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INTRAHOUSEHOLD DECISION MAKING AND FERTILITY CHOICES IN RURAL SENEGAL AND UGANDA

Kaat Van Hoyweghen, Goedele Van den Broeck, and Miet Maertens

ABSTRACT

Feminist economic approaches have transformed mainstream economic analysis to better account for intrahousehold decision making. To quantify decision making, studies resort to self-reported survey-based measures, derived from questions directed to household members, or proxy-variable methods. This study uses a choice experiment, a stated preference method, implemented in rural Senegal and Uganda and specifically distinguishes between individual and household choices to analyze spouses' preferences on fertility and child raising and calculate a decision-making coefficient. Findings show individual fertility preferences of men and women cannot substitute for household-level choices, and intrahousehold decision making concerning fertility and child raising is region specific. While in Uganda household fertility choices reflect a balance between the spouses' fertility preferences, in Senegal these choices seem more dominated by the husband's preference. This study demonstrates the importance of considering the adequate decision-making unit when designing family planning and child-centered programs and of using a region-specific approach.

KEYWORDS

Collective household model, decision-making unit, gender, child raising, choice experiment, Sub-Saharan Africa

JEL Codes: D10, D70, I00

HIGHLIGHTS

- Analyzing spousal fertility and child-raising choices provides an alternative to traditional proxies for intrahousehold decision making.
- Choice experimental data and methods enables the calculation of a decision-making coefficient.
- Individual fertility preferences cannot substitute for household-level choices.
- Considering the adequate gender and decision-making unit is crucial in designing family planning programs.

INTRODUCTION

In the last three decades, feminist economic approaches have transformed mainstream household and intrahousehold economic models (Doss 2021). After unitary household models were proven to be deficient with respect to both their theoretical soundness and the empirical applications (Bergmann 1996; Duflo and Udry 2004; Qian 2008; Munro 2014), a broader set of collective household models were developed that include individual (and possibly opposing) preferences of spouses. The literature on collective household models differentiates between non-cooperative household models, where individuals maximize their personal utility, taking others' behavior as given (Leuthold 1968; Browning 2000; Chen and Woolley 2001), and cooperative models, where individuals bargain to reach a specific Pareto efficient intrahousehold allocation of welfare (Manser and Brown 1980; McElroy and Horney 1981). With this transformation of theoretical household models, an increasing share of the literature empirically tries to measure intrahousehold decision making, both to support further development of sound theoretical models, and because a growing body of evidence demonstrates the importance of woman's control over assets and decision making for her and her children's well-being (Beegle, Frankenber, and Thomas 2001; Duflo 2003; Quisumbing and Maluccio 2003; Doss 2006; Reggio 2011; Imai et al. 2014; Dito 2015).

While accounting for the impact of intrahousehold decision making increasingly finds its way into the scientific literature, studies necessarily resort to self-reported survey-based methods or proxy variables to measure decision making.¹ Surveys ask for spouses' participation in decision making (for a variety of decision-making domains, often related to expenditure decisions, mobility within or outside the village, and so forth), with possible responses: deciding alone, together with spouse or a third person, or someone else decides.² The interpretation of the answers to such questions is not straightforward, as participation in a specific decision-making process depends on whether the topic is important for the individuals and whether preferences of the spouses differ (Doss 2013; Meurs and Ismaylov 2019). Moreover, survey-based decision-making measures can lead to conflicting results as individuals do not necessarily have the same view on who decides on what in the household (Ambler et al. 2022), or as Cheryl Doss (2021: 9) phrases it: "when you interview multiple people in the same household and ask them the same question, you frequently get different answers."

In this study we report on a stated preference experiment designed to distinguish between individual preferences and household choices and use this information to unravel intrahousehold decision making. We conduct a choice experiment to value preferences with respect to

fertility (the household's number of children) and child raising (the education, nutrition, and healthcare provisioning of the children), using married couples as subjects. Interviewing a sample of 500 couples, we first implement the experiment with both spouses separately and repeat the experiment with the spouses jointly as couple. We analyze men's and women's preferences and calculate a decision-making coefficient based on the method proposed by Nesha Beharry-Borg, David A. Hensher, and Riccardo Scarpa (2009). We distinguish between couples where one spouse dominates the decision-making process in the couples experiment (that is, resulting in choice outcomes that are close to the choice outcomes in the experiment with one of the individual spouses) and couples where household choices within the couples experiment are made using a more balanced decision-making approach (that is, resulting in choice outcomes that are in different from those of the individual spouse experiments). We reflect on the implications of intrahousehold decision making for household fertility and child raising choices. We implement our choice experiment in two rural regions in Senegal and Uganda. Both countries are characterized by high fertility rates (4.7 and 5.1 for Senegal and Uganda, respectively in 2017), low secondary completion rates, and high prevalence of undernourishment and child mortality (World Bank 2020).

Our results are relevant from a methodological perspective in two ways. First, we provide an alternative to the traditional proxies for decision making. Second, we contribute to a better understanding of the differences between the preferences of men and women, and how these individual preferences are reflected in the household choice. Previous experiments using a similar experimental approach revealed the divergence between individual preferences and household choices with respect to a wide variety of topics such as household consumption, valuation of environmental services, residential location, schooling choices for children, or holiday destinations (Dosman and Adamowicz 2006; Bateman and Munro 2009; Beharry-Borg, Hensher, and Scarpa 2009; Marcucci et al. 2011; Mariel, Scarpa, and Vega-Bayo 2018; Beck and Rose 2019).³ To our knowledge, no experiment exists that considers fertility and child raising, a topic with inherent consequences for the household as a whole (that is, the household is structurally smaller or larger and children in the household benefit from more or less essential services) and so highly dependent on the gendered preferences of spouses individually.

While decision-making experiments are increasingly used in many scientific fields, the measurement and study of decision making in the context of fertility decisions and fertility preferences remains largely observational and survey based. Some studies compare stated preferences of husband and wife with their fertility outcome, that is, the actual number of children the couple has. These studies base their measures on straight away asking for a person's preferred fertility, but this approach has been

proven to result in unreliable, highly variable estimates that overestimate the actual preferred fertility (Bongaarts 1990; Kodzi, Casterline, and Aglobitse 2010; Trinitapoli and Yeatman 2018; Bhrolcháin and Beaujouan 2019; Cleland, Machiyama, and Casterline 2020).

The few studies that explore intrahousehold differences in fertility preferences find ambiguous effects with respect to which spouse is decisive for fertility outcomes. Akinrinola Bankole (1995) uses two rounds of Nigerian survey data and regression analysis to reveal that on average both spouses' preferences to have another child are important predictors of the couple's subsequent fertility outcomes. However, the results show that when the couple has a low number of living children, the man's preference is dominating, while the woman's preference is dominating when the couple has a high number of living children. Imran Rasul (2008) uses two rounds of Malaysian survey data and regression analysis to describe how in Malay households both spouses' fertility preferences have an equal, positive, and significant effect on fertility outcomes, while in Chinese households, only the wife's preferences determine subsequent fertility. Jessica D. Gipson and Michelle J. Hindin (2009) use survey data and regression analysis to show for rural Bangladeshi couples that women's rather than men's fertility preferences are the main driver of subsequent fertility outcomes. On the other hand, if men prefer more children, women are less likely to prevent pregnancy. To our knowledge, no studies consider the link between intrahousehold decision making and household's fertility and child raising choices.

Our results are also important from an empirical perspective as feminist economics research points toward the dependence of many key development outcomes, such as women's and children's education and health, on the ability of women to negotiate favorable intrahousehold allocations of resources (Doss 2013; Dito 2015). Addressing the unmet need for contraception has been a primary focus of family planning policies in Sub-Saharan Africa (SSA), where adverse effects from a potential doubling of the population between 2010 and 2050 are expected (Drechsel et al. 2001; Alexandratos 2005; Ezeh, Bongaarts, and Mberu 2012; Graves et al. 2019; United Nations 2019). However, programs often fail to recognize intrahousehold power relations and underlying intrinsic motivations of people for choosing (not) to use contraception (Senderowicz and Maloney 2022). Aligning family planning policies with reproductive empowerment, instead of reproductive control, requires policies that are founded on the choices and preferences of individuals and couples, and hence a thorough understanding of households' fertility preferences and child-raising choices and the link with gendered intrahousehold decision-making authority (Van Hoyaeghen et al. 2023).

METHODS

Background and data

Our analysis relies on data from two study-regions: the Mount Elgon region in Eastern Uganda and the Saint-Louis region in North-Western Senegal. Both regions are rural areas with a strong connection to a secondary urban center, and are characterized by their high dependence on agriculture, high poverty rates, high population growth and density rates, and weak infrastructure development. In both regions traditional, patrilineal rural societies are established with high polygamy rates. In Uganda and Senegal, the Gender Inequality Index (GII)⁴ is high and highly similar (respectively 0.535 and 0.533, positioning Uganda at the 130th and Senegal at the 131st place out of 162 countries [UNDP 2017]). Also child marriage rates are high in both countries; respectively 34 and 31 percent of girls are married by age 18 in Uganda and Senegal (UNICEF 2021), which has been proven to correlate negatively to women’s bargaining power within the marriage (Sunder 2019).

Islam is the dominant religion in the research area in Senegal (99.6 percent of the sampled households), and everyday life is ruled by Islamic and customary laws (Lambert and Rossi 2016). Both the introduction of the Islam and the imposition of the French colonial system that incentivized the growing of cash-crops on large monocrop fields using animal-drawn ploughs lowered the position and bargaining power of women in rural Senegalese society (Creevey 1996; Alesina, Giuliano, and Nunn 2013). In the Ugandan research area, Christianity is the dominant religion (92.7 percent of the sampled households). People attach a high value to children and a woman’s status is highly connected to the number of children she bears (Makwa 2012; Kwagala 2013). While in theory women are under control of their father or husband, the status of men highly depends on his marital status (more than women), livelihoods in the area are highly dependent on women’s labor, and divorce and remarriage are fairly easy for women. Women’s independence might therefore be larger than expected (Jackson 2013). British colonial rule (forcibly) introduced the growing of cash-crops, mainly coffee, in the region (Petursson and Vedeld 2015). However, as this is highly labor intensive, the shift in cropping systems did not significantly alter the position of women in society (Alesina, Giuliano, and Nunn 2013).

We use data from a household survey and a discrete choice experiment (DCE). Survey data were collected in 2016, from respectively 464 and 758 households in Senegal and Uganda. Households were sampled using a two-stage random sampling design with stratification based on distance to an asphalt road and wage employment status in Senegal, and a three-stage random sampling design with stratification based on urbanization level and altitude in Uganda.⁵ A structured quantitative questionnaire was used to

collect data on demographics, farm production, land and non-land assets, living conditions, and employment at the individual and household level. The DCE was implemented in 2017 with 250 households in each region that were randomly selected from the larger household samples. Within a household, both husband and wife completed the DCE separately, after which they completed the experiment together as a couple. The individual DCEs were followed by questions on attribute non-attendance, and the respondent's current and preferred number of children.

