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ABSTRACT

Can questions about life satisfaction be used to measure parental preferences for daughters versus sons? Daughter preference has rarely been documented in the literature, even in matrilineal settings. One possible reason is that the commonly used measures of parental gender preference, such as fertility-stopping rules and sex ratio at birth, are ill-suited to high-fertility settings. We instead assess maternal preferences in Malawi by examining the life satisfaction of women who currently have one child, comparing those with a daughter to those with a son. We find that in matrilineal (but not patrilineal) households, having a daughter increases mothers' life satisfaction, relative to having a son.

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1 Introduction

Given the strong evidence that parents have a preference to have sons in patrilineal societies (Coale and Banister, 1994; Park and Cho, 1995; Goodkind, 1996; Arnold et al., 1998), a natural prediction is that in matrilineal societies, parents prefer having daughters. However, daughter preference has rarely been documented using common measures of child gender preferences such as the sex ratio at birth or fertility-stopping rules.

At the same time, recent studies in sub-Saharan Africa have provided indirect evidence consistent with daughter preference in matrilineal societies. First, among women who have a child before marriage, a first-born daughter reduces the likelihood of marrying in patrilineal areas, but increases it in matrilineal ones (Genicot and Hernandez-de Benito, 2020). Second, the gender gap in schooling, which generally favors boys, is smaller in matrilineal areas (Lowes, 2022). Third, boys' disadvantage in terms of severe stunting prevalence is larger in matrilineal areas (Lowes, 2022). These findings make it plausible that matrilineal parents desire having daughters over sons.

We conjecture that one reason that daughter preference has been difficult to detect using standard measures such as the sex ratio at birth, fertility-stopping rules, and stated preferences over gender composition is that these measures are ill-suited to high-fertility settings. Most matrilineal societies are located in sub-Saharan African countries with higher fertility than the Asian countries where son preference is commonly documented. Son preference in patrilineal societies has been shown to take the form of strongly wanting at least one son and otherwise favoring gender balance (Jayachandran, 2017). If daughter preference in matrilineal societies is analogous, then the preference will almost always be satisfied naturally in high-fertility contexts. Few couples will need to engage in sex selection or go beyond their ideal family size to ensure they have a daughter (behaviors that affect the sex ratio at birth and fertility stopping-rules, respectively), and the child gender composition they desire will

be roughly balanced, despite their daughter preference.[1]

In light of this challenge, we investigate whether questions about life satisfaction can be used to indirectly measure parental preferences for daughters in sub-Saharan Africa. We posit that if a parent has a gender preference, then their child's gender will influence their life satisfaction.[2] The effect will likely be easiest to detect shortly after the birth, before additional children are born, so we focus on young parents who have had only one child, comparing those with a first-born son to those with a first-born daughter.[3]

We use life satisfaction measures collected for female respondents in the Multiple Indicator Cluster Surveys (MICS) to assess maternal preferences for child gender in Malawi, comparing matrilineal and patrilineal households. The Malawi MICS data are ideal for studying our question for several reasons: (1) Malawi has both patrilineal and matrilineal ethnic groups, with the latter representing around 70% of the population; (2) the two recent survey waves from Malawi (MICS4 2013-14 and MICS6 2019-20) ask life satisfaction questions to young adults between ages 15-25 and collect women's complete birth history; (3) the Malawi survey has the largest sample size among MICS surveys fielded in countries with matrilineal groups, allowing for a sufficiently-powered analysis. Because the MICS sample of fathers is much smaller, we focus our analysis on mothers.

We find that having a daughter significantly increases young mothers' life satisfaction compared to having a son—but only in matrilineal households. Among matrilineal households, having a daughter instead of a son increases the likelihood of being very satisfied

[1] Adebowale and Palamuleni (2015) find that the majority of Demographic and Health Survey respondents in Malawi say they want an equal number of daughters as sons or have no gender preference, though a larger share of women prefer more daughters than prefer more sons (23.3% versus 16.5%).

[2] We interpret a link between having a daughter and life satisfaction as indicating that the parent desires having a daughter more than a son; they feel greater life satisfaction once their preferred outcome materializes. We note that the effect could also reflect a different form of gender preference whereby the parent derives more utility from spending time with a daughter. This could be an automatic, non-rational response that does map to an ex ante or even ex post preference to have a daughter rather than a son.

[3] Using variation in the gender of the first-born also helps avoid bias from endogenous fertility. Sex-selective abortion is uncommon in sub-Saharan Africa, supporting our assumption that the sex of the first-born is exogenous (Anderson and Ray, 2010; Chao et al., 2019; Genicot and Hernandez-de Benito, 2020). Observable characteristics of mothers, fathers, and households are broadly balanced by first-born sex within matrilineal and patrilineal groups (see Table A.1).

by 3.5 percentage points (pp), comparable to the gain in life satisfaction associated with having 2 additional years of education. Among patrilineal households, the estimated effect of having a daughter on life satisfaction is slightly negative but not statistically significant. These results are consistent with matrilineal kinship leading to daughter preference.

We then illustrate that it is methodologically important to restrict the focus to young parents with just one child in order to detect the impact on life satisfaction. Most existing studies on child gender and life satisfaction examine the impact of the gender composition among all children or of the first-born's gender, but after the parent also has other children. We conduct an analysis with these alternate specifications and sample restrictions, which reproduce the noisy null result found in past studies.

As a final analysis, we draw on Demographic and Health Survey data to compare our findings to those using traditional measures of gender preference including sex ratio at last birth and stated gender preferences. The test based on life satisfaction provides the strongest evidence of daughter preference among matrilineal mothers, whereas the other preference measures suggest only a weak link or fail to detect one. Overall, our analysis highlights the potential usefulness of life satisfaction measures for understanding parental preferences over child gender, particularly in high fertility settings where the more common measures are less well-suited.

Our paper makes both a substantive and a methodological contribution to the literature. Substantively, we add to our understanding of how traditional kinship systems influence fertility preferences over child gender. Compared to the large literature on son preference in patrilineal societies in Asia, child gender preferences in Sub-Saharan Africa have received less attention.[4] Few studies directly compare preferences across kinship systems, even though the mix of matrilineal and patrilineal systems makes Africa a rich setting to study.[5] An exception

[4]While recent studies document emerging stated daughter preference among some Asian countries such as Japan and South Korea, this is mainly interpreted as reflecting changing old-age support needs rather than kinship institutions, which remain patrilineal (Fuse, 2013; Chun and Das Gupta, 2022).

[5]Several studies link patrilocal or patrilineal kinship systems to son preference based on sex ratios, stopping rules, or stated preferences in Asia: Nasir and Kalla (2006); Chakraborty and Kim (2010); Goli et al. (2024) on India; Murphy et al. (2011) on China; Becquet and Guilmoto (2015) on Vietnam; and Ebenstein

is Rossi and Rouanet (2015), who compare birth spacing based on the prior child's gender across Africa. When gender preference affects how long parents are willing to wait before having another child or how long they breastfeed a child, birth spacing will capture gender preference even in high fertility settings (Jayachandran and Kuziemko, 2011; Chakravarty, 2015). Rossi and Rouanet (2015) find statistically significant patterns consistent with son preference among patrilineal groups. Among matrilineal groups, the point estimates are in the direction of daughter preference but statistically insignificant. To our knowledge, our results represent the first positive evidence of daughter preference in sub-Saharan Africa.

Methodologically, our paper makes progress on using life satisfaction to assess parental preferences over child gender. Our first contribution is to highlight the particular value of the approach in high-fertility settings. We argue that one reason for the evidence gap on daughter preference in Africa is that standard tests of gender preferences based on fertility behavior such as stopping rules or stated preferences are less informative in high-fertility settings.[6] Life satisfaction can detect gender preferences even when fertility is high.

Our second methodological contribution is to develop a more high-powered empirical test than previous studies that have analyzed how parental life satisfaction varies with child gender. Specifically, we show the importance of careful sample restriction to isolate the link between child gender and parental well-being. Most of the small number of prior studies that have analyzed life satisfaction and child gender find no systematic patterns, even in settings with well-documented son preference, such as China. We believe that this is partly due to methodological limitations. Prior studies typically assess parents' life satisfaction several years after they have children, correlating it with the sex composition of their children (Hans-Peter Kohler, 2005; Pushkar et al., 2014; Lei et al., 2023).[7] That test might be low-powered,

(2014) across 108 countries. A few studies examine daughter preference among matrilineal ethnic groups in Asia: Narzary and Sharma (2013) on tribal groups in Meghalaya, India, and Mattison et al. (2016) on matrilineal Mosuo in China.

[6] See Arnold (1992) on stated preferences and fertility behavior; Fuse (2008) on stated preferences; and Basu and de Jong (2010) on sex ratios.

[7] Conzo et al. (2017) examine how fathers' versus mothers' life satisfaction varies with their number of children in Ethiopia. Most other studies use data from Europe, North America or China.

both because the variation in sex composition is not stark (and is endogenous to stopping rules), and the timing of satisfaction measurement is distant from the childbirth events. We improve on this by assessing life satisfaction when parents have only had one child; this creates sharp variation between parents with a son versus a daughter, and the timing of measurement is relatively close to the birth.

