Using two levels of spatial aggregation evidence, Studies 1 A and 1B consistently found that in regions with higher economic inequality, there were fewer reproductive-aged men but more reproductive-aged women. Study 2 aimed to take one step further and investigate whether reproduced-aged men, compared to reproduced-aged women, living in states higher in income inequality were more likely to move out.

To this end, Study 2 employed a large-scale survey data that includes the individual migration records of 4,746,718 American residents. Importantly, same as in Studies 1 A and 1B, we focused on reproduced-aged men and women (i.e., aged 15 to 49) in Study 2. We predicted that there is a significant interaction between economic inequality (indexed by *GINI*) and sex on migration behavior. In particular, *GINI* would predict increased migration (moving out of his/her living state) among reproduced-aged men than women, suggesting that men, compared to women, would show increased aversion toward high economic inequality.

6.1. Main variables

Predictor. The state-level Gini coefficient from 2006 to 2017 was obtained from ACS one-year estimates dataset.

Outcome Variable. Individual migration behavior was obtained from the ACS Public Use Microdata Series (PUMS) (https://www.ipums.org/). In particular, millions of Americans indicated where they lived at the time of the survey (e.g. 2017) and previous year (e.g. 2016). We coded their migration behavior as a dichotomous variable, with 1 indicating interstate migration (different states in two time points), and 0 indicating no interstate migration (the same state in two time points). In the current study, the data of individual-level *Migration* covered the years from 2006 to 2018. To our knowledge, the data at U.S. state level *GINI* (our predictor) of year 2005 and before were not publicly released, thus the ACS PUMS data in 2006 at the individual-level was deleted. This results in a total of 4,746,718 respondents in the final analysis.

Moderator: Sex is a dichotomous variable (0 = men, 1 = women).

6.2. Control variables

Individual-level control variables: *Education level, Age, and Income.*

State-level control variables: *Operational Sex Ratio (OSR), Mean Education Level, Real GDP* per capita*, Real GDP* per capita*, The Compositions of Economy, and Employment Rate.* Please see Supplementary Materials for details.

6.3. Data source

Please see Supplementary Materials for details.[5]

6.4. Results and discussion

We used a fixed-slope, random-intercept two-level logistic regression model, with individuals as the first level, states as the second level, and controlling for the fixed effects of year (i.e., each year as a dummy variable).[6] And before entering the models of formal analysis, all continuous variables were standardized (global standardization regardless of state and year). There was a significantly negative interaction effect between *GINI* and sex on individual migration behavior (i.e., moving out of his/her living state), $\beta = -0.01$, *Log Likelihood* = −627,181.48, $p = .006$ (see *Table* 8 s in Supplementary Materials for details). In particular, the influence of *GINI* on reproduced-aged men's migration behavior (i.e., moving out of his living state) was larger compared to reproduced-aged women.

Study 2 provides further evidence at the individual level that reproductive-aged men, compared to women, are more inclined to leave areas with high economic inequality, suggesting that men show an increased aversion to economic inequality. Different from *OSR* in Studies 1 A and 1B, which serves as a proxy for a preference for living in a particular society at a group level, migration behavior is an individual-level proxy. However, the ACS PUMS data utilized in Study 2 does not include information on sexual orientation, which potentially affects and ambiguates the interpretation of our obtained results (Van Anders, 2015). Therefore, in the subsequent experimental studies, we only recruited heterosexual participants to exclude the undesirable influence of sexual orientation.

7. Study 3 Manipulating economic inequality and societal preference of two sexes

Using archival data, Studies 1 A, 1B, and 2 showed that reproductive-aged men, compared to women are less likely to reside in and more likely to move out of places high in economic inequality, suggesting that men, compared to women, show increased aversion toward high economic inequality when it comes to mating. Study 3 aimed to conceptually replicate this finding using experiments that directly manipulate economic inequality (high versus low) of a society and one's goal (mating versus working). We predicted that after entering a society high in economic inequality, men, compared to women, would show reduced preference to live in this society when mating is made salient. For the subsequent two experiments (Studies 3 and 4), following prior standards, we aimed for 100 participants per condition (e.g., Chen, Wang, Zang, & Guinote, 2021; Teng et al., 2022; Wang, Chen, Chen, & Luo, 2022).