Table 1 describes the socioeconomic characteristics of the sampled households and respondents. The average household size, as well as the variation in household size, is larger in the Senegal sample than in the Uganda sample, which relates to multiple generations living together in extended families in Senegal versus a singular couple plus children living in nuclear households in Uganda. Polygamy is common in both regions but is slightly more prevalent in the Senegal sample. Only 7 and 16 percent of the respondents have completed lower secondary education in respectively the Senegal and Uganda sample – which is lower than the national averages of 18 percent for Senegal (2017 data) and 24 percent for Uganda (2012 data; World Bank 2020a). Women respondents are on average less likely to have completed lower secondary education compared to men respondents. Most of the sampled households are poor, with a higher incidence of poverty in the Uganda sample than in the Senegal sample.⁶

Design of DCE

Based on Lancaster's consumer theory which argues that consumer preferences are shaped by the individual characteristics a good or service possesses and not by the good as a whole, DCEs provide a link between observed behavior and economic theory (Lancaster 1966). In general, DCEs involve respondents choosing among hypothetical alternatives presented in choice sets where the alternatives are described by varying levels of a set of predefined attributes. During this DCE, a respondent is asked to choose between hypothetical alternatives on different situations of child raising. The choice of the attributes and attribute levels is based on the literature, key informant interviews and focus group discussions in both Senegal and Uganda, to increase the validity of the experiment (Mangham, Hanson, and McPake 2009). In total we specify four attributes, with the first referring to the fertility aspect, number of children, and the next three to the child-raising aspect, covering education, nutrition and healthcare (Table 2).

The first attribute specifies the number of children and consists of six levels. The range of one to twelve children is based on the observed number of children in the study regions as derived from the quantitative surveys. The second attribute is defined as the share of children from the household

Table 1 Socioeconomic characteristics of sampled households and respondents

Variable	Total sample	Country		Gender of respondent	
		Senegal	Uganda	Men	Women
<i>N</i>	1,000	500	500	500	500
Age	43.671 (12.907)	39.38 (11.35)	47.963*** (12.953)	48.489 (12.647)	38.855*** (11.272)
Distance to main road (km)	2.8 (3.024)	2.368 (2.904)	3.231*** (3.082)	2.8 (3.025)	2.8 (3.025)
Next to main road (0/1)	0.276 (0.447)	0.420 (0.494)	0.132*** (0.339)	0.276 (0.447)	0.276 (0.447)
Household size	9.76 (5.855)	13.048 (6.431)	6.472*** (2.367)	9.76 (5.858)	9.76 (5.858)
Polygamous (1/0)	0.244 (0.43)	0.292 (0.455)	0.196*** (0.397)	0.244 (0.43)	0.244 (0.43)
Educated (1/0) ^a	0.115 (0.319)	0.066 (0.249)	0.164*** (0.371)	0.15 (0.357)	0.08*** (0.272)
Non-poor (1/0) ^b	0.464 (0.499)	0.648 (0.478)	0.28*** (0.449)	0.464 (0.499)	0.464 (0.499)

Notes: Standard deviations reported between parentheses. We used two-sided *t*-tests. ***, **, * denote significance at the 1, 5, and 10 percent levels, respectively.

^aDummy equal to one if respondent completed lower secondary education.

^bDummy equal to one if respondent's household's per capita income lies above the international moderate poverty line of \$3.1USD per person per day.

Table 2 Attributes and attribute levels

Attribute	Description	Attribute levels
Children	Number of children	1, 2, 4, 6, 9, 12
Education	Share of children from the household that can obtain a secondary school degree	None (base level), Half, All
Nutrition	Number of days a week a household can eat a complete meal	Zero (base level), Four, Seven
Healthcare	Quality of the healthcare institute the household can go for help when a child has a severe fever	Low (base level), Medium, High

that completes lower secondary education. The attribute contains three levels: none, half, and all of the children. The third attribute is defined as the number of days a week a household can eat a complete meal, including carbohydrates, proteins, and vegetables, for the main meal of the day. On the other days an incomplete meal is consumed (for example, only carbohydrates). The attribute consists of three levels: zero, four, and seven days a week. The fourth attribute is defined as the quality of

healthcare institute the household can consult when a child has a severe fever. The attribute contains three levels: low-quality, medium-quality, and high-quality. The three child-raising attributes are similar in both countries but are adapted to the local context (for example, in Senegal low-quality healthcare is a “case de santé,” while in Uganda it is a “health center II facility”). A detailed explanation of the three child-raising attributes can be found in the Appendix.

For the most efficient generation of the choice sets with different combinations of three alternatives, we use a Bayesian design. This design integrates a prior distribution of likely parameter values when generating the optimal choice sets (Kessels et al. 2008). We use small but gradually increasing positive priors for the levels of the child-raising attributes, as we hypothesize that respondents have positive preferences toward a more qualitative child raising. We hypothesize that the utility derived from the number of children is concavely shaped (positive but marginally decreasing preference), so priors are higher for four and six children, and lower for one, two, nine, and twelve children. We use choice sets with three alternatives and visual illustrations to assist illiterate people when making their choice (Figure 1). We present the same twelve choice cards to each respondent and randomize the order to avoid learning bias.

The experiment was introduced to both spouses together. It was explained that each respondent would choose between three hypothetical alternatives on different child-raising situations. Each alternative would be described in function of the attributes, which were then explained in detail. The enumerator highlighted the experiment’s hypothetical character by emphasizing that each household (alternative) should be taken as given, not considering possible economic, social, or physical limitations, or the actual composition of their specific household. Spouses were informed that first the individual experiment would take place (the spouses were interviewed separately by an enumerator of the same gender), after which the experiment would be repeated with both spouses. To not distort the decision-making processes between the spouses, no instructions were given to the respondents considering how to make joint choices in the couple’s experiment. After the description of the experiment, the individual experiments started with a test card, to check whether the respondent understood the rationale of the study.

As we implemented the choice experiment first with the individual spouses, after which the experiment was repeated with both spouses together, we obtained information on 54,000 observations. We drop three households from the analysis, as they did not complete the couple’s experiment. Information on one choice card is missing for the experiments of one man, one woman, and one couple, and for two couples experiments information on two choice cards are missing. We therefore retain 53,655 observations for the analysis.

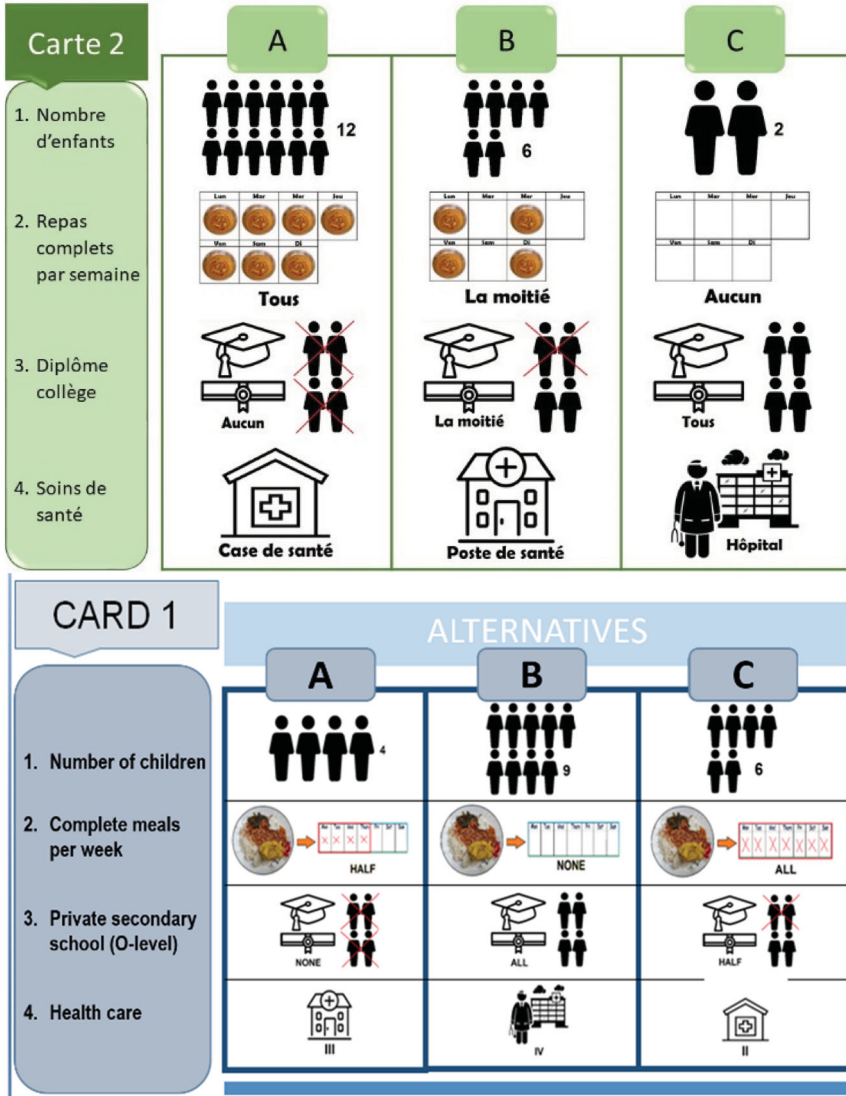


Figure 1 Examples of choice cards from the Senegalese (upper) and Ugandan (lower) experiment

Analysis of DCE

The random utility theory framework in which DCEs are embedded, assumes that respondents choose the alternative that yields for them the highest utility from each choice set (Louviere, Hensher, and Swait 2000). Following this framework, the utility respondent i derives from alternative

j (U_{ij}) can be divided into an observable deterministic component (V) – linearly depending on the attributes of the alternative (Z_j) and individual-specific socioeconomic characteristics (X_i) – and a stochastic component (ε) capturing unobserved heterogeneity across alternatives and individuals (equation [1]; Hensher, Rose, and Greene [2005]).

$$U_{ij} = V(Z_j, X_i) + \varepsilon(Z_j, X_i) \quad (1)$$

We use the probability that respondent i chooses alternative j , expressed in terms of a logistic distribution, as an approximation of the unobservable respondent i 's utility (Louviere, Hensher, and Swait 2000; Hensher, Rose, and Greene 2005). We use mixed logit models (MXL) combined with maximum likelihood estimation, as they are most common and allow for preferences to be heterogeneous across respondents (Train 2003). We estimate different specifications of the MXL, treating all attributes as random. We add a quadratic specification of the “Children” attribute (Children² in Tables 3 and 5), as we expect this relation to be non-linear. We conduct several robustness checks, as described in the Appendix and Tables A1, A2, and A3, and find that the results are robust. Hence, we continue our analysis using the MXL models.

In a first analysis we discuss fertility and child-raising preferences based on all three sets of choice experiments: with men individually, with women individually, and with couples. We identify three model specifications. First, we include only the individual experiments (men and women) and add an interaction term for women (equation [2]).

$$U_{ij} = \beta_1 Z_{ij} + \beta_2 Z_{ij} * Women_i + \varepsilon_{ij} \text{ if } i = \text{man or woman} \quad (2)$$

Second, we use all three choice experiments (men, women, and couples) and include an interaction term for couples (equation [3]).

$$U_{ij} = \beta_3 Z_{ij} + \beta_4 Z_{ij} * Couples_i + \varepsilon_{ij} \text{ if } i = \text{man, woman or couple} \quad (3)$$

Third, we include respectively the experiments of men and couples, and the experiments of women and couples, and add an interaction term for couples (equations [4] and [5]).

$$U_{ij} = \beta_5 Z_{ij} + \beta_6 Z_{ij} * Couples_i + \varepsilon_{ij} \text{ if } i = \text{man or couple} \quad (4)$$

$$U_{ij} = \beta_7 Z_{ij} + \beta_8 Z_{ij} * Couples_i + \varepsilon_{ij} \text{ if } i = \text{woman or couples} \quad (5)$$

The first two specifications allow us to discern differences between men, women, and couples, while the third specification indicates whether it is mainly men's or women's preference structure that is reflected in couples' choices. We cluster standard errors at the household level, to control for the specific household-based structure of the data.

