Son Preference and the Value of Daughters: A Social Norms Intervention in Georgia*

Ana Maria Munoz-Boudet
World Bank

Lourdes Rodriguez-Chammussy
World Bank

Mert Gumren
Koc University

December 24, 2019

Abstract

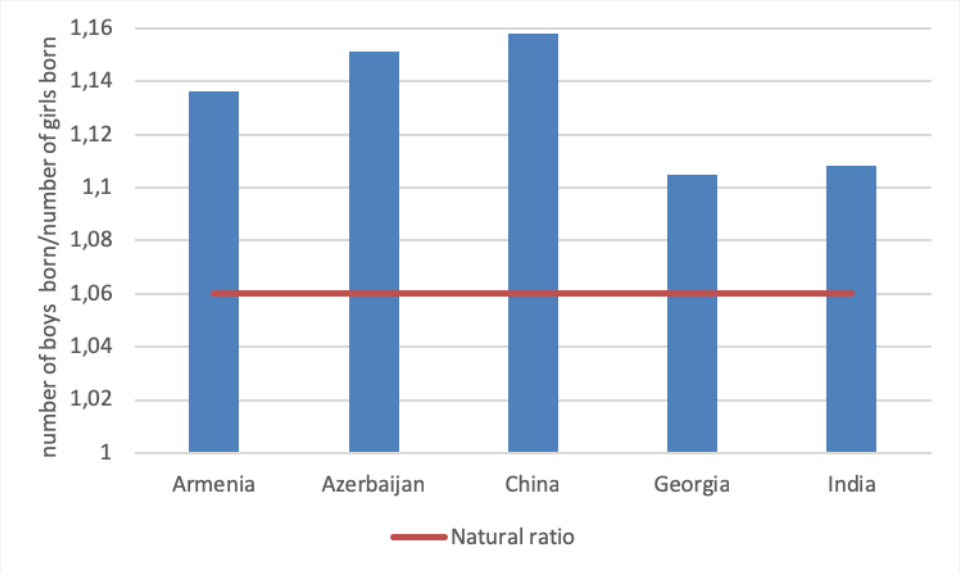
We test the effectiveness of a communication campaign in influencing parental perceptions associated with son preference leading to skewed sex ratios at birth. We measure attitudes changes regarding the value of sons and fertility preferences following the screening of a produced short entertaining movie highlighting the value of daughters to couples with non-completed fertility in a region of Georgia with skewed sex birth ratios. The randomized controlled trial finds mixed results when it comes to changes in preferences and son preference -measured using an Implicit Association Test, showing that these types of interventions are promising, but more research is required in the field.

*Acknowledgments: The research was conducted in conducted by the World Bank, UNFPA, and the National Center for Disease Control of Georgia (NCDC) with financial support from SIDA and the World Bank Umbrella Facility for Gender Equality. The team is also thankful to Lusine Yeremyan who supported the organization of the fieldwork, and to Christophe Guilmoto, Charles Efferson, Matthias Schief, and Sonja Vogt for their feedback and inputs, and Roberta Gatti, Victor Orozco for their valuable comments. The authors gratefully acknowledge research assistance by Shaon Lahiri and Benn Hogan. Corresponding author: Ana Maria Munoz-Boudet Email: amunozboudet@worldbank.org

1 Introduction

Son preference, while largely associated with India and China, is also prevalent in countries in the South Caucasus and the Balkans. Across all these countries, son preference manifests in skewed child sex ratios in favor of boys. Recent research from Georgia, and other South Caucasus countries, shows that parents' preference for sons has distorted the sex ratio at birth (number of boys born per 100 girls births) to levels above the expected natural sex ratio of 105 male births per 100 female births. In most contexts in the world, parents appear to want to ensure the birth of a son. Filmer et al. (2009) demonstrate using data from 64 countries that parents adapt their fertility (or childbearing) behavior to ensure the birth of a son. Altindag (2016) confirms this for Turkey to show that parents' decision about next birth is influenced by whether or not they already have sons. However, in some countries such as India, China and those of the South Caucasus region, parents act on the demand for sons not just by altering their fertility but also through prenatal sex selection. When sufficient number of couples acts this way, the sex ratio at birth, that is, the number of boys born per 100 girls born, increases above the natural ratio. Skewed sex ratios at birth in the South Caucasus countries increased dramatically since the 1990s, and are among the highest in the world with levels comparable to those in China and India. In the South Caucasus, the sex birth ratio around 2013 was at 1.13 boys per every girl born in Armenia, 1.15 boys per girl born in Azerbaijan, and at 1.10 boys per girl in Georgia.[1] Recent data on sex ratios at birth (SRBs) suggests an improving trend, however the pace of the change is slow and yearly trends have shown progress is not steady.

Figure 1: Sex ratios at birth in the South Caucasus, China and India (2013)



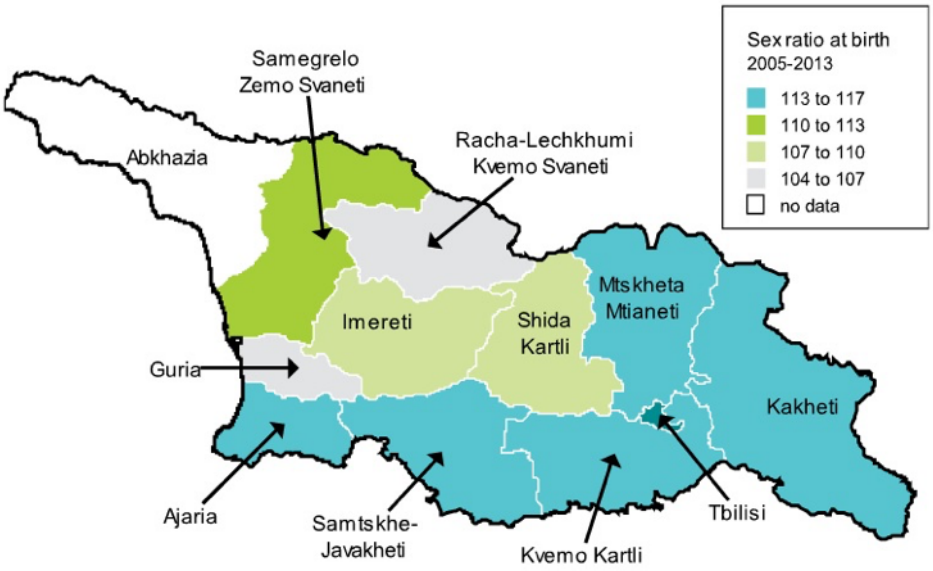
Source: World Bank Genderstats 2016

Country-level averages mask Georgia's notable regional variation in sex ratios at birth, with 8 out of 11 regions showing values above the natural level. Recently completed analysis pub-

[1] According to the 2014 census, in Georgia the rates were 1.09 boys per girl born. Administrative data reported by the National Statistics Office of Georgia for reports a ratio between 1.09 and 1.08 for the 2014-2018 period

lished by UNFPA using birth registration data (UNFPA 2019), shows that SRBs are as high as 1.14 in Ajara, 1.15 in Kakheti, 1.15 in Mtskheta- Mtianeti, and 1.16 in Kvemo Kartli and Samtskhe-Javakheti. All these regions are clustered around the Southern and Eastern most parts of the country's territory.

Figure 2: Sex ratios at birth by region



Taking advantage of the observed regional variation, this study tests the effectiveness of a pilot communication and advocacy campaign in altering parental perceptions about daughters in one of the Georgian regions with high levels of sex birth ratios.

The literature on media campaigns aimed at changing entrenched social preferences and attitudes has grown significantly in the past 10 years documenting the results of multiple studies designed to test the effectiveness of the use of means of public communication -media campaigns, distribution of booklets and printed information, public health campaigns, etc. A number of economics papers document causal effects of media exposure on social outcomes ranging from early marriage, risk behaviors, violence against women, fertility preferences, and female genital cutting, among others.[2] The evidence on the impacts of media-based interventions, such as TV programs, suggests that such medium, when acting on expectations and information to question the value of current norms, can affect preferences. This seems to be the channel by which exposure to cable TV shifted gender attitudes in India (Jensen and Oster, 2007), fertility in Brazil (La Ferrara et al., 2012), and teenage pregnancy in the US (Kearney and Levine, 2015) and Brazil (Cardoso and Verner, 2006), as well as family planning in Tanzania (Vaughan and Rogers, 2000). A similar design of the one used in the intervention evaluated in this paper, namely community broadcasts and discussions has proven successful in tackling risky sexual behavior in Nigeria (Banerjee et al., 2019), and female genital cutting (Vogt et al., 2016). However, when it comes to son preference, less has been documented of successful interventions

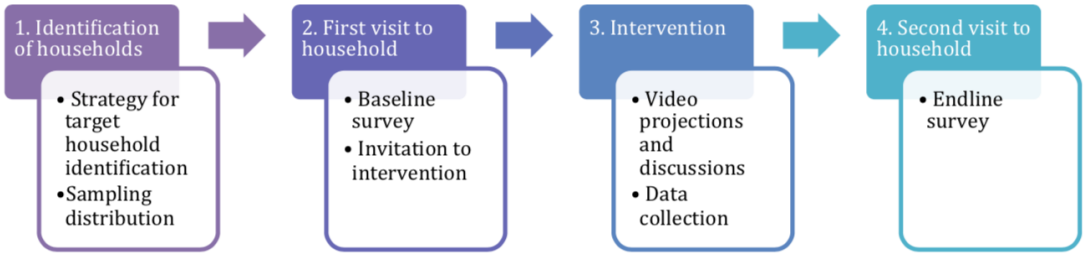
[2]Price and Dahl (2012) and DellaVigna and La Ferrara (2015) provide a review of studies focusing on the impact of media-based interventions on behavioral outcomes.

focusing on normative change using media [3]. The challenge comes partly because there are multiple factors behind son preference. Qualitative studies for the South Caucasus countries (Dudwick, 2015) suggest that sons have both an instrumental and a symbolic value for a household. Instrumentally, sons will be those to take care of, help, and stay close to parents. Symbolically, through them the family name will be carried, they'll contribute to the family's good reputation, and be a sign of the value of their father. While customs and norms surrounding the instrumental and symbolic role of sons and daughters can change, there is a paucity of evidence on interventions to change son preference by using media channels to change the relative value of women in a society vis-a-vis the value ascribed to sons (Gupta, 2015; Kumar and Sinha, 2018; Ma, 2014).

