

**Sex Composition and Fertility Preferences:
Investigating Daughter Preference in a Matrilineal Context**

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Sociologists contend that the gender system within which parents live influence their preference for sons, daughters, or a combination of the two. Because of the predominance of patriarchy, however, cross-culturally, men's sex preferences consistently favor sons, leaving open the possibility that sex-based biological factors are at play, as psychologists have implied. We explore whether men display daughter preference in a matrilineal context of Malawi as a strategy for examining whether the gender system in which men live informs their preferences. We find that all boy sex composition strongly increases men's, and women's, preference for another child in matrilineal Malawi, suggesting daughter preference. Offering the first evidence of daughter preference among men in a matrilineal setting that we are aware of, the study will advance understanding of how gender systems influence men's and women's sex preferences, and as a result, the link between sex composition and fertility preferences.

Sociologists contend that the gender system within which parents live (Mason 1995) directly influence their preference for sons, daughters, or a combination of the two. Because of the predominance of patriarchy, cross-culturally, sex preferences tend to favor sons versus daughters, resulting in couples most commonly adopting fertility behaviors to maximize the number of sons (Bongaarts 2013, Williamson 1976). The vast majority of research demonstrating a link between sex composition and fertility behaviors focuses on Asian societies wherein son preference is exceptionally strong—especially among men (Arnold 1985, Arnold and Zhaoxiang 1986, Clark 2000, Das Gupta and Mari Bhat 1997, Das 1987, Stash 1996).

Even in the United States, however, where the gender system and its corresponding cultural norms and social institutions do not necessarily value sons over daughters, and where there is some evidence of a preference for mixed sex compositions (Pollard and Morgan 2002), men behave in ways that imply a clear preference for sons. For example, men spend more time with their sons versus daughters, are more likely to marry their romantic partners if they bear a firstborn son versus daughter, and invest more in their marriage in the presence of a son (Harris and Morgan 1991, Lundberg 2005, Lundberg, McLanahan and Rose 2007).

Although the strength of men's preferential behaviors towards sons appears to vary as a function of the gender system in which they live, the consistency of fathers' displaying son preference leaves open the possibility that sex-based biological factors are at play, as psychological research implies (Jones and Moss 1971, Leaper, Anderson and Sanders 1998, Leaper and Smith 2004, Moss 1967). One way to confirm that this is not the case, and that the gender system in which men live are driving their sex preferences, is to examine fathers' sex preference in a matrilineal context: if the gendered system fully drives men's preferential behavior for sons versus daughters, as past work suggests, men should display daughter preference in matrilineal settings. Although select studies have shown evidence of mothers' preferential behaviors towards daughters in matrilineal settings (in Meghalaya, India (Narzary and Sharma 2013) and Garo, Bangladesh (Islam, Islam and Banowary 2009)), we are unaware of any study confirming the same is true of fathers.

In the present study, we will offer a thorough assessment of whether men's, as well as women's, fertility preferences align with daughter preference in a matrilineal region of Malawi, a southeast African country to offer a robust assessment of whether the gender system in which men live influences their sex preference for children. In initial analyses, we assess whether all son family composition influences fathers' and mothers' preferences for an additional child.

In matrilineal Malawi, families pass resources along the female line and women own resources, including land, meaning that inheritance passes directly from mother to daughter (Davison 1997). As a result, fathers, as well as mothers, may prefer daughters because of their access to resources, and thus greater ability to provide them with more old-age security relative to sons. Moreover, because it is customary for sons to move to their wives' village upon marriage, but for daughters to remain, parents can be more confident that their daughters will be present and available to care for them as they age. In addition to economic motivation, the local cultural context may lead men to prefer daughters. Dating back to colonial times, anthropologists have noted the deference to women in matrilineal Malawi. For instance, Rowley (1867) reported: "I was much struck with the regard which the men had for the women, whose position seemed to be in no way inferior to that of the men" (26).

Data and Sample

We use data from Demographic and Health Surveys (DHS), a commonly used data source for analyzing fertility behaviors in Malawi and in other low-income countries. The DHS program is a nationally representative, cross-sectional survey. We specifically use data from the 2015 Malawian Demographic and Health Survey. The DHS uses a stratified random sampling approach with "clusters" providing the primary sampling unit. To explore the consequences of sex composition for men's and women's fertility preferences, we distinguish between couples residing in the northern region of Malawi where the Tumbuka ethnic group predominates versus the central and southern regions of Malawi where the Chewa, Lomwe, Ngoni, and Yao dominate. Additional analyses confirm that among couples residing in the

northern region of Malawi, merely 14 percent identify with an ethnic group that is matrilineal versus more than 90 percent in central and southern regions of Malawi.

Because ideal family size is between three and four children (3.78 among women and 3.81 among men), we focus specifically on men's and women's preferences for a fourth child based on their having three boys versus three girls and/or mixed sex composition. Thus, we restrict the sample to those women and men who currently have three children at the time of the survey, focusing specifically on the sample of 1,981 women and the 511 men who are currently in their first marital union and have three children. We excluded the 157 women and 14 men who report that they are unable to have (additional) children.