In a second analysis, we reflect on the implications of intrahousehold decision making for household fertility and child-raising choices. We generate a decision-making coefficient based on the method proposed by Beharry-Borg, Hensher, and Scarpa (2009) which relies on the premise that the individual preferences of the spouses are at the origin of household decision making. The basic collective model defined by M. Browning and P. A. Chiappori (1998) includes a “distribution of power” coefficient δ (equations [6] and [7]).

$$U(p, x, \delta) = \max_{q, Q, p, x} [\delta U^m(q, Q, p, x) + (1 - \delta) U^w(q, Q, p, x)] \quad (6)$$

Subject to

$$p(q^m + q^w + Q) = x \quad (7)$$

Where a man m and a woman w maximize the utility of the household, considering prices p and income x , and consuming both private q and public Q goods. The coefficient δ is limited to values between 0 and 1. If $\delta = 1$, the household behaves as if the man always gets his way, whereas if $\delta = 0$, the woman always gets her way. Intermediate values indicate that both the man and the woman hold some decision-making power. Beharry-Borg, Hensher, and Scarpa (2009) operationalize this framework using the random utility theory (equation [1]). Making abstraction of the stochastic component of utility, the indirect utility V of the collective choice (the household choice) of each alternative j by couple n is framed as a convex combination of the individuals’ utilities (equation [8]).

$$V_{jn} = \delta_n V(Z_j, \beta_n^m) + (1 - \delta_n) V(Z_j, \beta_n^w) \quad (8)$$

Couple n ’s indirect utility derived from alternative j is composed of the weighted combination of individual utilities described based on the alternative’s attributes Z and the individual taste parameters for the man β_n^m and woman β_n^w . The couple-specific weight δ_n – the *decision-making coefficient* – can be interpreted as above: as δ_n approaches 1, more weight is given to the man’s utility in the couple’s joint decision, that is, the man is dominating during the couples experiment.

Assuming linearity in the parameters and a Gumbel distributed error term with $\lambda = 1$, we can set up a basic logit model that defines the probability of couple n to select alternative i from all alternatives j (equation [9]).

$$Pr(i, n) = \frac{\exp(V_{i,n})}{\sum_j \exp(V_{j,n})} = \frac{\exp(\delta_n \beta_n^m Z_i + (1 - \delta_n) \beta_n^w Z_i)}{\sum_j \exp(\delta_n \beta_n^m Z_j + (1 - \delta_n) \beta_n^w Z_j)} \quad (9)$$

We use the R package *Apollo* to model the following indirect utility response function from which we derive the couple-specific decision-making coefficient δ_n (equation [10]):

$$V(\cdot) = \begin{cases} \lambda^m \beta_n^m Z_j & \text{if } man \\ \lambda^w \beta_n^w Z_j & \text{if } woman \\ \lambda^j [\delta_n \beta_n^m Z_j + (1 - \delta_n) \beta_n^w Z_j] & \text{if } couple \end{cases} \quad (10)$$

The intrahousehold decision-making coefficient is constrained to values between 0 and 1, with a value closer to 0 or 1 indicating more decision-making power for respectively the woman or the man, while a value around 0.5 indicates more balance in the decision-making power. For ease of interpretation and comparison we use dummy specifications by subdividing the sample in three decision-making groups: couples with man-dominated choices where the husband has a larger decision-making power ($x > 0.6$; equation [11]), couples with woman-dominated choices where the wife has a larger decision-making power ($x \leq 0.4$; equation [12]), and couples with balanced choices where the decision-making power is more balanced between both spouses ($0.4 < x \leq 0.6$; equation [13]). For this second analysis we only consider the experiment with the couples, as we are interested in the effect of intrahousehold decision making on decisions taken as a couple.

$$U_{ij} = \beta_9 Z_{ij} + \beta_{10} Z_{ij} * man - dominant_i + \varepsilon_{ij} \text{ if } i = couple \quad (11)$$

$$U_{ij} = \beta_{11} Z_{ij} + \beta_{12} Z_{ij} * woman - dominant_i + \varepsilon_{ij} \text{ if } i = couple \quad (12)$$

$$U_{ij} = \beta_{13} Z_{ij} + \beta_{14} Z_{ij} * balanced_decision - making_i + \varepsilon_{ij} \text{ if } i = couple \quad (13)$$

RESULTS AND DISCUSSION

Preference structures

The results from the different choice experiments are summarized in Table 3. We find that men have a different preference structure than women (models 1 and 5). In the Senegal sample, women have a lower preference for having more children, and a higher preference for better nutrition than men. In the Uganda sample, women have a higher preference for having more children, and for better education and healthcare, compared to men. Models 2 and 6 show that results differ when we compare the individual with the couple's experiment. For the Senegal sample, we find significant differences for all attributes and attribute levels. This is less the case for the Uganda sample, where only the coefficients for high-quality education, and medium-quality healthcare and nutrition differ significantly for the experiment with couples. Models 3, 4, 7, and 8 reveal

Table 3 Region-specific estimation results for the MXL models using combinations of the experiments with men (a), women (b), and couples (c), and interaction terms

Experiments Interaction term X	Senegal				Uganda			
	(1) a vs b	(2) $a + b$ vs c	(3) a vs c	(4) b vs c	(5) a vs b	(6) $a + b$ vs c	(7) a vs c	(8) b vs c
	Women	Couple	Couple	Couple	Women	Couple	Couple	Couple
Mean preferences								
Children	0.218*** (0.033)	0.124*** (0.022)	0.220*** (0.034)	0.035 (0.031)	0.120*** (0.035)	0.156*** (0.026)	0.111*** (0.033)	0.218*** (0.036)
Children ²	− 0.014*** (0.003)	− 0.007*** (0.002)	− 0.014*** (0.003)	− 0.000 (0.002)	− 0.010*** (0.003)	− 0.012*** (0.002)	− 0.009*** (0.003)	− 0.017*** (0.003)
Education half	1.761*** (0.106)	1.732*** (0.074)	1.764*** (0.107)	1.696*** (0.105)	1.497*** (0.130)	2.053*** (0.097)	1.392*** (0.129)	2.575*** (0.136)
Education all	2.956*** (0.122)	2.897*** (0.093)	2.964*** (0.124)	2.822*** (0.126)	3.020*** (0.204)	3.578*** (0.165)	2.832*** (0.185)	4.104*** (0.205)
Healthcare medium	0.707*** (0.091)	0.643*** (0.064)	0.707*** (0.091)	0.569*** (0.079)	0.439*** (0.076)	0.776*** (0.066)	0.404*** (0.073)	1.147*** (0.107)
Healthcare high	1.593*** (0.100)	1.477*** (0.077)	1.596*** (0.102)	1.358*** (0.095)	0.764*** (0.082)	1.068*** (0.067)	0.747*** (0.088)	1.425*** (0.104)
Nutrition half	1.748*** (0.103)	1.788*** (0.087)	1.758*** (0.106)	1.803*** (0.106)	1.811*** (0.133)	1.714*** (0.095)	1.709*** (0.128)	1.608*** (0.121)
Nutrition all	2.077*** (0.120)	2.262*** (0.098)	2.084*** (0.122)	2.415*** (0.129)	2.099*** (0.157)	1.925*** (0.107)	2.031*** (0.145)	1.757*** (0.140)

(Continued).

Table 3 Continued.

<i>Experiments</i> <i>Interaction term X</i>	<i>Senegal</i>				<i>Uganda</i>			
	(1) <i>a vs b</i> <i>Women</i>	(2) <i>a + b vs c</i> <i>Couple</i>	(3) <i>a vs c</i> <i>Couple</i>	(4) <i>b vs c</i> <i>Couple</i>	(5) <i>a vs b</i> <i>Women</i>	(6) <i>a + b vs c</i> <i>Couple</i>	(7) <i>a vs c</i> <i>Couple</i>	(8) <i>b vs c</i> <i>Couple</i>
<i>Preference heterogeneity</i>								
X * Children	− 0.184*** (0.047)	0.064* (0.033)	− 0.032 (0.037)	0.154*** (0.043)	0.128** (0.051)	− 0.012 (0.036)	0.024 (0.042)	− 0.075* (0.043)
X * Children ²	0.014*** (0.004)	− 0.005** (0.003)	0.002 (0.003)	− 0.012*** (0.003)	− 0.010** (0.004)	0.002 (0.003)	− 0.001 (0.003)	0.006* (0.003)
X * Education half	0.005 (0.152)	0.570*** (0.119)	0.528*** (0.156)	0.593*** (0.143)	1.297*** (0.212)	0.216 (0.132)	0.936*** (0.176)	− 0.335** (0.155)
X * Education all	− 0.018 (0.167)	0.573*** (0.134)	0.489*** (0.176)	0.635*** (0.161)	1.464*** (0.249)	0.615*** (0.160)	1.045*** (0.222)	0.120 (0.194)
X * Healthcare medium	− 0.115 (0.115)	0.161** (0.078)	0.095 (0.088)	0.233** (0.108)	0.794*** (0.131)	0.158* (0.089)	0.527*** (0.106)	− 0.220** (0.110)
X * Healthcare high	− 0.172 (0.122)	0.305*** (0.082)	0.176* (0.102)	0.426*** (0.121)	0.742*** (0.135)	0.127 (0.087)	0.418*** (0.119)	− 0.224** (0.103)
X * Nutrition half	0.122 (0.127)	0.316*** (0.110)	0.333*** (0.122)	0.288** (0.139)	− 0.067 (0.170)	0.279** (0.118)	0.249* (0.147)	0.372*** (0.144)
X * Nutrition all	0.438*** (0.170)	0.299** (0.127)	0.468*** (0.154)	0.132 (0.163)	− 0.203 (0.207)	0.201 (0.146)	0.100 (0.170)	0.320* (0.164)

Standard deviation

Children	− 0.035** (0.017)	0.037* (0.019)	− 0.051*** (0.015)	0.026* (0.015)	0.004 (0.059)	− 0.059* (0.034)	0.035 (0.069)	− 0.064* (0.038)
Children ²	− 0.002 (0.002)	− 0.001 (0.003)	− 0.001 (0.002)	0.000 (0.002)	0.006*** (0.001)	− 0.004 (0.003)	0.003 (0.006)	− 0.005 (0.004)
Education half	0.394*** (0.106)	0.381*** (0.106)	0.406*** (0.129)	0.349*** (0.117)	1.053*** (0.115)	1.221*** (0.094)	0.956*** (0.172)	− 1.208*** (0.120)
Education all	0.778*** (0.087)	0.786*** (0.073)	0.797*** (0.097)	0.772*** (0.094)	1.844*** (0.121)	2.046*** (0.120)	1.624*** (0.104)	1.953*** (0.152)
Healthcare medium	− 0.103 (0.222)	0.047 (0.094)	0.118 (0.787)	− 0.004 (0.022)	0.277** (0.121)	0.338*** (0.124)	− 0.281*** (0.104)	0.335*** (0.124)
Healthcare high	0.891*** (0.065)	0.888*** (0.066)	0.933*** (0.073)	0.834*** (0.130)	0.581*** (0.100)	− 0.517*** (0.092)	0.512*** (0.099)	− 0.256* (0.141)
Nutrition half	− 0.426*** (0.109)	0.451*** (0.087)	− 0.346* (0.209)	0.459*** (0.114)	0.377* (0.211)	0.535*** (0.091)	− 0.212 (0.160)	0.721*** (0.104)
Nutrition all	0.747*** (0.103)	0.809*** (0.071)	0.712*** (0.096)	0.802*** (0.082)	− 0.928*** (0.166)	1.036*** (0.086)	0.878*** (0.081)	0.916*** (0.096)
X * Children	− 0.001 (0.009)	− 0.055*** (0.021)	0.045** (0.020)	0.042 (0.109)	0.038 (0.073)	− 0.019 (0.012)	0.004 (0.018)	− 0.002 (0.007)
X * Children ²	0.000 (0.001)	− 0.001 (0.002)	− 0.001 (0.003)	− 0.003 (0.006)	− 0.008** (0.004)	− 0.000 (0.001)	0.002 (0.002)	0.001 (0.001)

(Continued).

