Pre-Analysis Plan for
A Public Goods Game in Urban Uganda

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August 2019

Abstract

Previous research has shown randomising the language of public goods games leads to significantly different contribution levels for bilingual subjects. However, the mechanism is not well understood. In the first paper described here we will measure norms and expectations, testing each as candidate mechanisms. Do bilingual people contribute more in one language because they feel they should, expect others to do so, or have internalised certain behaviours? This has direct relevance for bilingual subjects (the majority of the world) as well as shedding light on the importance of frames for revealed preferences. In addition to testing mechanisms, this experiment will act as a robustness check on Clist and Verschoor (2017), by examining the same question in a new (urban) setting.

In a second paper, we will examine the role of place in determining norms and expectations. Our experiment will be conducted in Kampala, amongst people with an ethnic or cultural link to a more rural eastern part of Uganda (Bugishu). All subjects will then have at least two geographical references. We will measure norms and expectations for our Kampala-based subject pool regarding behaviour in both Kampala and Bugishu. For norms this will make use of a novel hypothetical design. This will allow us to examine how internal migration, and the associated places, affect norms and expectations of cooperative behaviour.

In a third paper, we will examine how these differences manifest over the length of time a person has been exposed to a given place. We will compare the most recent arrivals to Kampala with others, in order to see whether norms and expectations can be learnt. We will also compare those that visit Bugishu more frequently with others, in order to see whether norms and expectations can be unlearnt.

Keywords: Norms, expectations, language, urban, cooperation, migration, preferences
JEL Codes: C71, C92, O12, R10

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1 Introduction

Economists have systematically measured cross-country differences in preferences for many years, with early attempts comprising just four nations (Roth et al., 1991). Amongst recent attempts, perhaps the most ambitious is Falk et al. (2018), who measure a range of economic preferences for 80,000 individuals in 76 countries. With such a variety of countries, trying to understand where preferences 'come from' has moved from finding individual-level correlates to country-level correlates. Language has recently emerged as an important factor. Initial cross-country observational studies (Chen (2013), Jakiela and Ozier (2018), Galor et al. (2018)) report that language explains a large fraction of cross-country differences in revealed preferences. However, concerns have been raised regarding potentially spurious results because of autocorrelation (the so-called Galton problem, see Roberts et al., 2015). A small experimental literature comparing revealed preference by language has since emerged, which typically cannot distinguish language from other cultural aspects (Sutter et al., 2018).

This experiment will contribute to a new literature that uses experiments with a bilingual sample, and is able to randomise the language of the experiment. As the majority of the world's population is bilingual (Crystal, 2012), this has inherent external relevance. Previous studies have also shown this method is capable of producing novel and important insights into the flexibility and contextual elements of preferences (Clist and Verschoor, 2017; Li, 2017; Lambarraa and Riener, 2015). This is essentially a method that can 'prime' subjects in a more subtle and relevant fashion than traditional methods (Benjamin et al., 2010).

Most related to our own work, Clist and Verschoor (2017) randomise the language of a Public Goods Game amongst bilinguals in rural Uganda. They found that there was a difference of around 30% in contributions depending on the language used, even though all subjects were bilingual and the expectations of partner identity were kept as consistent as possible. While the differences in contribution were consistent with relevant anthropological literature, the underlying mechanism (norms) was inferred rather than tested. We plan to investigate both norms and expectations as candidates for this mechanism.

Norms and expectations are closely related, and only by measuring both will we be able to distinguish between them. Fehr and Schurtenberger (2018) argue that social norms can explain most of the regularities in social dilemma games. However, the norm here is *conditional cooperation*, essentially that contributions to a public good are higher if a subject expects others' to contribute. Bicchieri (2010) is typical in distinguishing between normative beliefs (the shared view of what is socially acceptable) and empirical expectations (the extent to which others obey the norm). In this terminology, we use *expectations* to refer to empirical expectations.

The role of norms (normative beliefs, in the language of Bicchieri, 2010) has been highlighted by methodological advances. Krupka and Weber (2013) introduced the four-point norms elicitation method, showing the importance of norms in simple dictator games. The method is a pure coordination game (Mehta et al., 1994), thus making it incentive compatible to reveal shared norms. This approach has since been widely adopted and/or adapted (Kimbrough and Vostroknutov, 2016; Gächter et al., 2017; Barr et al., 2018; Chang et al., 2019)).

We depart from Clist and Verschoor (2017) by using an urban setting. Clist and Verschoor (2017) examined social preferences in a rural setting with static bilingualism. Recently, Berge et al. (2018) found that more recent rural-urban migrants adopted different social preferences, as the most recent migrants to Narobi were more ethnically biased than those than had lived in Nairobi for over a year. Similarly, Cameron et al. (2015) found that Asian migrants to

Australia adopted local preferences over time. This implies that we may find different behaviour in Kampala than was previously found in rural areas, and differences within our sample. The role of rural-urban migration, and its effects on revealed social preferences, is particularly interesting given the rapid urbanisation in Africa, with migrants being part of multiple overlapping groups (Stites et al., 2014). Such an environment is ideal for studying multiple cooperative equilibria, and the process of people's preferences, norms and expectations changing.

