The role of parent-offspring conflict in Shuar partner choice and marital practices

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A B S T R A C T

Previous research argues that female choice may not be as powerful an influence on the evolution of human mating preferences as once expected given the importance of parental choice in marital practices across cultures. Furthermore, much of the literature supporting this argument assumes that endorsed cultural norms reported in the ethnographic record accurately represent individuals' behaviors. Here, we argue that the roles of parent-offspring conflict and parental choice are more nuanced. We test predictions from parent-offspring conflict theory and illuminate three loci of conflict between parents and daughters over partner choice. Using data from over 10 years of fieldwork in Shuar communities, we demonstrate that endorsed norms do not reflect complete behavioral repertoires at the individual level. We conclude that analyzing individual behavior provides insight into (1) areas of parental-offspring conflict and (2) complementary aspects of female choice and parental choice.

1. Parent-offspring conflict in human mating

Human mating has been a central focus of research in the evolutionary social sciences since its earliest days. Sexual selection theory (Darwin, 1871) and the corollary mid-level theories of parental investment (Trivers, 1974) and sexual conflict (e.g., Buss, 2017), have been invoked to explain numerous robust sex differences in mate preferences, intimate relationships, and sexual and reproductive behavior documented across a wide range of populations using a multitude of methods (e.g., Buss, 1989; Buss & Barnes, 1986; Gouda-Vossos, Nakagawa, Dixson, & Brooks, 2018; Miller, 2013; Thomas et al., 2019). These core theories have also been fruitful in deriving numerous novel predictions regarding differences in sexual and romantic motivation, emotional responses, and behavioral strategies between women and men, many of which have received compelling empirical support (see e.g., Bleske-Rechek & Buss, 2001; Buss, Larsen, Westen, & Semmelroth, 1992; Ellis & Symons, 1990; Haselton & Buss, 2000; Hess & Hagen, 2006; Owens, Shute, & Slee, 2000; Schmitt & International Sexuality Description Project, 2003). The main sources of conflict proposed by these theories are the biological sex differences in the cost of reproduction and sex differences in reproductive optima, resulting in a strong emphasis on

intersexual conflict as the main hypothesized source of selective pressure on human mating psychology.

In recent years, however, scholars have increasingly pointed to another source of conflict that has too often been overlooked in the evolutionary literature on human mating strategies: parent-offspring conflict (Trivers, 1974). Due to the intense amount of parental investment required in our species, it is predictable that human parents, relative to those in other sexually reproducing species, should exhibit intense interest in, and strong preferences regarding, offspring mating decisions. Human conjugal bonds not only determine who reproduces or invests in offspring, but also play a critical role in defining the extended networks of kin, allies, competitors, and enemies that form the social landscape of human life (Chapais, 2008; Shenk, 2021). Parents stand to gain a wide range of cooperative benefits through the marriage arrangements of their children, such as the ability to create or strengthen social alliances or combine resources such as material wealth, food resources, property, or territorial rights (e.g., Delêtre, McKey, & Hodkinson, 2011; Shenk, 2021). In many Amazonian societies, for example, sons-in-law have historically represented vital allies in the context of tribal warfare (Escasa, Gray, & Patton, 2010; Macfarlan et al., 2018; Macfarlan, Walker, Flinn, & Chagnon, 2014; Patton, 2017).

Because parents stand to gain important resources and social alliances of their own through the marriages of their children, we might expect natural selection to have favored psychological adaptations specific to assessing and responding to cues of an individual's likely quality as an in-law—that is, for calculating the likely benefit of having that individual as a son- or daughter-in-law—in addition to those adaptations that have evolved to assess and respond to cues of an individual's likely mate quality (Apostolou, 2007; Chagnon, Lynch, Shenk, Hames, & Flinn, 2017).

2. In-law preferences

Multiple studies in recent years have explored possible points of divergence between parental "in-law preferences" and individual mate preferences. In particular, it has been hypothesized that parents should prefer an earlier age at marriage, and therefore an earlier onset of reproduction, for their children than the offspring should prefer for themselves. This may function to better control the mating decisions made by offspring and maximize the benefits accrued to the parents (e.g., Apostolou, 2012). In line with this, researchers have hypothesized that parents, relative to offspring, should prioritize partner qualities related to the likelihood of the union conferring material or social benefits to the parents, while offspring, relative to their parents, should prioritize partner qualities related to individual reproductive value, such as age or physical attractiveness (e.g. Apostolou, 2008b; Buunk, Park, & Dubbs, 2008; Perilloux, Fleischman, & Buss, 2011).

Although the empirical evolutionary literature appears to support these hypotheses, much of the evidence used in these studies relies on within-person designs in which a single individual reports either (1) their own preferences for both a potential mate and a potential in-law or (2) their own preferences and their *perceptions* of either their parents' or children's preferences. For example, in a series of studies that surveyed British parents, individuals endorsed a stronger preference for physical attractiveness in a potential mate for themselves than in a potential son- or daughter-in-law (Apostolou, 2008b), as well as a stronger preference for good family background when evaluating a potential in-law than a potential mate (Apostolou, 2008c). Another study using the same method found that British parents endorsed a later onset of sexual behavior, but an earlier age of marriage, for their offspring than for themselves. Furthermore, this pattern was more pronounced for female offspring than for male offspring (Apostolou, 2010). Similarly, studies in which respondents were asked to rate a potential partner's negative qualities as more unacceptable to either parents or offspring, conducted in multiple countries, found that parents and offspring agreed that (1) offspring would find physically unattractive partners more unacceptable than parents would and (2) parents would find partners lacking cues to parental investment or resources to be more unacceptable than offspring would (Buunk et al., 2008; Buunk & Solano, 2010; Dubbs & Buunk, 2010; Dubbs, Buunk, & Taniguchi, 2013).

Fewer studies have attempted to directly compare the preferences of parents and their offspring. Those that have also provide support for the hypotheses that parents prefer an earlier age of reproduction and shorter period between marriage and reproduction than do their children (Apostolou, 2012) and that parents and offspring prioritize different qualities in a potential partner for the offspring (Agey, Morris, Chandy, & Gaulin, 2021; Apostolou, 2011; Bovet, Raiber, Ren, Wang, & Seabright, 2018; Perilloux et al., 2011). While these studies do directly compare parent and offspring preferences, it is likely that participant responses to hypothetical scenarios only imperfectly capture their preferences in real-world contexts, and possibly even less-perfectly capture actual mate choice (e.g., Todd, Penke, Fasolo, & Lenton, 2007).

Furthermore, while it is reasonable to expect that parents and offspring will sometimes prioritize different qualities in a potential child-in-law versus a potential mate, we should also expect that an individual's perceived quality as a potential in-law will be at least partially based on their likely mate value (e.g., Agey, Crippen, Wells, & Upreti,

2023; Schaffnit, Hassan, Urass, & Lawson, 2019). Traits such as reproductive potential, the ability to provide resources for offspring, or the ability to cooperate with and not inflict harm on their mate (in this case, the assessor's child) are all features that will impact the cost-benefit tradeoffs represented by the in-law bond in ways similar to that represented by the mateship bond. The domains in which we should expect the greatest conflict between parental in-law preferences and individual mate preferences, therefore, are those with the greatest difference in their contributions to an individual's likely value as an in-law versus their likely value as a mate. For example, a large age difference between spouses may have a substantial negative impact on one's perceived value as a mate, but little impact (or even a positive impact) on their value as an in-law. A kin network that includes many other eligible partners, on the other hand, may have little effect on one's value as a mate, but a very large impact on their value as an in-law.