Table 3 Continued.

<i>Experiments</i> <i>Interaction term X</i>	<i>Senegal</i>				<i>Uganda</i>			
	<i>(1) a vs b</i> <i>Women</i>	<i>(2) a + b vs c</i> <i>Couple</i>	<i>(3) a vs c</i> <i>Couple</i>	<i>(4) b vs c</i> <i>Couple</i>	<i>(5) a vs b</i> <i>Women</i>	<i>(6) a + b vs c</i> <i>Couple</i>	<i>(7) a vs c</i> <i>Couple</i>	<i>(8) b vs c</i> <i>Couple</i>
X * Education half	− 0.164 (0.193)	− 0.096 (0.185)	− 0.092 (0.552)	0.164 (0.234)	− 0.755*** (0.197)	1.049*** (0.189)	1.353*** (0.181)	0.975*** (0.244)
X * Education all	0.311 (0.237)	− 0.267 (0.227)	0.212 (0.341)	− 0.325 (0.281)	0.959*** (0.202)	− 0.473** (0.203)	2.166*** (0.293)	− 1.088*** (0.189)
X * Healthcare medium	0.013 (0.067)	0.111 (0.106)	− 0.022 (0.141)	0.085 (0.143)	0.427*** (0.148)	0.199 (0.186)	0.163 (0.154)	− 0.153 (0.162)
X * Healthcare high	0.249 (0.182)	− 0.312 (0.206)	− 0.223 (0.442)	0.402 (0.405)	0.062 (0.201)	0.156 (0.140)	0.264*** (0.098)	0.320** (0.161)
X * Nutrition half	0.376* (0.206)	0.045 (0.134)	− 0.187 (0.466)	− 0.031 (0.292)	− 0.597*** (0.214)	0.716*** (0.203)	0.631*** (0.124)	− 0.340** (0.149)
X * Nutrition all	0.549*** (0.208)	− 0.139 (0.140)	0.139 (0.501)	− 0.030 (0.074)	− 0.475 (0.547)	0.433 (0.280)	− 0.328 (0.278)	0.617** (0.240)
N	17,778	26,655	17,766	17,766	18,000	27,000	18,000	18,000
AIC	8386.247	12309.878	8077.255	8133.716	8139.024	12074.950	8129.786	7716.289
BIC	8635.390	12571.981	8326.376	8382.838	8388.564	12337.465	8379.326	7965.829
Log-likelihood	− 4161.123	− 6122.939	− 4006.627	− 4034.858	− 4037.512	− 6005.475	− 4032.893	− 3826.144

Notes: Standard errors reported between parentheses. ***, **, * denote significance at the 1, 5, and 10 percent levels, respectively. Children² is the quadratic specification of the attribute Children. 1500 Halton draws are used.

that men's preferences for the number of children are more in line with the fertility choices made by couples in both the Senegal and Uganda sample, as there are less significant differences in the interaction terms' coefficients in models 3 and 7 than in models 4 and 8.

The results are to some extent consistent with the findings that men prefer larger households and are less concerned with the quality of child raising than women in other studies in various settings (Bankole and Singh 1998; Westoff 2010; Matovu et al. 2017; Van Hoyweghen et al. 2023). The finding that women prefer more children than men in the Uganda sample might relate to specific observations about a woman's social status being strongly connected to the number of children she bears in Uganda (Makwa 2012; Kwagala 2013;). Our results corroborate the finding that choices made jointly by couples may differ from the choices made by the individual spouses from other experiments on other topics, for example., from household economics, transportation economics, environmental economics, and urban economics (Beharry-Borg, Hensher, and Scarpa 2009; Braaten and Martinsson 2015; Beblo and Beninger 2017; Mariel, Scarpa, and Vega-Bayo 2018; Beck and Rose 2019).

While one might intuitively expect the couples' choices to lie in between the individual choices, we find in both the Uganda and Senegal samples that couples' preferences for some of the attributes are more extreme than the preferences found for men and women individually. This could be explained by the "group polarization phenomenon," described by psychologists as the tendency of a group to have a more extreme response to a problem or choice than the individual pre-discussion group member responses (Myers and Lamm 1976; Sieber and Ziegler 2019). Three main theories are proposed to explain the group polarization phenomenon: social comparison processes, persuasive argumentation, and social identity concerns (see Mackie [1986] and Sieber and Ziegler [2019] for an in-depth discussion). Given the within-couples setting of our experiment, it is likely the persuasive argumentation that might lead to the more extreme choices in the couples' experiment. This theory describes that if a group starts with a positive or negative leaning before a discussion, more arguments favoring the already dominant direction are likely to be mentioned and processed, making the final choice more polarized.

Intrahousehold decision making

We summarize the intrahousehold decision-making coefficient in Table 4 and Figure 2. We find a mean decision-making coefficient of 0.64 for Senegal and 0.45 for Uganda. This implies, on average, a stronger decision-making authority for men in the couples experiment in the Senegal sample, and a more balanced decision making in the Uganda sample. As we find highly dissimilar preference structures between men and women in Uganda

Table 4 Characteristics of the decision-making coefficient

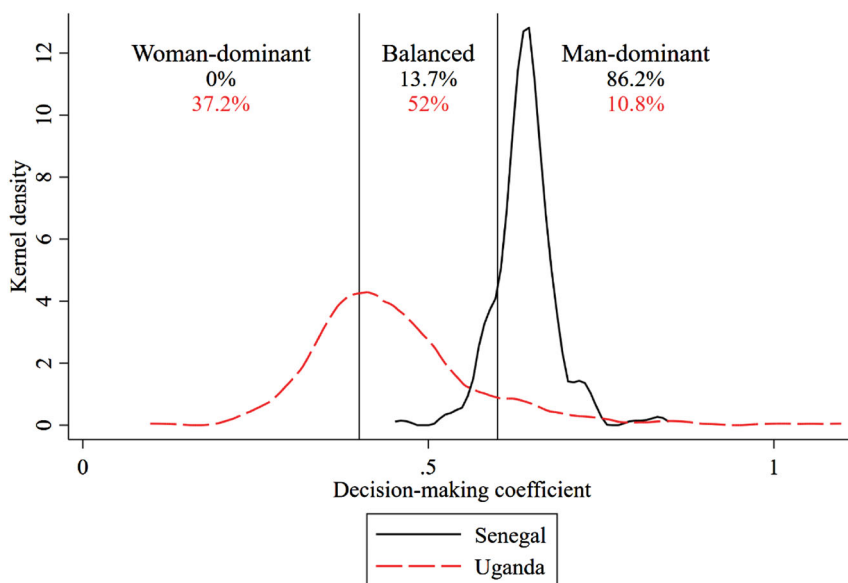
	Senegal	Uganda
Number of observations	247	250
Decision-making coefficient	0.641 (0.044)	0.45 (0.124)
Decision-making dominated by:		
Woman (0/1) ^a	0	0.372
Man (0/1) ^b	0.862	0.108
Balanced decision-making (0/1) ^c	0.138	0.52

Notes: Standard deviations reported between parentheses.

^aDecision-making coefficient ≤ 0.4 .

^bDecision-making coefficient > 0.6 .

^cDecision-making coefficient > 0.4 and ≤ 0.6 .



kernel = epanechnikov, bandwidth = 0.0093

Figure 2 Kernel density visualization of decision-making coefficient for Senegal and Uganda samples

Notes: Decision-making groups' cut-offs are visualized at $x = 0.4$ and $x = 0.6$, and couple-specific decision-making group categorizations are indicated.

Source: Authors' calculations.

(Table 3, model 5), the balanced decision-making coefficient suggests rather equal decision-making power between men and women in the couples' choices. Figure 2 illustrates the distribution of the region-specific

decision-making coefficients using a kernel density plot. We find that there is more variation in the coefficient in the Uganda sample, with a particularly long right tail, compared to the Senegal sample, where it is centered around the mean. When we split up the sample in decision-making groups, we find that couples' choices are dominated by the husband's preferences for most Senegalese couples (86.2 percent). The remaining Senegalese couples make choices that are more balanced toward the preferences of both spouses. There are no woman-dominated couples present in the Senegal sample. In the Uganda sample, more than half of the couples make balanced choices (52 percent), a large share of the couples' choices (37.2 percent) are dominated by women's preferences, and only 10.8 percent of the couples' choices are male dominated.

Given the similar gender inequality index in the two countries, we would have expected more comparable results on intrahousehold decision making in Senegal and Uganda. The observed difference in occurrence of spouse-dominated and balanced intrahousehold decision making over fertility between the two countries might imply that reproductive decision-making authority is not necessarily closely linked to gender inequality. On the other hand, this finding is supported by a recent report on bodily autonomy and integrity for women and girls (UNFPA 2021). The report discusses three dimensions regarding bodily autonomy and integrity (being able to individually decide on healthcare, contraception, and sex with their partners), and shows that Senegal stands amongst the worst scoring countries, together with Niger and Mali, considering bodily integrity and autonomous reproductive healthcare decision making of women. While overall in SSA around 50 percent of women can decide autonomously, only 7 percent can in Senegal, compared to 62 percent in Uganda. This lack of autonomy in reproductive health decision making is reflected in our decision-making coefficient.

Couples' fertility and child-raising preferences

We are interested in the link between intrahousehold decision making and the choices couples make, as we assume these will mirror best the decisions couples will take in real life. We therefore only use the experiment with couples in the following regression analysis (Table 5).