7.1. Method

Participants. A total of 850 heterosexual single Chinese participants were recruited from a Chinese university participant pool. Thirty-two failed an attention check question and were thus excluded from the final analysis. This resulted in 812 participants ($M_{age} = 24.94$, $SD = 3.52$) in the final analysis, with 384 women ($M_{age} = 25.08$, $SD = 3.45$) and 428 men ($M_{age} = 24.81$, $SD = 3.58$). Both men and women were randomly assigned to one of the four conditions: context (mating vs. working) by (economic inequality: high vs. low), resulting in roughly 100 participant per sex in each condition.

Procedure and Measures. To ensure all participants would complete this study in a rather homogenous environment, they were all invited to a university laboratory for the study. After reporting basic demographic measures, such as sex, age, sexual orientation, relationship status, education level, participants were told that they would be introduced to a new society. Their task was to imagine living in this society as vividly as possible. In particular, following prior studies (e.g., Cheng, Hao, Wang, Li, & Wang, 2023; Sánchez-Rodríguez, Willis, Jetten, & Rodríguez-Bailón, 2019), participants were randomly assigned to a society called Bimboola, with high or low economic inequality. Similarly, participants in both conditions were told that their individual income was at the medium position. To assess whether participants read our instructions carefully, they were asked to tick the level they belonged to in this world. Those who did not to choose the middle level were considered as failing the attention check question. To determine whether our inequality manipulation was effective, a separate group of participants

[5] The sex distribution at the state-level and descriptive information at individual-level are showed in *Table* 6 s and *Table* 7s in Supplementary Materials.

[6] See Supplementary Materials for why this model was chosen.

($N = 101$) were asked to what extent they perceived Bimboola's economic distribution as unequal. Results showed that those in the high unequal society ($M = 5.90$, $SD = 1.21$) perceived a higher level of economic inequality than those in the low unequal society ($M = 3.71$, $SD = 1.61$; 1 = *not unequal at all*, 7 = *very unequal*), $F(1, 99) = 58.77$, $p < .001$, $\eta_p^2 = 0.372$, 95 % CI = [2.752, 1.621]. This validated our manipulation method.

Next, participants were further randomly assigned to a mating or a working condition, and depending on their assigned condition (mating versus working), participants were explicitly told that they need to think carefully about finding a life partner and getting married (mating condition) or finding a job and working (working condition) in Bimboola. They were also instructed to write a few sentences describing married life (working life) in this society.

To assess the extent to which participants prefer this society, they responded to three questions: "To what extent would you like to live in this society?" "To what extent would you look forward to living in this society?" "To what extent do you believe living in this society would be enjoyable?" (1 = *not at all*; 7 = *very much*). An overall preference score was calculated by averaging the scores across items with higher scores corresponding to higher levels of preference ($\alpha_{mating} = 0.767$; $\alpha_{working} = 0.897$).

For control measures, we have included social dominance orientation (SDO) and competitiveness. Please see Supplementary Materials for details.

Finally, participants were thanked and debriefed.

7.2. Results and discussion

In terms of society preference, participants in general showed an aversion toward economic inequality (high: $M = 3.74$, $SD = 1.51$; low: $M = 4.32$, $SD = 1.21$), $F(1, 804) = 44.64$, $p < .001$, $\eta_p^2 = 0.053$, 95 % CI = [0.390, 0.768]. More importantly, a three-way interaction between context (mating versus working), sex (men versus women), and economic inequality level (high versus low) emerged, $F(1, 804) = 8.96$, $p = .003$, $\eta_p^2 = 0.011$, 95 % CI = [0.393, 1.889]. This effect remained significant after controlling for trait competitiveness, SDO, and educational level, $F(1, 801) = 8.85$, $p = .003$, $\eta_p^2 = 0.011$, 95 % CI = [0.371, 1.809].