Measures

Desire for additional child. Interviewers ask men and women whether they would like additional children in the future. We compare women and men who (1) want another child, (2) are unsure of whether they want another child or (3) do not want another child or are sterilized (reference group).

Sex composition. Interviewers ask respondents detailed information about each live birth, including the child's sex and vital status at the time of the survey. With these data, we create our key independent variable of whether the family is composed of all sons (mixed sex composition and all daughters are the reference). In additional analyses, we also explore two additional indicators of sex composition to ensure the robustness of the results: (1) a binary indicator of all daughters (mixed sex composition and all sons are the reference group) and (2) a three categorical variable of whether the family is composed of all daughters, all sons, or mixed sex composition (reference group).

We conducted a series of analyses to ensure that sex composition is not related to omitted variables that could drive a spurious association between it and men's and women's fertility preferences. For example, past work suggests that the historically low sex ratios in sub-Saharan Africa may be due to maternal malnourishment, suggesting that mothers with all sons may be fitter, which could influence their desire to pursue a larger family size. Thus, we conducted a series of additional regression analyses to explore the correlates of all son composition—analyzing a number of socioeconomic indicators, as well as maternal height (as a marker of physical health). We find no evidence that this is the case (results available upon request).

Control variables. We include a series of control variables that could influence fertility preferences. We control for wives' religion (Christian, Muslim, or other), and the wives' and husbands' age at marriage. We also include indicators for both the wives' and the husbands' level of education (none, primary, secondary), the number of years they have been married, whether the marriage is polygynous, and whether they reside in a rural versus urban setting. We also include an indicator for the household's level of resources using the DHS's pre-constructed wealth index. A principal component factor analysis that capturing inequality in material resources across households is the basis of the DHS wealth index. The factor includes information on a household's ownership of various assets (e.g., radio, television, refrigerator, bicycle, car) and housing characteristics (e.g., availability of electricity, source of drinking water, type of toilet facility, number of rooms). The DHS categorizes households into five wealth quintiles based on their factor score, ranging from poorest to least poor. In models not disaggregated by matrilineal versus patrilineal context, we control for respondents' region of residence (north, central, south). See Table 1 for descriptive statistics.

Preliminary Findings

Men's fertility preferences. Table 2 shows multinomial logistic regression model results assessing whether sex composition influences men's desire for a fourth child. As shown in Model 1, Malawian men who have three sons, relative to those who also have three children but one to three daughters, are substantially more likely to report wanting a fourth child. As shown in Models 2 and 3, when we disaggregate men by those in the patrilineal northern region versus the matrilineal central/southern regions of Malawi, it becomes clear that the finding is concentrated in the matrilineal region of Malawi. Men with all sons in matrilineal Malawi are substantially more likely to want an additional child relative to those who also have three children but already have one to three daughters. This offers compelling

evidence that the gender system in which men reside moderates the link between sex composition and their fertility preferences. The model results shown in Appendix A confirm that we find no evidence that all daughters increase men's desire for a fourth child (relative to men with all sons). Furthermore, as shown in panel 2 of Appendix A, having all sons versus mixed-sex composition increases the desire for another child, but having all daughters does not, suggesting that a preference for mixed-sex composition is not driving the findings.

Women's fertility preferences. Turning to the models focused on women's fertility preferences in Table 3, the results mirror those documented among men: Malawian women who have three sons are substantially more likely to report wanting a fourth child relative to their peers who have one to three daughters. When we disaggregate the sample by women in the patrilineal northern region versus the matrilineal central/southern region, it becomes clear the findings are concentrated among women in the matrilineal region. Women with all sons in matrilineal Malawi are significantly more likely to want an additional child relative to those who already have one to three daughters. Again, the results in Appendix B confirm that having all daughters does not increase women's desire for a fourth child (relative to women with all sons). Furthermore, having all sons increases the likelihood women want a fourth child even when we compare them only to those with mixed-sex composition, yet the same is not true for women with all daughters, again confirming that the findings are not driven by a desire for mixed sex composition.

Discussion and Next Steps

These initial results offer compelling evidence that the gendered system in which men and women live substantially influences their sex preferences, and as a result, the consequences of sex composition for their fertility preferences. Offering the first evidence that we are aware of demonstrating daughter preference among men in a matrilineal setting, the study will substantially advance our understanding of how the gender system in which men and women live can powerfully influence their sex preferences.

As we continue to develop the project, we will expand our analysis to explore corresponding fertility-related behaviors, including how sex composition influences contraceptive behaviors, birth spacing, and achieved family size.