2 Evaluation Design

We implement and evaluate the study in four phases: Identification of the households, baseline survey, intervention (short movie screening and group discussions), and the endline survey. The selection of households is based on a simple inclusion criteria: have the presence of a married woman, whose husband has been in the household in the past 3 months, and that are between the age of 18-35. The baseline data collection, consisting of an individual questionnaire and an Implicit Association Test (IAT) takes place at the woman's home, on the same visit subjects are invited -verbally and via a paper invitation- to the movie screening that will occur three days later at the local school. When the invited participants come to the movie screening, they are divided into two groups: a control and treatment groups. Subjects in the treatment group watch the intervention movie and subsequent group discussions. Subjects in the control group watch a placebo movie, also followed by a group discussion. After the discussions individuals in both groups took another round of the IAT. Two weeks after the intervention, the endline survey was collected at the participants' households.[4]

Figure 3: Evaluation Design



We use a cluster design where the schools used for the movie showings are the units of randomization. Participant households were selected from a radius around the schools for a total of 50 clusters (meetings) across 9 locations in the Kakheti region. Table 1 shows the

[3] see Kumar and Sinha (2018) for a survey of policies and interventions in this regard

[4] The intervention took place on July 28-September 21 of 2017. Table **??** in Appendix A presents the dates of each data collection phase.

minimum number of meetings per municipality needed for the evaluation, and the actual number of meetings held each municipality. The minimum number of meetings for each municipality is proportional to the percentage of women between the ages of 18-35 living in that municipality relative to the total population of women in the Kakheti region.[5]. All participants that attended the movie screenings received a supermarket voucher [6]

2.1 Sampling and Identification of Households

For sampling we used the following criteria: As schools were the base for the sample, we first ranked all schools across each of the eight municipalities of Kakheti based on data provided by the Ministry of Science and Education of Georgia. Then, we selected the largest schools per municipality (8) plus Telavi City (the region capital) for a total of 50 schools (units), which were the ones than then hosted the intervention.[7] The number of schools chosen ranged from 3 in Telavi city to 9 in the municipality of Sagarejo.

Table 1: Number of Meetings in Each Municipality

Municipality	of Meetings
Telavi, City	3
Akhmeta	5
Gurjaani	8
Dedoplistskaro	3
Telavi	7
Lagodekhi	7
Sagarejo	9
Sighnaghi	4
Kvareli	4
Total	50

For household selection, we use data from the Statistical Office of Georgia for school addresses and area maps of the surrounding area. Households were selected based on a radius of 2 kilometers around the school. In order to identify participant households, key informants (from the public health center) presented a list of 15-20 potential participants based on their local area knowledge.[8] From this initial list, one household was randomly selected as the starting point, from which then households were added following on distance from the starting point to complete the number of households required per location. Subjects were included in the study if

[5]Details are given in the Appendix A.

[6]The amount of the voucher was of 25 Georgian Lari (8.7 USD)

[7]An additional criteria for selection of schools was language, as the study focused only on Georgian-speaking population (the region also includes Azeri speaking population), in the school selection by size 5 schools were replaced by the comparably middle size schools of Georgian language of instruction.

[8]The study data collection and intervention was implemented by the National Center for Disease Control of Georgia, which is a public institution dependent of the Ministry of Health.

they agreed to participate in all the three stages of the study (baseline, intervention and endline). Each study participant was also asked to indicate their knowledge of two or more 18-35 years old married women who also could be involved in the study. These were added at the end of the random list (if not in the list already), and visited until the expected number of households was completed.[9]

2.2 Movie Screenings and Group Discussions

The intervention is based on delivering messages to change attitudes and influence behaviors through a specially-produced movie that was presented at community movie screening. The intervention has as a focus shifting beliefs by acting on social norms, particularly aiming at relaxing sanctions to deviation and targeting the reported root causes -instrumental and symbolic- of the son preference norm. It builds on analysis of interactive norms such as Bicchieri's (2006, 2010), where, at the community level, there is a conditional preferences to follow the norm, based on a set of expectations regarding other's behaviors and expectations from others of one's own behavior; and the value of that norm -inasmuch as it is linked to individual identities and self-value. To this effect, an animated short movie was designed around the key messages which emphasize the value of daughters, and was used for the intervention.[10]

The intervention, consisting of the movie projection and group discussions took place three days after the baseline surveys, in the early evening (to allow for fathers to attend).[11] Only 595 (60.1%) of the baseline survey participants attended the intervention [12]. The main objective of the discussion was to cover participants' impressions of the video, their understanding of the key messages, and main problems articulated in the story, the issues that were missed from the story, and other impressions [13].

2.3 Instruments

We use two instruments to measure the changes in women's beliefs: an individual questionnaire and an Implicit Association Test, both were adapted from the tools used by Schief et al. (2019) in Armenia to measure son preference beliefs and behaviors. Both were applied before (baseline) and after (endline) the intervention. In the case of the questionnaire, 3 days before the intervention and 2 weeks after. The IAT was also applied 3 days before the intervention and immediately after the intervention, at the end of the session.

[9] for each planned meeting, at least 25 households were invited

[10] The film was 15 minutes long. It was designed in partnership with UNFPA and pre-tested with households participating in a qualitative study around son preference in a different region in Georgia. Screenshots from the short movie are given in Appendix A. The control group was shown a different animated movie, of similar duration but on an unrelated topic.

[11] Each group was composed of 5-6 people on average. The entire intervention had a planned duration of one hour, including both movie and group discussions. While the invitation was explicit to invite husbands to participate, very few of them participated (Annex 3).

[12] an estimated 20% attrition was planned at the invitation time

[13] The discussion session was facilitated by a moderator and there were notes on the discussions collected by an assistant moderator

2.3.1 Questionnaire

The questionnaire is constructed around three main outcome of interests: Attitudes/beliefs (value of sons/daughters), preferences (expectations regarding others, and once own behavior) and sanctions to deviations from expected behaviors (e.g. community views, scorn and masculinity). In addition, data is collected on household characteristics and demographics, actual and desired fertility for self and for children, son preference, abortion history and attitudes towards abortion, among others.

2.3.2 Implicit Association Test

In order to elicit women's implicit beliefs about sons and daughters we used a version of the Implicit Association Test (IAT) (Greenwald et al., 2003) -to measure attitudes and beliefs that people may be unwilling or unable to report if prompted directly to report about it. We used the version for son preference developed by Schief et al. (2019). We used a tablet-based measure that uses the same features of any traditional IAT, requiring that respondents rapidly categorize two target concepts with an attribute (e.g. in our case the concepts "family with two sons" and "family with two daughters" with positive attributes - "to flourish/to wither"-, such that easier pairings (faster responses) are interpreted as more strongly associated than more difficult pairings (slower responses). [14] [15]

3 Identification strategy and data

3.1 Identification strategy

The experiment design allow us to study the impact of the participation in the movie screening session on beliefs and future fertility preferences. To estimate the average treatment effect, we estimate a benchmark specification corresponding to equation (1):

$$Y_{imj1} = \beta T_{imj0} + \theta X'_{imj} + \delta_m + \epsilon_{imj1} \tag{1}$$

where Y_{imj1} is the outcome of interest for individual i who lives in municipality m, invited to screening session j in the follow-up survey (Time 1) and Y_{imj0} is the baseline (Time 0) value of the same variable. T_{imj0} is a dummy equal to 1 if the individual was assigned to the produced movie screening, and zero if the individual was assigned to the placebo movie at the time of the screening session. X'_{imj} is a vector of control variables measured at baseline that include age, education level, labor participation status, family composition and household income. δ_m denotes municipality fixed effects. Standard errors are clustered at the screening session level.

[14] The IAT's were programmed in OpenSesame, an open-source platform used primarily for programming psychology experiments, and were administrated using Samsung Galaxy tablets aided by headphones.The technical details about the tablets are given in the appendix.

[15] The Appendix includes detailed information on the design of the IATs, including the stimuli used and screenshots from the task.

The parameter β is an estimate of the average effect of the participation in the movie screening session.

We also test for heterogeneity in treatment effects by examining the interaction of treatment with a number of characteristics of the women measured at baseline. In order to do so, we estimate:

$$Y_{imj1} = \beta_0 T_{imj0} + \beta_1 Z_{imj0} + \beta_2 T_{imj0} Z_{imj0} + \theta X'_{imj} + \delta_m + \epsilon_{imj1} \quad (2)$$

where Z_{imj0} is the characteristic considered, for example, number and gender of children. β_2 estimates the difference in the effect of the treatment associated with the specific composition of existing children in the household. For instance, already having a boy.

3.2 Data and descriptive statistics

In total we surveyed 984 study participant women at baseline and 897 at follow up. Out of 984 participants 595 of them attended the movie screening, with a take-up rate for the invitation of 60.47%. Treatment and control groups were defined at the movie showing sessions, with 267 women assigned to the control group and 328 women assigned to treatment.

We first summarize some demographic variables for all the women who participated to the baseline survey (Table 2)[16]. The average age of our baseline sample is 29, while minimum and maximum age are 17 and 38 respectively. In terms of education level, 32.5% of the women have lower secondary or lower level of education, 33.9% have and upper secondary or vocational education and 33.5% have higher professional or higher level of education. Less than one third of the women participating in the study work for pay (29%). Women's average income corresponds to a monthly income around 600 GEL. We observe that 53.3% of the women's husbands are self-employed, 18.6% are in wage-employment, 15.8% work in agriculture and 12.3% of them are unemployed.

A high percentage of the women in the study live in an extended household (77%). We constructed a "decision-making power index" using women's answers to various survey questions (details in Appendix xx). 71.2% of women either make financial decisions jointly with their husbands or by themselves.

We next look at women's fertility outcomes and preferences. On average, women have 1.8 children. 64.6% of the women have at least one daughter and 67.7% have at least one son; 5% of women in the sample do not have any children. Children gender composition is as follows: 15.5% of women only have one son, 16.5% have only one daughter, 24.5% have 1 son and 1 daughter. Women on average want to have 1.6 children in the future. 62% of women in the sample want another children in the future, while 29% of them do not and 9% of them is undecided. 22.3% of women had an abortion and 26.6% had a natural miscarriage in the past.

[16]Table X in the annex includes descriptives for the full sample of women, including those that did not attend the treatment

Table 2: Baseline Descriptive Statistics

	Baseline Sample				
	mean	sd	min	max	count
Age	28.707	4.515	16.83	38.92	982
Works for pay	0.291	0.454	0.00	1.00	984
Education: Lower secondary or lower	0.325	0.469	0.00	1.00	984
Education: Upper secondary-vocational	0.339	0.474	0.00	1.00	984
Education: Higher professional or higher	0.335	0.472	0.00	1.00	984
Decision power (index)	7.301	1.528	0.00	8.00	984
Future fertility: Yes	0.617	0.486	0.00	1.00	984
Future fertility: No	0.292	0.455	0.00	1.00	984
Future fertility: Undecided	0.091	0.288	0.00	1.00	984
Desired number of children	1.570	0.801	1.00	6.00	607
Has a sister	0.569	0.495	0.00	1.00	984
Has a brother	0.665	0.472	0.00	1.00	984
Ratio of male siblings	0.559	0.462	0.00	3.00	903
Job: Unemployed	0.123	0.329	0.00	1.00	984
Job: Agriculture	0.158	0.364	0.00	1.00	984
Job: Self-employed	0.534	0.499	0.00	1.00	984
Job: Wage-employment	0.186	0.389	0.00	1.00	984
Has at least one son	0.677	0.468	0.00	1.00	984
Has at least one daughter	0.646	0.478	0.00	1.00	984
Has no child	0.046	0.209	0.00	1.00	984
Household size (excluding children and husband)	1.530	1.041	0.00	3.00	984
Extended family (binary)	0.770	0.421	0.00	1.00	984
Income: 400 GEL or less	0.325	0.469	0.00	1.00	984
Income: 401-800 GEL	0.368	0.482	0.00	1.00	984
Income: More than 800 GEL	0.307	0.461	0.00	1.00	984
Financial status: Low	0.193	0.395	0.00	1.00	685
Financial status: Middle	0.350	0.477	0.00	1.00	685
Financial status: High	0.457	0.499	0.00	1.00	685
Prefers next children to be a son	0.380	0.486	0.00	1.00	697
B: Son Preference Index	2.709	1.963	0.00	9.00	1012
Baseline D-score (IAT)	-0.215	0.415	-1.26	1.28	741

Sex ratios at birth: When it comes to sibling composition, 45 percent of households in the sample have two children, of which half have a son and a daughter, and for the additional 15 percent with three children, it is more likely that households have a higher share of boys than of girls. Table 3 shows the average sex ratios by birth order of children reported in the sample. Ratios are aligned with a slightly skewed ratio for first and second order births, and growing in magnitude for third and fourth order children. However, and as documented in Guilmoto (2017) when looking at the birth ratios following sex order (Table 3 that ratios are extremely skewed for the second and third order births.