For the Senegal sample, we find that in general couples deciding in a more balanced way derive a lower utility from the attribute number of children compared to couples in which the husband dominates the couple's decision. On the other hand, while man-dominated couples' utility for the number of children is concavely shaped – marginal utility decreases for each additional child – balanced decision-making couples' utility for the number of children is convexly shaped – when the number of children increases these couples' utility continues to increase. These results

Table 5 Region-specific estimation results for the MXL models using only the experiments with couples, and interaction terms to disentangle the decision-making groups. In the Senegal sample, balanced decision-making couples (X) are compared with man-dominated couples as base category (2); in the Uganda sample respectively man-dominated couples (X) (4), woman-dominated couples (X) (5), and balanced decision-making couples (X) (6) are compared with the other two decision-making groups as base category

Couples experiment	Senegal		Uganda			
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Interaction term X</i>		Balanced		Man-	Woman-	Balanced
Couples where decision-		(0/1)		dominated	dominated	(0/1)
making is:				(0/1)	(0/1)	
<i>Base category</i>		Man-dominated		Balanced or	Balanced or	Man – or
Couples where decision-				woman-	man –	woman-
making is:				dominated	dominated	dominated
<i>Mean preferences</i>						
Children	0.185*** (0.036)	0.231*** (0.040)	0.133*** (0.036)	0.137*** (0.037)	0.119*** (0.045)	0.140*** (0.050)
Children ²	− 0.012*** (0.003)	− 0.016*** (0.003)	− 0.010*** (0.003)	− 0.009*** (0.003)	− 0.008** (0.003)	− 0.011*** (0.004)
Education half	2.236*** (0.121)	2.438*** (0.137)	2.209*** (0.155)	2.305*** (0.160)	1.816*** (0.169)	2.291*** (0.246)
Education all	3.372*** (0.148)	3.541*** (0.168)	4.078*** (0.243)	4.176*** (0.243)	3.838*** (0.284)	3.903*** (0.424)
Healthcare medium	0.784*** (0.092)	0.865*** (0.103)	0.907*** (0.098)	0.868*** (0.104)	0.780*** (0.117)	1.049*** (0.141)

Healthcare high	1.737*** (0.106)	1.858*** (0.117)	1.161*** (0.101)	1.167*** (0.106)	0.992*** (0.110)	1.265*** (0.147)
Nutrition half	2.051*** (0.115)	2.048*** (0.124)	1.871*** (0.148)	1.790*** (0.155)	2.125*** (0.178)	1.589*** (0.202)
Nutrition all	2.501*** (0.138)	2.492*** (0.149)	2.025*** (0.169)	1.900*** (0.163)	2.303*** (0.207)	1.695*** (0.219)
<i>Preference heterogeneity</i>						
X * Children		- 0.280*** (0.095)		- 0.050 (0.158)	0.063 (0.079)	0.000 (0.073)
X * Children ²		0.027*** (0.007)		- 0.000 (0.012)	- 0.006 (0.006)	0.002 (0.006)
X * Education half		- 0.861*** (0.302)		- 0.768** (0.369)	1.347*** (0.392)	- 0.223 (0.374)
X * Education all		- 0.639** (0.317)		- 0.390 (0.561)	0.906** (0.405)	0.617 (1.257)
X * Healthcare medium		- 0.370 (0.238)		0.261 (0.304)	0.353* (0.202)	- 0.278 (0.204)
X * Healthcare high		- 0.557** (0.251)		- 0.048 (0.274)	0.518** (0.229)	- 0.188 (0.232)
X * Nutrition half		0.208 (0.368)		0.884** (0.439)	- 0.520* (0.272)	0.734 (0.471)
X * Nutrition all		0.359 (0.450)		1.238** (0.570)	- 0.676** (0.308)	0.720* (0.413)

(Continued).

Table 5 Continued.

<i>Standard deviation</i>							
20	Children	0.057*** (0.021)	0.061*** (0.021)	− 0.006 (0.027)	0.027 (0.025)	0.045** (0.019)	− 0.033 (0.035)
	Children ²	0.002 (0.002)	0.000 (0.000)	− 0.003** (0.002)	0.000 (0.001)	− 0.001 (0.001)	− 0.002 (0.004)
	Education half	0.360** (0.157)	0.298 (0.187)	1.540*** (0.174)	1.512*** (0.172)	1.379*** (0.203)	1.343*** (0.513)
	Education all	0.805*** (0.114)	0.820*** (0.118)	2.154*** (0.153)	2.076*** (0.166)	2.137*** (0.155)	1.986*** (0.275)
	Healthcare medium	− 0.006 (0.029)	0.036 (0.046)	0.251 (0.215)	− 0.276 (0.175)	− 0.244 (0.221)	0.261 (0.160)
	Healthcare high	0.911*** (0.096)	0.926*** (0.097)	0.377** (0.178)	− 0.384** (0.149)	− 0.303** (0.135)	0.354 (0.248)
	Nutrition half	− 0.320** (0.161)	0.351*** (0.135)	0.782*** (0.164)	0.762*** (0.163)	0.387* (0.230)	− 0.774*** (0.217)
	Nutrition all	0.679*** (0.110)	0.580*** (0.124)	1.027*** (0.132)	0.904*** (0.138)	0.900*** (0.132)	1.008*** (0.218)
	X * Children		0.070 (0.047)		− 0.102* (0.054)	0.006 (0.011)	− 0.019 (0.055)
	X * Children ²		0.001 (0.001)		− 0.001 (0.002)	− 0.001 (0.001)	0.003 (0.006)

X * Education half		0.512		− 0.548	1.112***	1.034
		(0.364)		(0.336)	(0.297)	(1.246)
X * Education all		0.136		1.852***	− 0.858***	− 1.267
		(0.161)		(0.638)	(0.269)	(1.687)
X * Healthcare medium		0.183		− 0.318	− 0.162	− 0.301
		(0.143)		(0.362)	(0.292)	(0.452)
X * Healthcare high		− 0.098		0.056	0.579**	− 0.283
		(0.126)		(0.212)	(0.232)	(0.462)
X * Nutrition half		− 0.524*		0.406***	1.091***	− 0.247
		(0.300)		(0.124)	(0.244)	(0.276)
X * Nutrition all		− 0.868***		1.640***	0.511*	0.406
		(0.295)		(0.304)	(0.302)	(0.358)
N	8,877	8,877	9,000	9,000	9,000	9,000
AIC	3912.072	3889.647	3839.667	3838.648	3813.520	3845.845
BIC	4025.532	4116.567	3953.347	4066.007	4040.879	4073.204
Log-likelihood	− 1940.036	− 1912.824	− 1903.833	− 1887.324	− 1874.760	− 1890.923

Notes: Standard errors reported between parentheses. ***, **, * denote significance at the 1, 5, and 10 percent levels, respectively. d.m. = decision-making. Children² is the quadratic specification of the attribute Children. 1500 Halton draws are used.

suggest that man-dominated couples attach more value to the number of children in general, while balanced decision-making couples derive positive marginal utility from each additional child, but the number of children in general contributes less to their utility. In addition, we find that balanced decision-making couples derive a lower utility from children’s secondary education or from high-quality healthcare, compared to couples where the man dominates the couple’s decisions. These results support Sarah Deschênes, Christelle Dumas, and Sylvie Lambert (2020) in their argument that responsibility over children’s education and healthcare traditionally lies with the husband in many (but not all) African societies, while women are in charge of catering to daily needs which require lower financial investments.

For the Uganda sample, in line with the results from the individual and couples experiments in Table 3, we find that when the wife dominates the couple’s experiment, the utility the couple derives from a better education and healthcare is higher, and the utility derived from a better nutrition is lower, compared to when the husband dominates or when there was balanced decision making. This finding supports earlier evidence from Uganda showing that mothers care more about their children’s health compared to fathers (Nyqvist and Jayachandran 2017; Sunder 2019). We do not find important differences in utility structures when we compare balanced decision-making couples with individual decision-making couples. Balanced decision-making couples only derive a significantly higher utility from being able to provide a better nutrition (all days of the week) for their children. This goes against existing evidence showing that households are better off when decision making is spread more evenly between spouses (Lancaster, Maitra, and Ray 2006; Iversen et al. 2011; McCarthy and Kilic 2017; Lecoutere and Jassogne 2019; McCarthy 2019; Lecoutere and Van Campenhout 2023).

Limitations and scope for further research

Our approach is subject to the critiques of Alistair Munro (2018) on the interpretation of the decision-making coefficient used in experiments. Munro (2018), considering Beharry-Borg, Hensher, and Scarpa (2009)’s experiment, ascribes the lack of patterns in utility structures to the experiment’s impossibility to distinguish between respondents answering the individual experiment from an egocentric perspective and respondents already considering their spouses’ preferences during the individual experiment. Our experiment does not disentangle this either. Moreover, we do not account for differences in scale parameter between the individual and couples’ experiments, which could result in wrongly ascribing randomness in choices to differences in decision-making power (Munro 2018). However, as we do not find evidence for scale heterogeneity

in the region-specific samples, we do not expect our results to be biased by a high level of randomness in respondents' answers.

Our findings on fertility and child-raising preferences and intrahousehold decision making are derived from specific regions in rural Uganda and Senegal and cannot be generalized. We find large heterogeneity in preferences between the two countries that are probably linked to their differences in cultural, ethnic, and religious background. Studies have proven that fertility preferences can be highly variable over the course of a lifetime, but we did not specifically target young people who have not started their childbearing years yet (Kodzi, Casterline, and Aglobitse 2010; Yeatman, Sennott, and Culpepper 2013; Trinitapoli and Yeatman 2018). Moreover, when nucleus households are strongly rooted in the extended intergenerational family, the studied decision-making unit should also be extended to different generations. The analysis of fertility preferences and intrahousehold decision making considering different sociocultural context, life-time dynamics and extended intergenerational families are interesting avenues for further research.

CONCLUSION

To provide an alternative to the traditional proxies for measuring intrahousehold decision making we implemented a choice experiment in rural Senegal and Uganda to distinguish between individual and household choices, calculate a decision-making coefficient, and analyze spouses' preferences on fertility and child raising. We find that individual fertility preferences of men and women cannot substitute for household-level choices, and that intrahousehold decision making concerning fertility and child raising is region specific. While in Uganda household fertility choices reflect a balance between the spouses' fertility preferences, in Senegal these choices seem to be more dominated by the husband's preference.

Our results refute the assumption of uniform household preferences underlying the unitary household models and support feminist economics approaches. Insights on individual fertility preferences of men and women do not suffice to understand fertility choices couples make. This raises data collection challenges and implies that the practice of traditional survey-based data collection – to select one member from the household for preference elicitation and to treat that member's choice as a reliable substitute for the overall household choice – does not suffice. When collecting traditional household survey data, one must make sure to include all relevant voices present in the (extended) household, be it adults or children. Collecting data on household preferences and intrahousehold decision making requires the use of innovative approaches, such as experimental games or choice experiments, as introduced in this article.

Our study on intrahousehold decision making and fertility choices reveals the importance of considering the adequate decision-making unit when designing family planning and child-centered programs. While we find that Senegalese women have different preferences from their partners, they do not have the decision-making authority to influence the household's choice toward these preferences. As Senegalese women do not have proper autonomy over their own body (UNFPA 2021), fertility and child-raising choices in rural Senegal will most likely follow men's preferences. When family planning and child-centered programs in Senegal want to go beyond reproductive control toward reproductive empowerment, they must – apart from triggering an increase in the decision-making authority of women – incentivize men to participate in these programs. In Uganda, on the other hand, women seem to have more intrahousehold decision-making authority, as the majority of the couples experiments was implemented using balanced decision making, or even dominated by the woman. Here, programs addressing child education or healthcare will likely be more effective if women are specifically targeted as beneficiaries while for child nutrition programs targeting of spouses or couples likely matters less.