As predicted, when mating was made salient, there was a significant interaction between sex (men versus women) and economic inequality (high versus low), $F(1, 417) = 10.32$, $p = .001$, $\eta_p^2 = 0.024$, 95 % CI = [0.275, 1.141] (see Fig. 2). This effect remained significant after controlling for general competitiveness, SDO, and educational level, $F(1, 414) = 10.82$, $p = .001$, $\eta_p^2 = 0.025$, 95 % CI = [−1.129, −0.284]. In particular, men's preference level for high economic inequality was significantly lower ($M = 3.77$, $SD = 1.26$) than that of women ($M = 4.35$, $SD = 1.00$), $F(1, 205) = 13.66$, $p < .001$, $\eta_p^2 = 0.062$, 95 % CI = [−0.893, −0.272]. In contrast, this sex difference was not significant for low economic inequality (men: $M = 4.29$, $SD = 1.16$ versus women: $M = 4.16$, $SD = 1.10$), $F(1,212) = 0.67$, $p = .415$, $\eta_p^2 = 0.003$, 95 % CI = [−0.178, 0.429]. In parallel, in the context of mating, men preferred high economic inequality to a less extent compared to low economic inequality, $F(1, 192) = 8.99$, $p = .003$, $\eta_p^2 = 0.045$, 95 % CI = [−0.864, −0.178]. In contrast, this effect was absent for women, and the pattern was actually in the opposite direction, $F(1, 225) = 1.80$, $p = .191$, $\eta_p^2 = 0.008$, 95 % CI = [−0.088, 0.462].

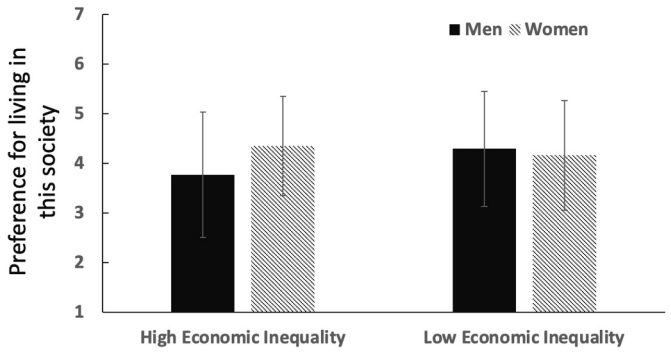

Fig. 2. Societal preference as a function of sex (men versus women) and level of economic inequality (high versus low). Error bars represent +/− 1SD.

In comparison, when working was made salient, no significant interaction between sex (men versus women) and economic inequality (high versus low) was found, $F(1, 387) = 1.86$, $p = .173$, $\eta_p^2 = 0.005$, 95 % CI = [−0.191, 1.057], and replicating prior research, people in general preferred high economic inequality ($M = 3.37$, $SD = 1.74$) to a less extent compared to low economic inequality ($M = 4.43$, $SD = 1.30$), $F(1, 387) = 48.62$, $p < .001$, $\eta_p^2 = 0.112$, 95 % CI = [−1.371, −0.759].

Therefore, using experiments that directly manipulated economic inequality (high versus low) and one's goal (mating versus working), we found that after entering a society high in economic inequality, men, compared to women, showed reduced preference to live in this society when mating is made salient. It is worth mentioning that, in contrast to Studies 1 A-2, Study 3 directly measured inequality preference (instead of using proxies) and provides causal conclusions.

8. Study 4 manipulating economic inequality and societal preference of two sexes

Study 4 aimed to replicate the findings that men with a mating goal, compared to women, would show reduced preference to live in a society with high economic inequality. Rather than making a mating goal salient among participants, Study 4 aimed to test whether the same effect could be observed among individuals actively seeking a life partner, for whom a mating goal is inherently salient. In addition, we measured and tested whether expected life quality after marriage would act as a mediator in this process.

8.1. Method

Participants. Heterosexual single college students who were currently looking for a life partner were recruited from a Chinese university participant pool. In particular, potential participants were approached and instructed to fill out a few questions. Only those who indicated that they were currently single and were looking for a life partner were further invited to our study. A total of 440 participants were recruited. Twenty-two participants failed our attention check question and were thus excluded from final analysis. This resulted in 418 participants ($M_{age} = 25.36$, $SD = 3.85$) in the final analysis, with 207 women ($M_{age} = 25.27$, $SD = 3.74$) and 211 men ($M_{age} = 25.44$, $SD = 3.97$). Both men and women were randomly assigned to one of the two conditions (economic inequality: high vs. low), resulting in roughly 100 participant per sex in each condition.