3. Asymmetrical information and influence

In addition to the differences between parental in-law preferences and individual mate preferences, parents and offspring also likely have different capacities for both assessing the qualities of a potential in-law or mate and in successfully negotiating a marriage with a high-quality partner (see, e.g., Hart, 2007; Nanda, 2000; Shenk, 2021). The longer an organism lives, the more opportunities they have had to acquire information and experience relevant to making beneficial mating decisions, resulting in a fundamental asymmetry between older individuals and younger individuals and, consequently, between parents and offspring. This asymmetry can be dramatically exaggerated in a long-lived, slow-developing, and highly social species such as humans. Indeed, while studies show that human infants are sensitive to a variety of social cues at even very young ages (e.g., Liberman, Kinzler, & Woodward, 2014; Powell & Spelke, 2018), the time and energy required to develop or acquire the social skills, cognitive abilities, and local knowledge needed to competently navigate the human social world is immense compared to that required by the other social-living great apes (Kaplan, Gurven, & Winking, 2009). Parents typically have larger social networks, greater understanding of local status hierarchies and social norms, and a greater appreciation of social consequences than do their offspring. Thus, parental preferences may often be based on a more informed and finely tuned understanding of the implications of specific mating decisions than are those of their offspring, and particularly of young offspring, an asymmetry that is often recognized by those who practice arranged marriage (e.g., Hart, 2007; Nanda, 2000). These same features may also give parents an advantage over their children in the degree to which parents are able to successfully negotiate marriage terms to maximize the benefits to both their offspring and their extended kin network (see, e.g., Parkin, 2021; Schaffnit et al., 2023).

In contrast, offspring may have access to information via sensory cues or dyadic features that are unavailable to their parents and that may be directly relevant to reproductive outcomes. For example, studies suggest that both women and men may be sensitive to scent cues associated with genetic dissimilarity on a specific suite of genes hypothesized to be related to immune functioning, finding the scents of dissimilar individuals to be more sexually appealing than those of individuals with more similar alleles (e.g., Gangestad & Thornhill, 2008; Saphire-Bernstein et al., 2017; Winternitz, Abbate, Huchard, Havlicek, & Garamszegi, 2017). Similarly, the perception that a partner or potential partner has a "good sense of humor," a characteristic on which there is generally low between-rater agreement (Martin & Ford, 2018; Thorson & Powell, 1991), has been associated with longer relationship duration and higher relationship satisfaction (Kurtz & Algoe, 2015; Martin & Ford, 2018), features that may have facilitated cooperative parenting in the ancestral past.

Due to such asymmetries in information and negotiating abilities, contradictory parent and offspring preferences need not always reflect a conflict of interest, per se, but may occur even when parent and offspring interests are aligned.

4. Cultural norms and individual behavior

Given the existence of at least some conflicts of interest between parents and offspring regarding offspring mating decisions, we should also expect to see evidence of strategies on the part of both parents and offspring designed to satisfy one's own preferences while thwarting those of the other. As many scholars have pointed out, parents in general likely hold a strong intrinsic advantage over offspring due to parental control of resources (e.g., wealth, food, territory, protection, or social networks) coupled with the physical advantages conferred by mature adulthood (see, e.g., Apostolou, 2007). Some scholars have suggested that this intrinsic advantage, combined with the prevalence of arranged marriage systems and disenfranchisement of women, in particular, in human cultures, indicate that female mate choice has likely been a weak and rarely expressed factor in the evolutionary history of human mating (e.g. Apostolou, 2007, *c.f.* Schaffnit et al., 2019).

Some such arguments (e.g., Apostolou, 2007, 2008a) are based on the ethnographic evidence found in large cross-cultural datasets, such as the Human Relations Area Files (HRAF) and the Standard Cross-Cultural Sample (SCCS; Murdock & White, 1969). 39% of societies represented in the SCCS, for example, have been identified as cultures that practice arranged marriage, while another 37% are categorized as requiring some degree of parental or other authorized approval for marital decisions, and a mere 6% are identified as including marriage practices characterized by individual choice. Similarly, cultural phylogenetic analyses of marriage practices using similar sources of data combined with genetic analyses have suggested that the most likely pattern of ancestral marriage practices included parental arrangement, brideservice on the part of sons-in-law, and low rates of polygyny (Walker, Hill, Flinn, & Ellsworth, 2011). Finally, parental influence in marriage has been established as an important factor in mating decisions across a wide range of modern societies, from small hunter-gatherer societies (e.g., Walker et al., 2011) to large, diverse nation-states (e.g., Buunk, Park, & Duncan, 2010). A recent cross-cultural study of parental influence on mate choice was conducted in 175 cultures, including subsistence farmers (Agey et al., 2021). This study identified numerous cost-inflicting and benefit-bestowing tactics used by parents to influence their children's mating decisions.

The evidence of wide-spread parental influence in human mating decisions is striking and constitutes a clear argument for the need to further explore the psychological adaptations that might shape human in-law preferences, as distinct from individual mate preferences. We should be cautious, however, in using ethnographic description to infer ancestral conditions (see, e.g., Barrett, 2022). We should further be cautious of overinterpreting the degree to which reported cultural norms reflect individual behavioral practices (see, e.g., Hart, 2007). Cross-cultural comparisons are invaluable to understanding between-group differences and in appreciating both the range of variation in human behavior and the importance of culture in shaping such variation (see, e.g., Bliege Bird & Codding, 2022). But culture-level data necessarily obscures important individual variation in behavioral practices, and the individual-level moderators that likely influence these behavioral practices (see, e.g., Agey et al., 2023; Schaffnit et al., 2023).

It is also possible that reported cultural norms more closely reflect the attitudes and behaviors of older generations in a population than those of the younger generations, producing a potentially skewed perception of typical behavior in any given ethnographic example. Social rules, whether in formal contexts such as laws or rituals (e.g., Fehr & Fischbacher, 2004a; Jones, 1999; Watson-Jones & Legare, 2016), informal behavioral expectations enforced through mechanisms of social disapproval (e.g., Posner & Rasmusen, 1999), denial of benefits (e.g., de Kwaadsteniet, Kiyonari, Molenmaker, & van Dijk, 2019), or conferral of punishments (e.g., Fehr & Fischbacher, 2004b), are almost universally created and maintained by adults.

An example of how relying on reported cultural norms can be potentially misleading is in the representation of romantic and parental relationships among the Mosuo people of China. Mosuo culture has been described as a "society without fathers or husbands" (Hua, 2001), and the Mosuo people have been described as having no experience with or understanding of romantic or sexual jealousy (e.g., Cai, 2001; Stacey, 2009). These characterizations have been associated with the practice of "walking marriages," in which romantic or sexual partners do not cohabitate, coparent, or combine resources, but instead sons and daughters remain in their mothers' household throughout their lives, with brothers helping to raise their sisters' children and a daughter eventually taking over the role of matriarch. As part of this social structure, Mosuo cultural norms specify that children have little interest in or regard for their biological fathers and that women and men experience little or no jealousy over sexual or romantic partners. Mosuo culture has thus been invoked by some as counterevidence to the evolutionary argument that emotions such as romantic love or jealousy represent species-typical adaptations. While it is incontrovertibly true that traditional Mosuo family structure is atypical among human populations and that the recognition of such diversity is critical for understanding the full breadth of human emotional, psychological, and behavioral adaptations, a closer look at individual behaviors among contemporary Mosuo indicates that the patterns of resource investment and social network composition do, in fact, broadly conform to the expectations of kin selection theory (Mattison, Scelza, & Blumenfield, 2014; Thomas et al., 2018; Yong & Li, 2022). Patterns of individual behaviors among contemporary Mosuo regarding patterns of attraction and jealousy also broadly conform to the expectations of sexual strategies theories (Bliss, 2004; Ji et al., 2013; Mattison, 2010).

Together, these insights from parent-offspring conflict theory, cultural evolution theory, and the ethnographic literature suggest that we should be cautious in inferring mating strategies or their influence on sexual selection from aggregated cultural patterns alone. Instead, it is important to document individuals' actual mating behaviors and outcomes, and to ask whether and when those behaviors and outcomes do or do not conflict with cultural descriptions based on reported norms. Moreover, ethnographic work can help reveal when and how behaviors and norms can be misaligned due to culture change. Our current study examines behavioral outcomes, norms, individual preferences, and attitudes within a single framework to investigate when norms surrounding mating are or are not reflected in actual mating behavior in a community where parental control over marriage decisions has been the historically reported norm.

5. Current study

The current study uses a cultural case study approach to enhance our understanding of these issues. Based on several sources of data collected over more than a decade of research in Shuar communities in Amazonian Ecuador, we will assess parent-offspring conflict related to mate choice in a traditionally patriarchal and polygynous society in which arranged marriage for girls was the norm until very recently, and which continues, albeit less commonly, today. With these data, we will explore 1) the degree to which individual mating and reproductive behavior conforms to proscriptive cultural norms, 2) the specific loci of conflict between parents and daughters in this population, 3) the effects of parental choice on women's relationship and reproductive outcomes, and 4) how these features may be changing as a result of broader culture change.