The only other paper that highlights the importance of the timing of measurement when using subjective well-being to assess gender preferences is Song and Gao (2023). They study fathers in the US who have a son or daughter less than three years old and analyze fathers' self-reports about happiness, pain, sadness, stress, tiredness, and meaningfulness while doing different activities with the child.[8] An advantage of our analysis is we use a more commonly collected and holistic well-being measure, namely general life satisfaction, which might have a higher signal-to-noise ratio than emotions during a specific, one-time activity.

The reminder of the paper proceeds as follows. Section 2 describes the data and sample and presents descriptive statistics. Section 3 analyzes the impact of child gender on parental life satisfaction. Section 4 contrasts these findings with those using other measures of child gender preferences. Section 5 concludes.

2 Data and sample description

2.1 Malawi MICS and DHS

This section describes the nationally representative surveys from Malawi used in our analysis: the Malawi Multiple Indicator Cluster Surveys (MICS) and the Malawi Demographic and Health Survey (DHS).

MICS. Our main analysis uses two waves of the Malawi MICS conducted in 2013–14 (MICS 04) and 2019–20 (MICS 06). Both surveys were implemented by the National Statis-

[8] Song and Gao (2023) conclude that gender preference is limited among American fathers overall, but ethnically Asian fathers have son preference, as Asian fathers report reduced stress (but no difference in the other five emotions) when spending time with at least one son than with only daughters. While the finding is reported as statistically significant, the inference does not correct for multiple hypothesis testing.

tical Office of Malawi in collaboration with UNICEF as part of the global MICS program, which collects internationally comparable data on the well-being of women and children in low- and middle-income countries. The Malawi surveys are representative at the national level. Each wave includes four questionnaires: a household survey, a women's survey, a men's survey, and a child-under-five survey. All women aged 15–49 in selected households were eligible for the women's survey, which collected detailed information on fertility, health, education, attitudes, and life satisfaction. Our main outcome is constructed from the question about overall satisfaction with one's life.[9] A shorter men's questionnaire was administered to men aged 15–49 in one-third of sampled households and also included life satisfaction questions.

In addition to life satisfaction, we use demographic and socioeconomic modules to construct control variables, including household wealth (measured by the MICS wealth index based on principal component analysis of household assets), years of education, marital status, ethnicity of household head, religion, and region of residence.

Homogenizing life satisfaction measures. Across MICS survey waves, the life satisfaction module varied in terms of coverage, wording, and response scale. In MICS 04, the item was asked only to women aged 15–25, while in MICS 06, eligibility was expanded to women aged 15–49. In MICS 04 (question LS12), respondents were asked: "How satisfied are you with your life, overall?" with five categorical response options: very unsatisfied, somewhat unsatisfied, neither satisfied nor unsatisfied, somewhat satisfied, and very satisfied. In MICS 06 (question LS2), respondents were instead shown a "ladder" numbered from 0 (worst possible life) to 10 (best possible life) and asked: "On which step of the ladder do you feel you stand at this time?"

To harmonize the life satisfaction measures across survey waves, we recoded the 0–10 ladder responses in MICS 06 into five categories that mirror the distribution of MICS 04 responses. We then construct a binary indicator for being very satisfied with life: coded 1 for

[9]The module also asked respondents their satisfaction with specific domain such as health and income.

"very satisfied" in MICS 04 or for a ladder score of 5–10 in MICS 06, and 0 otherwise. Figure A.1 depicts the raw and harmonized responses: Panel A shows the five-category distribution in MICS 04, Panel B the recoded five-bin version of MICS 06, and Panel C the raw 0–10 ladder distribution in MICS 06. In MICS 04, 68 percent of women aged 15 to 25 reported being "very satisfied." In MICS 06, our re-categorization yields a comparable share of 67 percent for women 15 to 25 years old.

DHS. We also use the 2015–16 Malawi DHS, implemented by the National Statistical Office of Malawi. DHS interviewed all women aged 15 to 49 in selected households and a subsample of men aged 15 to 49 in one in every three households. The DHS is representative at the national and regional levels. As with MICS, it collects extensive information on fertility, health, education, and socioeconomic characteristics, but with a stronger focus on demographic and health outcomes and no subjective well-being measure. Two modules of the DHS are central to our analysis: stated fertility preferences and birth history.

Stated fertility preferences. Respondents are asked about their ideal total number of children and, conditional on this, the desired number of boys, girls, and children of "either gender." From these questions, we construct two measures: (i) Wants more daughters than sons, a binary variable that equals to 1 if the respondent reports a strictly larger number of desired daughters than sons; and (ii) Share of daughters desired, defined as desired number of daughters divided by total desired children, where "either gender" is coded as 0.5 of each gender. Observations in which desired daughters + desired sons + "either gender" do not sum to total desired children are excluded (less than 1% of the sample).

Birth history. Using women's full fertility histories, we construct two behavioral indicators commonly used to proxy for gender preference. First, "last birth is a girl" equals 1 if the most recent child is female (0 otherwise). Second, "duration of birth interval" is the interval in months between consecutive births, computed following Rossi and Rouanet (2015). In settings with son preference, the first measure (inverted) has been interpreted as evidence of stopping behavior: parents are more likely to cease childbearing after a son (Das, 1987;

Yamaguchi, 1989). The second measure captures whether couples accelerate the next birth when they lack a son, resulting in shorter intervals after a daughter than a son (see Rossi and Rouanet (2015)).

2.2 Kinship systems in Malawi

Kinship and gender preference. In matrilineal settings, daughters transmit land and lineage identity, while sons typically form households outside the natal lineage and their children belong to other descent groups (Schneider and Gough, 1974; Peters, 1997, 2019). Women also anchor the lineage socially and ritually, making them central to lineage continuity and kinship organization(Richards and La Fontaine, 2013; Peters, 2019). These features suggest a potential for daughter preference. Even where matrilineal land inheritance has weakened, descent, lineage membership, and ritual reproduction often continue to flow through women (Richards and La Fontaine, 2013; Peters, 2019).

Classification. Our analysis requires measures of Malawi's traditional kinship systems, in particular a classification of whether a respondents is matrilineal or patrilineal. We assign lineage type based on ethnic group and district, following the most recent accounts of kinship traditions in Ibik (1970) and Berge et al. (2014). Appendix Table A.2 summarizes our classification. In MICS, respondents could specify one of nine ethnic groups or select "other". We classify all nine ethnic groups and leave the "other" category unclassified; the classified sample covers 92% of young mothers with one child. In DHS, we are able to classify eight of the ten reported groups, covering 92% of women aged 15–49. This approach yields broad coverage in both datasets, and the resulting distribution of matrilineal and patrilineal groups across districts aligns with established accounts of kinship variation in Malawi (Peters, 2010; Le Roy, 2017).[10]

[10] Murdock (1967) diverges from these sources in some cases: it codes the Tonga and Sena as matrilineal, whereas Ibik (1970) and Berge et al. (2014) classify them as patrilineal. It also codes the Ngoni as patrilineal, although later accounts distinguish between northern Ngoni (patrilineal) and southern Ngoni (matrilineal phratries).

2.3 Sample and descriptive statistics

Table 1 describes mother, father and household characteristics for our analytical sample of 5,449 women aged 15–25 in the Malawi MICS with one child (father characteristics are available for 3,886 cases). The table reports means and standard deviations for the full sample and separately for matrilineal and patrilineal households. Mothers in the two systems are similar in age (about 20.35 years). Matrilineal women are slightly younger and less likely to have been married at first birth. Education is low overall but higher among patrilineal than matrilineal women, while current marriage rates are very similar across systems. Among fathers, those in patrilineal households are older, exhibit a larger husband–wife age gap, and have higher schooling levels than those in matrilineal households. At the household level, patrilineal families are larger, wealthier, and modestly less likely to be female-headed, with similar rural residence across systems. Finally, matrilineal households are concentrated in the South and Central regions and include a larger Muslim share.

To address the differences in wealth, region, and religion by kinship type, we include household wealth as a control in our main regressions (in parallel to our kinship type variable) , and show in the appendix that results are robust to adding additional controls (Muslim indicator, years of education, age, and region), entered both as main effects and interacted with *Has daughter*.

Appendix Table A.3 examines the correlates of life satisfaction. On average, 68 percent of women in the main sample report being very satisfied with life, rising to 71 percent when women without children are included. Consistent with prior work (e.g., Deaton (2008)), life satisfaction is positively associated with marriage and education, and shows no systematic relationship with age.

3 Impact of child gender on life satisfaction by kinship

To assess how the impact of child gender on women's life satisfaction varies across kinship systems, we estimate:

$$LS_{iv} = \beta_1 HasDaughter_i + \beta_2 Patrilineal_i + \beta_3 HasDaughter_i \times Patrilineal_i + \rho_v + \epsilon_{iv} \quad (1)$$

For this main specification, we use a sample of women between ages 15-25, whose first births occurred at 15 years old or older and who have one child. The dependent variable LS_{iv} is an indicator for whether respondent i in wave v reports being very satisfied with life overall, $HasDaughter_i$ is an indicator for the respondent having a daughter, and $Patrilineal_i$ indicates whether her ethnic group follows a patrilineal kinship system.[11] ρ_v denotes survey wave fixed effects. Standard errors are clustered at the primary sampling unit (PSU) level. Under the assumption that the first child's gender is exogenous, β_3 estimates the differential effect of having a daughter (rather than a son) in patrilineal versus matrilineal systems.

