

Parent-offspring conflict over mate choice: An experimental investigation using a Chinese marriage market

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Abstract. Both parents and offspring have evolved mating preferences that enable them to select mates and in-laws to maximize their inclusive fitness. Although such preferences may substantially overlap, the theory of parent-offspring conflict predicts that preferences for potential mates may differ between parents and their offspring, especially with respect to the importance of investment potential and the biological quality of a mate. Indeed, individuals are expected to value biological quality more in their mates than in their in-laws, and to value investment potential more in their in-laws than in their mates. We tested this hypothesis in China using a naturalistic “marriage market” where parents actively search for marital partners for their offspring. Parents gather at a public park in order to advertise the characteristics of their adult children, looking for a potential son or daughter-in-law. To experimentally investigate parent-offspring conflict in mating preferences, we presented 832 parents and young adults from the city of Kunming (Yunnan, China) with hypothetical mating candidates varying in their levels of income (as a proxy for investment potential) and physical attractiveness (as a proxy for biological quality). Consistent with parent-offspring conflict theory, we found a significant difference between preferences of young women and parents, with the former evaluating physical attractiveness as more important than parents. We also found a strong effect of the sex of the mating candidate on preferences, as physical attractiveness was deemed more valuable in a female potential mate or in-law, thus underlining the specific role of female physical appearance in the evolution of mate choice.

Keywords: mate choice, in-law preferences, parent-offspring conflict, trade-offs, attractiveness, sex differences

8124 words

1. Introduction

The parent-offspring conflict theory postulates that a conflict between parents and offspring can arise from the difference between the parental investment the offspring wants to receive, and the investment the parent wants to give to a particular child (Trivers 1974). This is due to parental investment increasing the fitness of the selected offspring while decreasing the parent's ability to invest in other (existing or future) offspring. As noted by Trivers (1974), this phenomenon of parent-offspring conflict may be extended further to include the mate choice of children: one type of mate might benefit the offspring more than the parents, whereas another type of mate might benefit the parents more than the offspring. Moreover, parents exercise a strong control over the mating decisions of their offspring in many societies and there is evidence that this may have been the case during most of our evolutionary past, suggesting that parents' preferences for in-laws may have been a substantial evolutionary force (Apostolou 2007a, 2010b, 2017; Buunk and Solano 2010; Buunk, Park, and Duncan 2010).

Mates provide not only their genes but also benefits in terms of parental investment, either by directly caring for the offspring or by providing resources (food, protection, wealth) that are necessary for survival and reproduction. These may be considered two crucial factors that play a role in human mate choice. However, once those offspring reach sexual maturity and search for mates, the traits they will look for in a potential mate will not necessarily be those that increase the inclusive fitness of their own parents, since they are not genetically identical to their parents. It has been hypothesized that parents have a relatively stronger preference for offspring's mates with characteristics suggesting parental investment, whereas their offspring have a relatively stronger preference for mates with characteristics signaling heritable fitness (Apostolou 2007a; Buunk, Park, and Dubbs 2008; Apostolou 2008; Buunk, Park, and Dubbs 2008; Buunk and Solano 2010; Dubbs and Buunk 2010; Schlomer, Del Giudice, and Ellis 2011; van den Berg et al. 2013; Apostolou 2017).

Characteristics signaling heritable fitness can be generalized to what we will call here "biological quality", which includes any trait increasing the number, survival and reproduction of the descendants: fertility, health, "good genes", etc. The difference between parents' and offspring's preferences comes from the fact that biological quality and investment potential contribute in different ways to the fitness of parents and offspring. A high biological quality in

the child's partner contributes to parents' fitness only through the child's own descendants. In contrast, the benefits coming from investment can be shared to some extent by other family members (e.g., siblings). But more importantly, if the child's partner is not an adequate provider, the parents will have to compensate by spending time and resources; this will inevitably limit their ability to invest in other children and grandchildren (Schlomer, Del Giudice, and Ellis 2011; Buunk, Park, and Dubbs 2008; Buunk and Solano 2010; Dubbs and Buunk 2010; van den Berg et al. 2013).

Of course, biological quality does benefit parents as well, so that parents' and offspring's preferred characteristics should be highly correlated. If an individual can find a mate with both high biological quality and high level of investment potential, parents' and offspring's choice will match. What is expected to differ between parent and offspring is the relative weighting of some characteristics: a conflict arises only if a tradeoff between biological quality and investment is involved (Dubbs and Buunk 2010; Schlomer, Del Giudice, and Ellis 2011; van den Berg et al. 2013; Apostolou 2017).

Note that we do not need to postulate any biological or intrinsic tradeoff between these two qualities¹, but only a somewhat independent variation of these two traits, leading to different combinations of these traits in the population. Because of competition, individuals displaying a high biological quality together with an elevated level of investment will be more difficult to obtain, and mate choice will inevitably involve a compromise, such that pursuing one type of benefit (e.g., biological quality), reduces the likelihood of obtaining another type of benefit, such as investment potential (Gangestad and Simpson 2000). And for this kind of tradeoff, parents and offspring are expected to differ in the compromises they are willing to make.