Table 3: Sex ratios (boy/girl) by birth order

Birth order	Gender		Boy/girl ratio	Boy/girl ratio	
	Boy	Girl		Census	Birth Reg.
First child	490	449	**1.091**	XXX	XXX
	(%)	(%)			
Second child	330	301	**1.096**	XXX	XXX
	(%)	(%)			
Third or more children	120	102	**1.176**	XXX	XXX
	(%)	(%)			
Total	940	852	**1.10**	XXX	XXX
	(%)	(%)			

Table 4: Sex ratios (boy/girl) by number of children and birth order

	First child			Second child			Third child		
# of children	Boy	Girl	Ratio	Boy	Girl	Ratio	Boy	Girl	Ratio
1	142	158	**0.90**	-	-	-	-	-	-
	(47.33%)	(52.67%)		-	-	-	-	-	-
2	246	190	**1.29**	223	213	**1.05**	-	-	-
	(56.42%)	(43.58%)		(51.15%)	(48.85%)		-	-	-
3 or more	85	91	**0.93**	94	82	**1.15**	92	84	**1.09**
	(48.30%)	(51.70%)		(53.41%)	(46.59%)		(52.27%)	(47.73%)	

Abortion history and fertility stopping behavior: In the endline survey, we elicit detailed information about women's abortion history and beliefs about abortion. This part of the questionnaire performed privately by the women without the presence of the enumerator.[17] We report the descriptive statistics about abortion by using only the control sample, since these questions were asked after the treatment. X% of women report having natural miscarriage. X% of women reported having at least one abortion.

In our sample we observe son-biased fertility stopping. Table 5 shows the effect of first born son and second born son on women's likelihood of having more than 2 children.

[17]The list of questions in the private questionnaire is given in Appendix X.

Table 5: Fertility stopping behavior

	More than 2 children (>2)	
	(1)	(2)
First child: boy	-0.335**	-1.194***
	(0.17)	(0.24)
Second child: son	0.124	-0.659**
	(0.21)	(0.29)
First child: boy x Second child: is boy		1.591***
		(0.33)
Constant (both children are girls)	-0.802***	-0.439**
	(0.20)	(0.20)
N	628	628

Note: * p<0.10, ** p<0.05, *** p<0.01. We report the beta

Balance between treatment and control: At baseline we detect no significant differences in personal and household characteristics for women assigned to treatment and control. As shown in table 17 overall the sample is balanced across control and treatment groups in terms of age, number of children, income, working status, and women's future decision to give birth, desired number of future children and gender preference for a future child. Our measures of implicit and explicit son bias are not significantly different between control and treatment ($p = 0.634$) [18]. In terms of stated fertility preferences, the percentage of women who prefer their next children to be a son is not significantly different between the control and treatment groups (40% in control, 36% in treatment, $p = 0.5239$, Mann-Whitney test).

[18] Kolmogorov-Smirnov test for equality of distribution functions show that the distributions of the D scores are not significantly different across treatment and the control.

Table 6: Balance Table

	Control			Treatment			
	n	mean	sd	n	mean	sd	Diff
Age	267	29.08	4.54	320	28.70	4.56	-0.386
Works for pay	267	0.30	0.46	321	0.23	0.42	-0.070**
Education: Lower secondary or lower	267	0.33	0.47	321	0.36	0.48	0.029
Education: Upper secondary-vocational	267	0.37	0.48	321	0.34	0.48	-0.024
Education: Higher professional or higher	267	0.30	0.46	321	0.30	0.46	-0.004
Decision power (index)	267	7.11	1.80	321	7.34	1.50	0.224
Future fertility: Yes	267	0.63	0.48	321	0.61	0.49	-0.015
Future fertility: No	267	0.31	0.47	321	0.30	0.46	-0.019
Future fertility: Undecided	267	0.06	0.24	321	0.09	0.29	0.034
Desired number of children	167	1.63	0.84	196	1.57	0.77	-0.062
Has a sister	267	0.57	0.50	321	0.57	0.50	0.004
Has a brother	267	0.72	0.45	321	0.68	0.47	-0.033
Ratio of male siblings	245	0.57	0.42	296	0.58	0.49	0.012
Job: Unemployed	267	0.09	0.28	321	0.13	0.33	0.042
Job: Agriculture	267	0.15	0.36	321	0.20	0.40	0.046
Job: Self-employed	267	0.56	0.50	321	0.53	0.50	-0.025
Job: Wage-employment	267	0.21	0.41	321	0.14	0.35	-0.063*
Has at least one son	267	0.66	0.47	321	0.70	0.46	0.042
Has at least one daughter	267	0.67	0.47	321	0.65	0.48	-0.019
Has no child	267	0.06	0.23	321	0.04	0.20	-0.013
Household size (excluding children and husband)	267	1.46	1.03	321	1.61	1.03	0.157*
Extended family (binary)	267	0.76	0.43	321	0.79	0.40	0.034
Income: 400 GEL or less	267	0.30	0.46	321	0.36	0.48	0.062
Income: 401-800 GEL	267	0.40	0.49	321	0.33	0.47	-0.067
Income: More than 800 GEL	267	0.30	0.46	321	0.31	0.46	0.006
Financial status: Low	192	0.21	0.41	232	0.23	0.42	0.015
Financial status: Middle	192	0.37	0.48	232	0.32	0.47	-0.047
Financial status: High	192	0.42	0.49	232	0.45	0.50	0.032
Prefers next children to be a son	183	0.38	0.49	226	0.35	0.48	-0.029
B: Son Preference Index	267	2.93	2.01	328	2.72	1.98	-0.203
Baseline D-score (IAT)	208	-0.22	0.43	236	-0.21	0.40	0.010

Note: * p<0.10, ** p<0.05, *** p<0.01. We report the beta

3.3 Fertility

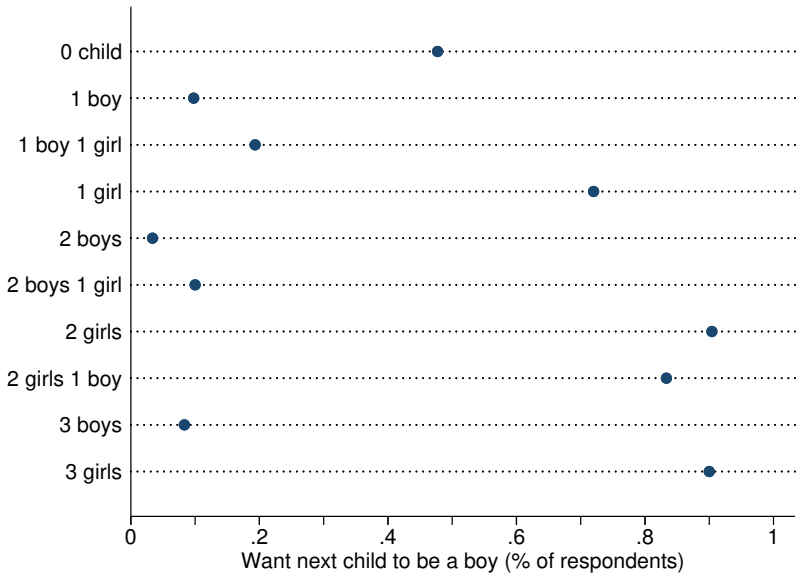
We first look at fertility, both actual and future desired one, following a range of possible answers, starting by directly capturing women's stated fertility preferences, their explicit son bias, and their implicit one.

3.4 Stated Fertility Preferences

Two questions in the survey elicit participants' own future fertility preferences: "Would you like to have another child in the future?", and, if yes or undecided, "what sex would they like for that next child to be?", with the response option to be undecided about preference on the sex of the potential future child. 61.7% of respondents want children in the future, and an additional 9.1% is undecided. Among those that want more children we capture a daughter preference, with 61.6% choosing a girl for their future child. However, this preference is strongly correlated

with the existing gender composition of the respondent's children, with women with one or more daughters having a stronger willingness to have a son, and for those without children having no specific preference for one sex or the other (see Figure 4) Overall, we see no openly stated son preference beyond balance ideals to be expected based on the existing number and sex of children in the family.

Figure 4: Son preference across different family compositions



Following Schief et al. (2019) we build a son preference index, focusing on the preferred composition of the family of their oldest (or only) child. This disentangles preferences for own fertility from existing child composition -as future grandchildren do not yet exist- and allow us to assess whether women state son preference for the family of their children.[19] The index takes values between 0 to 9, where 9 implies the highest level of son bias. In our sample the mean value of the index is 2.7. The distribution of the son preference index is given in 5.