In extended specifications, we expand the sample to include women without children (or married women without children). We then add the indicator $HasSon_i$ and its interaction with kinship structure, which allows us to compare women with a daughter, a son, or no children at all. In these specifications, the effect of having a daughter rather than a son for matrilineal mothers is captured by the difference between the coefficients on $HasDaughter_i$ and $HasSon_i$. For patrilineal mothers, the corresponding effect is the difference between $(\beta_{HasDaughter} + \beta_{HasDaughter \times Patrilineal})$ and $(\beta_{HasSon} + \beta_{HasSon \times Patrilineal})$.

Table 2 reports the results. Column 1 presents the pooled specification without kinship interactions: on average, having a daughter increases the likelihood of being very satisfied with life overall by 2.2 pp compared to a having a son ($p = 0.088$).[12] Columns 2–4 report

[11] Because MICS does not record the woman's ethnicity, we use the household head's ethnicity as a proxy.

[12] Appendix Table A.4 shows that compared to having no children, having a daughter is associated with lower life satisfaction (-3.2 pp), but the decline associated with having a son is considerably larger (-5.4 pp). The results are similar when excluding women who are unmarried without children.

estimates from the main specification in Eq. (1). Column 2 shows that having a daughter increases life satisfaction for matrilineal mothers ($p = 0.019$), while for patrilineal mothers the effect is negative but not statistically significant.[13] The estimated difference across kinship structure is statistically significant at the 5% level ($p = 0.044$). Column 3 represents our main specification, which controls for household wealth and its interaction with $HasDaughter$ because of the imbalance in wealth across patrilineal and matrilineal households. The differential effect of having a daughter life satisfaction in patrilineal societies remains sizable (6.4 pp and statistically significant ($p = 0.026$). In Column 4, we restrict the sample to the South region, where the presence of two kinship structures is more balanced. The results are similar, although the standard errors become larger due to the smaller sample size.

We next assess the robustness of these findings to a range of alternative specifications. A first concern is differential selection into the sample across kinship structure due to endogenous birth spacing: mothers who are dissatisfied with the gender of their first child may have shorter birth intervals and therefore be underrepresented in the sample of one-child mothers. To address this concern, Table 3 re-estimates the specification in Column 3 of Table 2 while expanding the sample to all mothers who are observed within 1, 2, or 3 years after the first birth, regardless of total births. Importantly, this sample inclusion rule does not depend on birth spacing.[14] The estimated effects are even larger when restricting the sample to mothers observed within one year after first birth, and remain similar in magnitude to our main specification when using two- or three-year windows, suggesting that selection through fertility timing is unlikely to drive the results.

Additional robustness checks are reported in the Appendix. Appendix Table A.6 shows that the results hold when restricting the analysis to a single survey wave or when using alternative cutoffs for life satisfaction. In Appendix Table A.7, Columns 1–4 add additional

[13]Relative to having no children, both daughters and sons are associated with lower life satisfaction for women in both kinship systems (Appendix Table A.5).

[14]Birth spacing between the first and second child is typically less than three years. Mothers whose first child is three three years old or younger account for 77 percent of the one-child sample.

controls—-region fixed effects, household religion, women's education, and age—-with little change in the estimates. Since child gender may affect short-run marriage prospects (Genicot and Hernandez-de Benito, 2020), Column 5 excludes unmarried mothers and the results remain stable. Finally, using patrilocality rather than patrilineality as the measure of patriarchal tradition yields similar findings, consistent with the high correlation between the two practices (Appendix Table A.8).

To recap, we find results consistent with the hypothesis that, due to kinship structure, matrilineal women have a preference for daughters. In contrast, patrilineal women do not exhibit daughter preference; they seem to have weak son preference or no gender preference.[15]

3.1 Importance of the timing of measurement

In this subsection, we investigate whether restricting the sample to young mothers plays an important role when estimating the impact of child gender on life satisfaction. Most existing studies assess the effect of children's gender on life satisfaction many years after parents have children. Such a test might be low-powered because the variation in sex composition is less stark, both due to having multiple children and due to endogenous stopping rules. Furthermore, the timing of satisfaction measurement is distant from the childbirth events, potentially making the estimates noisier. Since life satisfaction measures are available for women aged 15 to 45 in MICS 6, we replicate the typical analysis in existing papers and check whether we continue to find evidence of daughter preference among matrilineal mothers.

We fail to find evidence of daughter preference when we expand our sample to include women between 15-49 years old. Following Pushkar et al. (2014) and Lei et al. (2023), Appendix Table A.10 compares the mothers who have only daughters and those with only sons.[16] We do not observe any significant difference between them, even when we restrict

[15]We report the analogous impact on father's life satisfaction in Appendix Table A.9. Having a daughter (compared to a son) seems to lower father's life satisfaction even among matrilineal fathers, but less so than among patrilineal fathers. This pattern is consistent with the preference for daughters we observe among matrilineal women relative to patrilineal women if layered on top of a general preference for sons among men. However, the sample size is small and the results are not statistically significant, so the interpretation is speculative.

[16]Note that the original studies use a categorical variable for overall satisfaction, whereas we use a binary

our attention to matrilineal mothers. In Appendix Table A.11 and Appendix Table A.12, we follow Hans-Peter Kohler (2005) and other specifications in Lei et al. (2023) by regressing life satisfaction on the first-born's gender or the number of daughters. The estimates are again small and not statistically significant, even for matrilineal mothers. Overall, we do not find any evidence indicating daughter preference. This highlights the advantage of our refinements to how to use life satisfaction to study child gender preferences.

4 Other measures of child gender preference

In this section, we examine more standard measures of gender preference in our context, using Malawi DHS data. Despite the evidence for daughter preference in matrilineal households we have shown, we find weak evidence, at best, using traditional methods, consistent with our conjecture that life satisfaction is an advantageous approach in high-fertility settings.

4.1 Sex ratio at last birth

We first look at sex ratio at last birth. If parents continue their fertility until they reach a desired number of daughters, their last child will disproportionately be female (whether obtained naturally or through sex selection).[17] We find that sex ratio at last birth is around 0.50 in matrilineal ethnic groups, and not significantly different in patrilineal groups (Table 4). On average, therefore, the sex ratio at last birth shows no indication of gender preference or differences by kinship structure.

This null result is consistent with parental gender preferences in this context taking the form of desiring at least one daughter and preferring gender balance thereafter.[18] Since this preference is more likely to be unmet when fertility is low, we may expect the differences

indicator. Pushkar et al. (2014) use a sample of Canadian retirees (no age restriction) and Lei et al. (2023) use Chinese parents aged 45 or older.

[17] Baland et al. (2024) propose new methods for detecting sex selection versus fertility-stopping behavior by examining sibship size and composition. They do not find a significant presence of either practice in Malawi.

[18] Another possibility is that the maternal preferences that we measure with life satisfaction are outweighed by paternal preferences. Unlike like satisfaction or stated preferences, which are individual-level measures, fertility behaviors depend on the aggregation of maternal and paternal preferences.

in sex ratio at last birth to be more pronounced among women who desire fewer children. In Appendix Table A.13, we compare sex ratio at last birth between patrilineal women and matrilineal women conditional on ideal number of children; we indeed find some evidence that the gap increases as ideal number of children decreases ($p < 0.10$). This pattern aligns with our conjecture that the standard measures perform better when total fertility is lower.

Compared to sex ratio at last birth, birth spacing might be able to better capture gender preferences even in high fertility settings. Parents who only have sons may try to quickly have another child to obtain the daughter they desire sooner rather than later. We replicate the birth spacing analysis by Rossi and Rouanet (2015) in Appendix Table A.14. As in their study, we find point estimates consistent with son preference among patrilineal mothers and daughter preference among matrilineal mothers, but these results lack statistical significance.[19] Potential explanations for gender preferences not affecting birth spacing are limited ability to control birth timing due to low uptake of modern contraception or a conformity to local norms about appropriate birth spacing.

4.2 Stated gender preference

As a final analysis, we consider another common measure of gender preferences, namely stated preferences based on survey questions that ask the woman her ideal number of children and her ideal gender composition among them. In our sample, the average woman reports wanting 4 children, and 64% of respondents' desired number of children is an even number. Table 5, columns 1-3 show that fewer than 20% of matrilineal women report wanting strictly more daughters than sons. The estimates tend to be slightly smaller for patrilineal mothers (by 1 to 2 pp), but the differences are not statistically significant.[20] In Columns 4-6, we see that matrilineal women, on average, desire 51% of their children to be daughters. The

[19] More detailed explanation of the analysis is presented in Appendix B.