These predictions have received initial support from several survey studies from different countries (Apostolou 2008, 2015; Buunk, Park, and Dubbs 2008; Park, Dubbs, and Buunk 2009; Buunk and Solano 2010; Dubbs and Buunk 2010; Dubbs, Buunk, and Taniguchi 2013). However, these studies have some limitations. Very often, the parents interviewed were not actually looking for a partner for their offspring, for example in societies with minimal parental influence over mate choice as the USA, the UK or the Netherlands. In some cases their offspring were too young or already in a relationship; or the scenarios involved an imaginary son or daughter. In other

¹ There is however some evidence that this kind of intrinsic tradeoff may exist: for a review see Buss and Schmitt 1993 or Gangestad and Simpson 2000

90 studies, the parents' preferences were based on the children's perception of how their parents
91 might respond, or the reverse (parents reporting what they thought their children would prefer).
92 Consequently, the responses obtained were based on hypothetical scenarios, potentially quite far
93 from reality. Moreover, in almost all these studies, participants had to rate several characteristics
94 on a scale, which does not reflect the tradeoffs that individuals may have to face in reality, a key
95 point in the theory of parents-offspring conflict over mate.

96 In this study, we build on these previous studies by exploring the parent-conflict theory
97 over mate choice in China, a country where parents have a strong influence on their offspring's
98 mate choice. Arranged marriages were the dominant tradition in China for centuries: the parents
99 chose the potential spouse for their child, often with the help of a professional matchmaker (Xie
100 and Combs 1996; Xia and Zhou 2003; Huang, Jin, and Xu 2017). Since the beginning of the 20th
101 century, a combination of increasing wage labor in China's cities and growing Western influence
102 on China's culture and educational system began to promote young people's choices in mating
103 decisions (Xiaohe and Whyte 1990; Pimentel 2000; Xie and Combs 1996). After the Chinese
104 communists came to national power in 1949, they vigorously promoted freedom of mate choice,
105 making arranged marriages illegal (the Marriage Law, adopted in 1950). Moreover, the
106 government helped to abolish the traditional marriage system by encouraging women to join the
107 labor force (Pimentel 2000; Xia and Zhou 2003). Then, the economic reforms of the late 1970s
108 dramatically changed the life of the Chinese people, as China became increasingly open to the
109 rest of the world (Higgins et al. 2002; Chang et al. 2011). However, despite a profound social
110 revolution over the last three decades, Chinese parents continue to powerfully affect their
111 children's marriages (Xiaohe and Whyte 1990; Pimentel 2000). As proof of this parental
112 influence on mate choice, a new phenomenon appeared in several Chinese cities around 10 years
113 ago: the so-called *marriage markets*, platforms created to help parents find a marital partner for
114 their adult children (see for example "In Pictures: China Spouse Market" 2009).

115 In this study, we used such a naturalistic marriage market in Kunming, the capital of the
116 province of Yunnan in South China. Every Saturday in Kunming, one corner of a public park
117 (Green Lake Park) hosts a marriage market, a platform where individuals can search for a spouse.
118 This platform, initiated by a few parents in 2005, has developed into an established event and
119 mostly targets parents looking for a marital partner for their adult children. Parents and other
120 participants come to this marriage market to chat to each other, post the basic information of the

individual to be married on the wall of the park together with some contact information, check the information of others on the wall, address one of the marriage agencies present at the park, or any combination of the above. These marriage search platforms used by parents or other relatives are a widespread but relatively new phenomenon in China.

We developed an experiment to investigate the existence of a parent-offspring conflict over mate choice in the case of a trade-off between biological quality and investment potential. To this end, we created profiles of hypothetical mating candidates varying in their level of biological quality and investment capacity. We used facial attractiveness as a proxy of biological quality, as there is substantial theoretical and empirical evidence that both are linked (for a review see Buss 2015; Thornhill and Gangestad 1999). Because the potential for investment of an individual depends on the possession of sufficient resources, we used income to approximate investment capacity of the hypothetical candidates. We showed these hypothetical profiles to parents coming to the marriage market and asked them to choose the profile they would prefer as a long-term mate for their son or daughter. Then we compared their choices to those of young individuals looking for a partner for themselves. We hypothesize that individuals will give higher importance to facial attractiveness when they choose a mate for themselves than when they choose a mate for their offspring. We also expect this difference to appear only in the case of a tradeoff between biological quality and investment potential. Finally, we expect to find a sex difference, with biological quality being more valued in a female potential mate, and investment potential more important for a male candidate, reflecting general sex differences over mate choice (see for instance Buss 1989a; Buss and Schmitt 1993; Li et al. 2002).

2. Material and Methods

This study is part of a larger project called "Questionnaire for Search Activities for a Marital Partner in Yunnan", in cooperation between the Yunnan Normal University (YNNU) and the Institute of Advanced Study in Toulouse. The survey was approved by the Toulouse School of Economics Research Ethics Committee in April 2016. Formal permissions from the local government and from the Yunnan Normal University were also received.