5.1. Traditional marriage practices among the Shuar

The Shuar represent a unique population in which to examine parent-offspring conflict in mate choice. Similar to the typical pattern suggested by the cultural phylogenetic study of Walker et al. (2011), marriage among the Shuar and related Chicham-speaking cultures has historically entailed arranged marriage, brideservice, and polygyny. Traditional Shuar marriage has been characterized, by both

anthropologists and by the growing community of Indigenous scholars documenting Shuar history and cultural practices, as best reflecting an arrangement between men, as fathers-in-law and sons-in-law represented critical coalitionary allies in inter- and intragroup warfare (e.g. Descola, 1996; Pillsworth, 2008; Rubenstein, 1993; Wambasho Nungaima, 2013; Wampach Tupikia, 2013). Daughters were often married before puberty and had little or no say in either the timing of marriage or choice of spouse. Instead, young men would travel in search of brides and, upon finding a desirable and available prospect, would present themselves to the girl's father and attempt to negotiate a union. The prospective father-in-law—and, to a lesser extent, the prospective mother-in-law—would judge the young man based on his hunting and warfare ability, lineage, and likely future coalitionary value. If deemed acceptable, the young man would typically remain in his father-in-law's household, contributing food and labor and establishing a cooperative alliance, for approximately one year or until the first offspring was born. After this period of evaluation, during which the father-in-law might choose to withdraw his support, the new family would set up their own household, with sons-in-law and fathers-in-law typically maintaining their strategic alliance in future conflicts.

Within the marital union, Shuar husbands and wives traditionally experienced very high levels of interdependence due to the gendered nature of most subsistence activities, including the clearing of gardens, the cultivation and harvesting of staple plant products, hunting, tool-making, food preparation, childcare, and house construction. Despite such interdependence, scholars have typically described traditional Shuar marriages as being strongly if not wholly dominated by husbands through the regular use of intimate partner violence (see, e.g., Descola, 1996; Harner, 1984; Pillsworth, 2008; Wambasho Nungaima, 2013; Wampach Tupikia, 2013).

These traditional marriage practices are the historical norm according to both Shuar people and anthropologists, and they continue to varying degrees to the present day. Despite increasingly rapid technological change and exposure to ever-widening cultural models over the past few decades, as well as substantial increases in education attainment and increased personal autonomy, especially for young women, the traditional pattern remains relevant to contemporary Shuar life.

In the current analysis, we present three sources of data in combination: 1) qualitative data regarding marital norms, experiences, and preferences obtained from formal interviews and informal conversations with individuals in multiple Shuar communities over a ten-year span, 2) a systematic survey of attitudes regarding parental involvement in mate choice based on the cross-culturally validated Parental Influence on Mate Choice scale (Buunk et al., 2010), and 3) detailed marital histories of the majority of women living in one Shuar village in 2017.

5.2. Predictions

5.2.1. Norms versus behavior

Much of the evolutionary psychological literature on parent-offspring conflict in mate choice relies on population-level data to argue that, across evolutionary history, parents have likely maintained greater influence on offspring's mate choices than the individuals' own preferences, and that this is particularly true for daughters (e.g., Apostolou, 2007). However, the ethnographic literature broadly, and recent evolutionary-informed studies of marriage practices in Tanzania specifically, suggest that such influence may be overstated (e.g., Baraka, Lawson, Schaffnit, Wamoyi, & Urassa, 2022; Schaffnit et al., 2019; Schaffnit & Lawson, 2021). We predicted that, in a direct comparison of stated cultural norms and individual practice in this Shuar community, we would find significant discrepancies. If true, this suggests that cross-cultural comparisons utilizing culture-level data—while critical for understanding between-group differences and cultural evolutionary processes—may be less effective for (1) understanding individual decision-making or (2) inferring the relative influence of individual versus parental preferences on mate choice over evolutionary time. In

particular, we expected that daughter's reproductive decisions would reflect greater autonomy than Shuar cultural narratives about parental control would imply.

5.2.2. Divergent mate preferences among parents and offspring

Based on the existing evidence for divergent parent and offspring preferences for daughters' mating strategies, we made the following predictions regarding marriage and reproductive patterns in arranged versus autonomously selected marriages. First, we predicted that women whose parents controlled their marriage decisions would marry at earlier ages and begin reproduction at earlier ages, compared to those who controlled their own marriage decisions. We further predicted that we would see a bias toward husbands with greater resources and social status in marriages arranged by parents, and a bias toward husbands with greater physical attractiveness when daughters controlled their own marriage decisions.

6. Methods

All portions of data collection were approved by the Institutional Review Boards at UCLA (#G03-07-030-01; #G03-07-030-02; #G03-07-030-03; #G04-12-077-01; #G04-12-079-01) and California State University, Fullerton (HSR-15-0277; HSR-17-0196; HSR-21-22-393). Verbal consent for all portions of the study was obtained at both the village and individual level. Anonymized data for the PIM and Relationship History portions of the study are published on Mendeley Data (Pillsworth, 2023).

6.1. Qualitative data

The qualitative data and anecdotes reported here are based on conversations and observations relevant to marriage, sexuality, and relationships during a combined estimated 40 months of fieldwork over the past ten years. The first author (E.G.P.) documented conversations with over 180 men and women in detailed fieldnotes primarily during the years 2003–2006 and coded these notes in reference to romantic, sexual, and parenting behaviors. Recorded information includes statements of cultural norms (e.g., "In Shuar culture, women give birth alone; no one helps"), reports of others' behavior (e.g., "Maruja had a baby six months ago. She gave birth alone in the house; no one helped"), reports of individuals' own behavior (e.g., from Maruja, "My mom came to help with the birth and stayed with me for two weeks to help out"), and direct observations by the researcher (e.g., the first author observed a birth in a neighboring village, attended by the pregnant woman's mother and sister-in-law). Information was recorded on a variety of mating-relevant themes, including romantic attraction, dating and sexual behavior, marriage and reproduction, and social proscriptions and sanctions.

These data are not systematic; they were gathered opportunistically in the course of daily activities and interactions, and may be biased by the researchers' interests, interlocutors' interests, and/or sampling error.

6.2. Quantitative data

6.2.1. Parental influence in mate choice

In addition to the unstructured interactions described above, in 2015, 2017, and 2023 we collected systematic survey data to measure attitudes about parental involvement in marriage. The survey was adapted from the Parental Influence in Mate Choice scale (PIM; Buunk et al., 2010). The adapted measure consisted of seven forced-choice questions, as follows: 1) Is it more correct to say that a woman has the right to choose her own spouse without any interference by her parents, or that if parents have serious objections to a potential partner, a woman cannot marry him; 2) Is it more correct to say that when choosing a marriage partner, a daughter ought to take into account the preferences of her parents, or that when choosing a marriage partner, a daughter

must always consult with her parents; 3) If parents have selected a marriage partner for their daughter, is it more correct to say that they, the parents, have the right to insist that their daughter accept their choice, or that the daughter has the right to refuse a partner that her parents have chosen; 4) Who has the final word in choosing a husband for a woman: the woman herself or the woman's parents; 5) In your opinion, do parents have the *right* to look for a spouse for their daughters; 6) In your opinion, do parents have the *obligation* to find the best marriage partner for their daughters; and 7) In your opinion, do parents have the right to give their daughter in marriage if they have good reasons for doing so?

In order to get a somewhat representative sample, the PIM survey was administered opportunistically in interviews arranged for multiple different research purposes across three field seasons. Each participant completed the survey only once. In sum, a total of 41 individuals completed the PIM survey, including 29 women (M_{age} = 32.4, SD = 9.0, Range = 19–57 at the time of interview) and 12 men (M_{age} = 38.2, SD = 11.5, Range = 22–61 at the time of interview). Of the 29 women, 25 were currently married, two were separated and currently single, one was widowed, and one had never been married. Of the 12 men, 11 were currently married and one had never been married. Fourteen (34%) of the women who completed the PIM also provided relationship history data described below. Twenty-seven (66%) of the individuals who completed the PIM were living in the community in which the relationships history data was collected, while the rest (33%; *n* = 14) lived in neighboring Shuar communities that varied in size, access to resources (e.g. electricity, hunting availability), and proximity to roads, urban centers, and other communities.