[19]The scoring algorithm assigns one point whenever the respondent (a) wants the first child of their oldest child to be a boy, (b) wants more boys than girls, or (c) wants all children to be boys (for more details see Schift et al.(2019)

Figure 5: Histogram of the son preference index

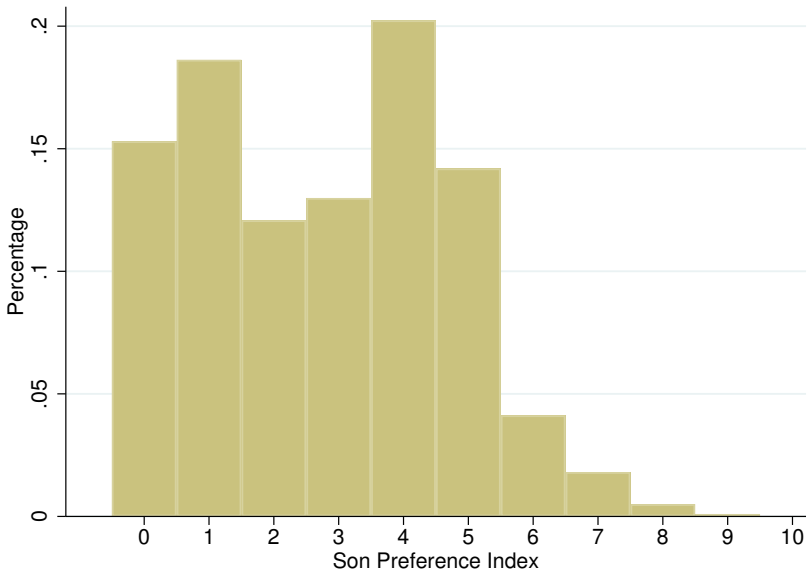


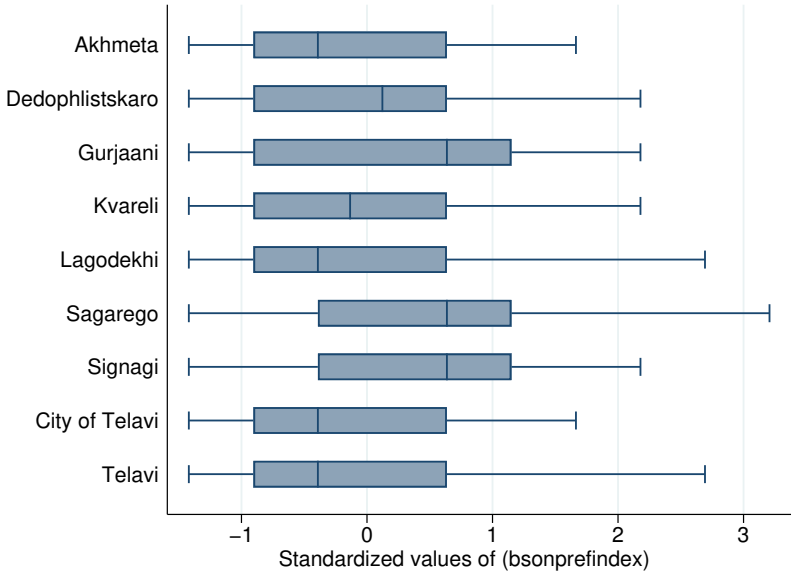
Table 7 shows the correlates of our measure of explicit son preference. We observe that son preference is correlated with women's education level, where higher educated women are less likely to prefer sons over daughters. Having at least one son increases the preference over families with sons, and having at least one daughter decreases this preference.

Table 7: Correlates of son preference index

	(1)	(2)	(3)
Age	-0.014	-0.015	-0.015
	(0.01)	(0.01)	(0.01)
Works for pay	-0.037	-0.043	-0.038
	(0.13)	(0.13)	(0.13)
Decision power (binary)	-0.153	-0.157	-0.135
	(0.24)	(0.25)	(0.24)
Education: Upper secondary-vocational	-0.526***	-0.529***	-0.540***
	(0.19)	(0.19)	(0.19)
Education: Higher professional or higher	-0.595**	-0.587**	-0.626***
	(0.23)	(0.23)	(0.23)
Has a sister	-0.281	-0.281	-0.262
	(0.23)	(0.23)	(0.23)
Has a brother	-0.246	-0.243	-0.221
	(0.20)	(0.20)	(0.20)
Has both sister and brother	0.061	0.060	0.029
	(0.29)	(0.29)	(0.29)
Has at least one daughter	-0.287*	-0.281*	-0.284*
	(0.15)	(0.15)	(0.15)
Has at least one son	0.282**	0.285**	0.284**
	(0.14)	(0.14)	(0.14)
Job: Agriculture		-0.032	-0.049
		(0.22)	(0.22)
Job: Self-employed		0.086	0.075
		(0.20)	(0.20)
Job: Wage-employment		0.038	0.050
		(0.22)	(0.22)
Extended family (binary)			0.637**
			(0.28)
Household size (excluding children and husband)			-0.189
			(0.11)
N	979	979	979

We also observe heterogeneity in son bias across the different municipalities in the sample, with the highest son preference being observed in Gurjaani, Sagarego, and Signagi.

Figure 6: Distribution of explicit son preference index across different municipalities



If we look at the set of questions that make the son preference index, we can see a stronger son preference for the sex of the first child of their oldest child, with 57.6 percent of respondents preferring a son for their first grandchild (table 8) . For a second grandchild preferences balance towards a child of the opposite sex of the first one (a daughter following a son and a son following a daughter), while for the third order birth we see a lot of heterogeneity, but with 60.3 percent of respondents choosing girls as long as a boy has been secured in any of the preceding two births.

Table 8 show the percentage of women who prefer son for their oldest or only child. There is an interesting pattern here, we observe a son preference usually in the gender of the first grandchildren which has significantly higher son preference than late order children. 58% of women prefer their grandchild to be a boy if their son have only one child. 52% of women prefer their first born grandchild to be a boy, while 46% prefer the second born grandchild to be a boy (difference is significant at 10% level). However, the percent of women who prefer son is not significantly different than 50% in the for the first grandchild ($p = 0.3322$). When the number of hypothetical grandchildren is 3, we observe that the son preference is 53%, 38% and 38% for the first, second and the third grandchild respectively.

So the percentage of women who prefer son for the first born grandchild is significantly higher than for the later born grand children (both second and third born child, significant at the 1% level). Lastly, son preference is 52% for the first born child in the hypothetical case of having 4 grandchildren. This number is significantly different than son preference for the second and fourth born child, but not the third child ($p = 0.000$, $p = 0.1357$, $p = 0.0273$ respectively for second, third and fourth order child).

Table 8: Sex ratios implied by the hypothetical questions about future grandchildren

	First child			Second child			Third child			Fourth child		
# of children	Boy	Girl	Ratio	Boy	Girl	Ratio	Boy	Girl	Ratio	Boy	Girl	Ratio
1	553	403	**1.37**	-	-	-	-	-	-	-	-	-
	(57.85%)	(42.15%)		-	-	-	-	-	-	-	-	-
2	493	463	**1.06**	444	512	**0.87**	-	-	-	-	-	-
	(51.57%)	(48.43%)		(46.44%)	(53.56%)		-	-	-	-	-	-
3	507	449	**1.13**	360	596	**0.60**	361	595	**0.60**	-	-	-
	(53.03%)	(46.97%)		(37.66%)	(62.34%)		37.76	62.24		-	-	-
4	493	463	**1.65**	391	565	**0.69**	460	496	**0.93**	432	524	**0.82**
	(51.57 %)	(48.43%)		(40.90 %)	(59.10%)		(48.12%)	(51.88%)		(45.19%)	(54.81%)	

Figure 7: Preferred gender compositions for families with two children

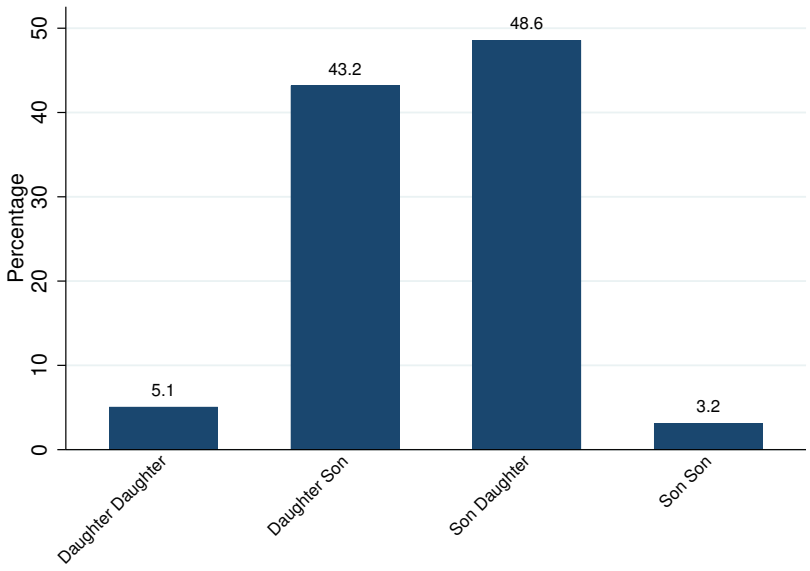


Figure 8: Preferred gender compositions for families with three children

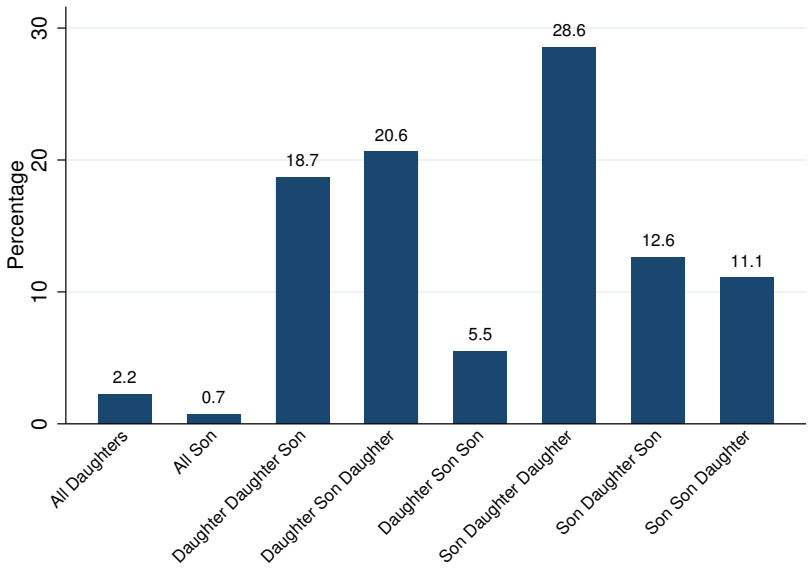
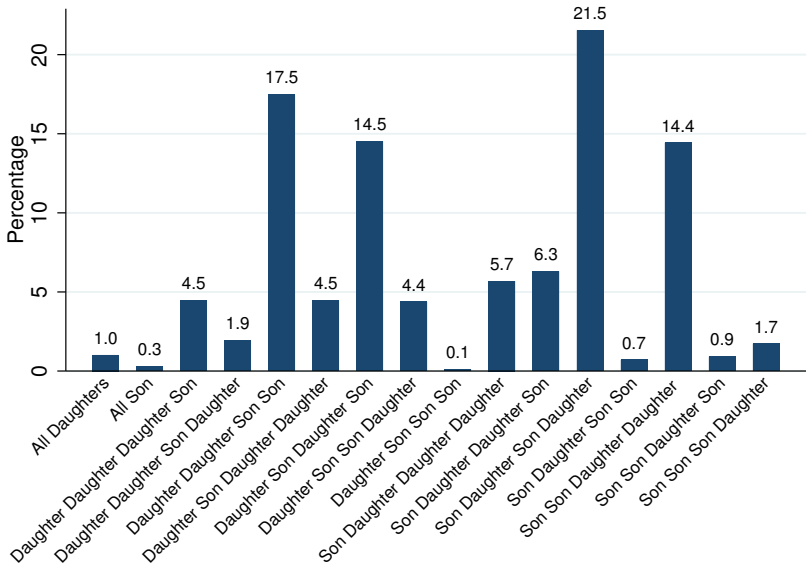


Figure 9: Preferred gender compositions for families with four children



3.5 Implicit Son Bias

Following on the explicit preference for sons or daughters, we elicit implicit -non-revealed- preferences via an IAT and estimate the D score, that is typically reported as a measure of association. D scores are distributed on the interval [-2; 2], where a negative score indicates an association between negative words with daughters and positive words with sons. Details about the design of the IAT and the algorithm to compute D scores are provided in Annex B.