2.1. Participants

From April to July 2016, 549 participants were recruited at the marriage market of Green Lake Park in the city of Kunming (Yunnan, China). In this sample, 75% of all participants were looking on behalf of someone else - the focus individual - and around 23% were looking for a partner for themselves. Among people looking on behalf of someone else, nearly half of the respondents (49%) were looking for a partner for their daughter, 35% were looking for a partner for their son, 6% for their niece, 3% for a nephew and the rest were other relatives or friends. We only kept parents looking on behalf of their children, as our study focuses on parent-offspring conflict. Moreover, we discarded data where the person to be married (the focus individual) had already been married before (i.e. was widowed or divorced), as mating preferences can differ between a first and a second marriage. This constituted our “parents” sample (N = 313). For anonymity reasons (and because some children were not aware that their parents were going to a marriage market for them), we were not able to collect the contact information of the children for whom our participants were looking for a partner. Instead, we interviewed young individuals looking for a partner for themselves. A small part of our sample at the marriage market matched these criteria (never married individuals looking for a partner for themselves, N = 46). To complete this sample, we also interviewed 230 young individuals at the Yunnan Normal University in Kunming. This constituted our “offspring” sample (N = 276).

2.2. Stimuli

During the interviews, respondents were shown a pair of hypothetical profiles, each one including a facial picture and information on income, age, and city of residency (see figure 1). One of the pictures was depicting an attractive individual, and the other one was depicting an unattractive individual. Each picture was a composite created using Webmorph (DeBruine and Tiddeman 2017), from several facial photographs of Chinese individuals (mix of attractive people found on Chinese modeling websites, average individuals found on Chinese networking websites and unattractive individuals found on websites showing individuals before plastic surgery). The pictures were rated for attractiveness using a different sample (N=134) before the launch of the study, to verify that the differences in attractiveness between the faces were significant (two-tailed t-test, all $p < 0.001$). The mean attractiveness score (on a 5 points scale) for the female attractive face was 3.97 and 2.22 for the unattractive female face, 3.76 for the attractive male face and 2.33 for the unattractive male face (see figure A1). Moreover, there was no difference

between the two attractive faces (male and female), nor between the two unattractive faces ($p > 0.08$).

The incomes of the profiles could take 3 different configurations: 3000¥ vs 12000¥ (large difference between the two profiles), 3000¥ vs 6000¥ (medium difference), and 5000¥ vs 6000¥ (small difference). The association between the picture and the income was randomized, meaning that the income associated with the attractive face could be higher (*no tradeoff*) or lower (*tradeoff*) than the income associated with the unattractive face. We did not expect any difference between the three *no tradeoff* conditions (attractive face associated with the higher income), but we also randomized the income profiles in the no tradeoff context for completeness of the experimental design.

The age and city of residency of the profiles were kept constant (27 years old, city of Kunming), and their role was only to make the profile appear more realistic. The position of the attractive face on the screen was randomized. The profiles were depicting two men if the focus individual was a woman and two women if the focus individual was a man. Each participant only saw one pair, and was asked to choose the hypothetical profile they would prefer for a long-term partner for the focus person (i.e. for their son, their daughter or themselves according to the situation).

简介 1



年龄 : 27
月收入 : 6 000 ¥
地址 : 昆明

简介 1



年龄 : 27
月收入 : 3 000 ¥
地址 : 昆明

简介 2



年龄 : 27
月收入 : 3 000 ¥
地址 : 昆明

简介 2



年龄 : 27
月收入 : 12 000 ¥
地址 : 昆明

197

198 **Figure 1.** Example of pairs of hypothetical profiles for a male focus individual (left) and for a
199 female focus individual (right). Translation: Age/Income/Residency: Kunming. Attractive faces
200 on the top line, and unattractive faces on the bottom line. The participants were asked to choose
201 the profile they would prefer as a long-term partner for the focus individual (i.e. for their
202 offspring or for themselves according to the sample).

203

204 2.3. Procedure

205 The enumerators were students from the Yunnan Normal University and were trained by the
206 research team. For data collection, the CAPI software Survey Solution from the World Bank was
207 used on Android tablets. The World Bank also provided software support and server space that
208 facilitated data collection. The enumerators went every Saturday between April 2016 and July
209 2016 to the marriage market at the Green Lake Park to recruit participants (with some exceptions
210 for holidays and end-of-semester exams). For data collection at the YNNU campus, the university
211 administration gave permission to open a stand in front of one of the two canteens. The canteens
212 were frequented by most campus students which helped the random selection of the participants.

Along with the hypothetical profiles choice, the survey included demographic information about the participant and focus individual (sex, age, income, household registration, education, religion, marital status, family size). The interviews were conducted in Mandarin Chinese but interviewers had knowledge of the local dialect. Small gifts of the value of 10¥ (2€) were provided for every participant who finished the interview.

2.4. Statistical analyses

We used an ordinal logit regression to analyze the participants' choice during the hypothetical profiles test. The response variable was the choice of the profile with the attractive face during the test, and could take three different values: 1 (the participant chose the attractive face), 0.5 (the participant was indifferent²) and 0 (the participant chose the unattractive face). Our variable of interest was the situation of the participant: a parent looking for a spouse for his/her offspring (*parent* indicator) or a young individual looking for a partner for him or herself (*offspring* indicator).