6.2.2. Relationship history survey

In 2015–2017, E.G.P. recorded the relationship histories of a majority of all married women and mothers in one Shuar village (hereafter referred to as "Kampunin"). In total, 30 married women and one unmarried mother completed the survey. The married women surveyed represent approximately 80% of all married women living in Kampunin

at that time and include two women who lived there previously but had since moved to neighboring villages. The eight women not included in the data were either away from the community at the time of the interviews or were unable to coordinate a time with the researcher. No women in the community refused to participate or were intentionally omitted from data collection, nor do we have reason to suspect any systematic differences between the women who provided data and those who did not. Women ranged in age from 19 to 78 (M_{age} = 36.1, SD = 13.11), and first marriages occurred 2–65 years prior to data collection in 2017 (M_{time} = 18.5, SD = 13.95). See Table 1.

Marital history included: the participant's age at first marriage, her husband's age when they married, how she met her husband, whether the marriage was arranged by her parents or by her own choice, and, if arranged, whether or not she wanted to marry. Women were also asked to report their total number of children and their own age at each birth. Finally, women were asked whether and how their first marriage ended, how many total times they had been married, whether they had ever been deserted by or left a husband, whether they had ever been in a polygynous marriage, and whether their husbands had ever "been with another woman" during their marriage. Because of the inability to ensure privacy during interviews and the risk of harm that could result from any suspicions of infidelity, participants were never asked about their own sexual partners or about any pre- or extra-marital sexual activities outside of the context of reported pregnancies.

6.2.3. Community rankings of men's traits

To assess the degree to which daughters and their parents prioritize different partner traits when selecting a spouse for the daughter, we used community ranking data collected in a separate round of data collection (Pillsworth, n.d.; following methods reported in Patton, 1996 and elsewhere). Multiple raters ranked all community members on a variety of traits (*n* = 3–5 raters of both sexes per trait; rank ties allowed), a subset of which were relevant to the current study. These included men's relative wealth, social status, parenting ability, and physical attractiveness.

Table 1
Demographic information.

Partner Choice	Permission		*n*	Mean (*SD*)	Min	Max
Self-Chosen	Parental Permission	Current Age	6	28.33 (6.41)	20	36
		Age at First Marriage	6	16.25 (2.19)	13.5	20
		Partner's Age at Marriage	5	20.20 (3.27)	17	25
		Total Children	6	3.83 (2.23)	1	7
	No Permission	Current Age	7	29.14 (9.06)	19	44
		Age at First Marriage	7	21.14 (5.49)	16	30
		Partner's Age at Marriage	5	25.40 (5.64)	18	32
		Total Children	7	2.29 (1.38)	1	4
	No Answer	Current Age	3	28.67 (4.04)	25	33
		Age at First Marriage	3	17.00 (3.00)	14	20
		Partner's Age at Marriage	1	21.00	21	21
		Total Children	3	2.67 (2.89)	1	6
Parent-Chosen	Daughter Permission	Current Age	3	34 (6.56)	28	41
		Age at First Marriage	3	17.33 (2.31)	16	20
		Partner's Age at Marriage	3	24.00 (1.00)	23	25
		Total Children	3	3.67 (2.52)	1	6
	No Permission	Current Age	9	49.11 (14.66)	30	78
		Age at First Marriage	9	15.78 (1.39)	13	18
		Partner's Age at Marriage	6	28.83 (10.48)	18	46
		Total Children	9	5.89 (2.42)	2	10
	No Answer	Current Age	2	39 (5.66)	35	43
		Age at First Marriage	2	17.50 (0.71)	17	18
		Partner's Age at Marriage	1	38.00	38	38
		Total Children	2	2.5 (2.12)	1	4

Note. Table 1 lists the demographic information for the number of women for whom we have age at time of interview, age at first marriage, partner's age at marriage, and total number of children. These descriptive statistics are separated by who chose the daughters' spouse (i.e., self-chosen or parent-chosen) and permission status (i.e., parental/daughter permission, no permission, or no data on permission).

7. Results

7.1. Marriage practices

In conversations with >100 individuals, spanning over a decade, Shuar women and men provided notably consistent responses when describing Shuar relationship and marital practices. Consistent with the occurrence of significant changes in education requirements and opportunities, a rapidly improving and expanding national infrastructure, major technological innovations, and massive increases in population flow and density experienced in the communities in which these data were collected, responses to questions about relationship and marital practices were often qualified as being characteristic of either the past or the present. For example, a stereotypical response to such inquiry was "In the past, men and women had often not even seen one another. Men would hear of a marriageable girl and go to talk with her father. If her father agreed, they would be married. Today, things are changing. Today young people meet and fall in love and then try to get the father's permission." Indeed, among the 30 women from Kampunin for whom we have marriage data, the proportion of marriages arranged by parents has been steadily declining over the years (see Fig. 1). In a logistic regression, participant's current age significantly predicted whether a woman's parents or she, herself, had chosen her first husband ($OR = 1.22$, $CI = [1.06, 1.41]$, $p = .006$).

Another frequent comment when asked about marriage practices was the assertion that "Among the Shuar, marriage is forever; there is no divorce." Yet, in our sample, 23.3% ($n = 7$) of first marriages ended in permanent separation (excluding spousal death). Separations were just as likely to be initiated by wives ($n = 3$) as husbands ($n = 4$). Among all women whose first marriages ended for any reason, including spousal death ($n = 2$), six out of nine (66.6%) remarried. Two women in our sample had been married three times. 100% of all second and third marriages were the result of individual choice.

In addition to marital dissolution, women may be able to enact their own mating decisions through extra-marital sexual activity. As noted above, data on this practice is necessarily imprecise: local norms regarding female infidelity are strict and the punishments imposed on women for even suspected infidelity can be severe. We therefore made no effort to obtain systematic information about rates of infidelity among Shuar women, and no questions regarding women's pre- or extra-marital sexual activities were included in the relationship history survey. There were, however, multiple unsolicited reports of known or suspected female infidelity in the qualitative data. We used the following criteria to generate an estimate of the frequency of extra-marital sexual encounters among Shuar women: 1) the reported infidelity did not result in the wife permanently leaving her husband (i.e. it was not an instance of "mate switching") and 2) the account was reported, independently, by at least two people without any direct questioning about the incident on the part of the researchers. Using those criteria to identify cases in interviews obtained over several years and in multiple communities, we estimated that approximately 10% of women in our samples may have engaged in sexual infidelity at some point in their marriages. Given the unsystematic nature of the data, the conservative criteria used, and the potential risks faced by women who disclose infidelities, this figure is likely to be an underestimate.

7.2. Norms versus practice

In order to identify possible points of divergence between expressed social norms and individual behavior, we assessed both women's and men's attitudes regarding parental involvement in mating decisions using the modified PIM scale ($n = 41$; see Table 2). In general, participants strongly endorsed parental influence in women's mating decisions, with no clear differences in attitudes expressed by women compared to men, married compared to unmarried individuals, or older compared to younger individuals. 88% of those surveyed endorsed the statement that women should always ask their parents' permission before getting married, 70% endorsed the notion that daughters should end a relationship if her parents do not approve of her partner, and 23% agreed that daughters have a responsibility to accept any spouse chosen by her parents.

Yet, despite overwhelming consensus among the sample who completed the PIM that women should always obtain permission from their parents prior to marriage, among the 16 women in the sample who chose their own first husband (Range$_{age}$ = 19–44), only six (37.5%) said they sought permission from their parents (see Fig. 1). Seven women (43.8%) said that they did not ever ask their parents for permission, and three (18.8%) declined to answer. Although our sample size is too small for robust statistical tests, in a logistic regression, daughter's age at marriage, but not daughter's current age, was marginally associated with the likelihood of asking for parental permission (age at marriage: $OR = 0.57$, $CI = [0.30, 1.07]$, $p = .078$; current age: $OR = 1.21$, $CI = [0.86, 1.68]$, $p = .271$). Daughter's current age at the time of data collection can reveal "cohort" effects, or changing norms across generations; that is, one might expect older women to have a different experience, on average, than younger women. This was not the case in our sample; instead, parental choice was associated with daughter's age at marriage, regardless of generational cohort. The median age at marriage for women who obtained their parents' permission was 16 ($n = 6$, $M_{age} = 16.3$, $SD = 2.19$, Range = 14–20), whereas those who did not ask permission had a median age at marriage of 18 ($n = 7$, $M_{age} = 21.1$, $SD = 5.50$, Range = 16–30; see Fig. 2). This pattern suggests that the practice of obtaining parental permission for marriage may more likely be a function of marital age than of changing norms over time.