[20] Appendix Table A.15 shows that patrilineal women are 3 pp more likely to report wanting more sons than daughters. Thus, the stated preference measures are better able to detect that matrilineal mothers have weaker son preference than that they have daughter preference.

estimates are smaller for patrilineal mothers, but by only 0.4 to 1.2 pp.[21] Hence, the results are in line with existing studies that categorize Malawi has having balanced gender preference (Fuse, 2008). If this sample size were one fourth as large—comparable to our MICS sample—the analysis would not have been powered to detect the observed differences. Overall, these results appear consistent with our conjecture that gender preferences may be difficult to detect with the existing DHS questions in some contexts.

5 Conclusion

Uncovering parental preference over child gender may be challenging in a high-fertility setting. Our paper proposes examining parental life satisfaction close to the time of first birth as a useful alternative approach. Using this approach, we test for daughter preference among matrilineal ethnic groups in Malawi and find that having a daughter increases the life satisfaction of matrilineal mothers.

We show that, in contrast, standard measures of gender preference, including sex ratio at last birth and birth spacing, generally do not detect gender preferences in the same context. This could be due to parents having a strong preference for having at least one child of the preferred gender, which is more challenging to detect using standard measures in a high fertility setting Jayachandran (2017). It could also be due to cessation of fertility or birth spacing being less of an active choice for women in this setting, due to religious beliefs or lack of birth control. Even in settings with low fertility, lack of sex-selective abortion would make it more difficult to infer gender preference from these measures.

Stated preference questions could be useful in capturing gender preferences, particularly if they asked respondents to rank preferences over different gender realizations, some of which entailed having no daughters or no sons. The existing DHS survey questions, however, only show weak evidence of daughter preference among matrilineal mothers. Hence, our results using life satisfaction measures provide the strongest evidence of daughter preference among

[21] As a gauge of the magnitude of the difference, 1.2 pp is about half of the rural–urban difference in desired daughter share.

matrilineal mothers among the different approaches we compare. The matrilineal preference for daughters that we detect using life satisfaction is in line with existing studies finding that daughters benefit more from matrilineal kinship (Lowes, 2022). Hence, life satisfaction questions collected close to the timing of child birth have the potential to serve as another useful measure of parental gender preference.

Table 1: Summary of parental and household characteristics

	All		Matrilineal		Patrilineal		Diff.
	Mean	(SD)	Mean	(SD)	Mean	(SD)	p-value
Mother characteristics							
Age	20.35	(1.98)	20.35	(1.97)	20.37	(1.99)	0.807
Age at first birth	18.33	(1.78)	18.31	(1.77)	18.43	(1.80)	0.044
Currently married	0.72	(0.45)	0.72	(0.45)	0.71	(0.45)	0.802
Married at first birth	0.76	(0.43)	0.74	(0.44)	0.79	(0.40)	0.000
Years of education	3.88	(3.56)	3.74	(3.50)	4.35	(3.72)	0.000
Ever attended school	0.65	(0.48)	0.64	(0.48)	0.69	(0.46)	0.002
Observations	5449		4164		1285		5449
Father characteristics							
Age	25.35	(4.39)	25.20	(4.16)	25.83	(5.03)	0.001
Husband-wife age gap	4.54	(3.07)	4.44	(2.96)	4.87	(3.39)	0.000
Years of education	4.03	(3.88)	3.87	(3.81)	4.57	(4.04)	0.000
Ever attended school	0.66	(0.47)	0.64	(0.48)	0.73	(0.45)	0.000
Observations	5449		4164		1285		5449
Household characteristics							
HH size	4.37	(2.33)	4.18	(2.17)	4.97	(2.71)	0.000
Female headed household	0.25	(0.43)	0.26	(0.44)	0.22	(0.42)	0.019
Wealth score	-0.12	(0.87)	-0.19	(0.83)	0.08	(0.94)	0.000
Rural	0.86	(0.34)	0.87	(0.34)	0.86	(0.35)	0.630
Region: South	0.47	(0.50)	0.54	(0.50)	0.26	(0.44)	0.000
Region: Central	0.36	(0.48)	0.44	(0.50)	0.10	(0.30)	0.000
Religion: Christian	0.84	(0.37)	0.80	(0.40)	0.97	(0.17)	0.000
Religion: Muslim	0.13	(0.34)	0.17	(0.37)	0.01	(0.09)	0.000
Observations	5449		4164		1285		5449

Notes: This table compares mother, father and household characteristics between matrilineal and patrilineal households. Columns 1–2 report the mean and standard deviation for the full sample; Columns 3–4 for matrilineal households; Columns 5–6 for patrilineal households. Column 7 reports the p-value from a test of equality of means (Patrilineal vs. Matrilineal), obtained from an OLS regression of each variable on a patrilineal indicator with standard errors clustered at the PSU level. The sample consists of MICS women aged 15–25 with one child, whose first birth occurred at age 15 or older. The husband–wife age gap is winsorized at the top 1%. Categories "North region," "no religion," and "other religion" are omitted. Missing values for controls are imputed using the wave specific sample median.

Table 2: Child gender and maternal life satisfaction by kinship structure

	Life overall: Very satisfied (5 to 10)			
	(1)	(2)	(3)	(4)
Has daughter	0.022	0.035	0.040	0.030
	(0.013)	(0.015)	(0.015)	(0.019)
	[0.088]	[0.019]	[0.007]	[0.109]
Patrilineal		0.052	0.043	0.011
		(0.021)	(0.021)	(0.039)
		[0.013]	[0.040]	[0.788]
Has daughter x Patrilineal		-0.057	-0.064	-0.047
		(0.028)	(0.029)	(0.051)
		[0.044]	[0.026]	[0.365]
Wealth controls			✓	
Dependent variable mean	0.676	0.663	0.663	0.685
Restriction: South region	No	No	No	Yes
p-value: Has daughter + Has daughter x Patrilineal		0.361	0.330	0.732
Observations	5,449	5,449	5,449	2,578

Notes: This table shows how the effect of having a daughter (rather than a son) on women's life satisfaction varies by kinship structure. The estimates are obtained from OLS regressions of a binary life satisfaction indicator on child gender, a patrilineal ethnicity indicator, and their interaction, controlling for wave fixed effects. The sample consists of MICS-surveyed women between 15 and 25 years old, whose first birth occurred at 15 years old or older, and who have one child. The dependent variable is a binary, which takes the value of 1 if reporting "Very satisfied" on a 5-point scale (or 5 or above on a 10-point scale) and 0 otherwise. *Patrilineal* indicates the household head belongs to a patrilineal ethnic group according to the categorization in Berge et al. (2014) and Ibik (1970). Wealth controls include a wealth score constructed by the MICS team (via PCA of household assets) and its interaction with *Has daughter*. Dependent variable mean reports the means for women with a son in Column 1 and the mean for matrilineal women with a son in Columns 2-5. Standard errors clustered at the PSU level are shown in parentheses and p-values in brackets.

Table 3: Child gender and maternal life satisfaction by kinship structure - Restricting by years since first birth

	Life overall: Very satisfied (5 to 10)					
	(1)	(2)	(3)	(4)	(5)	(6)
First-born daughter	0.037	0.041	0.042	-0.084	0.068	0.048
	(0.020)	(0.016)	(0.014)	(0.178)	(0.058)	(0.035)
	[0.064]	[0.010]	[0.003]	[0.637]	[0.244]	[0.173]
Patrilineal	0.058	0.031	0.034	0.058	0.030	0.034
	(0.027)	(0.024)	(0.021)	(0.027)	(0.024)	(0.021)
	[0.030]	[0.199]	[0.104]	[0.030]	[0.208]	[0.103]
First-born daughter x Patrilineal	-0.102	-0.065	-0.060	-0.104	-0.064	-0.061
	(0.038)	(0.032)	(0.029)	(0.038)	(0.032)	(0.029)
	[0.007]	[0.047]	[0.036]	[0.006]	[0.049]	[0.034]
Wealth controls	✓	✓	✓	✓	✓	✓
Number of children controls				✓	✓	✓
Dependent variable mean	0.665	0.665	0.657	0.665	0.665	0.657
Years since first birth	≤ 1	≤ 2	≤ 3	≤ 1	≤ 2	≤ 3
p-value: First-born daughter + First-born daughter x Patrilineal	0.041	0.410	0.468	0.293	0.948	0.756
Observations	3,172	4,576	5,687	3,172	4,576	5,687

Notes: This table reports OLS estimates of the association between women's life satisfaction and the gender of their first child, interacted with a patrilineal ethnicity indicator. The sample includes MICS-surveyed women between 15 and 25 years old, whose first birth occurred at 15 years old or older, observed within one, two, or three years since their first birth. The dependent variable equals 1 if the respondent reports being "Very satisfied" on a 5-point scale (or 5 or above on a 10-point scale) and 0 otherwise. All specifications include survey wave fixed effects and control for the household wealth score (constructed via PCA of household assets) and its interaction with first-born daughter. Patrilineal indicates that the household head belongs to a patrilineal ethnic group following Berge et al. (2014) and Ibik (1970). "Dependent variable mean" reports the mean for matrilineal women whose first child is a boy. Standard errors clustered at the PSU level are shown in parentheses, and p-values are shown in brackets.