Procedure and Measures. Similar as in Study 3, participants were invited to a university laboratory to complete this study. After reporting basic demographic measures, such as sex, age, relationship status, family income, sexual orientation, and perceived social rank, participants were told that they would be introduced to a new society. The manipulation method of economic inequality was identical to that of Study 3.

Next, to assess participants' perceived life quality via mating, they were presented with four questions: "To what extent do you believe you can improve your life quality via finding a life partner in this world? (1 = *not at all*; 7 = *very much*)" "To what extent do you believe you can achieve a better social position via finding a life partner in this world? (1 = *not at all*; 7 = *very much*) "Your life quality after getting married in this society can be__ (1 = *much lower than now*; *much higher than now*)." "It is highly possible that your family income level after getting married in this society can be__ (1 = *at the bottom*; 7 = *at the top*)." An overall expected life quality via mating score was calculated by averaging the

scores across items with higher scores corresponding to higher levels of expected life quality (α = 0.786).

To assess the extent to which participants prefer this society, they responded to the same three questions in the mating condition as in Study 3. An overall preference score was calculated by averaging the scores across items with higher scores corresponding to higher levels of preference (α = 0.851).

Finally, participants were thanked and debriefed.

8.2. Results and discussion

Preference. Replicating the findings of Study 3, there was a significant interaction between sex (male versus female) and economic inequality level (high versus low) on preference, $F(1, 414) = 11.85$, $p = .001$, $\eta_p^2 = 0.028$, 95 % CI = 0.323, 1.184] (see Fig. 3). This effect remained significant after controlling for family income and social rank, $F(1, 412) = 10.62$, $p = .001$, $\eta_p^2 = 0.025$, 95 % CI = [0.282, 1.138]. In particular, men's preference for high economic inequality was significantly lower ($M = 4.51$, $SD = 1.37$) than that of women ($M = 5.04$, $SD = 0.90$), $F(1, 206) = 10.73$, $p = .001$, $\eta_p^2 = 0.049$, 95 % CI = [−0.845, −0.210]. In contrast, this sex difference was not significant for low economic inequality (Men: $M = 4.93$, $SD = 1.17$ versus Women: $M = 4.71$, $SD = 0.96$), $F(1, 208) = 2.32$, $p = .129$, $\eta_p^2 = 0.011$, 95 % CI = [−0.067, 0.518]. In parallel, men preferred high economic inequality to a less extent compared to low economic inequality, $F(1, 209) = 5.80$, $p = .017$, $\eta_p^2 = 0.027$, 95 % CI = [0.077, 0.769]. In contrast, this effect was in the opposite direction for women, such that they preferred high economic inequality to a larger extent compared to low economic inequality, $F(1, 205) = 6.51$, $p = .011$, $\eta_p^2 = 0.031$, 95 % CI = [0.075, 0.586].

Expected Life Quality via *Mating*. A similar pattern was obtained for one's expected life quality via mating, $F(1, 414) = 12.25$, $p = .001$, $\eta_p^2 = 0.029$, 95 % CI = [−1.020, −0.286]. This effect remained significant after controlling for family income and social rank, $F(1, 412) = 10.95$, $p = .001$, $\eta_p^2 = 0.026$, 95 % CI = [−0.973, −0.248]. In particular, men's expected life quality via mating was significantly lower ($M = 4.39$, $SD = 1.14$) than that of women ($M = 4.97$, $SD = 0.88$) in the high economic inequality society, $F(1, 206) = 16.64$, $p < .001$, $\eta_p^2 = 0.075$, 95 % CI = [−0.857, −0.299]. In contrast, this sex difference was not significant in the low economic inequality society ($M = 4.84$, $SD = 1.00$ versus $M = 4.76$, $SD = 0.75$), $F(1, 208) = 0.38$, $p = .537$, $\eta_p^2 = 0.002$, 95 % CI = [−0.165, 0.315].