In addition to the relationship histories analyzed here, evidence from our qualitative data indicates that many individuals do not conform to the social norm that girls should end a relationship if their parents do not approve of their partner. Our ethnographic fieldnotes are rife with examples of young girls who have run away with their boyfriends, often hiding in places where it can be difficult for parents to find them. If a girl is found by her parents, she is generally brought home and may be punished, including physical punishment and/or confinement to the home. Some girls have run away repeatedly, with either the same or different boyfriends. Despite the risks of punishment, this can be an effective strategy, as, typically, once a girl is pregnant, her parents and community will accept, and may insist, that she is married to the father of her child.

While nearly all participants agreed that a daughter should always obtain parental permission prior to marrying, 56% of respondents also agreed that it is ultimately the daughters themselves, rather than their parents, who should have the final say in their choice of spouse, and only 28% agreed that fathers have the right to give their daughters in marriage without consulting or asking them. These expressed norms are in contrast to observed parental behavior. Of the 14 women whose parents chose their spouses (Range$_{age}$ = 28–78), only three (21.4%) reported that their parents ever asked whether they wanted to marry, while nine (64.3%) reported that their parents never inquired about their opinion (two women declined to answer). The likelihood of parents asking their daughter's opinion regarding her marriage was not statistically associated with either the daughter's age at marriage or her current age ($ps > 0.15$). Whether their parents asked their opinion or not, only one woman whose parents chose her husband stated that she ultimately agreed to the marriage before it occurred. The remaining 13 women all confirmed that they were married against their wishes.

7.3. Parental choice and life history traits

7.3.1. Age at marriage

Based on previous studies, we predicted that women whose parents arranged their marriages would marry at an earlier age than those who made their own marital decisions. Based on our sample, the average age at first marriage has remained largely stable over the past few decades (t
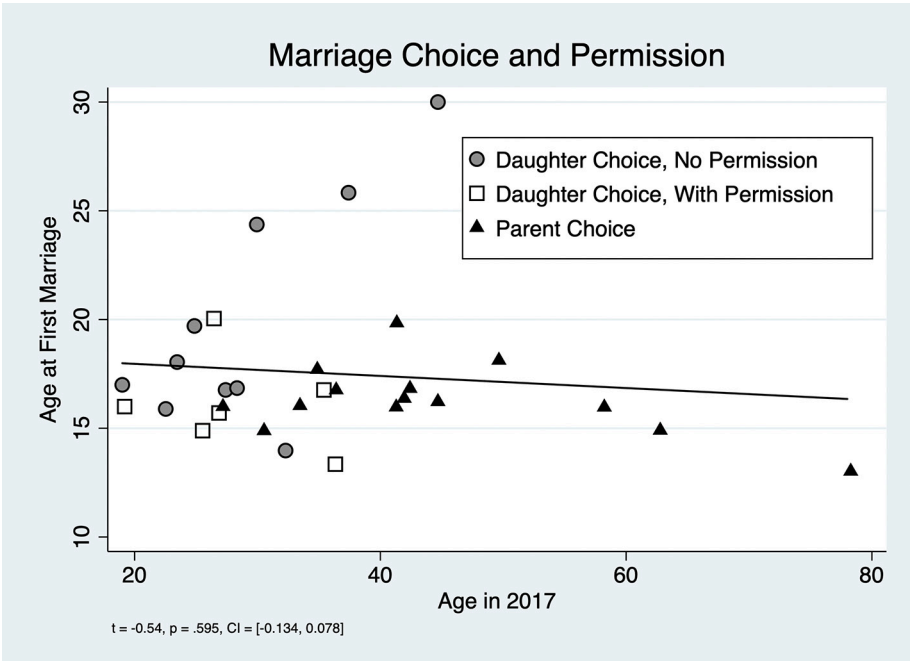
Fig. 1. The proportion of marriages arranged by parents in Kampunin is decreasing over time. The x-axis displays women's age in 2017; and the y-axis displays women's age at first marriage. $t = -0.54$, $p = .595$, 95%CI[−0.134, 0.078]. Parentally arranged marriages are rarer among younger women, on the left side if the graph. The regression line shows the estimated relationship between a women's current age (in 2017) and her age at first marriage. Women in younger cohorts are getting married at later ages than did older women.

Table 2
Behavior does not always reflect endorsed norms.

Statement	Endorsement Frequency	Actual Behavioral Frequency
Women should always ask for their parents'' permission before getting married.	88%	37.5% of 16 women who chose own first spouse asked for permission. 43.8% never asked for permission. 18.8% declined to answer.
Daughters should defer to their parents' preferences in a spouse.	70%	21.4% ($n = 3$) = parents asked daughters whether they wanted to marry.
Daughters have the responsibility to accept a spouse chosen for them by their parents.	23%	64.3% ($n = 9$) = parents did not inquire about their opinion.
Daughters, rather than parents, should have final say in their choice of spouse.	56%	14.3% ($n = 2$) = declined to answer.
Fathers have the right to give their daughters in marriage without consulting or asking them.	28%	13 out of 14 women were married against their wishes.

Note. Table summarizes stated norms' endorsement rates compared to actual behavioral frequency. The statement column states the item on the adapted Parental Influence in Mate Choice scale (PIM; Buunk et al., 2010). The endorsement frequency column indicates participants' agreement with the items. The actual behavioral frequency column indicates actual behavior related to the statement. There is not a one-to-one relationship between the PIM items and the recorded behaviors. However, these behaviors indicate divergence from the endorsement of cultural norms signifying that actual behavior does not always align with endorsed norms.

= −0.54, $p = .595$, $CI = [−0.13, 0.08]$; see Fig. 1), but was significantly associated with parental choice, with women who married at an earlier age being significantly more likely to have had an arranged union than those who married at a later age ($OR = 0.72$, $p = .051$, $CI = [0.52, 1.00]$). The median age at first marriage for women in arranged marriages was 16 ($M_{age} = 16.4$, $SD = 1.65$, Range = 13–20) while the median age at first marriage for those in self-selected marriages was 17 ($M_{age} = 18.5$, $SD = 4.54$, Range = 14–30; see Fig. 2).

7.3.2. Spouse's age at marriage
    In addition to a younger age at marriage, the spouses of women in arranged marriages were also typically older men than those in autonomously-selected marriages, though this relationship did not reach statistical significance in the current sample ($n = 21$, $OR = 1.38$, $CI = [0.92, 2.08]$, $p = .122$). The median age of spouses in parent-choice marriages was 25 ($M_{age} = 28.3$, $SD = 8.83$, Range = 18–46), while the

median age of spouses in self-selected marriages was 22 ($M_{age} = 22.6$, $SD = 4.90$, Range = 17–32; see Fig. 3).

7.3.3. Age difference between spouses
    As expected, based on the younger average age of daughters and older average age of their husbands in parent-choice marriages, parental choice was associated with a larger age gap between spouses ($n = 21$, $OR = 1.62$, $CI = [0.91, 2.89]$, $p = .104$). The median age difference between spouses in parental-choice marriages was 8 years ($M = 11.7$, $SD = 9.29$, Range = 2–31). Those in self-selected marriages had a median age difference of 6 years ($M = 5.2$, $SD = 5.95$, Range = −8-16; see Fig. 4).