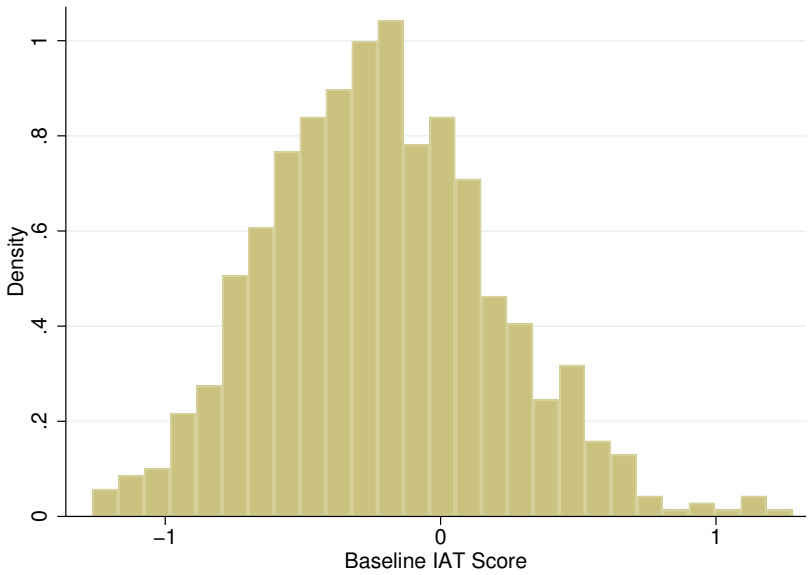
Figure 10 shows the distribution of the D scores for the baseline IAT. The distribution of the scores is close to a normal distribution, with a median of -0.24. 28.1% of the IAT scores being greater than 0 show that more than one quarter of women in our sample have some degree of positive attitude towards family with boys, while having negative attitudes towards family with girls. However, for the 708 observations in the baseline IAT the mean value of the D score is -0.22, which suggest that the average women in our sample does not positively associate family with sons and positive words. Rather, there is a slight positive association between families with daughters and positive words.

These results are in line with the findings in Schief et al. (2019) for women in three regions of Armenia. Their findings show similar values of IAT's D score for women and large differences in son bias within households, with husbands tending to have markedly stronger son biases than their wives, and generally their mothers.

Table 9: Correlates of implicit bias

	(1)	(2)	(3)
Age	-0.000	-0.000	-0.000
	(0.00)	(0.00)	(0.00)
Works for pay	0.026	0.023	0.025
	(0.03)	(0.03)	(0.03)
Decision power (binary)	-0.002	-0.003	0.001
	(0.04)	(0.04)	(0.04)
Education: Upper secondary-vocational	-0.015	-0.017	-0.020
	(0.04)	(0.04)	(0.04)
Education: Higher professional or higher	-0.083*	-0.081*	-0.087*
	(0.05)	(0.05)	(0.05)
Has a sister	0.009	0.010	0.010
	(0.05)	(0.05)	(0.05)
Has a brother	0.002	0.005	0.005
	(0.05)	(0.05)	(0.05)
Has both sister and brother	-0.024	-0.024	-0.025
	(0.06)	(0.06)	(0.06)
Has at least one daughter	-0.010	-0.009	-0.010
	(0.04)	(0.04)	(0.04)
Has at least one son	0.056*	0.057*	0.057*
	(0.03)	(0.03)	(0.03)
Job: Agriculture		0.002	0.001
		(0.06)	(0.06)
Job: Self-employed		0.037	0.037
		(0.05)	(0.05)
Job: Wage-employment		0.025	0.028
		(0.06)	(0.06)
Extended family (binary)			0.062
			(0.06)
Household size (excluding children and husband)			-0.015
			(0.03)
Constant	-0.214*	-0.238*	-0.266*
	(0.12)	(0.13)	(0.14)
N	725	725	725

Figure 10: Histogram for D Score in the Baseline



The implicit son preference bias captured in the IAT is strongly correlated with the explicit preference captured in the son preference index - see Table 10, however, having a first born son, while it has an effect of women's son preference index, it doesn't affect their implicit bias towards sons (Table 11).

Table 10: Correlation between implicit and explicit son preference measures

	(1) Son Preference Index	(2) Son Preference Index	(3) Son Preference Index
Baseline D-score (IAT)	0.665***	0.669***	0.605***
	(0.19)	(0.19)	(0.18)
Children composition FE		✓	✓
Municipality FE			✓
N	731	705	705

Note: * p<0.10, ** p<0.05, *** p<0.01. OLS regressions, dependent variable is whether the women prefers a boy or not. Standard errors are clustered at the school (meeting) level.

Table 11: Relation between first child sex on woman's implicit and explicit bias behavior

	Implicit bias		Son Preference Index	
	(1)	(2)	(3)	(4)
First child: boy	0.044	0.044	0.602***	0.667***
	(0.03)	(0.03)	(0.13)	(0.13)
N	690	690	936	936

We are to assume that explicit and implicit son bias shape woman's fertility behavior. Specifically by (1) son bias affecting the gender of the last born child, and (2) by affecting the desire to have another child in the future.

Inasmuch as women and their partners might have a son preference, the gender of their last child (only or the youngest child) might be a result of sex biased fertility decision, including pregnancy interruption or the stopping rule (where families might decide not to have more children after a son is born). While we assume most women in our sample have not yet achieved their desired number of children, we look at whether, for those with a child the sex of their last child correlates with their revealed son preference. Table 12 shows that women with higher son bias are more likely to have a son as the youngest child -significant only at 10%. For women who already have a daughter we can see a significantly different son preference for a future child than for those with sons (Table 13). While the sex of their last child might affect women's son preference, the son preference index is driven by the sex of the first born child (which might be considered as exogenous shock-except for the cases where selection was used).

Table 12: Gender of the last child

	Last child is a boy			
	(1)	(2)	(3)	(4)
Baseline D-score (IAT)	0.209	0.196		
	(0.21)	(0.20)		
B: Son Preference Index			0.046*	0.054*
			(0.03)	(0.03)
Municipality FE		✓		✓
N	689	689	933	933

Table 13: Effect of son bias on the willingness to have a child in the future

	Wants a child in the future (=yes)					
	(1)	(2) Has daughter	(3) Has son	(4)	(5) Has daughter	(6) Has son
B: Son Preference Index	-0.004	0.030***	-0.012	0.008	0.043***	-0.009
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Family composition FE				✓	✓	✓
Municipality FE				✓	✓	✓
N	981	318	663	950	315	635

3.6 Social Norms

As a social behavior, son preference can be understood as a social norm. It is a behavior driven by beliefs about how households in the reference group -in this case, the community and region- typically behave or how a member of the group ought to behave (Bicchieri 2006). We follow (Bicchieri, 2005) by identifying the personal normative beliefs (what the person thinks), social empirical expectations (what they perceive happens in their community), and social normative expectations (what they think others in the community think or believe). For the case of son preference, we look at the participant's beliefs about what people in their country thinks and

does, in their reference group (community, neighbourhood), themselves, and their partners in relation to positive and negative views that shape son preference.

We aggregate all questions on social norms in four indices: a social normative expectations one (SNE), a social empirical expectations index (SEE), a personal normative beliefs index (PNB), and an individual husband normative beliefs index (IHNB), table **??** in the annex summarizes the set of questions used to construct the indices. Table 2 presents the indices values at baseline. We see no difference between treatment and control groups at baseline. However, we see variation of norms between communities (aggregated at the municipality level). As expected, there was substantial intra-community correlation for the social normative expectations index (SNE) for son preference at baseline (approximately 23 percent).

4 Results

We look at the effect of movie treatment on women's implicit and explicit son preferences, attitudes, and beliefs. We run the benchmark specification described in equation (1) for the outcome variables of interest: son preference index, social norms and implicit son bias as measured by the IAT.

4.1 Treatment Effects on Explicit and Implicit Son Preference

Table 14 shows the treatment effect on the son preference index. We see that the treatment effect is significant at 5 percent level after controlling for baseline son preference index and municipality fixed effects.

Table 14: Treatment Effects on Son Preference Index

	(1)	(2)	(3)
	E: Son Preference Index	E: Son Preference Index	E: Son Preference Index
Treatment	0.323*	0.417**	0.362**
	(0.18)	(0.16)	(0.16)
B: Son Preference Index		0.465***	0.419***
		(0.04)	(0.04)
First born: son			0.664***
			(0.16)
Municipality FE			✓
N	595	595	559

Note: * p<0.10, ** p<0.05, *** p<0.01. OLS regressions, dependent variable is the son preference index. Standard errors are clustered at the school (meeting) level.

We next look at the treatment effect on women's implicit beliefs about families with two sons and two daughters. We calculate D-scores based on the algorithm in Greenwald et al. (2003). D-scores are distributed between [-2, 2] and higher score implies higher son bias (score of 0 means no bias). In addition to the main D-score we calculate two transformed version of the D-score, based on Schief et al. (2019). Formulas for the two transformed versions of the D-score is given below:

$$D^{transformed_1} = sgn(D) \cdot D^2$$

$$D^{transformed_2} = sgn(D) \cdot \sqrt{sgn(D) \cdot D}$$

The first transformation emphasizes the differences in the tails of the distribution, and the second transformation emphasizes the differences around zero. Table 15 shows the effect of the treatment on different versions of the D-score. We find a treatment effect on the unadjusted D-score ($p < 0.10\%$, column 1), however this is not strongly statistically significant. The treatment effect on the D-score is stronger and significant only with the transformed D-score ($p < 0.05\%$, column 2). [20]

Table 15: Treatment effect on implicit son bias

	(1) D	(2) $D^{transformed\_1}$	(3) $D^{transformed\_2}$
Treatment	-0.060*	-0.044**	-0.062
	(0.03)	(0.02)	(0.05)
First born: son	-0.020	-0.009	-0.017
	(0.04)	(0.03)	(0.05)
Municipality FE	✓	✓	✓
N	401	401	401

Note: * p<0.10, ** p<0.05, *** p<0.01.OLS regressions, dependent variable is the D score in the endline IAT. Standard errors are clustered at the school (meeting) level.

[20] Appendix X shows the results where baseline D-scores are used as control. These results indicate that the effect of the intervention on implicit son bias may take place mainly for individuals with stronger initial implicit son bias. These results need to be taken with caution given that the number of observations drops significantly because of unmatched data between first and second observations of the IAT.