The experimental treatment was entered as an explanatory variable: the first 3 conditions corresponded to the cases where the attractive face was associated with a higher income than the unattractive face (*no tradeoff* between physical attractiveness and income), the three other conditions corresponded to the cases including a tradeoff between physical attractiveness and income, as the attractive face was associated with a lower income than the unattractive face, and was sorted by three different levels of tradeoffs: a *small tradeoff* condition (5000¥ vs 6000¥) a *medium tradeoff* condition (3000¥ vs 6000¥) and a *large tradeoff* condition (3000¥ vs 12000¥). Control variables in the model were sex, income class (very low, low, medium or high), education level (low, medium or high). The parent-offspring conflict theory does not necessarily imply that preferences will depend on the number of actual siblings, as resources are also important for potential future siblings. However, it is possible that the presence of actual siblings would increase the parent-offspring conflict in the case of a trade-off. To test for this hypothesis, we added the number of siblings of the focus individual in interaction with the sample and the experimental treatment. Unfortunately, we did not have enough data to control for the sex of the

² We added this option to avoid having participants choosing randomly if they had no preference for one of the profiles. 14% of the participants chose this option.

parent in our *parent* sample, but previous studies found no difference between mothers' and fathers' preference (Apostolou 2007b; Dubbs and Buunk 2010; Perilloux, Fleischman, and Buss 2011 but see Dubbs, Buunk, and Taniguchi 2013). For robustness, we run the same regression within each sample, and for men and women separately. The control variables which appeared to be non-significant in the first general model were not included in the next models among the subsamples in order to save statistical power.

3. Results

The final *parent* group at the marriage market numbered 313 individuals (237 women, mean age = 60.75 years old, range 37-80). The *offspring* group was comprised of 276 individuals looking for a partner for themselves (148 women, mean age = 23.11 years old, range 16-54). In our sample, 89% of our participants declared being atheists and 90% were from the Han ethnicity. Slightly more than half of the families were single-child (55%). Sixteen participants refused to give information about the focus individual's income, so the number of observations in the model was 573.

As expected, there was no difference ($p > 0.2$) between our three *no tradeoff* conditions (cases where the attractive face was associated with a higher income than the unattractive face), confirming our hypothesis that it did not matter if the income of the attractive face was much higher, or a bit higher, or moderately higher than the unattractive face. Thus, in the following models, we grouped these three conditions under the label *no tradeoff*.

The analysis of the participants' choices during the hypothetical profiles test showed that there was a significant effect of the focus individuals' sex ($p < 0.001$): individuals chose the profile with the attractive face more often when the focus individual was a man (i.e. people looking either for a wife or a daughter-in-law). As hypothesized, there was also a difference between our two types of participants ($\beta = 1.12$, $p = 0.038$, see table 1): offspring were more likely to choose the profile with the attractive face than the parents. This effect was driven by the female focus individuals: daughters were more likely to choose the profile with the attractive face than parents looking for a son-in-law ($\beta = 0.83$, $p = 0.048$, see table 2 and figure 2). In the case of a male focus individual, parents and offspring had the same strong preference for the female profile with the attractive face.

The experimental conditions affected the choices but only for the offspring: in this group, participants were less likely to choose the profile with the attractive face when it was associated with a lower income than the unattractive face ($\beta = -2.31$, $p = 0.004$ for the medium tradeoff condition in interaction with the sample, and $\beta = -1.57$, $p = 0.02$ for the large tradeoff condition, see table 1). Once again, this effect was driven by the female focus individuals, as participants looking for a wife or a daughter-in-law were not influenced by the income, even in the case of a large income difference between the profiles ($p > 0.6$, see figure 2 and table 2).

The focus individual's age had a small negative effect on the probability of choosing the profile with the attractive face ($\beta = -0.05$, $p = 0.031$), and the probability of choosing the profile with the attractive face was higher for the group of focus individuals having a high education level ($\beta = 1.68$, $p = 0.035$). There was no significant effect of the focus individual's income or number of siblings, in interaction with the sample and the experimental condition or not (all $p > 0.05$).

		Estimate	Std. Error	t value	p value
Sample	Offspring	1.12	0.54	2.08	0.038
Experimental condition: Tradeoff	Small	0.19	0.73	0.26	0.793
	Medium	0.45	0.77	0.59	0.557
	Large	-0.17	0.63	-0.27	0.791
	Female (male faces)	-1.94	0.40	-4.86	< 0.001
Age of focus		-0.05	0.02	-2.16	0.031
Income of focus	Low	0.60	0.59	1.03	0.304
	Medium	0.56	0.50	1.11	0.267
	High	-0.20	0.52	-0.38	0.706
Education of focus	Medium	0.58	0.86	0.68	0.497
	High	1.68	0.80	2.11	0.035
Siblings of focus		-0.30	0.33	-0.91	0.363
Gender of focus*Tradeoff	Female*Small	0.13	0.77	0.17	0.863
	Female*Medium	0.51	0.68	0.75	0.452
	Female*Large	-0.53	0.62	-0.85	0.396
Sample*Tradeoff	Offspring*Small	-0.82	0.97	-0.84	0.400
	Offspring*Medium	-2.31	0.80	-2.89	0.004
	Offspring*Large	-1.57	0.68	-2.32	0.020
Focus' number of siblings*Tradeoff	Siblings*Small	0.75	0.82	0.92	0.359
	Siblings*Medium	0.02	0.74	0.02	0.984

	Siblings*Large	1.40	0.83	1.70	0.089
Focus' number of siblings*Sample	Offspring	0.11	0.41	0.28	0.782
Focus' number of	Siblings*Offspring*Small	0.15	1.09	0.13	0.893
siblings*Sample*Tradeoff	Siblings*Offspring*Medium	0.52	0.86	0.60	0.550
	Siblings*Offspring*Large	-1.12	0.92	-1.21	0.225
0 0.5		-2.78	1.12	-2.49	0.013
0.5 1		-1.71	1.11	-1.54	0.124

Table 1. Results of the ordinal logit regression on the choice of the participants during the hypothetical profiles test (N = 573). The response variable could take three different values: 1 if the participant chose the attractive face, 0 if the participant chose the unattractive face, and 0.5 if the participant was indifferent between the two profiles.