Table 4: Child gender at last birth by kinship structure

	Last birth is a girl				
	(1)	(2)	(3)	(4)	(5)
Patrilineal	-0.009	-0.007	-0.009	-0.007	0.008
	(0.009)	(0.009)	(0.009)	(0.009)	(0.017)
	[0.285]	[0.440]	[0.283]	[0.436]	[0.631]
Completed fertility control	✓	✓	✓	✓	
Number of children control			✓	✓	✓
Wealth controls		✓		✓	✓
Dependent variable mean	0.503	0.503	0.503	0.503	0.507
Restricted to women with completed fertility	No	No	No	No	Yes
Observations	17,176	17,176	17,176	17,176	5,439

Notes: This table examines the effect of kinship structure on the gender of the most recent child. OLS coefficients are obtained by regressing a binary indicator for whether the last child is a girl on a patrilineal ethnicity indicator, with the relevant controls. The sample consists of DHS-surveyed women aged 15–49 who had their first child at age 15 or older and for whom lineage information is available. The dependent variable *Last birth is a girl* equals 1 if the woman's most recent child is a girl, and 0 otherwise. *Patrilineal* indicates the mother belongs to a patrilineal ethnic group as categorized by Berge et al. (2014) and Ibik (1970). The completed fertility control equals 1 if the woman has not given birth in the past five years and reports not wanting additional children, or if she or her partner is sterilized; 0 otherwise. The number of children control is the total number of children ever born. Wealth controls include the DHS wealth index (constructed by PCA on household assets) and its interaction with *Patrilineal*. The dependent variable mean is reported for matrilineal mothers with children in Cols. 1–4 and for matrilineal mothers with completed fertility in Col. 5. Standard errors clustered at the PSU level are shown in parentheses and p-values in brackets.

Table 5: Women's stated preference over child gender by kinship structure

	Wants more daughters than sons			Share of daughters desired		
	(1)	(2)	(3)	(4)	(5)	(6)
Patrilineal	-0.019	-0.016	-0.009	-0.004	-0.012	-0.006
	(0.013)	(0.017)	(0.007)	(0.005)	(0.007)	(0.002)
	[0.135]	[0.321]	[0.177]	[0.502]	[0.085]	[0.013]
Ideal number of children controls	✓	✓	✓	✓	✓	✓
Wealth controls	✓	✓	✓	✓	✓	✓
Dependent variable mean	0.186	0.198	0.188	0.510	0.506	0.507
Child restriction	Without children	1 child	-	Without children	1 child	-
Age restriction	15-25 years old	15-25 years old	15-49 years old	15-25 years old	15-25 years old	15-49 years old
Observations	4,913	2,824	22,370	4,753	2,776	21,848

Notes: This table examines the effect of kinship structure on women's stated preferences over child gender. OLS coefficients are estimated by regressing measures of daughter preference on a patrilineal ethnicity indicator, controlling for the ideal number of children (included as a set of dummies) and wealth. The sample includes DHS-surveyed women who had their first child at 15 years of age or older and for whom lineage information is available. The dependent variable "Wants more daughters than sons" is a binary indicator equal to 1 if the mother reports wanting a strictly larger number of daughters than sons, and 0 otherwise. "Share of daughters desired" is defined as the desired number of daughters divided by the total desired number of children; it equals 0.5 for mothers who want one child of either gender. Mothers whose reported total desired number of children does not match the sum of desired daughters, sons, and "either" are excluded (less than 1% of the sample) as well as those who report not wanting any children (between 2-2.5% depending on the analytical sample). Dependent variable means are reported for matrilineal mothers in the estimation sample. Standard errors clustered at the PSU level are shown in parentheses and p-values in brackets.

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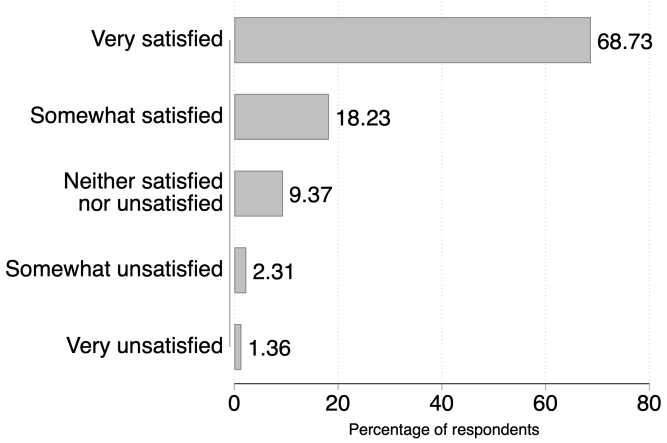
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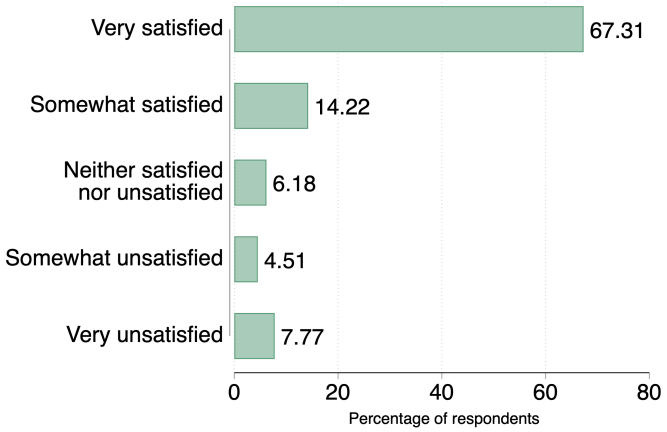
Online Appendix

A Supplementary figures and tables

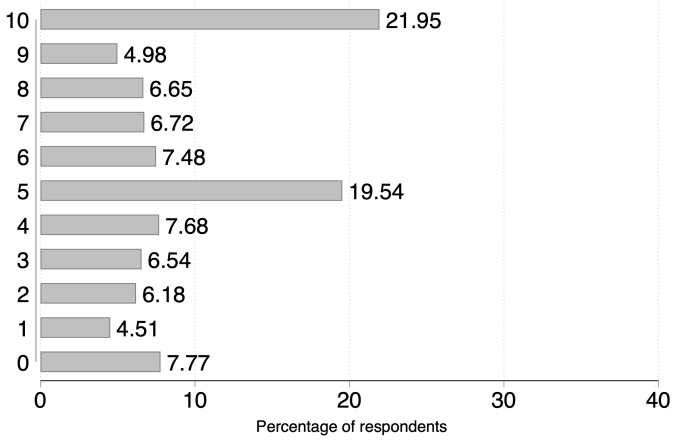
Figure A.1: Homogenizing life satisfaction variables across MICS 04 and MICS 06



Panel A. Raw variable distribution, MICS 04



Panel B. Recoded variable distribution, MICS 06



Panel C. Raw variable distribution, MICS 06

Notes: N=8,588. The sample is restricted to all women between 15 and 25 years old, whose first birth, if any, occurred at 15 years old or older.

Table A.1: Parental and household characteristics by first-born child's sex and kinship structure

	Omitted group	**Differences**		
	Mean (SD)	β_{Daughter} (SE)	$\beta_{\text{Patrilineal}}$ (SE)	$\beta_{\text{Daughter}\times\text{Patrilineal}}$ (SE)
Mother characteristics: *N*	2066	2098	608	677
Age	20.369	-0.036	0.111	-0.180
	(1.991)	(0.059)	(0.093)	(0.128)
Age at first birth	18.335	-0.058	0.091	0.058
	(1.788)	(0.053)	(0.085)	(0.114)
Currently married	0.730	-0.028*	-0.008	0.007
	(0.444)	(0.014)	(0.021)	(0.029)
Married at first birth	0.751	-0.015	0.030	0.040
	(0.432)	(0.013)	(0.019)	(0.026)
Years of education	3.744	-0.006	0.426*	0.185
	(3.510)	(0.108)	(0.184)	(0.230)
Ever attended school	0.634	0.004	0.049*	0.000
	(0.482)	(0.015)	(0.024)	(0.028)
Father characteristics: *N*	1489	1466	437	471
Age	25.299	0.030	0.806	-0.333
	(4.184)	(0.286)	(0.429)	(0.671)
Husband-wife age gap	4.531	-0.164	0.522**	-0.162
	(3.029)	(0.090)	(0.163)	(0.211)
Years of education	3.980	-0.070	0.803*	0.149
	(3.936)	(0.252)	(0.404)	(0.558)
Ever attended school	0.643	0.017	0.123*	-0.013
	(0.479)	(0.037)	(0.051)	(0.072)
Household characteristics: *N*	2066	2098	608	677
HH size	4.158	0.042	0.786***	0.013
	(2.148)	(0.065)	(0.142)	(0.180)
Female headed household	0.259	0.003	-0.027	-0.016
	(0.438)	(0.014)	(0.021)	(0.026)
Wealth score	-0.173	-0.026	0.259***	0.022
	(0.854)	(0.026)	(0.047)	(0.056)
Rural	0.858	0.015	0.001	-0.018
	(0.349)	(0.010)	(0.021)	(0.023)
Region: South	0.536	0.004	-0.288***	0.023
	(0.499)	(0.015)	(0.032)	(0.028)
Region: Central	0.445	-0.003	-0.337***	-0.008
	(0.497)	(0.015)	(0.025)	(0.022)
Religion: Christian	0.796	0.003	0.182***	-0.015
	(0.403)	(0.013)	(0.014)	(0.016)
Religion: Muslim	0.164	0.007	-0.157***	-0.004
	(0.370)	(0.012)	(0.013)	(0.013)

Notes: This table reports results from OLS regressions of each characteristic on indicators for *Daughter*, *Patrilineal*, and their interaction (*Daughter* × *Patrilineal*). Column (1) reports the mean and standard deviation (in parentheses) for the omitted group (*Patrilineal* = 0, *Daughter* = 0). Columns (2)–(4) present the estimated coefficients and clustered standard errors (in parentheses) for each indicator, respectively. All regressions include missing-value indicators for imputed observations and cluster standard errors at the PSU level. The sample includes women aged 15–25 from the MICS survey who have exactly one child, with the first birth occurring at age 15 or older.