4.2 Treatment effect on Social Norms

Table 16: Treatment effect on social norms

	(1) SNEindex	(2) SEEindex	(3) PNBindex	(4) IHNBindex
Treatment	0.074**	0.102	0.164***	0.031
	(0.03)	(0.10)	(0.05)	(0.08)
Baseline SNE Index, z-score	0.401***			
	(0.05)			
Baseline SEE Index, z-score		0.399***		
		(0.05)		
Baseline PNB Index, z-score			0.292***	
			(0.05)	
Baseline IHNB Index, z-score				0.476***
				(0.05)
Municipality FE	✓	✓	✓	✓
N	553	553	553	553

Note: * p<0.10, ** p<0.05, *** p<0.01. OLS regressions, dependent variable is the son preference index. Standard errors are clustered at the school (meeting) level.

5 Discussion and Conclusion

This study aimed at providing evidence about the effectiveness of a pilot communication and advocacy campaign in altering parental perceptions about the value of daughters and thereby contribute to the existing evidence base on what works to address son preference and accompanying skewed sex ratios at birth.

Recent research from Georgia, and other South Caucasus countries, shows that parentsâ preference for sons is distorting the number of boys born per 100 girl births (sex ratio at birth). Recent data on sex ratios at birth (SRBs) suggests an improving trend, however the pace of the change is slow and yearly trends have shown progress is not steady. Although on average Georgia displays a lower SRB than other South Caucasus countries, it has notable regional variation in these ratios.

This intervention is based on a behavioral approach to the phenomenon and the idea that social meanings and norms, and the social networks that individuals form, pull them toward certain frames and patterns of collective behavior. The local context in Georgia offered the opportunity of investigating differentiated impacts in regions where there may be a critical mass of individuals acting as change agents in comparison to regions where social norms are still very entrenched.

The intervention aimed at introduced parents and prospective parents to a âtargetedâ communications intervention, namely a short movie on the issue of son preference, followed by a discussion on impressions on the movie. Our sample consists of women of an average age of 29 of which the majority have an incomplete desired fertility.

We look at the effect of movie treatment on womenâs implicit and explicit son preferences,

attitudes, and beliefs as measured by three outcome variables: son preference index, social norms and implicit son bias as measured by the IAT.

Our findings suggest that there is margin to raise the value of daughters through communication campaigns that contrast personal and social normative beliefs. Our results show that change in attitudes mostly takes place through a change in personal normative beliefs, and in some measure through social normative expectations.

One of the limitations of the study is the inability to reach fathers and other individuals that may have a strong role in the forming process of son preferences (i.e. grandparents, mother-in-law). The fact that our intervention focused on mothers and prospective mothers For instance, findings by Schief et al. (2019) show find higher values in their measures of son preference among husbands and mothers-in-law and point to the importance of advocacy campaigns reaching them as potential change agents.

References

Altindag, Onur. "Son preference, fertility decline, and the nonmissing girls of Turkey." *Demography* 53 (2016): 541–566.

Banerjee, Abhijit, Eliana La Ferrara, and Victor H Orozco-Olvera. 2019 "The entertaining way to behavioral change: Fighting HIV with MTV.".

Bicchieri, Cristina. *The grammar of society: The nature and dynamics of social norms*. Cambridge University Press, 2005.

Cardoso, Ana Rute and Dorte Verner. "School drop-out and push-out factors in Brazil: The role of early parenthood, child labor, and poverty." (2006).

DellaVigna, Stefano and Eliana La Ferrara. "Economic and social impacts of the media." *Handbook of media economics*. . Volume 1 . Elsevier, 2015. 723–768.

Dudwick, Nora. ""Missing Women" in the South Caucasus." (2015).

Filmer, Deon, Jed Friedman, and Norbert Schady. "Development, modernization, and childbearing: The role of family sex composition." *The World Bank Economic Review* 23 (2009): 371–398.

Greenwald, Anthony G, Brian A Nosek, and Mahzarin R Banaji. "Understanding and using the implicit association test: I. An improved scoring algorithm.." *Journal of personality and social psychology* 85 (2003): 197.

Gupta, Monica Das. *"Missing Girls" in the South Caucasus Countries: Trends, Possible Causes, and Policy Options*. The World Bank, 2015.

Jensen, Robert and Emily Oster. The power of TV: Cable television and women's status in India. Technical report, National Bureau of Economic Research, 2007.

Kearney, Melissa S and Phillip B Levine. "Media influences on social outcomes: The impact of MTV's 16 and pregnant on teen childbearing." *American Economic Review* 105 (2015): 3597–3632.

Kumar, Sneha and Nistha Sinha. *Preventing More âMissing Girlsâ: A Review of Policies To Tackle Son Preference*. The World Bank, 2018.

La Ferrara, Eliana, Alberto Chong, and Suzanne Duryea. "Soap operas and fertility: Evidence from Brazil." *American Economic Journal: Applied Economics* 4 (2012): 1–31.

Ma, Li. "Economic crisis and womenâs labor force return after childbirth: Evidence from South Korea." *Demographic Research* 31 (2014): 511–552.

Price, Joseph and Gordon B Dahl. "Using natural experiments to study the impact of media on the family." *Family Relations* 61 (2012): 363–373.

Schief, Matthias, Sonja Vogt, and Charles Efferson. "The Structure of Son Bias in Armenia: From Implicit Associations to Explicit Behavior." *Available at SSRN* (2019).

Vaughan, Peter W and Everett M Rogers. "A staged model of communication effects: Evidence from an entertainment-education radio soap opera in Tanzania." *Journal of health communication* 5 (2000): 203–227.

Vogt, Sonja, Nadia Ahmed Mohmmed Zaid, Hilal El Fadil Ahmed, Ernst Fehr, and Charles Efferson. "Changing cultural attitudes towards female genital cutting." *Nature* 538 (2016): 506.

A Appendix

A.1 Descriptives of full sample (intent to treat)

Table 17: Balance Table (control group includes the subjects who did not participate)

	Control			Treatment			
	n	mean	sd	n	mean	sd	Diff
Age	662	28.71	4.50	320	28.70	4.56	-0.386
Works for pay	663	0.32	0.47	321	0.23	0.42	-0.070**
Education: Lower secondary or lower	663	0.31	0.46	321	0.36	0.48	0.029
Education: Upper secondary-vocational	663	0.34	0.47	321	0.34	0.48	-0.024
Education: Higher professional or higher	663	0.35	0.48	321	0.30	0.46	-0.004
Decision power (index)	663	7.28	1.54	321	7.34	1.50	0.224
Future fertility: Yes	663	0.62	0.49	321	0.61	0.49	-0.015
Future fertility: No	663	0.29	0.45	321	0.30	0.46	-0.019
Future fertility: Undecided	663	0.09	0.29	321	0.09	0.29	0.034
Desired number of children	411	1.57	0.82	196	1.57	0.77	-0.062
Has a sister	663	0.57	0.50	321	0.57	0.50	0.004
Has a brother	663	0.66	0.48	321	0.68	0.47	-0.033
Ratio of male siblings	607	0.55	0.45	296	0.58	0.49	0.012
Job: Unemployed	663	0.12	0.33	321	0.13	0.33	0.042
Job: Agriculture	663	0.14	0.35	321	0.20	0.40	0.046
Job: Self-employed	663	0.53	0.50	321	0.53	0.50	-0.025
Job: Wage-employment	663	0.21	0.41	321	0.14	0.35	-0.063*
Has at least one son	663	0.67	0.47	321	0.70	0.46	0.042
Has at least one daughter	663	0.65	0.48	321	0.65	0.48	-0.019
Has no child	663	0.05	0.21	321	0.04	0.20	-0.013
Household size (excluding children and husband)	663	1.49	1.05	321	1.61	1.03	0.157*
Extended family (binary)	663	0.76	0.43	321	0.79	0.40	0.034
Income: 400 GEL or less	663	0.31	0.46	321	0.36	0.48	0.062
Income: 401-800 GEL	663	0.38	0.49	321	0.33	0.47	-0.067
Income: More than 800 GEL	663	0.31	0.46	321	0.31	0.46	0.006
Financial status: Low	453	0.17	0.38	232	0.23	0.42	0.015
Financial status: Middle	453	0.36	0.48	232	0.32	0.47	-0.047
Financial status: High	453	0.46	0.50	232	0.45	0.50	0.032
Prefers next children to be a son	471	0.39	0.49	226	0.35	0.48	-0.029
B: Son Preference Index	684	2.70	1.96	328	2.72	1.98	-0.203
Baseline D-score (IAT)	505	-0.22	0.42	236	-0.21	0.40	0.010

Table 18: Treatment Effects on Son Preference Index (control includes all non-attendees)

	(1)	(2)	(3)
	E: Son Preference Index	E: Son Preference Index	E: Son Preference Index
Treatment	0.394**	0.419***	0.335**
	(0.16)	(0.15)	(0.14)
B: Son Preference Index		0.466***	0.402***
		(0.03)	(0.03)
First born: son			0.837***
			(0.13)
Municipality FE			✓
N	990	990	936

Note: * p<0.10, ** p<0.05, *** p<0.01. OLS regressions, dependent variable is the son preference index. Standard errors are clustered at the school (meeting) level.

A.2 Effect of first born child's gender on fertility and son preference

Since the gender of the first born child is exogenous, we can look at it's effects on fertility decisions, son preference, and likelihood of abortions. We first present baseline characteristics of the families in table 19. There are no statistically significant differences between families with first born sons and those with first born daughters.

Table 19: Baseline characteristics of families by first child's sex

	First child: Girl		First Child: Boy				
	mean	sd	mean	sd	b	t	count
Age	28.534	4.588	29.011	4.330	-0.477	-1.637	937
Works for pay	0.258	0.438	0.306	0.461	-0.048	-1.623	939
Education: Lower secondary or lower	0.330	0.471	0.331	0.471	-0.001	-0.032	939
Education: Upper secondary-vocational	0.341	0.474	0.343	0.475	-0.002	-0.068	939
Education: Higher professional or higher	0.330	0.471	0.327	0.469	0.003	0.101	939
Decision power (index)	7.376	1.418	7.327	1.506	0.050	0.521	939
Future fertility: Yes	0.612	0.488	0.588	0.493	0.025	0.772	939
Future fertility: No	0.287	0.453	0.320	0.467	-0.033	-1.101	939
Future fertility: Undecided	0.100	0.301	0.092	0.289	0.008	0.436	939
Desired number of children	1.535	0.711	1.490	0.835	0.045	0.687	563
Has a sister	0.590	0.492	0.567	0.496	0.023	0.708	939
Has a brother	0.655	0.476	0.667	0.472	-0.013	-0.406	939
Ratio of male siblings	0.543	0.457	0.550	0.443	-0.007	-0.213	865
Job: Unemployed	0.136	0.343	0.114	0.318	0.022	0.999	939
Job: Agriculture	0.171	0.377	0.139	0.346	0.033	1.386	939
Job: Self-employed	0.512	0.500	0.549	0.498	-0.037	-1.126	939
Job: Wage-employment	0.180	0.385	0.198	0.399	-0.018	-0.685	939
Has at least one son	0.392	0.489	1.000	0.000	-0.608***	-27.540	939
Has at least one daughter	1.000	0.000	0.382	0.486	0.618***	26.944	939
Has no child	0.000	0.000	0.000	0.000	0.000	.	939
Household size (excluding children and husband)	1.577	1.033	1.480	1.049	0.097	1.430	939
Extended family (binary)	0.784	0.412	0.751	0.433	0.033	1.192	939
Income: 400 GEL or less	0.332	0.471	0.316	0.466	0.016	0.507	939
Income: 401-800 GEL	0.352	0.478	0.388	0.488	-0.036	-1.136	939
Income: More than 800 GEL	0.316	0.466	0.296	0.457	0.020	0.675	939
Financial status: Low	0.192	0.395	0.191	0.393	0.002	0.055	663
Financial status: Middle	0.341	0.475	0.358	0.480	-0.018	-0.476	663
Financial status: High	0.467	0.500	0.451	0.498	0.016	0.413	663

* p<0.10, ** p<0.05, *** p<0.01.