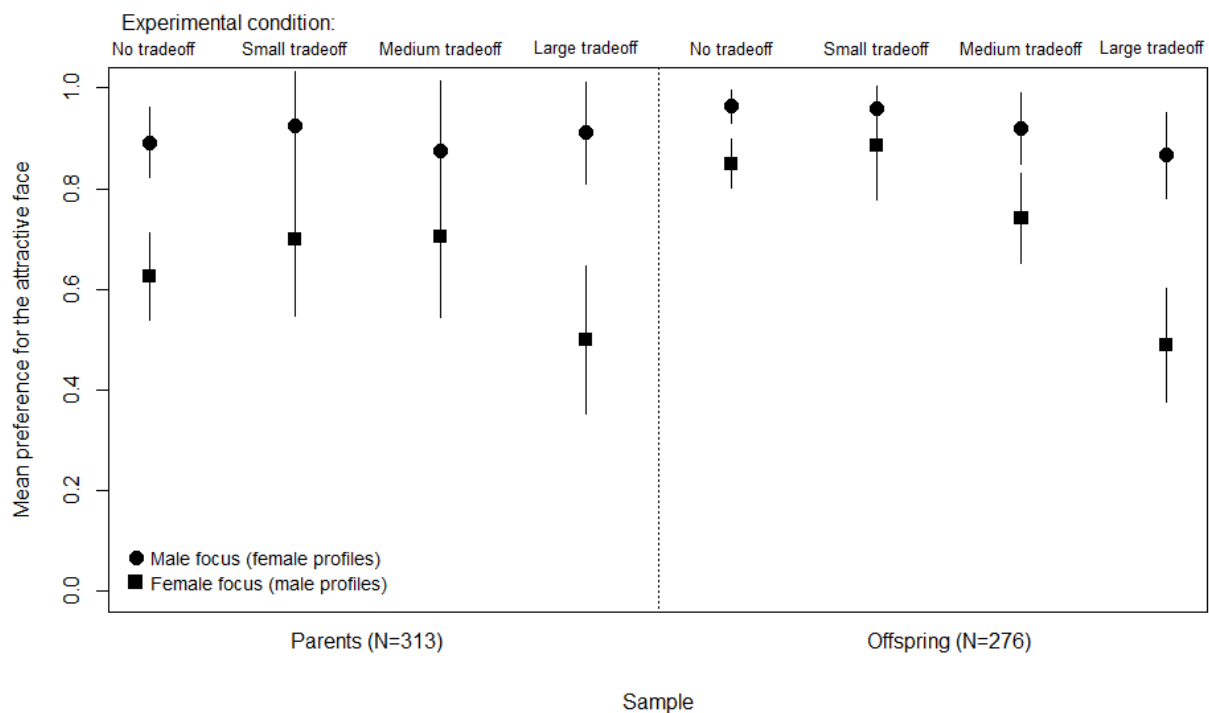


Figure 2. Mean preference for the profile with the attractive face (1 = profile with the attractive face chosen; 0 = profile with the unattractive face chosen; 0.5 = indifferent). Results are shown according to the group (*Parents* on the left, *Offspring* on the right), to the sex of the focus individual (circle for male focus, square for female focus), and to the experimental condition (*No tradeoff*: the attractive face is associated with the higher income; and *Small*, *Medium* and *Large tradeoff*: the attractive face is associated with the lower income, with the respective pairs of income: 5000¥ vs 6000¥; 3000¥ vs 6000¥ and 3000¥ vs 12000¥). Error bars are showing the 95% confidence intervals.

When we created our experimental design, the *no tradeoff* condition was included as a control: we were expecting almost all participants to choose the attractive face associated with the higher income. That is what we can see in the *offspring* group, where less than 5% of the participants chose the unattractive face under the *no tradeoff* condition. However, 26% of the parents looking for son-in-law chose the unattractive face associated with the lower income (see figure 2). Unfortunately, as we were not expecting this result, we do not have enough statistical power to properly statistically test this effect. We discuss this potential parental avoidance of the high quality male profile further below.

4. Discussion

In this study, we experimentally investigated the parent-offspring conflict over mate choice in the case of a trade-off between investment potential (approximated by income) and biological quality (approximated by facial attractiveness). To do that, we interviewed individuals at the marriage market of Kunming, China, where many parents go every Saturday in order to help their adult son or daughter find a spouse. For our experiment, we used hypothetical profiles of young individuals similar to the actual profiles parents advertise at the marriage market. This allowed us to control the variables displayed while being in a naturalistic context where parents are actively looking for a son or daughter-in-law. We compared the preferences of these parents to those of young individuals looking for a mate for themselves.