8.2.1. The mediating role of expected life quality via mating

To examine whether expected life quality mediated the interaction between sex (male = −1, female =1) and economic inequality (high = 1, low = −1) on society preference, a mediated moderation model was employed. For this, an interaction term between sex and economic inequality was created and treated as the independent variable; expected life quality via mating was entered as a mediator; preference was entered as the dependent variable, with sex and economic inequality being considered as covariates (Hayes, 2013). As shown in Fig. 4, the interaction effect predicted expected life quality as well as preference; expected life quality, in turn, predicted preference. When controlling for expected life quality, the interaction effect between sex and economic inequality on preference was significantly reduced. A bootstrapped analysis (Preacher & Hayes, 2008; 5000 resamples) revealed that the 95 % confidence interval for the indirect effect did not include zero: $a*b = 0.084$, $SE = 0.025$, CI = [0.037, 0.136]. The results showed that expected life quality via mating acted as a significant mediator, which was able to account for the interaction effect between sex and economic inequality on preference.

Therefore, Study 4 replicated the findings that men with a mating goal, compared to women, showed reduced preference to live in a society with high economic inequality, and this effect was observed among individuals actively seeking a life partner, for whom a mating goal is inherently salient. Alongside Study 3, Study 4 directly measured participants' preference for economic inequality and provides causal inference conclusions. In addition, we found that expected life quality after marriage acted as a mediator in this process.

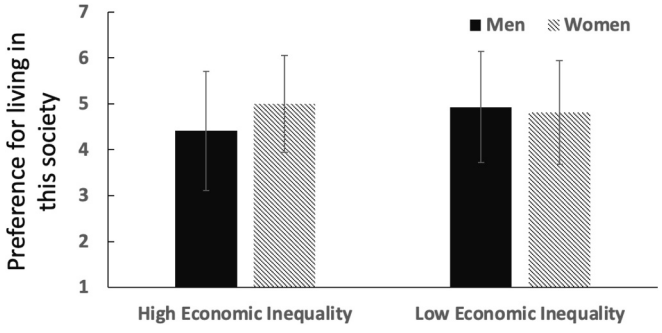

Fig. 3. Societal preference as a function of sex (men versus women) and level of economic inequality (high versus low). Error bars represent +/− 1SD.

9. General discussion

Despite the general aversion people have toward economic inequality (e.g., García-Castro et al., 2020; Kiatpongsan & Norton, 2014), no studies so far have systematically examined sex differences in this process. These preferences are especially unknown in the context of mating and marriage. In the current research, we hypothesized that when it comes to mating, men, compared to women, would show a higher preference for not living in an economically unequal society. This effect, if it occurs, could be because men's life quality via mating in societies with high economic inequality tend to be lower than that with low inequality.

This hypothesis was confirmed across five studies using a mixed-method approach and participants from two different countries (i.e., the United States and China). In Study 1A, 14 years of panel data across 50 U.S. states showed that high economic inequality correlated with lower operational sex ratios, thus indicating that economically unequal states had fewer fertile-aged men. This remained to be the case after controlling for several confounding variables, such as sex ratio at birth, mean education level, economic development level, and the population proportions of main economic sectors across 50 U.S. states. Study 1B replicated the findings of Study 1A at the U.S. county level and also controlled for a series of confounding variables. Study 2 extended these findings by examining migration patterns of fertile-aged men and women, as a function of state-level economic inequality. Our analysis of over 4.7 million individual migration records indicated that a notable interaction effect emerged between *GINI* and sex regarding individual migration behavior. Specifically, the impact of *GINI* on the migration behavior (i.e., moving out of their living state) of men of reproductive age was more pronounced compared to female counterparts. The implication was that men, compared to women, showed an increased aversion toward living in economically unequal states.

Studies 3 and 4 complemented the first three studies by providing

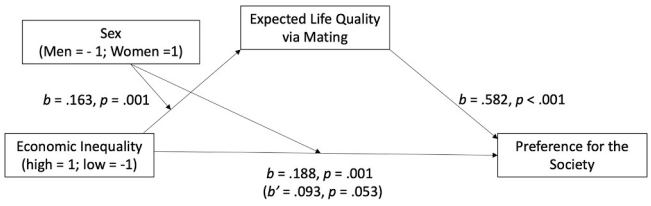

Fig. 4. The mediation model for the interaction effect of sex and economic inequality level on society preference via expected life quality via mating in Study 4. Values for the indirect path (i.e., when controlling for the mediator) are shown in parenthesis.

causal evidence in support of their results. In particular, Study 3 manipulated economic inequality (high versus low) and mating motivation goal (mating versus working) in a laboratory study. We found that men, compared to women, showed reduced preference to live in an economically unequal society when mating was made salient. This finding remained to be the case after controlling for trait competitiveness, SDO, and education level. Study 4 replicated the findings of Study 3 among individuals actively seeking a life partner, for whom a mating goal was inherently salient. In addition, we found expected life quality after marriage acted as a mediator in this process, showing that men's aversion to living in economically unequal areas was due to their expectation that marriage in an economically unequal world would decrease their life quality.