Table A.2: Kinship traditions at the ethnic-group level (Berge et al. (2014) and Ibik (1970))

Ethnic group	**Kinship tradition**
Chewa	Matrilineal
Lomwe	Matrilineal
Yao	Matrilineal
Tonga	Patrilineal
Sena	Patrilineal
Tumbuka	Patrilineal
Ngoni (North)	Patrilineal
Ngoni (South & Central)	Matrilineal
Nkhonde/Ngonde	Patrilineal

Notes: The table reports ethnic groups and their classifications Berge et al. (2014); Ibik (1971). For both DHS and MICS, entries with ethnicity "Other" are coded as missing. In DHS, "Nyanga" is also coded as missing because it does not match any group name exactly.

Table A.3: Demographic and household characteristics and maternal life satisfaction

	Life overall: Very satisfied (5 to 10)			
	(1)	(2)	(3)	(4)
Age	-0.003	-0.009	-0.002	-0.009
	(0.003)	(0.002)	(0.003)	(0.002)
	[0.455]	[0.000]	[0.580]	[0.000]
Currently married	0.056	0.037	0.058	0.027
	(0.014)	(0.009)	(0.017)	(0.011)
	[0.000]	[0.000]	[0.001]	[0.012]
Years of education	0.017	0.008	0.016	0.007
	(0.004)	(0.002)	(0.004)	(0.002)
	[0.000]	[0.000]	[0.000]	[0.001]
Patrilineal	0.004	0.010	0.005	0.013
	(0.015)	(0.010)	(0.022)	(0.013)
	[0.795]	[0.321]	[0.822]	[0.316]
Wealth score	0.035	0.041	0.032	0.042
	(0.007)	(0.004)	(0.009)	(0.005)
	[0.000]	[0.000]	[0.000]	[0.000]
HH size			0.003	0.000
			(0.003)	(0.002)
			[0.334]	[0.995]
Female headed household			-0.012	-0.029
			(0.017)	(0.009)
			[0.454]	[0.001]
Rural			-0.002	0.018
			(0.023)	(0.014)
			[0.942]	[0.226]
South region			0.032	0.031
			(0.025)	(0.016)
			[0.200]	[0.051]
Central region			0.000	-0.001
			(0.026)	(0.017)
			[0.996]	[0.970]
Christian			0.044	0.041
			(0.037)	(0.022)
			[0.241]	[0.063]
Muslim			0.009	0.013
			(0.042)	(0.026)
			[0.834]	[0.604]
Dependent variable mean	0.686	0.713	0.686	0.713
Sample restriction	1 child	1 or 0 children	1 child	1 or 0 children
Observations	5,449	15,032	5,449	15,032

Notes: This table reports the effect of demographic and household characteristics on women's life satisfaction. OLS coefficients are estimated from regressions of the binary life satisfaction indicator (defined in Table A.4) on the listed covariates. Dependent variable means are reported for the estimation sample in each column. Standard errors clustered at the PSU level are reported in parentheses and p-values in brackets.

Table A.4: Child gender and maternal life satisfaction

	Life overall: Very satisfied (5 to 10)	
	(1)	(2)
Has daughter	-0.032	-0.020
	(0.010)	(0.016)
	[0.001]	[0.206]
Has son	-0.054	-0.042
	(0.010)	(0.016)
	[0.000]	[0.009]
Dependent variable mean	0.728	0.718
Sample restriction	1 or 0 children	1 child or married with 0 children
p-value: Has daughter = Has son	0.094	0.089
Observations	15,032	6,802

Notes: This table shows the impact of having a daughter instead of no children or having a son instead of no children on women's life satisfaction. OLS coefficients are estimated by regressing a binary measure of life satisfaction on a (vector of) indicator(s) describing child gender, controlling for survey wave fixed effects. Dependent variable mean reports the mean for women with a son in Col. 1 and the mean for women with no children in Col. 2 and the mean for married women with no children in Col. 3. Standard errors clustered at the PSU level are shown in parentheses and p-values in brackets.

Table A.5: Child gender and maternal life satisfaction by kinship structure - women with 0 or 1 child

	Life overall: Very satisfied (5 to 10)			
	(1)	(2)	(3)	(4)
Has daughter	-0.032	-0.023	-0.005	-0.024
	(0.010)	(0.012)	(0.012)	(0.016)
	[0.001]	[0.048]	[0.671]	[0.130]
Has son	-0.054	-0.058	-0.044	-0.054
	(0.010)	(0.012)	(0.012)	(0.016)
	[0.000]	[0.000]	[0.000]	[0.001]
Patrilineal		0.031	0.014	0.023
		(0.012)	(0.012)	(0.020)
		[0.009]	[0.236]	[0.247]
Has daughter x Patrilineal		-0.036	-0.035	-0.060
		(0.022)	(0.023)	(0.041)
		[0.104]	[0.118]	[0.141]
Has Son x Patrilineal		0.021	0.029	-0.012
		(0.023)	(0.023)	(0.045)
		[0.348]	[0.209]	[0.784]
Wealth controls			✓	
Dependent variable mean	0.731	0.720	0.720	0.739
Restriction: South region	No	No	No	Yes
p-value: Has daughter + Has daughter x Patrilineal		0.002	0.038	0.026
p-value: Has son + Has son x Patrilineal		0.058	0.417	0.120
Observations	15,032	15,032	15,032	6,811

Notes: This table extends the specifications of Table 2 by including women without children. OLS coefficients are obtained by regressing the binary life satisfaction indicator on indicators for having a daughter or a son (relative to no children), a patrilineal indicator, and their interactions, controlling for survey wave and wealth. Dependent variable means are reported for women without children in Column 1 and for matrilineal women without children in Columns 2–5. Standard errors are clustered at the PSU level and shown in parentheses and p-values in brackets.

Table A.6: Robustness of life satisfaction results to alternative cutoffs and samples

	Life overall:			
	Very satisfied (5-10)	Very satisfied (5-10)	Very satisfied (4-10)	Very satisfied (6-10)
	(1)	(2)	(3)	(4)
Has daughter	0.047	0.032	0.039	0.034
	(0.021)	(0.020)	(0.014)	(0.015)
	[0.025]	[0.109]	[0.004]	[0.023]
Patrilineal	-0.002	0.080	0.029	0.048
	(0.032)	(0.029)	(0.021)	(0.022)
	[0.947]	[0.005]	[0.166]	[0.028]
Has daughter x Patrilineal	-0.079	-0.053	-0.049	-0.061
	(0.045)	(0.038)	(0.028)	(0.030)
	[0.077]	[0.161]	[0.077]	[0.042]
Wealth controls	✓	✓	✓	✓
Dependent variable mean	0.682	0.647	0.706	0.557
Wave	MICS 04	MICS 06	Pooled	Pooled
p-value: Has daughter + Has daughter x Patrilineal	0.412	0.512	0.677	0.297
Observations	2,466	2,983	5,449	5,449

Notes: This table reports the effect of having a daughter versus a son on binary measures of life satisfaction by kinship structure. Estimates are shown across alternative subsamples and outcome definitions (based on different cutoffs). The specification corresponds to Col. 3 of Table 2. Dependent variable means refer to matrilineal mothers with a son in the estimation sample. Standard errors clustered at the PSU level are in parentheses, and p-values are in brackets.