In line with the results of previous studies (Apostolou 2007b, 2008, 2010a, 2016; Perilloux, Fleischman, and Buss 2011), we found a sex difference, with people looking for a female partner (for themselves or for their offspring) valuing facial attractiveness more strongly and disregarding income compared to people looking for a male partner. This result can be explained by the different specializations between sexes with respect to reproduction. Because of the high physiological costs of pregnancy and lactation, women's fitness is closely linked to their physical condition, making biological quality more crucial in a female mate than in a male mate (Buss 2003, 2015, 1989b; Symons 1980; Jones 1996). As a consequence, women's physical attractiveness is more decisive than men's during mate choice (see for instance Buss 1989a; Buss and Schmitt 1993; Li et al. 2002, or Chang et al. 2011 for an example in China).

The results of our study show that biological quality is also a crucial criterion for parents looking for a female partner for their male offspring. The consequence is an absence of conflict between parents and their sons in the case of a tradeoff between physical attractiveness and income, as both are prioritizing the former over the later, probably because the minimal biological quality threshold is relatively high in a female mate. This result differs from studies showing that physical attractiveness is valued more in a wife than in a daughter-in-law (Apostolou 2008, 2011, 2015), which can be explained by the different populations studied (British and Greek-Cypriot versus Chinese participants³), although the dissimilar experimental designs could be a more relevant explanation. Indeed, individuals may declare that physical attractiveness for a daughter-in-law is not so important, but act differently when they see facial pictures. Moreover, results based on ratings could differ from our design, which includes a clear tradeoff with income, as physical attractiveness may indeed be less important for parents than for sons, but still be more important than income for both parents and sons. We conclude that the conflict between parents and sons may have been overestimated in previous studies using ratings of features instead of a choice between different candidates with a clear tradeoff.

The results differ in the case of a daughter. First, individuals looking for a husband or a son-in-law are influenced by the level of income of the hypothetical profiles: a significant number of participants chose the profile with the unattractive face when it was associated with the higher income (*large tradeoff* condition). This is concordant with studies showing that the potential to attain resources is more important in a male than in a female mate, and can once again be explained by the difference in parental investment between males and females (Buss 2003, 2015, 1989b; Symons 1980; Jones 1996; Li et al. 2002). Second, we found some evidence of a conflict between parents and daughters, as parents were more likely than daughters to choose the male profile with the unattractive face. This is consistent with previous studies showing that physical attractiveness is rated as more important in a husband than in a son-in-law (Apostolou 2008, 2011, 2015).

³ We do not think that the absence of effect of female profiles' income on choice could be explained by a particularly low employment rate among Chinese women. Indeed, in 2014, 64% of women over 15 were in the labor force compared to 78% of men ("The World Bank Databank" 2016), and 72% of mothers between 25 and 34 years old with a child under 6 were employed in 2011 ("All-China Women's Federation, Report on Major Results of the Third Wave Survey on The Social Status of Women in China (ACWF)" 2011), making women's income important for the household's resources.

Therefore, we found a conflict over mate choice between parents and daughters but not between parents and sons, which is in the same direction of previous studies showing a greater conflict with daughters than with sons (Apostolou 2012; Dubbs and Buunk 2010; Dubbs, Buunk, and Taniguchi 2013, but see Apostolou 2015). This result also fits the fact that parents are more likely to control the mating behavior of their daughters than that of their sons (Perilloux, Fleischman, and Buss 2008). Effectively, the fact that parents care about the mating behavior of their offspring is less relevant when parents' opinions do not differ from those of mating individuals themselves.

We also found some preliminary evidence of an interesting but unexpected result: a non-negligible number of parents seemed to avoid the male profile combining the attractive face with the higher income (but as often with unexpected results, we do not have enough data to explore it further, so this result should be taken with caution). This could in part be explained by the fact that older individuals rated the unattractive face as more attractive than did younger participants (see figure A1). However, this explanation is not sufficient, as the unattractive face is still rated as significantly less attractive than the attractive face, and as older individuals also rated more favorably the unattractive female face. We suggest that this avoidance of the high quality male profile could reflect an aversion to the risk to divorce (or break-up). Indeed, a high-quality mate may have more opportunity to find a better mate and to leave his current wife. The cost of divorce is considerably higher for women than for men (in particular in terms of re-mating opportunities), which could explain the sex difference. Parents with daughters could be more careful not to choose a too high quality (and so risky) son-in-law to avoid the costs of having a divorced daughter (as they will have to invest more to compensate the absence of the mate). For daughters, this cost may be compensated by the benefits of having a mate with good genes/health/fertility transmitted to her children, which is less beneficial for her parents as they only share 50% of their genes (in average) with their daughter.

Another possible explanation could be an association of these two specific male facial stimuli to some other mate qualities. The attractive face could for example carry cues of negative personality traits, and the unattractive face might be associated to some positive characteristics as generosity, responsibility, intelligence or cooperativeness (Lee, Wright, et al. 2017; Lee, Hibbs, et al. 2017; Tognetti et al. 2013; Olivola, Funk, and Todorov 2014). These traits being also linked to investment potential, parents could use them to choose a son-in-law. The two hypotheses are

not necessarily in contradiction, as an impression of an unfaithful face can be linked to more potential mating opportunities (because the individual is more physically attractive), or to some intrinsic characteristics linked to facial morphology, but independent from attractiveness. Further research with different stimuli is needed to explore these hypotheses. A possibility could be to add a description of some personality traits which however would deviate from the actual profiles displayed at the marriage market.