9.1. Theoretical and practical contributions

Our findings have several theoretical implications. First, this study allows us to transcend a simplistic view of aversion to economic inequality. Past evidence has often shown that women exhibit greater aversion to inequality in both experimental and real-world scenarios (Carlsson, Daruvala, & Johansson-Stenman, 2005; Norton & Ariely, 2011). Some have even considered this to be an ingrained sex difference, suggesting that aversion to inequality is a trait typical of women (e.g., Andreoni & Vesterlund, 2001). However, our research suggests that aversion to inequality is not exclusively an essential sex characteristic, but one that can be influenced by contextual and motivational factors. For instance, as indicated by the findings of the current research, women might demonstrate more tolerance toward economic inequality when mating goals are salient. This new perspective opens the door to further investigations into the multifaceted dynamics of sex disparities in preferences for inequality. How societal, contextual, and motivational factors impact individuals' preferences for economic inequality are research questions deserving further attention.

Second, the findings of the present research add a layer of complexity to our comprehension of the intricate dynamics between sex and mating motivations. Previous research has indicated that women, when seeking potential partners, tend to place a higher premium on resource advantages held by the opposite sex (Buss, 1989, 2005). Yet, there has been limited exploration of how this preference connects with the preference for economic inequality. This study bridges the gap between these two domains. Former studies have demonstrated that high economic inequality within a society implies greater wealth disparities among its members, particularly among men (Chancel et al., 2022; Piketty, 2014). This raises the possibility that high economic inequality could serve as a signal within the mating market, suggesting that a proportion of men possess abundant resources. Our findings further imply that when women are driven by mating motives, they appear to be attuned to this signal, and as a result they are more in favor of living in economically unequal areas than men are.

Finally, this study contributes to the field of intrasexual competition in evolutionary psychology. For a considerable period, both evolutionary biology and evolutionary psychology typically asserted that intrasexual competition primarily occurred among males, involving practices such as violence, coercion, or other non-violent means to compete (Andersson, 1994; Darwin, 1871). Females, in contrast, were often perceived as passive recipients of this competition (Hrdy, 2013). The findings from the current research, together with prior ones (e.g., Blake & Brooks, 2019a; Wang et al., 2021; Wang, Chen, & Chen, 2022), suggest that intrasexual competition could be prevalent among women as well. In particular, we found that women motivated by mating demonstrated a higher preference for economic inequality compared to men, and this effect could be explained by their expected high(er) life quality via mating. Because female hypergamy is still the norm in most societies, finding a partner in a society with high economic inequality could entail a higher chance of moving upward. Importantly, such a chance is coupled with high risks and competitiveness among peers at the same time (Campbell, 1999; Hrdy, 2009). This suggests that women do not shine away from intrasexual competition.

Apart from theoretical contributions, the current research carries some practical implications. At a micro level, current findings hold the potential to transform marketing strategies and advertising campaigns. For example, products related to mating and romance (e.g., engagement rings, wedding parties, and properties) that remind people of unequal distribution of wealth in a society may be more poorly received by male than female consumers. Therefore, marketers and advertisers can leverage this knowledge to develop more effective and nuanced strategies for products or services, especially when they target consumers of different sexes in the context of mating. At a macro level, government officials and policymakers can take these sex-driven variations into account when formulating policies to meet the diverse economic expectations. In particular, policymakers could consider how individuals' motivations, such as mating motives, influence their attitudes toward economic inequality when crafting policies. For example, citizens' attitudes toward and support for public policies, such as income distribution, taxation, and social welfare, could be significantly shaped by different life goals (e.g., mating and career) across different sexes.