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NOTES

- ¹ Proxy variables are for example the difference in age, education, or income between the spouses.
- ² These decision-making questions are now frequently used by among others the Demographic and Health Surveys (DHS; Meurs and Ismaylov 2019).
- ³ Such experiments typically first collect individual choices from each member of the couple or the household, and then ask the couple or the household to make choices jointly to reveal choices as a group, through collective bargaining and joint decision making. Some studies use revealed preferences as a proxy for the group decision, see for example Dosman and Adamowicz (2006) and Mariel, Scarpa, and Vega-Bayo (2018).
- ⁴ The GII measures gender inequalities for three aspects of human development: reproductive health (maternal mortality ratio and adolescent birth rates), empowerment (proportion of parliamentary seats occupied by women and proportion of adult women and men ages 25 years and older with at least some secondary education), and economic status (labor force participation rate of women and men ages 15 years and older). As it measures the human development costs of gender inequality, the higher the GII value the more disparities between women and men and thus the more loss to human development (UNDP 2019).
- ⁵ The different sampling methods in Senegal and Uganda are the consequence of the specific characteristics of the two case-study regions.
- ⁶ A household is defined as poor when per adult equivalent total household income falls below the international moderate poverty line of \$3.10USD per person per day.
- ⁷ We test for attribute non-attendance with respect to the *number of children* attribute, as less than 1 percent of the respondents indicated to have ignored another attribute. In addition, we only test in the Senegal sample, as less than 1 percent of Ugandan respondents indicated to have ignored an attribute in general.

REFERENCES

- Alesina, Alberto, Paola Giuliano, and Nathan Nunn. 2013. "On the Origins of Gender Roles: Women and the Plough." *Quarterly Journal of Economics* 128(2): 469–530.
- Alexandratos, Nikos. 2005. "Countries with Rapid Population Growth and Resource Constraints: Issues of Food, Agriculture, and Development." *Population and Development Review* 31(2): 237–58.
- Ambler, Kate, Cheryl Doss, Caitlin Kieran, and Simone Passarelli. 2022. "Spousal Concordance in Joint and Separate Households: Survey Evidence from Nepal." *World Development* 151: 105744.
- Bankole, Akinrinola. 1995. "Desired Fertility and Fertility Behaviour Among the Yoruba of Nigeria: A Study of Couple Preferences and Subsequent Fertility." *Population Studies* 49(2): 317–28.
- Bankole, Akinrinola and Susheela Singh. 1998. "Couples' Fertility and Contraceptive Decision-Making in Developing Countries: Hearing the Man's Voice." *International Family Planning Perspectives* 24(1): 15–24.
- Bateman, Ian J. and Alistair Munro. 2009. "Household Versus Individual Valuation: What's the Difference?" *Environmental and Resource Economics* 43(1): 119–35.
- Beblo, Miriam and Denis Beninger. 2017. "Do Husbands and Wives Pool Their Incomes? A Couple Experiment." *Review of Economics of the Household* 15(3): 779–805.
- Beck, Matthew J. and John M. Rose. 2019. "Stated Preference Modelling of Intra-household Decisions: Can You More Easily Approximate the Preference Space?" *Transportation* 46(4): 1195–213.
- Beegle, K., E. Frankenbergh, and D. Thomas. 2001. "Bargaining Power Within Couples and Use of Prenatal and Delivery Care in Indonesia." *Studies in Family Planning* 32(2): 130–46.
- Beharry-Borg, Nesha, David A. Hensher, and Riccardo Scarpa. 2009. "An Analytical Framework for Joint vs Separate Decisions by Couples in Choice Experiments: The Case of Coastal Water Quality in Tobago." *Environmental and Resource Economics* 43(1): 95–117.
- Bergmann, Barbara R. 1996. "Becker's Theory of the Family: Preposterous Conclusions." *Challenge* 39(1): 9–12.
- Bhrolcháin, M. N. and É Beaujouan. 2019. "Do People Have Reproductive Goals? Constructive Preferences and the Discovery of Desired Family Size." In *Analytical Family Demography*, edited by R. Schoen, 27–56. Cham, Switzerland: Springer.
- Bongaarts, John. 1990. "The Measurement of Wanted Fertility." *Population and Development Review* 16(3): 487–506.
- Braaten, Ragnhild Haugli and Peter Martinsson. 2015. "Experimental Measures of Household Decision Power." CREE Working Papers No. 02; Vol. 02. https://www.frisch.uio.no/prosjekter/cree/publications/CREE_working_papers/pdf_2015/braaten_martinsson_houshold_decision_power_cree_wp02_2015.pdf.
- Browning, Martin. 2000. "The Saving Behaviour of a Two-Person Household." *Scandinavian Journal of Economics* 102(2): 235–51.
- Browning, M. and P. A. Chiappori. 1998. "Efficient Intra-Household Allocations: A General Characterization and Empirical Tests." *Econometrica* 66(6): 1241–78.
- Chen, Zhiqi and Frances Woolley. 2001. "A Cournot-Nash Model of Family Decision Making." *Economic Journal* 111(474): 722–48.
- Cleland, John, Kazuyo Machiyama, and John B. Casterline. 2020. "Fertility Preferences and Subsequent Childbearing in Africa and Asia: A Synthesis of Evidence from Longitudinal Studies in 28 Populations." *Population Studies* 74(1): 1–21.
- Creevey, Lucy. 1996. "Islam, Women and the Role of the State in Senegal." *Journal of Religion in Africa* 26(3): 268–307.

- Deschênes, Sarah, Christelle Dumas, and Sylvie Lambert. 2020. "Household Resources and Individual Strategies." *World Development* 135: 105075.
- Dito, Bilisuma Bushie. 2015. "Women's Intrahousehold Decision-Making Power and Their Health Status: Evidence from Rural Ethiopia." *Feminist Economics* 21(3): 168–90.
- Dosman, Donna and Wiktor L. Adamowicz. 2006. "Combining Stated and Revealed Preference Data to Construct an Empirical Examination of Intrahousehold Bargaining." *Review of Economics of the Household* 4(1): 15–34.
- Doss, Cheryl. 2006. "The Effects of Intrahousehold Property Ownership on Expenditure Patterns in Ghana." *Journal of African Economies* 15(1): 149–80.
- . 2013. "Intrahousehold Bargaining and Resource Allocation in Developing Countries." *World Bank Research Observer* 28(1): 52–78.
- . 2021. "Diffusion and Dilution: The Power and Perils of Integrating Feminist Perspectives Into Household Economics." *Feminist Economics* 27(3): 1–20.
- Drechsel, Pay, Lucy Gyiele, Dagmar Kunze, and Olufunke Cofie. 2001. "Population Density, Soil Nutrient Depletion, and Economic Growth in Sub-Saharan Africa." *Ecological Economics* 38(2): 251–8.
- Duflo, Esther. 2003. "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa." *World Bank Economic Review* 17(1): 1–25.
- Duflo, Esther and Christopher Udry. 2004. *Intrahousehold Resource Allocation in Côte d'Ivoire: Social Norms, Separate Accounts and Consumption Choices*. National Bureau of Economic Research No. 10498. <http://www.nber.org/papers/w10498>.
- Ezeh, Alex C., John Bongaarts, and Blessing Mberu. 2012. "Global Population Trends and Policy Options." *Lancet* 380(9837): 142–8.
- Fiebig, Denzil G., Michael P. Keane, Jordan Louviere, and Nada Wasi. 2010. "The Generalized Multinomial Logit Model: Accounting for Scale and Coefficient Heterogeneity." *Marketing Science* 29(3): 393–421.
- Gipson, Jessica D. and Michelle J. Hindin. 2009. "The Effect of Husbands' and Wives' Fertility Preferences on the Likelihood of a Subsequent Pregnancy, Bangladesh 1998–2003." *Population Studies* 63(2): 135–46.
- Graves, Alisha, Lorenzo Rosa, Abdoul Moumouni Nouhou, Fadji Maina, and Djimé Adoum. 2019. "Avert Catastrophe Now in Africa's Sahel." *Nature* 575(7782): 282–6.
- Hensher, David A. and William H. Greene. 2010. "Non-Attendance and Dual Processing of Common-Metric Attributes in Choice Analysis: A Latent Class Specification." *Empirical Economics* 39(2): 413–26.
- Hensher, David A., John M. Rose, and William H. Greene. 2005. *Applied Choice Analysis – A Primer*. New York: Cambridge University Press.
- Hole, Arne Risa, Julie Riise Kolstad, and Dorte Gyrð-Hansen. 2013. "Inferred vs. Stated Attribute Non-attendance in Choice Experiments: A Study of Doctors' Prescription Behaviour." *Journal of Economic Behavior & Organization* 96: 21–31.
- Imai, Katsushi S., Samuel Kobina Annim, Veena S. Kulkarni, and Raghav Gaiha. 2014. "Women's Empowerment and Prevalence of Stunted and Underweight Children in Rural India." *World Development* 62: 88–105.
- Iversen, Vegard, Cecile Jackson, Bereket Kebede, Alistair Munro, and Arjan Verschoor. 2011. "Do Spouses Realise Cooperative Gains? Experimental Evidence from Rural Uganda." *World Development* 39(4): 569–78.
- Jackson, Cecile. 2013. "Cooperative Conflicts and Gender Relations: Experimental Evidence from Southeast Uganda." *Feminist Economics* 19(4): 25–47.
- Kessels, Roselinde, Bradley Jones, Peter Goos, and Martina Vandebroek. 2008. "Recommendations on the Use of Bayesian Optimal Designs for Choice Experiments." *Quality and Reliability Engineering International* 24(4): 229–48.
- Kodzi, Ivy A., John B. Casterline, and Peter Aglobitso. 2010. "The Time Dynamics of Individual Fertility Preferences Among Rural Ghanaian Women." *Studies in Family Planning* 41(1): 45–54.