This study has several limitations. First, we only used two stimuli per sex (one attractive and one unattractive face). We would need more stimuli to further explore which dimensions of attractiveness influenced the participants, and to vary other dimensions than facial attractiveness and income (faithfulness, cooperativeness, etc.). Also, for anonymity reasons, we were unable to contact the actual children of the parents coming to the marriage market in Kunming. Instead, we interviewed young individuals looking for a mate for themselves at the marriage market and at the University of Kunming (YNNU). Even if these individuals' preferences are probably similar, we cannot exclude the possibility that the results would have been different with the actual children of the parents (to our knowledge, only three studies on the parent-offspring conflict over mate choice used parents and their actual children: Perilloux, Fleischman, and Buss 2011; Apostolou 2015, 2016). While future research should include families, we believe this research is still of value. Moreover, this limitation does not apply to our results within each sample (such as the differences between daughters- and sons-in-law for example). Lastly, one might argue that the difference in preferences for the male profiles between parents and offspring could be explained by a difference between generations more than by a difference of context (parents looking on behalf of their offspring vs individuals looking for themselves). However, this is an issue inherent to studies investigating parent-offspring conflict, as parents and offspring are, by definition, from different generations.

One other potential issue linked to our sample is the Chinese family planning policy. Parent-offspring conflict theory implies that parents have incentive to reduce the investment in one child to be able to invest in other offspring. So, one can wonder if the one-child policy, introduced in China in 1979 (and replaced by a two-children policy in 2015), would make the parent-offspring conflict concept irrelevant in this population. We argue that it is most likely not the case. First, we do not know if the parent-offspring conflict selected for preferences plastic to environmental conditions, or for more deeply rooted preferences unlikely to be affected by a

policy implemented only a few decades ago. Moreover, the one-child policy was not applied to the entire population and a lot of exemptions existed, for example for couples living in rural areas whose first born was a girl (Baochang et al. 2007). More importantly, couples under the one-child policy could still decide to have an additional child, but with a cost (fines and penalties, see Scharping 2013), which makes the parent-offspring conflict even stronger, as the investment in another child is increased. Finally, in our sample, 45% of the focus individuals had at least one sibling, and the number of siblings did not have any effect on our results, which reinforces our idea that the one-child policy is not an issue for the present study⁴.

Conclusion

The current study addressed limitations of previous research into parent-offspring conflict over mate choice by using a novel design and a unique sample. An experimental approach was run in a naturalistic context with a strong parental influence: a Chinese *marriage market*, where parents come weekly to actively search for a marital partner for their adult children. Our experiment was designed to specifically include a key condition of the parent-offspring conflict over mate choice theory: the presence, among potential candidates, of a tradeoff between biological quality and investment potential. Participants had to choose between two profiles of hypothetical candidates, representing conditions closer to reality than a survey where participants rate a list of features.

Our results replicated those of previous studies and opened several interesting future directions. As predicted by an evolutionary perspective we found a sex difference, with individuals valuing physical attractiveness more in a wife or a daughter-in-law than in a husband or a son-in-law. A conflict between parents and daughters appeared, with daughters valuing more physical attractiveness than parents looking for a son-in-law. Interestingly and contrary to previous studies, no conflict between parents and sons was found, even in the case of a trade-off

⁴ Because of the one-child policy, we were also expecting a biased sex-ratio among young individuals. Indeed, since the early 1980s, China's sex-ratio at birth has been significantly above normal levels and has resulted, and will result, in the existence of over 23.5 million more marriageable-age men than women between 2000 and 2020 (Poston and Glover 2005). However, we found no sign of this unbalanced sex ratio in our sample, as 56% of our focus individuals (randomly sampled) were women. This may be because it was an urban sample, less affected by the unbalanced sex-ratio than rural areas (Yi et al. 1993). Therefore, we are reasonably confident that our results are not driven by a biased sample.

between facial attractiveness and income, as cues of biological quality were always considered as more important than investment potential in a female partner.