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Table 1. Descriptive statistics

	Men	Women
<i>Husband wants fourth child</i>		
Undecided	5.28	--
Yes, more	50.49	--
No, no more	44.23	--
<i>Wife wants fourth child</i>		
Undecided	--	6.28
Yes, more	--	45.56
No, no more	--	48.16
All boys	9.98	12.32
Mixed sex/all girls	90.02	87.68
<i>Wives' religion</i>		
Muslim	8.41	9.34
Christian	91.39	90.11
Other	0.2	0.56
Wives' age at marriage	17.96 (3.30)	18.02 (3.44)
Husbands' age at marriage	22.49 (4.86)	22.86 (5.20)
<i>Wives' educational level</i>		
No education	8.61	8.13
Primary	63.21	62.75
Secondary	26.03	26.15
Higher	2.15	2.98
<i>Husbands' educational level</i>		
No education	7.13	7.31
Primary	52.67	49.23
Secondary	35.84	36.96
Higher	4.36	6.49
Marital duration (years)	10.86 (4.09)	11.39 (4.69)
Polygynous marriage	6.5	10.02
<i>Household wealth</i>		
Poorest	14.09	14.29
Poor	19.96	19.33
Average	21.14	17.97
Richer	19.37	19.79
Richest	25.44	28.63
Rural residence	81.21	77.39
Northern region	10.59	20.39
Central region	38.75	34.38
Southern region	42.66	45.23
<i>N</i>	511	1960

Source: 2015 Malawi Demographic & Health Survey

Table 2. Husband Desires Additional Child

	(1) Full sample•		(2) North		(3) Central/South	
Does not want more children (ref)	--		--		--	
Undecided						
All boys	0.37	0.72	1.42	5.98	0.53	0.74
All girls/mixed	--		--		--	
Wants another child						
All boys	0.74*	0.35	0.17	0.93	0.79*	0.40
All girls/mixed	--		--		--	

Source: 2015 Malawi Demographic and Health Survey

◇Models control for: wives' religion (muslim, christian, other), wives' and husbands' age at marriage, wives' and husbands' years of education, polygynous union, household wealth, marital duration (in years), rural residence

•Models control for region of residence (north, south, central)

†p<.1; *p<.05; **p<.01; ***p<.001

Table 3. Wife Desires Additional Child

	(1) Full sample•		(2) North		(3) Central/South	
	Coeff	SE	Coeff	SE	Coeff	SE
Does not want more children (ref)	--		--		--	
Undecided						
All boys	0.12	0.32	0.20	0.53	0.01	0.43
All girls/mixed	--		--		--	
Wants another child						
All boys	0.37*	0.16	0.12	0.35	0.43*	0.43
All girls/mixed	--		--		--	

Source: 2015 Malawi Demographic and Health Survey

◇Models control for: wives' religion (muslim, christian, other), wives' and husbands' age at marriage, wives' and husbands' years of education, polygynous union, household wealth, marital duration (in years), rural residence

•Models control for region of residence (north, south, central)

†p<.1; *p<.05; **p<.01; ***p<.001

Appendix A. Husband Desires Additional Child

Model set 1	(1) Full sample•		(2) North		(3) Central/South	
Does not want more children (ref)	--	--	--	--	--	--
Undecided						
All girls	-1.03	1.06	-1.34	4.01	-0.82	1.08
All boys/mixed	--	--	--	--	--	--
Wants another child						
All girls	-0.15	0.30	-0.34	0.77	-0.11	0.34
All boys/mixed	--	--	--	--	--	--
Model set 2	(1) Full sample•		(2) North		(3) Central/South	
Does not want more children (ref)	--	--	--	--	--	--
Undecided						
All boys	0.30	0.72	-0.15	0.79	0.48	0.74
All girls	-1.00	1.07	-0.14	0.46	-0.78	1.08
Mixed gender	--	--	--	--	--	--
Wants another child						
All boys	0.73*	0.35	0.06	0.94	0.78*	0.40
All girls	-0.08	0.30	-0.33	0.78	-0.02	0.35
Mixed gender	--	--	--	--	--	--

Source: 2015 Malawi Demographic and Health Survey

◇Models control for: wives' religion (muslim, christian, other), wives'/husbands' age at marriage, wives'/husbands' years of education, polygynous union, household wealth, marital duration (yrs), rural residence

•Models control for region of residence (north, central/south); †p<.1; *p<.05; **p<.01; ***p<.001

Appendix B. Wife Desires Additional Child

Model set 1	(1) Full sample•		(2) North		(3) Central/South	
Does not want more children (ref)	--	--	--	--	--	--
Undecided						
All girls	0.25	0.29	-0.20	0.56	0.51	0.34
All boys/mixed	--	--	--	--	--	--
Wants another child						
All girls	0.20	0.15	0.12	0.35	0.25	0.17
All boys/mixed	--	--	--	--	--	--
Model set 2	(1) Full sample•		(2) North		(3) Central/South	
Does not want more children (ref)	--	--	--	--	--	--
Undecided						
All boys	0.16	0.33	0.17	0.54	0.09	0.43
All girls	0.27	0.29	-0.17	0.57	0.52	0.34
Mixed gender	--	--	--	--	--	--
Wants another child						
All boys	0.42**	0.16	0.15	0.36	0.48**	0.18
All girls	0.26	0.25	0.15	0.35	0.31†	0.17
Mixed gender	--	--	--	--	--	--

Source: 2015 Malawi Demographic and Health Survey;

◇Models control for: wives' religion (muslim, christian, other), wives'/husbands' age at marriage, wives'/husbands' years of education, polygynous union, household wealth, marital duration (yrs), rural residence