7.3.4. Age at first birth
    As expected by the stability of the average age at first marriage, women's age at first birth has also not significantly changed over the
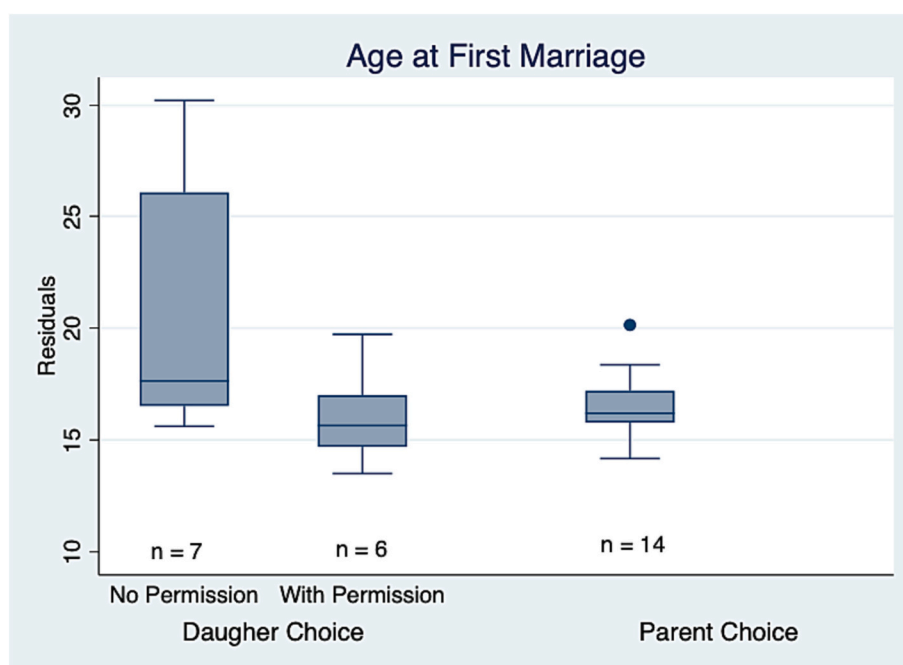
Fig. 2. Daughters' practice of obtaining parental permission for marriage may be a function of marital age rather than of changing norms. The median age at marriage for women who obtained their parents' permission was 16, whereas those who did not ask permission had a median age at marriage of 18. The y-axis identifies the residualized age at first marriage (i.e., age at first marriage controlling for participant age, reducing confounds of cohort effects). The x-axis represents who chose the spouse and whether or not daughters sought permission to marry their chosen spouse.
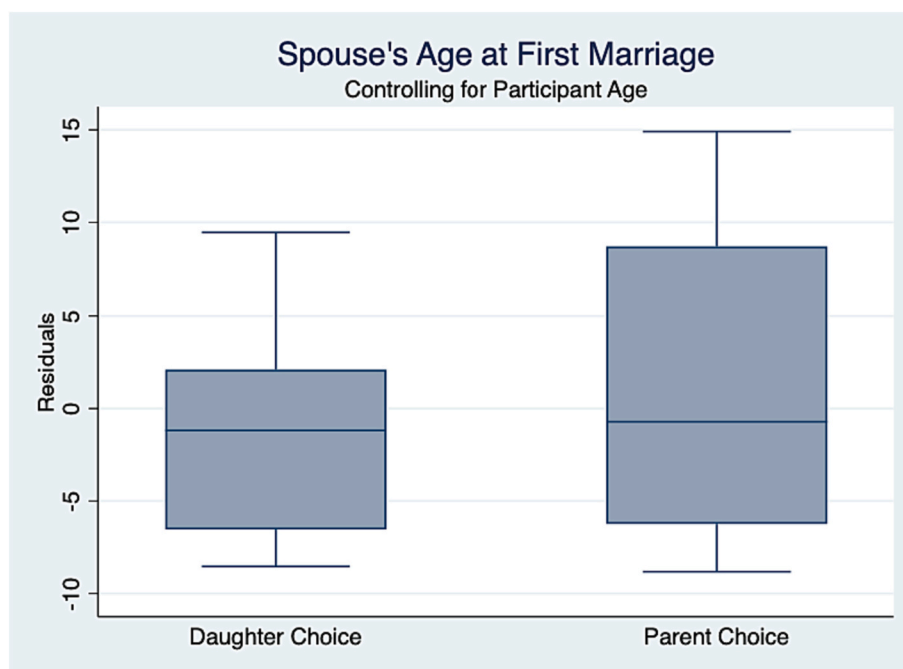

Fig. 3. There was no statistical effect of parental versus daughter-choice on spouse's age at first marriage controlling for participant age. However, women whose parents chose their spouse had a higher variance in spouse's age compared to self-chosen spouses. The y-axis identifies the residual value of spouse's age at first marriage controlling for participant age (i.e., the difference between the observed age of the spouse, and the mean age of the spouse expected based on the participant's age). The x-axis represents who chose the spouse – daughters or parents.

time period represented in our sample ($t = -0.78, p = .443$, CI = [−0.09, 0.04]). The overall average age at first birth was 18.1 (Range = 15–26,[1]

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[1] All but one woman in our sample experienced first birth between the ages of 15–22. Excluding the outlier has no effect on any reported results.

$SD = 2.54$). Because age at first birth is not a truly unique variable, being strongly linked to the potentially-intervening variable of age at first marriage, the statistical association of parent choice with age at first birth is substantially weaker than the associations of parent choice with either daughter's and spouse's ages ($OR = 1.05$, CI = [0.56, 1.94], $p = .888$). While not statistically significant, this represents a difference of
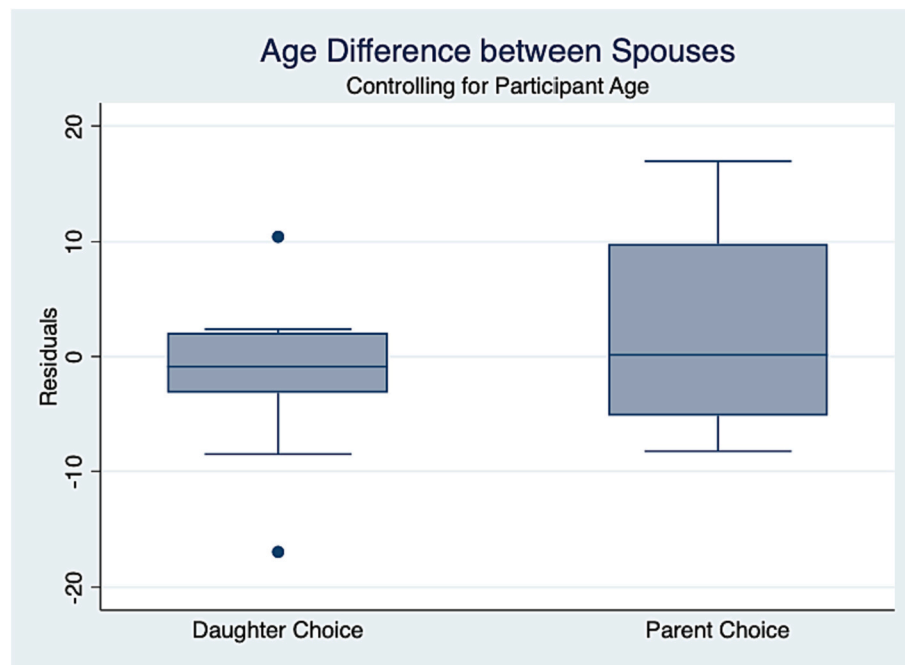
Fig. 4. Spouses chosen by parents trended toward a larger age difference compared to self-chosen spouses, $n = 21$, $OR = 1.62$, $CI = [0.91, 2.89]$, $p = .104$. The y-axis identifies the residuals of age at first marriage controlling for participant age. The x-axis represents who chose the spouse – daughters or parents.

approximately one year in the onset of reproduction in our sample (Parent choice: Median $= 17$, $M = 17.64$, $SD = 1.91$, Range $= 15$–22; Daughter choice: Median $= 18$, $M = 18.5$, $SD = 3.03$, Range $= 16$–26).