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587

		Female focus (male profiles, N=333)				Male focus (female profiles, N=256)				Parents (N=313)				Offspring (N=276)			
		Estimate	Std. Error	t value	p value	Estimate	Std. Error	t value	p value	Estimate	Std. Error	t value	p value	Estimate	Std. Error	t value	p value
Sample	Offspring	0.83	0.42	1.98	0.048	0.71	0.73	0.97	0.333	-	-	-	-	-	-	-	-
Sex of focus	Female (male profiles)	-	-	-	-	-	-	-	-	-1.67	0.41	-4.02	0.000	-1.81	0.66	-2.74	0.006
Tradeoff	Small	0.39	0.43	0.91	0.363	0.64	0.84	0.76	0.445	0.63	0.83	0.76	0.447	-0.56	0.96	-0.59	0.556
	Medium	0.42	0.44	0.95	0.340	0.00	0.73	-0.01	0.995	-0.01	0.73	-0.01	0.994	-1.19	0.86	-1.38	0.166
	Large	-0.56	0.37	-1.52	0.128	0.40	0.71	0.56	0.574	0.40	0.71	0.56	0.575	-1.58	0.78	-2.04	0.042
Age of focus		-0.04	0.02	-1.63	0.104	-0.07	0.03	-2.10	0.036	-0.07	0.03	-2.35	0.019	-0.03	0.03	-1.17	0.241
Sample*Tradeoff	Offspring*Small	0.40	0.92	0.44	0.658	-1.02	1.28	-0.80	0.423	-0.29	0.94	-0.31	0.759	1.36	1.25	1.09	0.277
	Offspring*Medium	-1.23	0.63	-1.97	0.049	-1.23	1.13	-1.08	0.279	0.40	0.85	0.47	0.638	0.34	0.97	0.35	0.729
	Offspring*Large	-1.33	0.58	-2.29	0.022	-1.98	1.06	-1.87	0.062	-0.94	0.80	-1.17	0.244	-0.44	0.90	-0.49	0.623
0 0.5		-2.34	0.79	-2.95	0.003	-4.83	1.16	-4.15	0.000	-4.78	1.02	-4.68	0.000	-5.12	0.93	-5.52	0.000
0.5 1		-1.24	0.79	-1.59	0.113	-3.98	1.14	-3.48	0.000	-3.92	1.01	-3.88	0.000	-3.71	0.90	-4.13	0.000

Table 2. Results of the ordinal logit regressions on the choice of the participants during the hypothetical profiles test. The response variable could take three different values: 1 if the participant chose the attractive face, 0 if the participant chose the unattractive face, and 0.5 if different between the two profiles. Results are presented separately according to the sex of the focus, and to the sample (parent or offspring).

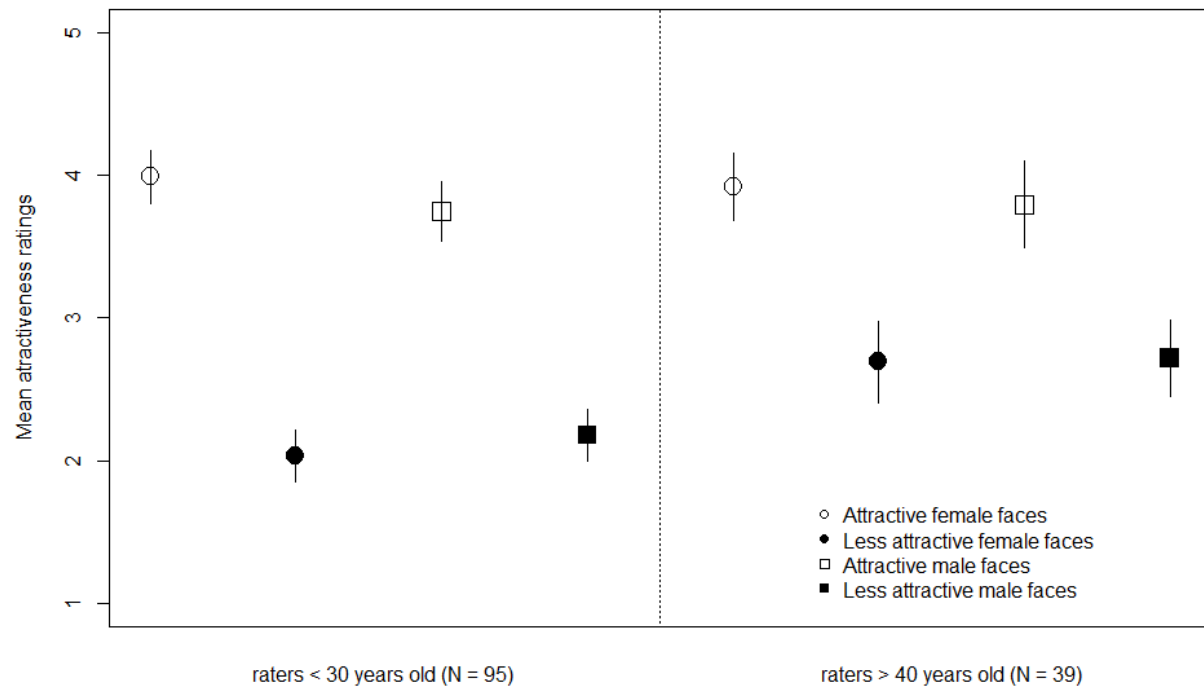


Figure A1: Attractiveness ratings (from 1 to 5) for the 4 faces from two different age groups of participants: The first is constituted of people under 30 years old ($N = 95$, mean age = 21, range: 18-27). The second group includes individuals older than 40 ($N = 39$, mean age = 62, range: 41-70). During this test, participants had to rate the physical attractiveness of the 4 faces used in the hypothetical profiles test, without any other information added to the pictures. The pictures were randomly presented. The young individuals are students at the YNUU. The older individuals are parents and relatives of the students. These participants were not part of the general survey and were unaware of the hypotheses of the study. There were significant differences in attractiveness rating between attractive and unattractive faces for both sexes, and within both samples of raters (two-tailed t-test, all $p < 0.001$). There were also significant differences between the two samples, but for the unattractive faces only: compared to younger raters, older raters gave higher attractiveness ratings to both female ($p < 0.001$) and male ($p = 0.001$) unattractive faces. There was no difference between the two attractive faces (male and female), nor between the two unattractive faces ($p > 0.08$ in both samples).