Table 20 presents the sex ratios of later born children conditional on the first child being boy or a girl.

Table 20: Sex ratios (boy/girl) by number of children and birth order conditional on a first born daughter/son

First born: Girl						
	Second child			Third child		
	Boy	Girl	Ratio	Boy	Girl	Ratio
2	101	89	**1.13**	-	-	**-**
	(53.16%)	(48.84%)		-	-	**-**
3 or more	33	58	**0.57**	51	40	**1.27**
	(36.26%)	(63.74%)		(56.04%)	(43.96%)	
First born: Boy						
	Second child			Third child		
# of children	Boy	Girl	Ratio	Boy	Girl	Ratio
2	122	124	**0.98**	-	-	**-**
	(49.59%)	(50.41%)		-	-	**-**
3 or more	61	24	**2.54**	41	44	**0.93**
	(71.76%)	(28.24%)		(48.24)	(51.76%)	

A.3 Survey Questions

A.3.1 Son Preference Index

The questions used to construct son preference index are given below.

- If you could choose exactly the number of children that your oldest or only child would have in his/her whole life, how many children would that be?
- Suppose your oldest or only child will have exactly 1 children. Specify below the gender of these children according to what you would wish for your son/daughter.
- Suppose your oldest or only child will have exactly 2 children. Specify below the gender of these children according to what you would wish for your son/daughter.
- Suppose your oldest or only child will have exactly 3 children. Specify below the gender of these children according to what you would wish for your son/daughter.
- Suppose your oldest or only child will have exactly 4 children. Specify below the gender of these children according to what you would wish for your son/daughter.
- Which of these scenarios would you most strongly wish to come true?

A.3.2 Decision-making power index

The questions used to construct decision-making power index are given below.

- Who usually decides how your husband's (partner's) earnings will be used?
- Who usually decides how the money you earn will be used?
- Who usually makes decisions on how to spend savings?
- Who usually makes decision on how to educate the children?
- Who usually makes decisions about major purchases?
- Who usually makes decision on the childrenâs healthcare?
- Who usually makes decisions on your own healthcare?
- Who usually makes decisions on your use of contraception?

A.3.3 Social Norm Indices

Social normative expectations(SNE)

- To what extent do you think that people in Georgia agree with this saying/statement that "Only a true man brings a boy to this world (...builds a house and plants a tree)"?
- Of 10 people in your community, how many do you think will agree with the saying/statement that "Only a true man brings a boy to this world(...builds a house and plants a tree)"?

- To what extend do you think that parents in Georgia would agree with this statement that girls belong to their husbandsâ family after they marry?
- Of 10 parents in your community, how many do you think would agree with this statement that girls belong to their husbandsâ family after they marry?
- To what extent do you think that people in Georgia agree with the statement that parental property belongs to the following family members (Eldest Son, Youngest Son, Eldest Daughter, Youngest Daughter, Any sons/all sons, All children equally, Other(spouse, siblings, cousins)
- "It is normal to want to know the sex of a child." Would most people in your village, town, or neighborhood agree or disagree with this statement?
- "Having too many daughters is bad, especially for men." Would most people in your village, town or neighborhood agree or disagree with this statement?
- "Having a son makes other people think you are a valuable person." Would most people in your village, town or neighborhood agree or disagree wit hthis statement?
- "It is ok to choose to have a son when you have one daughter." Would most people in your village, town or neighborhood agree or disagree with this statement?
- "It is ok to choose to have a son when you have two daughters." Would most people in your village, town or neighborhood agree or disagree with this statement?

Social empirical expectations index (SEE)

- In your opinion, out of 10 women in your community how many do you think have considered interrupting a pregnancy based on the sex of the child?
- Out of 10 women your age in your community how many do you think have considered interrupting a pregnancy based on the sex of the child?
- Out of 10 of your friends, how many do you think have considered interrupting a pregnancy based on the sex of the child?
- Out of 10 women with a first born a girl, how many do you think have considered interrupting a pregnancy based on the sex of the child?
- Out of 10 women with two daughters, how many do you think have considered interrupting a pregnancy based on the sex of the child?

Personal normative beliefs index(PNB)

- To what extent do you personally agree with this saying/statement "Only a true man brings a boy to this world (...builds a house and plants a tree)"?
- To what extend would you agree with this statement that girls belong to their husbandsâ family after they marry?
- To what extent do you personally agree with the statement that parental property belongs to the following family members:Eldest Son, Youngest Son, Eldest Daughter, Youngest Daughter, Any sons/all sons, All children equally, Other(spouse, sibilings, cousins)

Individual husband normative beliefs index (IHNB)

- To what extent do you think your husband will agree with the saying/statement that "Only a true man brings a boy to this world (...builds a house and plants a tree)"?
- To what extend do you think your husband would agree with this statement that girls belong to their husbands' family after they marry?

A.3.4 Private Questionnaire

A.4 Descriptive Statistics (Extra)

Table 21: Sibling sex composition

	Number of children			
Sibling composition	0	1	2	3
0 children	44 -			
1 boy		142 (47.33%)		
1 girl		158 (52.66%)		
1 boy 1 girl			225 (51.6%)	
2 boys			122 (28%)	
2 girls			89 (20.4%)	
2 boys 1 girl				57 (39%)
2 girls 1 boy				44 (30.1%)
3 girls				20 (13.7%)
3 boys				25 (17.1%)
Total	44 (4.6%)	300 (31.38%)	436 (45.61%)	146 (15.27%)

Table 22: Son preference across different family compositions

	What gender would you like your next ∣ child to be?		
Sibling composition	Boy	Girl	Total
0 children	20	23	43
	(46.51%)	(53.49%)	
1 boy	13	115	128
	(10.16%)	(89.84%)	
1 girl	107	42	149
	(71.81%)	(28.19%)	
1 boy 1 girl	28	117	145
	(19.31%)	(80.69%)	
2 boys	3	82	85
	(3.53%)	(96.47%)	
2 girls	65	7	72
	(90.28%)	(9.72%)	
2 boys 1 girl	2	18	20
	(10%)	(90%)	
2 girls 1 boy	10	2	12
	(83.33%)	(16.67%)	
3 girls	9	1	10
	(90%)	(10%)	
3 boys	1	11	12
	(8.33%)	(91.67%)	
Total	258	418	676
	(38.17%)	(61.83%)	(100%)