7.4. Parental choice and partner traits

To test whether daughters and their parents prioritize different partner traits when selecting a spouse for the daughter, we conducted a logistic regression of four assessed partner qualities – relative wealth,

social status, parenting ability, and physical attractiveness on the likelihood of parental or daughter partner choice. Of the 30 women in our sample, 22 had husbands who were ranked on these traits (19 were first marriages, 1 was a second marriage, and 2 were third marriages; 11 (50%) were parentally-arranged marriages). Because all of these traits are also correlated with age, we used the residual trait values after controlling for partner's age as the outcomes in the following analyses. Parental choice was associated with modestly higher ratings for partner's relative wealth ($z = 1.64$, $p = .100$, $CI = [-0.32, 3.65]$) and social
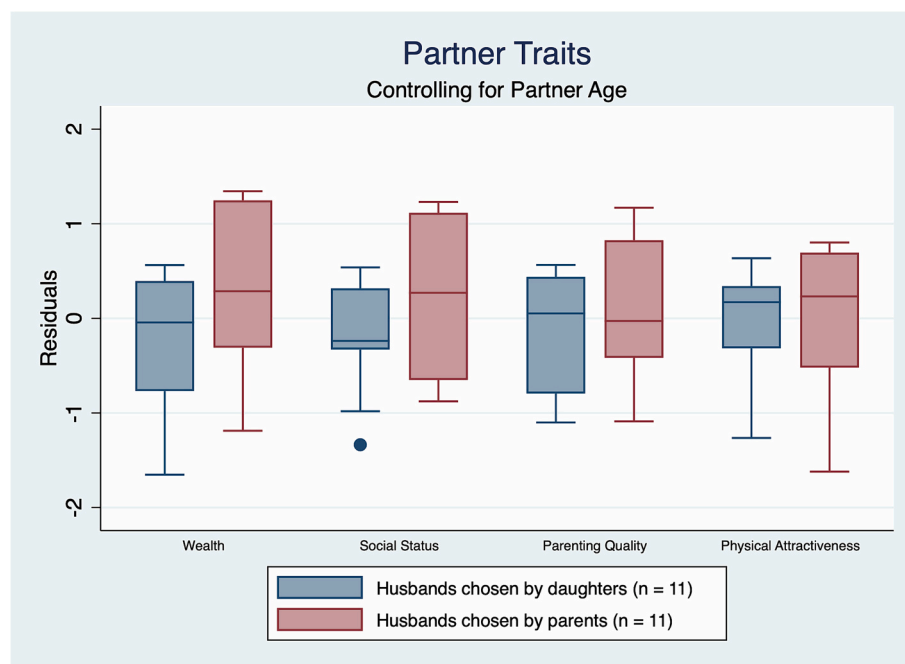

Fig. 5. Parental choice was associated with modestly higher ratings of partner's wealth ($p = .10$, $CI = [-0.32, 3.65]$) and social status ($p = .181$, $CI = [-0.66, 3.52]$). Parental choice was not associated with partner's parenting qualities ($p = .972$, $CI = [-1.717046, 1.780357]$) or physical attractiveness ($p = .909$, $CI = [-1.67, 1.48]$). The y-axis indicates community assessments of the husbands' traits, controlling for age. The x-axis indicates trait domain.

status ($z = 1.34$, $p = .181$, $CI = [-0.66, 3.52]$), but was not associated with partner's parenting qualities ($z = 0.04$, $p = .972$, $CI = [-1.72, 1.78]$) or physical attractiveness ($z = -0.11$, $p = .909$, $CI = [-1.67, 1.48]$; see Fig. 5).

8. Discussion

8.1. Cultural norms and subversive behavior

One aim of the current study was to examine the degree to which individual mating and reproductive behavior conform to the stated cultural norms expressed in a community. Evidence from both qualitative and quantitative methods confirm that individual behaviors often diverge dramatically from what would be expected based on cultural descriptions. For example, while elicited descriptions of Shuar marriage practices typically include the claim that divorce is not practiced in Shuar society, roughly one in five marriages in our sample has ended in permanent separation. Even when the costs of violating specific norms are severe, transgressions occur with some regularity. In Shuar communities, for example, women may face violent, sometimes fatal, consequences if they engage in extramarital sex (e.g., Descola, 1996), yet an estimated 10% of women in our sample may have engaged in sexual infidelity at some point in their marriages.

Evidence of the disjunct between norms and behavior can also be seen by comparing participants' responses on the Parental Influence in Mate Choice scale (PIM) with the actual behaviors reported in women's marriage and reproductive histories. The PIM responses, for example, exhibited overwhelming agreement with the proposition that a Shuar woman must always obtain parental permission prior to marrying. Yet, among the women in our sample whose marriages were not actively arranged by their parents, fewer than half ever asked for permission or approval. Similarly, a majority of PIM respondents agreed that daughters are obligated to end a relationship if her parents do not approve of her partner. However, our qualitative data are rife with stories of young women who have run away from their parents' homes with their boyfriends, sometimes repeatedly, and at times returning only after pregnancy ensures that her parents will accept the new son-in-law.

The PIM data also illustrate how norms can change over time. This observation is consistent with what has been reported by Shuar scholars, who emphasize the potential cost of changing norms to the persistence of Shuar culture and lifeways (Wambasho Nungaima, 2013; Wampach Tupikia, 2013). While we do not have direct measures of norm endorsement from the past, we can infer from (1) the fact that 90% of women over the age of 40 in 2017 had been married without their consultation or consent, (2) the common practice of identifying specific marriage practices as being of either the past or the present, (3) ethnographic reports written in the 1990s (e.g. Descola, 1996), and (4) reports from contemporary Shuar scholars (Wambasho Nungaima, 2013; Wampach Tupikia, 2013), that the practice of fathers unilaterally giving their daughters to desirable sons-in-law would have been normative behavior in the recent past. In 2015 and later, however, 75% of the individuals who completed the PIM survey stated that daughters, not parents, should have the final say in who they marry, and only 8% of respondents agreed that fathers have the right to give their daughters in marriage.

Taken together, these data lead us to conclude that the reproductive patterns of individuals in any population, whether past or present, are likely to diverge, sometimes dramatically, from the reported cultural norms of a population. There are many reasons this may be. For example, stated norms may be prescriptive, proscriptive or aspirational rather than descriptive, they may reflect the values of an older generation more than they do those of the younger generations, or they may reflect characteristic averages derived from highly variable behavior. Because of this, while the value of cross-cultural studies in assessing the range and distribution of human behavior and social structures and for understanding cultural evolutionary processes is indisputable, we

should be cautious in using ethnographic reports of norms reported in historical databases (such as the SCCS or HRAF) when making inferences about ancestral patterns of behavior or testing hypotheses related to evolved human mating psychology on an individual level.

8.2. Parent-offspring conflict in mating decisions

A second aim of the current research was to identify specific loci of conflict between parents and daughters in this population. Prior studies in other populations and using largely hypothetical survey methods have suggested some consistent areas of conflict between parental in-law preferences and individual mate preferences. In particular, studies have indicated that, on average, parents prefer an earlier age at marriage, earlier onset of reproduction, and shorter latency between marriage and reproduction for their daughters than women do for themselves (Apostolou, 2010, 2012). Further, these studies suggest that traits related to status and resources are relatively more important in parental in-law preferences compared to individual mate preferences while traits related to physical attractiveness are more important to individual mate assessments than to parental assessments of in-law quality (e.g., Buunk et al., 2008; Buunk & Leckie, 2022; Perilloux et al., 2011).

In our sample, we also found evidence of parent-offspring conflict related to the timing of marriage and reproduction as well as to the preferred traits of a son-in-law or husband. Among the women included in the marital histories collected for this study, and controlling for the participant's current age, women in arranged marriages were married at approximately one year younger than women who chose their own partners (a median marital age of 16 years compared to a median age of 17 years). In addition, age at first marriage was much more variable among those women who arranged their own marriages compared to those whose parents arranged their marriages, with no marriages in which the woman was 21 years or older being arranged by parents. This pattern could suggest that either the ability of parents to exert control or the benefits of parental control to either offspring or parental fitness decline as the offspring grows older. Future research would benefit by directly considering the tradeoffs to parents between the costs of exerting control and the benefits of controlling daughters' mating decisions as a function of daughter age, knowledge, and/or social influence, in addition to daughter's reproductive status.

Although the relationship between marital choice and age at first birth did not reach statistical significance in our sample, the correlation between age at first marriage and age at first birth is so strong ($r = 0.78$) that the observed difference in age at first birth is the same observed in age at first marriage, with women in arranged marriages experiencing their first birth at median age of 17 years and those in self-arranged marriages at a median age of 18 years.