- Kwagala, Betty. 2013. "Birthing Choices Among the Sabiny of Uganda." *Culture, Health & Sexuality* 15: S401–S414.
- Lambert, Sylvie and Pauline Rossi. 2016. "Sons as Widowhood Insurance: Evidence from Senegal." *Journal of Development Economics* 120: 113–27.
- Lancaster, Kelvin J. 1966. "A New Approach to Consumer Theory." *Journal of Political Economy* 74(2): 132–57.
- Lancaster, Geoffrey, Pushkar Maitra, and Ranjan Ray. 2006. "Endogenous Intra-household Balance of Power and Its Impact on Expenditure Patterns: Evidence from India." *Economica* 73(291): 435–60.
- Lecoutere, Els and Laurence Jassogne. 2019. "Fairness and Efficiency in Smallholder Farming: The Relation with Intrahousehold Decision-Making." *Journal of Development Studies* 55(1): 57–82.
- Lecoutere, Els and Bjorn Van Campenhout. 2023. "Joint Forces: The Impact of Intrahousehold Cooperation on Welfare in East African Agricultural Households." *Feminist Economics* 29(1): 266–97.
- Leuthold, Jane H. 1968. "An Empirical Study of Formula Income Transfers and the Work Decision of the Poor." *Journal of Human Resources* 3(3): 312–23.
- Louviere, Jordan J., David A. Hensher, and Joffre D. Swait. 2000. *Stated Choice Methods – Analysis and Applications*. Cambridge, MA: Cambridge University Press.
- Mackie, Diane M. 1986. "Social Identification Effects in Group Polarization." *Journal of Personality and Social Psychology* 50(4): 720–8.
- Makwa, Dominic D. B. 2012. "From 'Entering' and 'Hatching' to Being 'Clothed' into Manhood: Integration of Music and Dance in Imbalu Circumcision Rituals Among the Bagisu (Eastern Uganda)." In *Ethnomusicology in East Africa: Perspectives from Uganda and Beyond*, edited by S. Nannyonga-Tamusuza and T. Solomon, 71–92. Kampala: Fountain Publishers.
- Mangham, Lindsay J., Kara Hanson, and Barbara McPake. 2009. "How To Do (or Not to Do) ... Designing a Discrete Choice Experiment for Application in a Low-Income Country." *Health Policy and Planning* 24(2): 151–8.
- Manser, Marilyn and Murray Brown. 1980. "Marriage and Household Decision-Making: A Bargaining Analysis." *International Economic Review* 21(1): 31–44.
- Marcucci, Edoardo, Amanda Stathopoulos, Lucia Rotaris, and Romeo Danielis. 2011. "Comparing Single and Joint Preferences: A Choice Experiment on Residential Location in Three-Member Households." *Environment and Planning A: Economy and Space* 43(5): 1209–25.
- Mariel, Petr, Riccardo Scarpa, and Ainhua Vega-Bayo. 2018. "Joint Parental School Choice: Exploring the Influence of Individual Preferences of Husbands and Wives." *Regional Science and Urban Economics* 68: 23–35.
- Matovu, Joseph K. B., Fredrick Makumbi, Rhoda K. Wanyenze, and David Serwadda. 2017. "Determinants of Fertility Desire Among Married or Cohabiting Individuals in Rakai, Uganda: A Cross-Sectional Study." *Reproductive Health* 14(1): 1–11.
- McCarthy, Aine Seitz. 2019. "Intimate Partner Violence and Family Planning Decisions: Experimental Evidence from Rural Tanzania." *World Development* 114: 156–74.
- McCarthy, Nancy and Talip Kilic. 2017. "Stronger Together: Intra-Household Cooperation and Household Welfare in Malawi." Policy Research Working Paper No. 804, World Bank.
- McElroy, Marjorie B. and Mary Jean Horney. 1981. "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand." *International Economic Review* 22(2): 333–49.
- Meurs, Mieke and Rita Ismaylov. 2019. "Improving Assessments of Gender Bargaining Power: A Case Study from Bangladesh." *Feminist Economics* 25(1): 90–118.
- Munro, Alistair. 2014. *Hide and Seek: A Theory of Efficient Income Hiding within the Household (No. 14-17 Hide)*. Tokyo.

- Munro, Alistair. 2018. "Intra-Household Experiments: A Survey." *Journal of Economic Surveys* 32(1): 134–75.
- Myers, David G. and Helmut Lamm. 1976. "The Group Polarization Phenomenon." *Psychological Bulletin* 83(4): 602–27.
- Nyqvist, Martina Björkman and Seema Jayachandran. 2017. "Mothers Care More, But Fathers Decide: Educating Parents About Child Health in Uganda." *American Economic Review* 107(5): 496–500.
- Petursson, Jon Geir and Paul Vedeld. 2015. "The 'Nine Lives' of Protected Areas. A Historical-Institutional Analysis From the Transboundary Mt Elgon, Uganda and Kenya." *Land Use Policy* 42: 251–63.
- Qian, Nancy. 2008. "Missing Women and the Price of Tea in China: The Effect of Sex-Specific Earnings on Sex Imbalance." *Quarterly Journal of Economics* 123(3): 1251–85.
- Quisumbing, Agnes R. and John A. Maluccio. 2003. "Resources at Marriage and Intrahousehold Allocation: Evidence from Bangladesh, Ethiopia, Indonesia, and South Africa." *Oxford Bulletin of Economics and Statistics* 65(3): 283–327.
- Rasul, Imran. 2008. "Household Bargaining Over Fertility: Theory and Evidence from Malaysia." *Journal of Development Economics* 86(2): 215–41.
- Reggio, Iliana. 2011. "The Influence of the Mother's Power on her Child's Labor in Mexico." *Journal of Development Economics* 96(1): 95–105.
- Senderowicz, Leigh and Nicole Maloney. 2022. "Supply-Side Versus Demand-Side Unmet Need: Implications for Family Planning Programs." *Population and Development Review* 48(3): 689–722.
- Sieber, Janusch and René Ziegler. 2019. "Group Polarization Revisited: A Processing Effort Account." *Personality and Social Psychology Bulletin* 45(10): 1482–98.
- Sunder, Naveen. 2019. "Marriage Age, Social Status, and Intergenerational Effects in Uganda." *Demography* 56(6): 2123–46.
- Train, Kenneth E. 2003. *Discrete Choice Methods with Simulation*. Cambridge, MA: Cambridge University Press.
- Trinitapoli, Jenny and Sara Yeatman. 2018. "The Flexibility of Fertility Preferences in a Context of Uncertainty." *Population and Development Review* 44(1): 87–116.
- United Nations. 2019. "World Population Prospects 2019: Highlights." In *World Population Prospects 2019*. <http://www.ncbi.nlm.nih.gov/pubmed/12283219>.
- United Nations Children's Fund (UNICEF). 2021. "Child Marriage." UNICEF. <https://data.unicef.org/topic/child-protection/child-marriage/>.
- United Nations Development Programme (UNDP). 2019. "Gender Inequality Index (GII)." UNDP. Retrieved May 2021. <http://hdr.undp.org/en/content/gender-inequality-index-gii>.
- United Nations Population Fund (UNFPA). 2021. *State of World Population 2021*. New York: UNFPA Division for Communications.
- Van Hoyweghen, Kaat, Janne Bemelmans, Hendrik Feyaerts, Goedeke Van den Broeck, and Miet Maertens. 2023. "Small Family, Happy Family? Fertility Preferences and the Quantity–Quality Trade-Off in Sub-Saharan Africa." *Population Research and Policy Review* 42(85). doi:[10.1007/s11113-023-09828-5](https://doi.org/10.1007/s11113-023-09828-5).
- Westoff, Charles F. 2010. "Desired Number of Children 2000–2008." DHS Comparative Reports 25, USAID.
- World Bank. 2020. *World Development Indicators Databank*. Washington, DC: World Bank. <https://databank.worldbank.org/source/world-development-indicators>.
- Yeatman, Sara, Christie Sennott, and Steven Culpepper. 2013. "Young Women's Dynamic Family Size Preferences in the Context of Transitioning Fertility." *Demography* 50(5): 1715–37.

APPENDIX

DETAILED EXPLANATION OF THE THREE QUALITY ATTRIBUTES

The education attribute is defined as the share of children from the household that can complete lower secondary education. The attribute contains three levels: none, half, and all of the children. In both countries lower secondary education comprises four years (children ages 12–15 in Senegal, and 13–16 in Uganda), after which a certificate of completion is awarded. In Uganda, we consider private schools that charge high tuition fees, as focus group discussions pointed toward a very low quality of public schooling. In Senegal, we consider public schooling, as private schools are not available in rural areas. While no official tuition fees are charged in Senegalese public schools, costs remain high as children commute or stay overnight, books and school supplies are expensive, and informal “maintenance fees” are charged.

The nutrition attribute is defined as the number of days a week a household can eat a complete meal, including carbohydrates, proteins, and vegetables, for the main meal of the day. On the other days an incomplete meal is consumed (for example, only carbohydrates). The attribute consists of three levels: zero, four, and seven days a week. In Senegal, a very known local dish “thieboudienne” is taken as an example, which comprises rice, fish, and vegetables. In Uganda, a complete meal is defined as containing posho (maize meal) or matoke (green bananas), beans, and green leafy vegetables.

The healthcare attribute is defined as the quality of healthcare institute the household can consult when a child has a severe fever. The attribute contains three levels: low-quality, medium-quality, and high-quality. A low-quality healthcare institute is defined as a small healthcare facility, located in almost every rural community, with only a health worker or nurse present. Basic treatments can be performed using basic equipment (such as disinfecting wounds, applying bandages, and treating common pathologies, such as acute diarrhea or malaria), but diseases cannot be diagnosed. A medium-quality healthcare institute is operated by a larger staff of at least one nurse, one midwife and one assistant nurse. Medical equipment is more advanced and basic disease diagnosis is possible. In a high-quality healthcare facility, at least one doctor is stationed, often complemented by different specialists. Diagnosis and treatment of more complex or uncommon diseases are possible. The three quality attributes are similar in both countries but are adapted to the local context (for example, in Senegal low-quality healthcare is a “case de santé,” while in Uganda it is a “health center II facility”).

ATTRIBUTE NON-ATTENDANCE AND SCALE-HETEROGENEITY

As previous studies show that ignoring one or more attributes during the experiment could lead to biased estimates (Hensher, Rose, and Greene 2005; Hensher and Greene 2010; Hole, Kolstad, and Gyrd-Hansen 2013), we identify attribute non-attendance in the experiments with men and with women in Senegal⁷ by using the information on respondents’ attribute non-attendance statements. We test for scale heterogeneity in the region-specific experiments with men, women and couples, using the generalized multinomial logit model developed by Denzil G.

Fiebig et al. (2010). The results of the stated attribute non-attendance models are presented in Table A1 and the results of the models including scale heterogeneity are presented in Tables A2 and A3. The estimates of both the stated attribute non-attendance and the scale heterogeneity models are similar in magnitude, sign, and significance level compared to the estimates of the basic MXL model estimates. We therefore conclude that none of the models are sensitive to attribute non-attendance and scale heterogeneity and continue our analysis using the MXL models.

Table A1 Results of the attribute non-attendance analysis for the Senegal sample, individual experiments

	<i>Men experiment</i>		<i>Women experiment</i>	
	<i>Basic</i>	<i>SANA</i>	<i>Basic</i>	<i>SANA</i>
<i>Mean effects</i>				
Children	0.231*** (0.034)	0.257*** (0.039)	0.034 (0.032)	0.043 (0.034)
Children ²	-0.015*** (0.003)	-0.016*** (0.003)	-0.000 (0.002)	-0.001 (0.003)
Education half	1.820*** (0.113)	1.855*** (0.130)	1.732*** (0.111)	1.695*** (0.115)
Education all	3.070*** (0.136)	3.083*** (0.153)	2.890*** (0.133)	2.857*** (0.135)
Healthcare medium	0.733*** (0.095)	0.616*** (0.103)	0.581*** (0.082)	0.596*** (0.086)
Healthcare high	1.657*** (0.109)	1.513*** (0.115)	1.389*** (0.099)	1.384*** (0.103)
Nutrition half	1.820*** (0.112)	1.725*** (0.117)	1.834*** (0.115)	1.843*** (0.122)
Nutrition all	2.160*** (0.130)	2.004*** (0.135)	2.475*** (0.142)	2.488*** (0.150)
Ignored number of children ^a * Children		-0.123 (0.082)		-0.089 (0.102)
Ignored number of children ^a * Children ²		0.008 (0.006)		0.011 (0.008)
Ignored number of children ^a * Education half		0.002 (0.280)		0.454 (0.381)
Ignored number of children ^a * Education all		0.213 (0.323)		0.376 (0.525)
Ignored number of children ^a * Healthcare medium		0.704** (0.275)		-0.227 (0.278)
Ignored number of children ^a * Healthcare high		1.004*** (0.325)		0.023 (0.319)
Ignored number of children ^a * Nutrition half		0.684** (0.337)		-0.137 (0.302)
Ignored number of children ^a * Nutrition all		1.101*** (0.388)		-0.203 (0.302)

(Continued).