Table A.7: Child's gender and mother's life satisfaction with women and household controls

	Life overall: Very satisfied (5 to 10)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Has daughter	0.040	0.030	0.036	0.056	0.032	0.041	0.048
	(0.019)	(0.016)	(0.020)	(0.132)	(0.132)	(0.017)	(0.015)
	[0.042]	[0.063]	[0.072]	[0.670]	[0.811]	[0.018]	[0.002]
Patrilineal	0.047	0.033	0.037	0.043	0.034	0.051	0.050
	(0.030)	(0.021)	(0.021)	(0.021)	(0.029)	(0.025)	(0.022)
	[0.114]	[0.122]	[0.079]	[0.040]	[0.255]	[0.041]	[0.021]
Has daughter x Patrilineal	-0.066	-0.054	-0.063	-0.063	-0.056	-0.068	-0.070
	(0.039)	(0.029)	(0.029)	(0.029)	(0.039)	(0.034)	(0.030)
	[0.090]	[0.064]	[0.026]	[0.027]	[0.153]	[0.048]	[0.021]
Wealth controls	✓	✓	✓	✓	✓	✓	✓
Region controls	✓				✓		
Religion controls		✓			✓		
Women education controls			✓		✓		
Women age controls				✓	✓		
Dependent variable mean	0.663	0.663	0.663	0.663	0.663	0.676	0.657
Restriction: Married women	No	No	No	No	No	Yes	No
Restriction: Excludes pregnant women	No	No	No	No	No	No	Yes
p-value: Has daughter + Has daughter x Patrilineal	0.488	0.324	0.341	0.958	0.861	0.373	0.405
Observations	5,449	5,449	5,449	5,449	5,449	3,900	4,897

Notes: This table extends the specification in Col. 3 in Table 2 by including additional women and household controls. Controls enter as main effects and interacted with *Has daughter*. Region controls include region dummies; Religion controls include a Muslim indicator; education controls capture the woman's years of education; and age controls capture the woman's age. For each control, missing values are imputed with the sample median and a missingness indicator is included. Columns 1–4 use the full estimation sample, while Columns 5–6 apply the sample restrictions indicated in the table rows. Dependent variable means are reported for matrilineal mothers with a son (Cols. 1–4), matrilineal married mothers with a son (Col. 5), and matrilineal non-pregnant mothers with a son (Col. 6). Standard errors clustered at the PSU level are reported in parentheses, and p-values in brackets.

Table A.8: Child gender and maternal life satisfaction by post-marital residence

	Life overall: Very satisfied (5 to 10)		
	(1)	(2)	(3)
Has daughter	0.039	0.043	0.030
	(0.017)	(0.017)	(0.019)
	[0.027]	[0.014]	[0.109]
Patrilocal	0.012	0.013	0.011
	(0.019)	(0.019)	(0.039)
	[0.542]	[0.481]	[0.788]
Has daughter x Patrilocal	-0.034	-0.037	-0.047
	(0.025)	(0.025)	(0.051)
	[0.178]	[0.144]	[0.365]
Wealth controls		✓	
Dependent variable mean	0.670	0.670	0.685
Restriction: South region	No	No	Yes
p-value: Has daughter + Has daughter x Patrilocal	0.808	0.755	0.732
Observations	5,449	5,449	2,578

Notes: This table replicates the specifications in Table 2 but replacing kinship system (matrilineal vs. patrilineal) with post-marital residence (matrilocal vs. patrilocal). OLS coefficients are obtained by regressing the binary life satisfaction indicator on child-gender indicators, a patrilocal indicator, and their interactions, controlling for survey wave and wealth. *Patrilocal* indicates that the household head belongs to an ethnic group that traditionally practices patrilocal post-marital residence, as classified in Berge et al. (2014) and Ibik (1970)). Dependent variable means are reported for matrilocal mothers with a son. Standard errors clustered at the PSU level are shown in parentheses and p-values in brackets.

Table A.9: Child's gender and father's life satisfaction (pooled waves - fathers with 1 child)

	Life overall: Very satisfied (5 to 10)			
	(1)	(2)	(3)	(4)
Has daughter	-0.041	-0.013	-0.015	-0.051
	(0.043)	(0.048)	(0.049)	(0.065)
	[0.337]	[0.786]	[0.753]	[0.430]
Patrilineal		0.046	0.038	0.102
		(0.066)	(0.067)	(0.110)
		[0.485]	[0.575]	[0.356]
Has daughter x Patrilineal		-0.138	-0.136	-0.269
		(0.104)	(0.106)	(0.179)
		[0.186]	[0.198]	[0.134]
Wealth controls			✓	
Dependent variable mean	0.612	0.603	0.603	0.636
Restriction: South region	No	No	No	Yes
p-value: Has daughter + Has daughter x Patrilineal		0.105	0.105	0.058
Observations	599	599	599	272

Notes: This table replicates the specifications in Table 2 for fathers. The sample consists of married men aged 15–25 whose wives are in the maternal sample (i.e., first birth at age 15 or older and with lineage information). Only one out of three households was selected for the father's interview, which explains the smaller sample size. Dependent variable means are reported for fathers with a son in Column 1 and for matrilineal fathers with a son in Columns 2–5. Standard errors clustered at the PSU level are reported in parentheses and p-values in brackets.

Table A.10: Mother's life satisfaction and gender composition of children

	Life overall: Very satisfied (5 to 10)					
	(1)	(2)	(3)	(4)	(5)	(6)
Only daughters	-0.063	-0.031	-0.037	0.051	-0.003	-0.004
	(0.009)	(0.010)	(0.012)	(0.009)	(0.011)	(0.013)
	[0.000]	[0.002]	[0.003]	[0.000]	[0.770]	[0.785]
Only sons	-0.063	-0.031	-0.038	0.050	-0.004	-0.005
	(0.010)	(0.011)	(0.013)	(0.009)	(0.011)	(0.013)
	[0.000]	[0.003]	[0.003]	[0.000]	[0.718]	[0.714]
Sons and daughters	-0.114	-0.017	-0.024			
	(0.007)	(0.012)	(0.014)			
	[0.000]	[0.140]	[0.083]			
Number of children control		✓	✓		✓	✓
Dependent variable mean	0.728	0.728	0.707	0.614	0.614	0.596
Restriction: Women with children	No	No	No	Yes	Yes	Yes
Restriction: Matrilineal households	No	No	Yes	No	No	Yes
p-value: Only daughters = Only sons	0.957	0.942	0.915	0.957	0.944	0.923
Observations	24,433	24,433	16,812	18,490	18,490	12,913

Notes: This table shows the impact of child gender composition on women's life satisfaction. OLS coefficients are estimated by regressing the binary life satisfaction indicator on indicators for child gender composition, controlling for the number of children where indicated. The sample consists of MICS-surveyed women aged 15–49 who had their first child, if any, at age 15 or older. *Only daughters* equals 1 if the respondent has at least one daughter and no sons. *Only sons* equals 1 if the respondent has at least one son and no daughters. *Sons and daughters* equals 1 if the respondent has at least one son and at least one daughter. Dependent variable means are reported for mothers without children in Cols. 1–2, for matrilineal mothers without children in Col. 3, for mothers with both sons and daughters in Cols. 4–5, and for matrilineal mothers with both sons and daughters in Col. 6. Standard errors clustered at the PSU level are reported in parentheses and p-values in brackets.

Table A.11: Mother's life satisfaction and gender of the first child

	Life overall: Very satisfied (5 to 10)					
	(1)	(2)	(3)	(4)	(5)	(6)
First-born daughter	-0.113	-0.067	-0.072	-0.001	-0.002	-0.003
	(0.008)	(0.009)	(0.011)	(0.007)	(0.007)	(0.009)
	[0.000]	[0.000]	[0.000]	[0.929]	[0.761]	[0.710]
First-born son	-0.112	-0.064	-0.069			
	(0.008)	(0.009)	(0.011)			
	[0.000]	[0.000]	[0.000]			
Number of additional children control		✓	✓		✓	✓
Dependent variable mean	0.747	0.747	0.728	0.634	0.634	0.613
Restriction: Women with children	No	No	No	Yes	Yes	Yes
Restriction: Matrilineal households	No	No	Yes	No	No	Yes
p-value: First-born daughter = First-born son	0.929	0.761	0.710			
Observations	24,282	24,282	16,699	18,339	18,339	12,800

Notes: This table shows the impact of the gender of the first-born child on women's life satisfaction. OLS coefficients are estimated by regressing the binary life satisfaction indicator on indicators for the first-born child's gender, controlling for the number of additional children where indicated. The sample consists of MICS-surveyed women aged 15–49, who had their first child, if any, at age 15 or older. Mothers whose first delivery resulted in twins or triplets were excluded from the analysis (fewer than 1%).*First-born daughter* is a binary variable equal to 1 if the respondent's first child is a daughter; *First-born son* is defined analogously. Dependent variable means are reported for women without children in Cols. 1–2, for women without children in matrilineal households in Col. 3, for mothers whose first-born is a son in Cols. 4–5, and for mothers whose first-born is a son in matrilineal households in Col. 6. Standard errors clustered at the PSU level are reported in parentheses and p-values in brackets.