9.2. Limitations and future avenues

First, the differentiation between objective and subjective economic inequality, as well as their varied outcomes, is a focal issue in this field, as illustrated by studies by Schmalor and colleagues (Schmalor & Heine, 2022a, 2022b). However, there is also evidence suggesting that objective economic inequality and subjective or perceived economic inequality can lead to similar consequences. For instance, research by Blake and colleagues (Blake, Bastian, Denson, Grosjean, & Brooks, 2018; Blake & Brooks, 2019b) found that women's appearance enhancement occurs in both contexts of objective and subjective high economic inequality. Both objective and subjective high economic inequality are associated with self-enhancement values and a desire for a strong leader (Du, Götz, King, & Rentfrow, 2024; Sprong et al., 2019). In fact, there is evidence showing that objective economic inequality often correlates with subjective economic inequality (e.g., Poppitz, 2019; Sommet, Morselli, & Spini, 2018). Therefore, it remains debatable to what extent these two concepts overlap. Despite this, demonstrating that both objective (Studies 1a-2) and subjective (Studies 3 & 4) economic inequality could predict and result in similar effects, to some extent, supports the robustness of our hypothesized effect. Future studies could continue to systematically investigate whether the effect size could further vary as a function of objective and subjective economic inequality.

While the large-scale archival data analyses (i.e., Studies 1A, 1B, and Study 2) were based on the American population, we recruited Chinese college students for the subsequent experiments (i.e., Studies 3 and 4). This was because our goal was to identify a phenomenon that is not exclusive to a specific culture. Discovering the same phenomenon within two different cultural systems, albeit through different paradigms (correlational versus causal) demonstrates the robustness of this phenomenon to a certain extent. In other words, this method partially corrects sample bias and homogeneity issues. However, our research still faces limitations due to certain demographic characteristics of our samples (e.g., only college students in Studies 3 and 4). Future studies should expand to include a wider variety of regions, educational backgrounds, and age groups to replicate our findings. In addition, due to the use of different paradigms, we are unable to directly compare the effect sizes observed among American population with those of Chinese participants, which is one of the limitations of the current design. However, cross-cultural comparison is not the objective of our research. Future studies could recruit participants from different cultures and employ the same research paradigm to further investigate whether cultural values could potentially act as a moderator.

Furthermore, the results on sex differences toward economic

inequality of the current research are primarily based on the marriage practice in monogamous societies, and future research could further investigate whether similar effects would be obtained in polygynous societies. The practice of polygynous marriage, likely prevalent in ancestral conditions, is still observed in certain societies today (Altman, 2006; De la Croix & Mariani, 2015), and investigating whether marriage practice (monogamy versus polygyny) would further act as a moderator in this process provides valuable insights into how such practices have historically influenced and continue to influence perceptions of resource inequality across sexes. In particular, only a few successful men have multiple legal or de facto wives under polygyny, while the majority of men experience relatively deprived conditions in terms of mating and marriage opportunities (Altman, 2006). This disparity could be even more pronounced in societies with high economic inequality. In other words, to achieve reproductive success, men must face and engage in more intense intrasexual competition in such societies, and this could lead to increased aversion toward high economic inequality among most men when it comes to mating. The situation for women under polygyny in societies with high economic inequality could be more complex. While there may be more available spots as high-status men can have multiple legal wives, the resources of these high-status men are diluted among more wives rather than being monopolized by one wife (Dickemann, 1979; Gaulin & Boster, 1990). In other words, this results in a smaller share of resources for each woman. Whether this could translate into a perception of reduced intrasexual competition among women and whether it could enhance sex differences in aversion to economic inequality under polygyny are intriguing avenues for future research.

Finally, in the current research, we focused on the preference of economic inequality of two sexes due to their mating strategies. As a result, we obtained information on biological sex (Studies 1a, 1b, 2, 3, and 4) and ensured our participants were only heterosexual (Studies 3 and 4). Future research could be more inclusive and further consider how results could be affected by other important factors, such as gender identity and sexual orientation.

CRediT authorship contribution statement

Xijing Wang: Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing. **Hao Chen:** Conceptualization, Data curation, Formal analysis, Investigation, Project administration, Resources, Writing – original draft, Writing – review & editing. **Khandis R. Blake:** Validation, Writing – review & editing.

Declaration of competing interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.evolhumbehav.2024.106633.

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