Our data also provided some support for the hypothesis that parents may emphasize different traits when selecting a son-in-law than women do when selecting a mate. In particular, the husbands in our sample chosen by parents tended to be older, wealthier, and of higher social status, compared to husbands chosen by daughters. There was no difference observed in the average physical attractiveness or community-assessed parenting ability of husbands selected by parents compared to those selected by daughters. Importantly, all of the traits apparently maximized in this sample by parental choice, with the exception of the large age difference between spouses, are those which are also predicted by parental investment theory to be of particular importance in women's own mate assessments. Specifically, women are predicted to value access to resources – typically associated with greater wealth, social status, and, often, age – in a potential mate (Buss, 1989; Buss & Barnes, 1986), sometimes at the expense of other traits such as kindness or physical attractiveness (e.g. Li, Bailey, Kenrick, & Linsenmeier, 2002). The observation that husbands chosen by parents were typically rated more highly on these traits than husbands chosen by daughters may not imply so much a conflict of interest between parents and daughters as a

systematic asymmetry, either in parents' and daughters' abilities to discern these qualities or in parents' and daughters' abilities to negotiate for these qualities.

The fact that the husbands chosen by daughters were not, on average, rated as either better fathers or as more physically attractive than the husbands chosen by parents might suggest that, at least according to these rough measures, women did not have an advantage over their parents in assessing a potential mate's reproductive quality. A better test of the hypothesis that women may have access to information that her parents do not regarding a potential mate's dyadic reproductive value would be a comparison of birth outcomes, offspring success, and/or measures of marital conflict or harmony among women in arranged versus self-selected marriages.

These findings lend support to the hypothesis that humans are likely to have preferences specifically related to the assessment of potential mates for our children, and that these preferences may differ in important ways from those designed for individual mate selection. But they also suggest that in-law preferences and mate preferences may be in closer alignment than previously argued and that some of the variation between parents' preferences and daughters' preferences may be better explained by asymmetries in parents' and daughters' abilities to accurately assess or negotiate for a potential partner's long-term value as a mate than by conflicts of interest.

8.3. Limitations

The current study is characterized by some important limitations. Our sample was underpowered for conducting robust statistical analyses, increasing the risk of both Type I and Type II errors. In spite of the statistical weaknesses of these data, we have very high confidence in the patterns reported in the descriptive data, which are based on multiple sources of information collected (and often re-collected) over several years. The descriptive data clearly indicate significant areas of divergence between the stated norms related to marriage and reproductive practices in Shuar culture and the reported behavior of individuals. This highlights the importance of using individual-level data to test hypotheses related to evolved psychological mechanisms and behavioral strategies.

Much of the data reported here were collected in a non-systematic manner, based on conversations and interactions with hundreds of people across many contexts and over many years. Because the information shared in such interactions and that which is recorded by the researcher are influenced by the interests and biases of both the participants and the researchers, it is possible that some patterns in our data are over- or underestimated relative to their actual occurrence within the population. Despite the potential biases that are likely present in the qualitative data presented here, the sheer volume of interview and observational data collected from a relatively small and relatively stable population over more than a decade of semi-annual visits give us confidence that the patterns described therein are unlikely to be spurious. In addition, our ability to interpret data obtained in systematic surveys is vastly improved by our ability to appropriately situate the results within the complex cultural context in which it was obtained, a context that is best revealed through rich ethnographic records.

9. Conclusion

The existing literature on parent-offspring conflict in human mating is limited by two important factors that have shaped the research to date. The first is a reliance on culture-level data, typically representing cultural norms, to both derive and test hypotheses related to the relative influence of parental choice and individual choice in the evolution of human mating psychology and strategies. Our data suggest that the norms that are invoked when describing the practices – marital or otherwise – of a specific culture group may obscure, sometimes dramatically, the true range of behavioral strategies employed by

individuals within the population. At the most basic level, Shuar and other Chicham-speaking populations have been described as having a traditional marriage system characterized by extreme parental control over women's reproductive decision-making, including the practice of child marriages arranged between parents and sons-in-law and without the consultation or consent of the daughters to be wed, high rates of domestic violence, and extreme punishments for marital infidelity. We have demonstrated that even within this context of tight parental and societal control over women's mating decisions, women have numerous strategies available to them to assert their preferences and prioritize their own reproductive fitness. In our sample, for example, all of the women over age 45 and 50% of the women between ages 25 and 45 were married at the exclusive direction of their parents, in adolescence, and almost universally against their wishes. Among these women, whose histories reflect an especially low degree of relationship and sexual autonomy, two-thirds eventually married and had children with partners they chose themselves.

Another strategy by which women may assert their mate preferences within the context of strong parental control is through surreptitious extramarital sexual encounters. We estimated that as many as 10% of the women in this population may have engaged in extramarital sex at some point in their marriages, despite the very real risk of violence or death if discovered. And while we hazard no estimate of the likely rate of misattributed paternity in this population, it is certainly non-zero based on what evidence we have regarding women's and men's sexual behavior.

The second factor limiting our current understanding of parent-offspring conflict in mating is a possible over-estimation of the degree of conflict of interest between parental in-law preferences and individual mate-preferences, exaggerated by research methods that rely almost exclusively on hypothetical decision-making, estimates of third-party preferences, and forced choice paradigms to infer divergent in-law and mate preferences. Parents and daughters are expected to face somewhat different cost-benefit tradeoff calculations when evaluating an individual as either a possible son-in-law or a possible husband, based on the greater inclusive fitness benefits that in-law relationships can provide to parents and the potential tradeoffs in traits most relevant to the daughter's individual fitness that maximizing such inclusive fitness benefits might entail. But despite the expected variation in specific benefits represented by the in-law relationship compared to the marital relationship, the evolutionary theories invoked to explain and derive novel hypotheses related to human mating – including parental investment theory, sexual strategies theory, and inclusive fitness theory – all predict substantial overlap in the qualities that would make a man a valuable son-in-law or reproductive partner. In particular, the traits that have long been hypothesized to be of particular importance in female mate choice – access to resources, social status, and a willingness to invest in children (e.g., Buss & Barnes, 1986) – are the same traits that are often predicted to be of more importance to parents evaluating a potential son-in-law than to daughters evaluating a potential mate (e.g. Apostolou, 2007, 2014).

We suggest that considering the asymmetries in parent and daughter access to information relevant to assessing these qualities may provide a novel and useful way to understand the apparent discrepancies in parent and daughter preferences that have been documented in the literature. In our data, for example, we demonstrated that the husbands chosen by parents had, on average, higher wealth and social status than the husbands chosen by daughters. In contrast, whether the marriage was arranged by parents or by the daughter was unrelated to ratings of husbands' physical attractiveness or parenting ability. We further demonstrated that parents were more likely to arrange marriages, and daughters were more likely to seek parental approval, when daughters married at a younger age. One possible interpretation of these patterns is that parental influence, up to and including the arranging of marital unions, may benefit both parents' and daughter's reproductive fitness by increasing the probability of selecting a high-quality mate, particularly

when daughters are very young and still face a steep learning curve in developing social knowledge and becoming adept at managing the social landscape (see also, Shenk, 2021). This idea could be further explored by examining the relationship between daughter's age and social competence and parents' investment in efforts to influence or control daughters' mating decisions, whether by controlling access to opportunities for romantic or sexual exploration or by proactively selecting a mate in order to supersede the daughter's own decisions.

In conclusion, we argue that there is a clear need to focus human mating research on the psychological adaptations and behavioral strategies that may have evolved in response to the uniquely human challenge of assessing potential mates for individuals other than ourselves – i.e., our children – while simultaneously evaluating the likely inclusive fitness benefits that stand to be acquired through the development of in-law relationships. We presented ethnographic and survey data related to the marriage, sexual, and reproductive norms and practices in a population in which women have historically had a low degree of autonomy in their mating decisions to demonstrate that cultural norms cannot simply and straightforwardly be used as proxies for individual behavior and to highlight the importance of behavioral measures in testing hypotheses related to evolved human mating psychology and strategies. We used the relationship and reproductive histories of a representative sample of women within a Shuar community to highlight that even in the most restrictive reproductive environments, women engage in multiple behaviors that allow them to realize at least some of their individual mating preferences. We further showed there was a significant relationship between parental control of marital decisions and an earlier age of marriage, and a positive effect of parental choice on some desirable mating- and in-law relevant qualities, such as wealth and social status, expressed in husbands. Finally, we recommend that future research should directly assess individual behaviors in addition to reported cultural norms, reconsider the points of convergence and divergence in parental in-law preferences and individual mate preferences, and incorporate the concept of asymmetrical information and influence in considering the potential fitness payoffs to parents and daughters of different strategies to restrict, control, or influence daughters' mating decisions.

Declaration of Competing Interest

None.

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