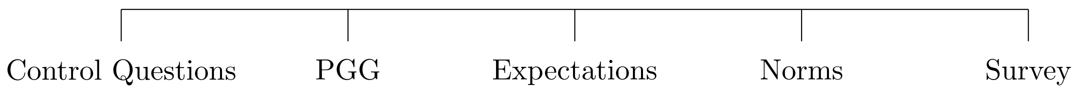
An important dimension in which international migration differs from national migration is the relative ease and frequency of returning 'home'. While Cameron et al. (2015) found Asian immigrants' preferences converging to those of Australians over time, these subjects were only measured in Australia, and so we cannot know whether their 'inherent' preferences changed, or merely their revealed preference in Australia. Likewise, we cannot know whether long term migrants to Nairobi would be less ethnically biased than their more recent arrivals if both groups were measured in a rural setting. How 'deep' these changes are is then an interesting question. We will examine the expectations and norms in the urban and rural area for the urban group, and see whether these can be learnt and unlearnt.

This pre-analysis plan sets out three separate papers which share the design and basic theoretical framework discussed in part I. Part II builds directly on Clist and Verschoor (2017), examining whether randomising the language in which a public goods game is played affects the level of contributions, and whether norms and/or expectations is the mechanism for any difference. Part III compares expectations and norms by place, and examines any interaction between place and language. Part IV examines the roll of exposure (time in a given place) in determining norms and expectations. Each is discussed in turn, with an appendix containing power calculations, the script and answer sheets.

2 Research design

Figure 1 summarises the elements of the experiment, discussed in turn below. Each session will be randomly allocated to be conducted in one of the two languages (Luganda or Lugisu) by a consistent set of experimenters delivering a script that has been carefully translated and backtranslated to ensure consistency. The language chosen will be used in *all* communication of that session (between experimenters, and from the first interaction to the last). Subjects will be pre-screened so that we can ascertain their ability to partake in the experiment (in either language).

Figure 1: Experimental Design



2.1 Location, sample and pre-screening

We will follow the work of Clist and Verschoor (2017) by limiting the sample to those that speak Lugishu and Luganda. We will depart by conducting the experiment in Uganda's capital Kampala, as opposed to rural areas in Bugishu (the homelands of the Bagishu). To invite subjects that are ethnically Gishu (or have a strong link to the area) we will initially use the (semi-formal) tribal social groups to recruit subjects. Because the experiment will be conducted by the Field Lab (https://thefieldlabuganda.com), which is based in Mbale, this focus will be relatively natural. As stated in the script: "We are from the Field Lab in Mbale, and are doing research in Kampala. We have invited you here today, because we want to learn about how people that are Bagishu, or from Bugishu region, make decisions." We will use this formula to explain our interest in someone's ethnicity or home village. Local informants have suggested that if a subject in Kampala speaks Lugishu, they will also be fluent in Luganda. This was confirmed during the pilot. As such, we will undertake all recruitment activities in Lugishu. Subjects will be allocated to a session, and provide their name and student ID, so that this can be checked when they arrive for the actual experiment.

We are aiming for a sample size of 300 (see appendix for power calculations), and will conduct our first sessions at Makerere university. If we are not able to attract 300 subjects that meet our selection criteria, we will ask the Field Lab to conduct follow up sessions at other universities in Kampala (including Kyambogo). Makerere attracts around 40,000 students from across Uganda, presenting an ideal pool from which a sample can be drawn. A room on campus will mean the 'cost' of participation will be low, and the recruitment will be merely days before the experiment, as this should reduce drop out. As each session will require an even number of players (as they are paired) we will pay a show up fee (equal to the minimum earnings in the experiment) for the last person to arrive if an odd number turn up. Sessions will be run with between 10 and 30 participants, depending on room size and turnout. Responses will be recorded on paper answer sheets (see appendix), and all instructions given verbally. We will use visual aids wherever possible.

2.2 Public goods game (PGG) and controls

When participants arrive for each session, they will be registered in the language of the session, confirming their name and student ID. They will then receive an ID card with a unique number. (This will be used to pair subjects, and determine a subject's pay.) It will be communicated to participants that:

- The experiment is being run by the Field Lab, from Mbale.
- The purpose of the experiment is to understand how people who are Bagishu, or from the Bugishu region, make decisions (this will inform participants that their partner for the PGG is also a Mugishu).
- The decisions participants make will affect how much both participants in a pair earn.
- All decisions will be made anonymously.
- The experiment is being run by a UK University and the money for payments does not belong to anyone involved with the experiment.
- Participation is voluntary and at any point subjects can withdraw (without earning any income).

We employ a standard linear one-shot two player PGG, which captures each participant's preference for cooperation. In this scenario, participants must choose between maximising their own payoff or the social benefit. Both individuals in the pair will be endowed with 12,000 Ugandan Shillings. At the time of writing this purchases 3 hot meals on campus, and is equivalent to around £2.70 or $3.25. Player 1's payoff (V_1) is calculated as:

$$V_1 = 12,000 - C_1 + 0.75(C_1 + C_2) \quad (1)$$

Where C_1 is their contribution to the joint fund and C_2 is the contribution from player 2. Each player can earn between 9,000 and 21,000 Ugandan Shillings, with the minimum and maximum pay out per pair totalling 24,000 and 36,000 Ugandan Shillings respectively.