Table A.12: Mother's life satisfaction and number of daughters

	Life overall: Very satisfied (5 to 10)					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of daughters	-0.038	-0.006	-0.004	-0.026	-0.006	-0.004
	(0.002)	(0.004)	(0.005)	(0.003)	(0.004)	(0.005)
	[0.000]	[0.179]	[0.474]	[0.000]	[0.181]	[0.475]
Number of children control		✓	✓		✓	✓
Dependent variable mean	0.747	0.747	0.728	0.664	0.664	0.639
Restriction: Women with children	No	No	No	Yes	Yes	Yes
Restriction: Matrilineal households	No	No	Yes	No	No	Yes
Observations	24,433	24,433	16,812	18,490	18,490	12,913

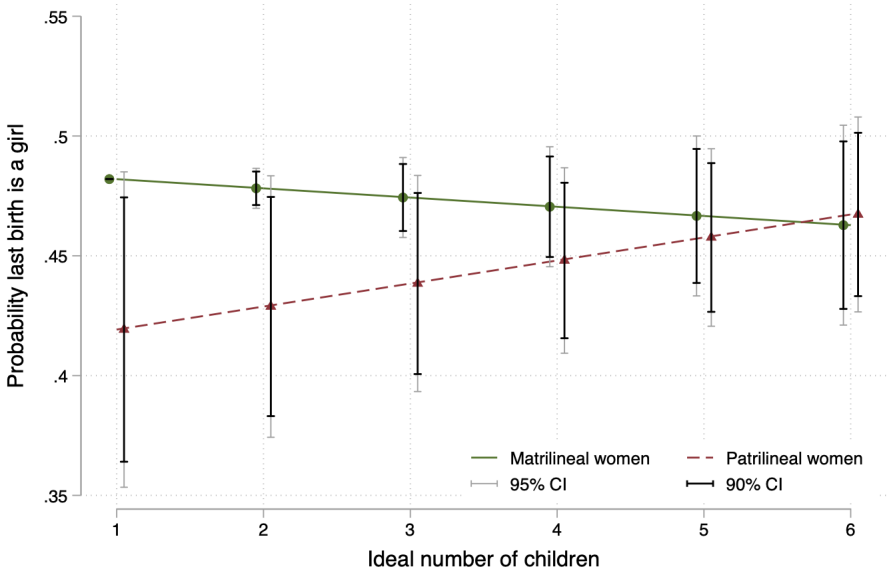
Notes: This table shows the impact of the number of daughters on women's life satisfaction. OLS coefficients are estimated by regressing the binary life satisfaction indicator on the number of daughters, controlling for the number of children where indicated. The sample consists of MICS-surveyed women aged 15–49, who had their first child, if any, at age 15 or older. *Number of daughters* is a continuous variable equal to the total number of daughters a woman has had. *Number of children* is included as a control where indicated. Dependent variable means are reported for women without children in Cols. 1–2, for matrilineal women without children in Col. 3, for mothers with no daughters in Cols. 4–5, and for matrilineal mothers with no daughters in Col. 6. Standard errors clustered at the PSU level are reported in parentheses and p-values in brackets.

Table A.13: Child gender at last birth by kinship structure and ideal number of children

Panel A: Regression estimates

	Last birth is a girl			
	(1)	(2)	(3)	(4)
Patrilineal=1	-0.069	-0.063	-0.069	-0.063
	(0.032)	(0.034)	(0.032)	(0.034)
	[0.031]	[0.062]	[0.031]	[0.061]
Ideal child number	-0.003	-0.003	-0.004	-0.004
	(0.004)	(0.004)	(0.004)	(0.004)
	[0.502]	[0.443]	[0.402]	[0.366]
Patrilineal=1 × Ideal child number	0.014	0.013	0.014	0.013
	(0.008)	(0.008)	(0.008)	(0.008)
	[0.065]	[0.098]	[0.064]	[0.097]
Completed fertility control	✓	✓	✓	✓
Number of children control			✓	✓
Wealth controls		✓		✓
Dependent variable mean	0.482	0.482	0.482	0.482
Restricted to women with completed fertility	No	No	No	No
Observations	16,617	16,617	16,617	16,617

Panel B: Implied values constructed from regression estimates (Column 4)



Notes: Panel A reports regression estimates of the relationship between kinship structure and the probability that the most recent birth is a girl, allowing this relationship to vary with the woman's ideal number of children. Panel B presents the estimates of column 4 graphically, computed as the matrilineal mean at an ideal number of children equal to one plus the relevant regression coefficients. The sample includes women aged 15–49 with at least one child who report wanting at least one child. The dependent variable equals one if the most recent birth is a girl. Ideal number of children is continuous and top-coded at six. Regressions control for completed fertility, total children ever born, and DHS wealth-index variables interacted with *Patrilineal*. Dependent-variable means are reported for matrilineal women who report wanting one child. Standard errors are clustered at the PSU level; 95% confidence intervals are shown.

Table A.14: Duration model of birth intervals (in months) by kinship structure

	Duration between births (in months)			
	(1)	(2)	(3)	(4)
Fraction of sons (γ_1)	0.010	0.022	2.734	0.027
	(0.034)	(0.038)	(0.143)	(0.164)
	[0.760]	[0.561]	[0.000]	[0.871]
Fraction of sons^2 (γ_2)			-2.722	-0.005
			(0.139)	(0.158)
			[0.000]	[0.977]
Patrilineal	0.040	0.076	0.052	0.095
	(0.048)	(0.051)	(0.052)	(0.056)
	[0.406]	[0.135]	[0.320]	[0.087]
Fraction of sons × Patrilineal (δ_1)	-0.054	-0.132	-0.534	-0.552
	(0.070)	(0.083)	(0.305)	(0.302)
	[0.439]	[0.112]	[0.080]	[0.067]
Fraction of sons^2 × Patrilineal (δ_2)			0.484	0.419
			(0.296)	(0.296)
			[0.102]	[0.157]
Wealth controls	✓	✓	✓	✓
Rossi and Rouanet (2015) controls		✓		✓
Testing for child gender preference				
Matrilineal groups: $\gamma_1 + \gamma_2$				
p-value of joint significance	0.760	0.561	0.000	0.846
Sum of coefficients:	0.010	0.022	0.012	0.022
p-value of the sum	0.760	0.561	0.740	0.564
Patrilineal groups: $\gamma_1 + \gamma_2 + \delta_1 + \delta_2$				
p-value of joint significance	0.739	0.279	0.000	0.262
Sum of coefficients	-0.044	-0.110	-0.039	-0.111
p-value of the sum	0.475	0.137	0.544	0.129
Testing for differential preferences				
p-value: $\delta_1 + \delta_2$	0.439	0.112	0.489	0.106
Observations	21,774	21,774	21,774	21,774

Notes: This table examines the effect of the gender composition of previous children on the length of subsequent birth intervals, by kinship structure. Estimates are obtained using a Cox proportional hazards duration model following Rossi and Rouanet (2015). The sample consists of all births to DHS-surveyed women aged 15–49 who had their first child at age 15 or older and for whom lineage information is available. Observations are reweighted to ensure that each woman counts once, irrespective of her number of children. The dependent variable is the duration between birth n and $(n+1)$ in months. *Fraction of sons* equal to the proportion of boys among the previous n born children. Rossi and Rouanet (2015) controls include rank of preceding birth and mother's characteristics (i.e., age at preceding birth, religion, union type, women's years of education, wealth score, rural, currently working and contraception use). Standard errors clustered at the mother's level are shown in parenthesis and p-values in brackets.

Table A.15: Son preference indicators for women

	Wants more sons than daughters (=1)		
	(1)	(2)	(3)
Patrilineal	0.030	0.019	0.031
	(0.011)	(0.017)	(0.006)
	[0.009]	[0.268]	[0.000]
Ideal number of children controls	✓	✓	✓
Wealth controls	✓	✓	✓
Dependent variable mean	0.125	0.160	0.136
Child restriction	Without children	1 child	-
Age restriction	15-25 years old	15-25 years old	15-49 years old
Observations	4,913	2,824	22,370

Notes: This table replicates the specification in Table 5, Cols. 1–3, replacing the strict daughter preference outcome with a strict son preference measure. OLS coefficients are estimated from regressions of the non-strict daughter preference indicator on a patrilineal indicator, including the same controls as in Table 5. The sample consists of DHS-surveyed women who had their first child, if any, at age 15 or older. The dependent variable *Wants more sons than daughters* equals 1 if the woman reports wanting a greater number of sons than daughters, or expresses no gender preference, and 0 otherwise. Women whose reported total desired number of children does not match the sum of desired daughters, sons, and children of neither gender are excluded (less than 1% of the sample). Dependent variable means are reported for matrilineal women subject to the relevant child and age restrictions. Standard errors clustered at the PSU level are reported in parentheses and p-values in brackets.

B Description of birth spacing analysis

We examine the duration of birth intervals using a Cox proportional hazard model. The prediction is a longer interval after the birth of a child of the preferred gender, due to less urgency to have another child. Following Rossi and Rouanet (2015), the main specification includes both the share of sons and its square (Columns 3–4), and we also report a simpler specification with just the linear term (Columns 1-2). Across both specifications, the results align with Rossi and Rouanet (2015): for patrilineal groups, the coefficient (Columns 1-2) or sum of coefficients (Columns 3-4) is negative, consistent with son preference, while for matrilineal groups, they are positive but close to zero.[22] In all cases, however, the associated p-values are large, providing no strong evidence of systematic gender preference (Appendix Table A.14).

[22] In the quadratic specification, the sum of the coefficients maps to the differential birth spacing when the woman has all sons compared to all daughters; the quadratic term allows for a taste for variety.