Figure 11: Baseline age distribution

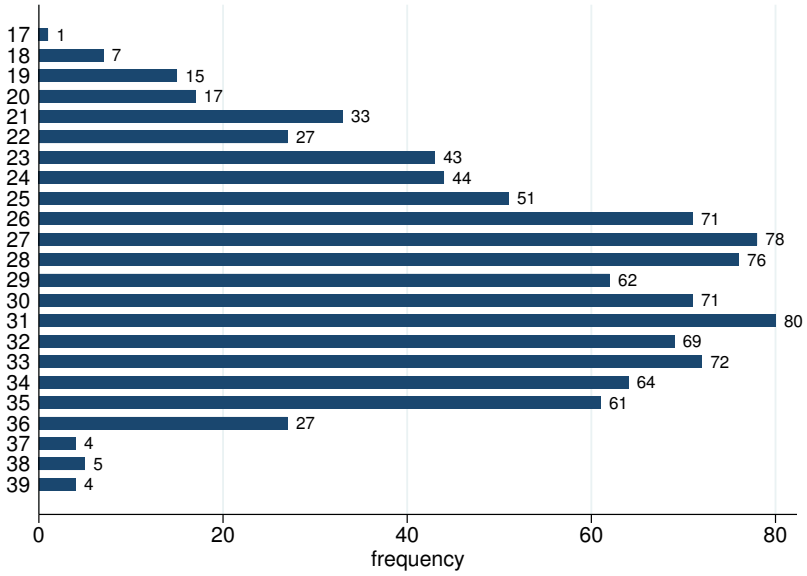


Figure 12: Baseline Income Distribution

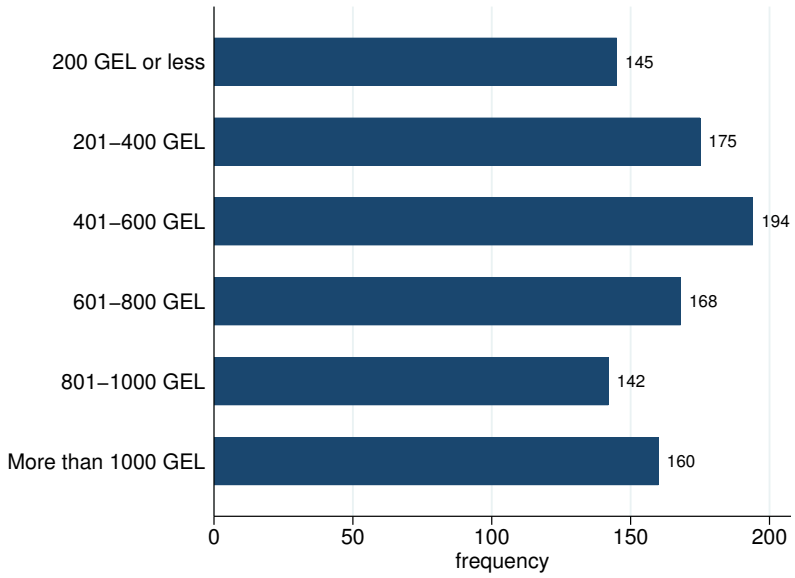


Figure 13: Baseline number of children

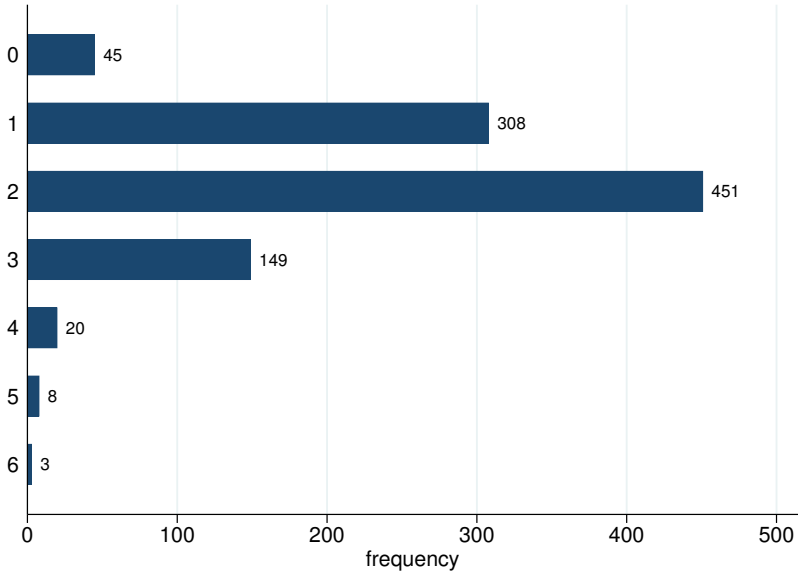
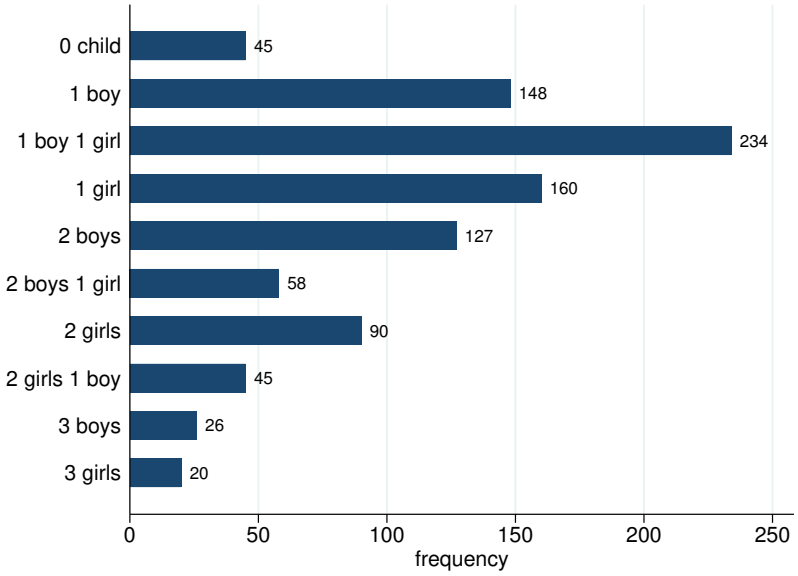


Figure 14: Baseline Children Composition in the Family



B Implicit Association Test (IAT)

Stereotype-Trial IAT

Table 23: Stimulus in Stereotype IAT

Flourish		**Wither**	
English	**Georgian**	**English**	**Georgian**
offspring		childless	
descendent		infertility	
to multiply		to interrupt	
standing		to fade	
to immortalize		extinction	

Figure 15: Picture Stimulus in Trial IATs

In the Stereotype-Trial IAT is used to measure participant's attitudes towards bugs or spiders. Subjects are either asked to sort the images

Table 24: Summary of the Stereotype-Trial IAT Block Structure

Block	**Left Key Assignment**	**Right Key Assignment**
A [bugFlower]	BUG	FLOWER
B [flourishWither]	FLOURISH	WITHER
C [bugFlourish_flowerWither]	BUG + FLOURISH	FLOWER + WITHER
D [flowerBug]	FLOWER	BUG
E [flowerFlourish_bugWither]	FLOWER + FLOURISH	BUG + WITHER

B.1 Stereotype IAT

The visual stimuli consist of four sets of drawings each depicting a particular family in five different scenes from daily life. The dimension of interest is the gender composition of the children (two boys vs two girls). Except for the children and the parents, all four sets are identical. To rule out that the IAT captures an effect induced by the parents rather than the children, parents are swapped across sets and we balance the children-parents combinations across subjects.

Table 25: Summary of the Stereotype IAT block structure

Block	**Left Key Assignment**	**Right Key Assignment**
A [girlsBoys]	GIRLS	BOYS
B [flourishWither]	FLOURISH	WITHER
C [girlsFlourish_boysWither]	GIRLS + FLOURISH	BOYS + WITHER
D [girlsFlourish_boysWither_cont]	GIRLS + FLOURISH	BOYS + WITHER
D [boysGirls]	BOYS	GIRLS
E [boysFlourish_girlsWither]	BOYS + FLOURISH	GIRLS + WITHER
F [boysFlourish_girlsWither_cont]	BOYS + FLOURISH	GIRLS + WITHER

Figure 16: Parents 1-Boys

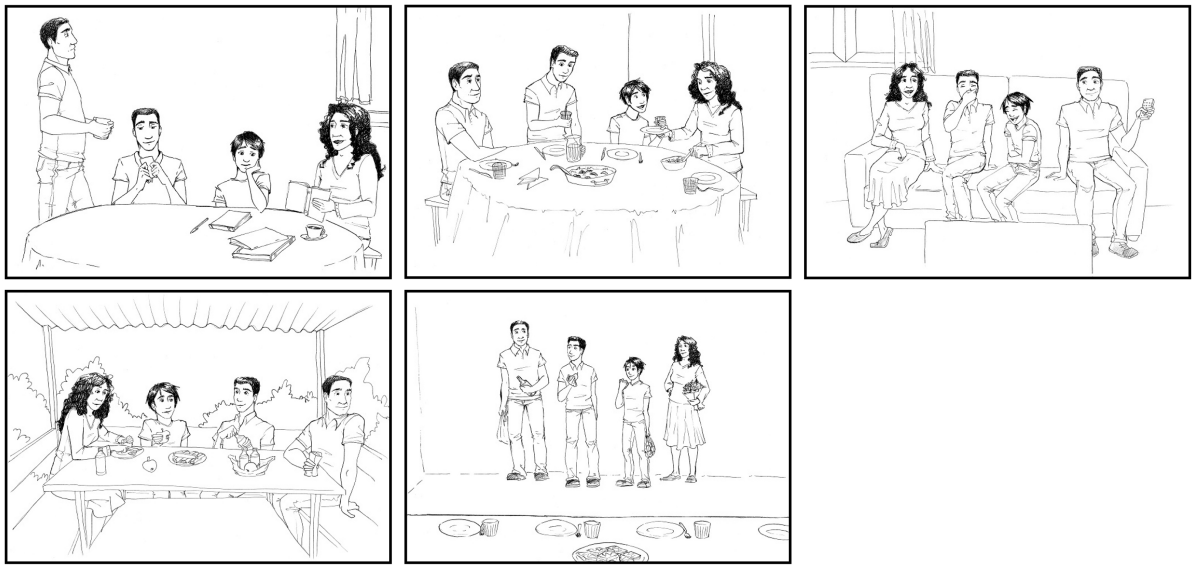


Figure 17: Parents 2-Boys

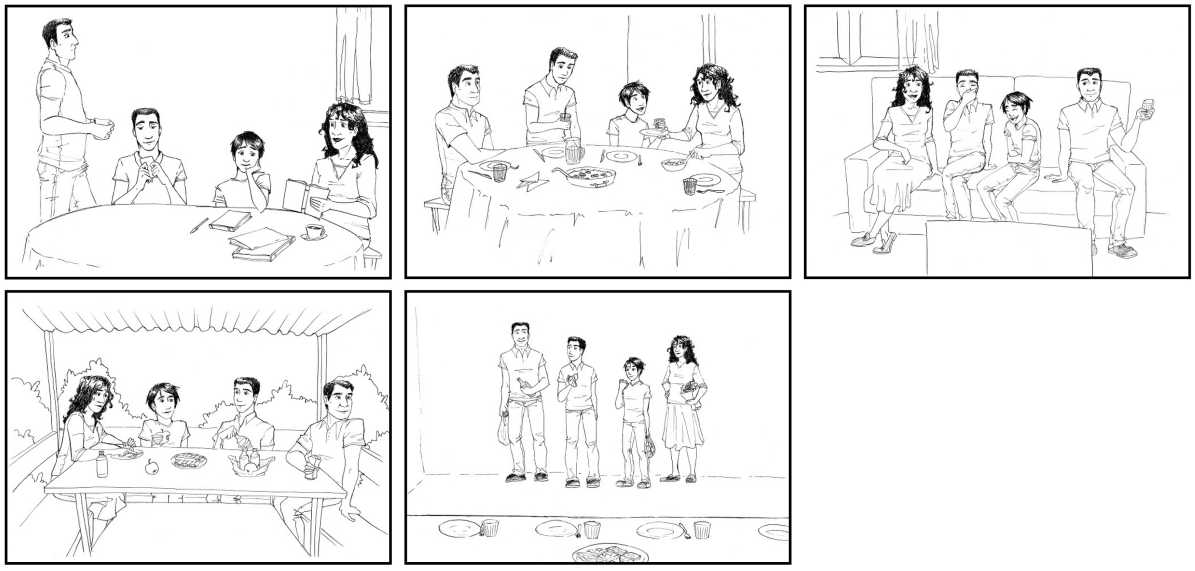


Figure 18: Parents 1-Girls

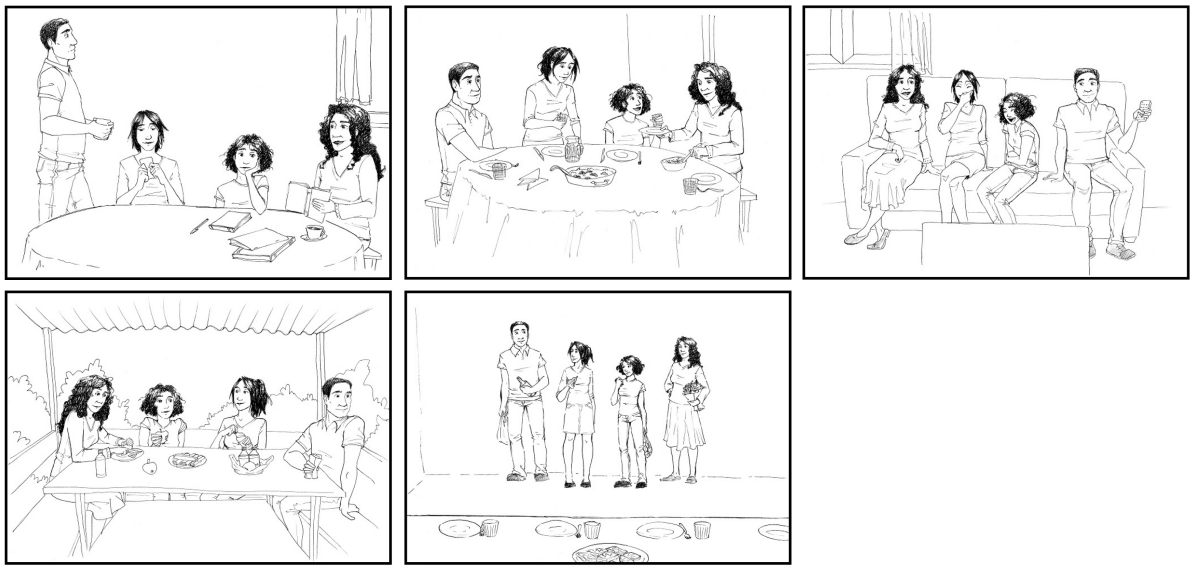


Figure 19: Parents 2-Girls