INTRAHOUSEHOLD DECISION MAKING AND FERTILITY CHOICES

Table A1 Continued.

	<i>Men experiment</i>		<i>Women experiment</i>	
	<i>Basic</i>	<i>SANA</i>	<i>Basic</i>	<i>SANA</i>
<i>Standard deviation</i>				
Children	− 0.029 (0.031)	− 0.007 (0.027)	0.001 (0.018)	0.004 (0.017)
Children ²	− 0.004** (0.002)	− 0.005*** (0.001)	− 0.002 (0.002)	− 0.001 (0.002)
Education half	0.475*** (0.143)	0.441*** (0.151)	− 0.383*** (0.140)	0.342** (0.159)
Education all	0.820*** (0.102)	0.835*** (0.102)	0.809*** (0.095)	0.803*** (0.103)
Healthcare medium	− 0.388*** (0.145)	0.391** (0.178)	0.017 (0.030)	0.040 (0.035)
Healthcare high	1.002*** (0.092)	0.911*** (0.082)	0.832*** (0.099)	0.825*** (0.102)
Nutrition half	− 0.469*** (0.123)	0.464*** (0.118)	0.555*** (0.118)	0.562*** (0.119)
Nutrition all	− 0.779*** (0.116)	0.732*** (0.124)	0.914*** (0.098)	0.910*** (0.097)
Ignored number of children ^a * Children		0.026 (0.032)		− 0.017 (0.019)
Ignored number of children ^a * Children ²		0.004 (0.003)		− 0.003 (0.003)
Ignored number of children ^a * Education half		0.179* (0.093)		0.019 (0.065)
Ignored number of children ^a * Education all		− 0.068 (0.139)		0.512 (0.542)
Ignored number of children ^a * Healthcare medium		− 0.205 (1.339)		− 0.358 (0.535)
Ignored number of children ^a * Healthcare high		1.098*** (0.349)		− 0.505 (0.427)
Ignored number of children ^a * Nutrition half		0.568* (0.324)		− 0.009 (0.053)
Ignored number of children ^a * Nutrition all		− 0.749** (0.298)		0.006 (0.040)
<i>N</i>	8,889	8,889	8,889	8,889
<i>AIC</i>	4163.323	4159.929	4214.294	4236.402
<i>BIC</i>	4276.804	4386.891	4327.775	4463.365
<i>Log likelihood</i>	− 2065.661	− 2047.965	− 2091.147	− 2086.201

Notes: Standard errors are reported between parentheses. ***, **, * denote significance at the 1, 5, and 10 percent levels, respectively. SANA = stated attribute non-attendance.

^aRespondent indicated to have ignored the attribute “number of children” after the completion of the individual choice experiment.

Table A2 Results of the scale heterogeneity analysis for the Senegal sample, individual and couples experiments

	<i>Men experiment</i>		<i>Women experiment</i>		<i>Couples experiment</i>	
	<i>Basic</i>	<i>Scale heterogeneity</i>	<i>Basic</i>	<i>Scale heterogeneity</i>	<i>Basic</i>	<i>Scale heterogeneity</i>
<i>Mean preferences</i>						
Children	0.231*** (0.034)	0.247*** (0.039)	0.034 (0.032)	0.041 (0.036)	0.180*** (0.035)	0.186*** (0.038)
Children ²	− 0.015*** (0.003)	− 0.016*** (0.003)	− 0.000 (0.002)	− 0.000 (0.003)	− 0.012*** (0.003)	− 0.012*** (0.003)
Education half	1.820*** (0.113)	2.025*** (0.154)	1.732*** (0.111)	1.963*** (0.152)	2.185*** (0.114)	2.351*** (0.145)
Education all	3.070*** (0.136)	3.377*** (0.216)	2.890*** (0.133)	3.288*** (0.216)	3.277*** (0.135)	3.501*** (0.167)
Healthcare medium	0.733*** (0.095)	0.826*** (0.121)	0.581*** (0.082)	0.706*** (0.099)	0.763*** (0.088)	0.836*** (0.100)
Healthcare high	1.657*** (0.109)	1.834*** (0.158)	1.389*** (0.099)	1.560*** (0.118)	1.716*** (0.104)	1.839*** (0.125)
Nutrition half	1.820*** (0.112)	2.017*** (0.158)	1.834*** (0.115)	2.106*** (0.172)	1.994*** (0.108)	2.140*** (0.130)
Nutrition all	2.160*** (0.130)	2.389*** (0.182)	2.475*** (0.142)	2.825*** (0.205)	2.415*** (0.127)	2.592*** (0.146)

36	<i>Standard deviation</i>						
	Children	− 0.029 (0.031)	0.050 (0.041)	0.001 (0.018)	− 0.025 (0.016)	0.052*** (0.018)	0.020 (0.034)
	Children ²	− 0.004** (0.002)	− 0.002 (0.004)	− 0.002 (0.002)	− 0.002 (0.003)	0.001 (0.002)	− 0.002 (0.002)
	Education half	0.475*** (0.143)	0.473*** (0.156)	− 0.383*** (0.140)	− 0.316 (0.211)	0.197 (0.169)	0.185 (0.257)
	Education all	0.820*** (0.102)	0.903*** (0.117)	0.809*** (0.095)	0.907*** (0.116)	0.792*** (0.113)	0.856*** (0.142)
	Healthcare medium	− 0.388*** (0.145)	0.534*** (0.141)	0.017 (0.030)	0.022 (0.069)	0.054 (0.107)	0.088 (0.158)
	Healthcare high	1.002*** (0.092)	1.093*** (0.111)	0.832*** (0.099)	0.942*** (0.115)	0.890*** (0.097)	0.986*** (0.109)
	Nutrition half	− 0.469*** (0.123)	0.494*** (0.151)	0.555*** (0.118)	0.569*** (0.150)	− 0.190 (0.186)	− 0.105 (0.495)
	Nutrition all	− 0.779*** (0.116)	0.852*** (0.130)	0.914*** (0.098)	0.982*** (0.114)	0.647*** (0.115)	0.681*** (0.129)
	τ		0.351*** (0.088)		0.406*** (0.073)		− 0.294*** (0.073)
	<i>N</i>	8,889	8,889	8,889	8,889	8,877	8,877
	<i>AIC</i>	4163.323	4158.340	4214.294	4201.538	3924.716	3917.546
	<i>BIC</i>	4276.804	4278.914	4327.775	4322.112	4038.175	4038.097
	<i>Log likelihood</i>	− 2065.661	− 2062.170	− 2091.147	− 2083.769	− 1946.358	− 1941.773

Notes: Standard errors are reported between parentheses. Significant differences are indicated with * $p < 0.1$; ** $p < 0.05$ or *** $p < 0.01$.

Table A3 Results of the scale heterogeneity analysis for the Uganda samples, individual and couples experiments

	<i>Men experiment</i>		<i>Women experiment</i>		<i>Couples experiment</i>	
	<i>Basic</i>	<i>Scale heterogeneity</i>	<i>Basic</i>	<i>Scale heterogeneity</i>	<i>Basic</i>	<i>Scale heterogeneity</i>
<i>Mean preferences</i>						
Children	0.119*** (0.037)	0.201*** (0.063)	0.237*** (0.038)	0.241*** (0.040)	0.133*** (0.036)	0.169*** (0.052)
Children ²	− 0.010*** (0.003)	− 0.016*** (0.005)	− 0.018*** (0.003)	− 0.019*** (0.003)	− 0.010*** (0.003)	− 0.012*** (0.004)
Education half	1.569*** (0.127)	2.282*** (0.301)	2.604*** (0.148)	2.682*** (0.178)	2.209*** (0.155)	2.864*** (0.320)
Education all	3.233*** (0.205)	4.757*** (0.533)	4.130*** (0.206)	4.299*** (0.302)	4.078*** (0.243)	5.508*** (0.677)
Healthcare medium	0.457*** (0.078)	0.515*** (0.115)	1.178*** (0.111)	1.221*** (0.132)	0.907*** (0.098)	1.129*** (0.155)
Healthcare high	0.795*** (0.088)	1.126*** (0.171)	1.447*** (0.109)	1.500*** (0.137)	1.161*** (0.101)	1.431*** (0.180)
Nutrition half	1.880*** (0.135)	2.989*** (0.357)	1.660*** (0.131)	1.718*** (0.176)	1.871*** (0.148)	2.668*** (0.396)
Nutrition all	2.204*** (0.164)	3.445*** (0.401)	1.818*** (0.154)	1.873*** (0.197)	2.025*** (0.169)	2.754*** (0.390)

<i>Standard deviation</i>						
Children	0.056 (0.035)	− 0.090** (0.036)	− 0.015 (0.020)	− 0.029 (0.023)	− 0.006 (0.027)	0.019 (0.054)
Children ²	0.004** (0.002)	− 0.005** (0.002)	− 0.009*** (0.001)	− 0.009*** (0.001)	− 0.003** (0.002)	− 0.003 (0.003)
Education half	1.175*** (0.166)	1.847*** (0.301)	− 1.129*** (0.126)	1.148*** (0.145)	1.540*** (0.174)	2.128*** (0.311)
Education all	1.952*** (0.142)	2.999*** (0.410)	1.955*** (0.170)	1.973*** (0.197)	2.154*** (0.153)	2.672*** (0.310)
Healthcare medium	0.264 (0.219)	− 0.700** (0.304)	0.400*** (0.121)	0.322* (0.194)	0.251 (0.215)	0.530** (0.226)
Healthcare high	0.731*** (0.154)	− 1.137*** (0.243)	0.338** (0.132)	− 0.326** (0.163)	0.377** (0.178)	0.248 (0.753)
Nutrition half	0.531** (0.207)	0.003 (0.243)	0.596*** (0.121)	0.577*** (0.118)	0.782*** (0.164)	− 0.428 (0.505)
Nutrition all	1.008*** (0.151)	1.236*** (0.276)	0.951*** (0.119)	0.967*** (0.136)	1.027*** (0.132)	1.228*** (0.187)
τ		− 0.800*** (0.111)		− 0.228 (0.144)		− 0.690*** (0.140)
<i>N</i>	9,000	9,000	9,000	9,000	9,000	9,000
<i>AIC</i>	4264.854	4205.566	3869.407	3867.936	3839.667	3810.621
<i>BIC</i>	4378.534	4326.351	3983.087	3988.721	3953.347	3931.406
<i>Log likelihood</i>	− 2116.427	− 2085.783	− 1918.703	− 1916.968	− 1903.833	− 1888.311

Notes: Standard errors are reported between parentheses. ***, **, * denote significance at the 1, 5, and 10 percent levels, respectively.