In order to ensure participants have fully understood instructions, the three corner solutions will be used as the basis for control questions (see table 1). A basket represents the group fund (C_1 + C_2) and envelopes represent the amount of the initial endowment retained (12,000 —

C_1). As per the appendix, each scenario has a number of control questions, which also help subjects to think through the logic of the experiment. Based on piloting, understanding was enhanced where at least one control question was jointly solved by the room with open discussion. Whether one or two of these control questions will be solved collectively will be established in final piloting. Irrespective, at least one control question will be answered by participants in controlled conditions. If more than 10% of the individually answered control question steps are not answered correctly that subject's data will be excluded from the analysis.

Table 1: Control questions

Scenario	Player 1's Choice	Player 2's Choice	Final Pay-offs
1	Envelope: 12,000 Basket: nil	Envelope: 12,000 Basket: nil	Player 1: 12,000 Player 2: 12,000
2	Envelope: nil Basket: 12,000	Envelope: nil Basket: 12,000	Player 1: 18,000 Player 2: 18,000
3	Envelope: 12,000 Basket: nil	Envelope: nil Basket: 12,000	Player 1: 21,000 Player 2: 9,000

On completion of the control questions, subjects will make their contribution decision: splitting 12,000 between their private envelope and a common basket (in an increment of 3,000). Payment is made to participants at the end of the experiment. A full (English) script and example answer sheet are in the appendix.

2.3 Expectations

The next section of each experimental session will measure expectations of contributions. Participants will be able to earn a bonus 4,000 Ugandan Shillings for whichever question in the norms and expectations section is randomly selected. Subjects are given no feedback until the end of the experiment. For the expectation question, subjects are asked to guess the percentage of people in their session that gave the various amounts (0 to 12,000 in 3,000 increments) to the common basket. Subjects will win the bonus, if that question is selected, if their guess is within 10% of the actual answer.

We will conduct two versions of the expectations question: as stated above the first will simply be related to the choices of those in their session. However, we will also use the the data from Clist and Verschoor (2017), which captures the (previous) decisions of people near Mbale. Subjects in Kampala will then be incentivised to guess the choices of people in Bugishu, in a way that is incentive compatible.

2.4 Norms

The next section of the session will measure norms. Participants will be asked to rank how socially acceptable each of the contributions are, using the now standard method (Krupka and Weber, 2013). We will employ a four-point scale; very socially unacceptable (- -), somewhat socially unacceptable (-), somewhat socially acceptable (+) and very socially acceptable (++). We will use the whole distribution of possible choices. If a norm question is (randomly) chosen to determine payment, a subject will be paid if they choose the most popular option. Participants will only be eligible for this bonus if they only select one option for each scenario.

As with the expectation questions, participants will answer the set of questions twice. The first set will simply be related to the most popular choice of their session. However, in a second set of choices we will ask subjects to imagine they are playing the same game with the same people, but that they are playing it in Mbale. This second step is a novel contribution to the literature as participants are coordinating with same people, but with a hypothetical difference. This may potentially allow a location to be a hypothetical coordinating device (see Sugden, 1995, for more on pure coordination games).

Consideration has also been given to the use of different samples for norms and expectations. While Krupka and Weber (2013) use separate samples for the norm elicitation and game, d'Adda et al. (2016) suggest this not necessary. Further, Erkut et al. (2015) find that role in a dictator game doesn't change elicited norms. Hence, we will use one sample for all questions.

2.5 Survey and payment

While participant payoffs are being calculated, participants will be asked to complete an exit survey. Each question will be read aloud, giving time for subjects to write their answers. Before answering the survey, a random question for the expectations and norms sections will be selected blind to determine which is used. The survey questions below will serve as either control variables, independent variables (see specifications below) or descriptive information. Further details on survey questions, including encoding, are included in the appendix.

Table 2: Survey questions

Question	**Nature**
How old are you?	Control variable
What is your gender?	Control variable
How long have you lived in Kampala?	Control variable
How many people do you know in this room?	Control variable
How many days in the last year have you spent in Bugisu region?	Independent variable
How important is it to follow social rules, even if there is a cost?	Independent variable
Which language did you learn first?	Descriptive information
Where were you born?	Descriptive information
Where is your mother from?	Descriptive information
Where is your father from?	Descriptive information
Which language do you prefer to speak at home?	Descriptive information

3 Model and empirical considerations

Research that looks at norms[1] tend to have some variant on the following model of norm-dependent preferences:

$$U_i(a_c) = V_i(a_c) - \gamma_i N(|a_c - a_c^*|) \tag{2}$$

where individual i must decide upon some action a_c, balancing direct ('norm-free') utility $V_i(a_c)$ against disutility that comes from deviating from some norm a_c^*. N is a strictly convex increasing function and γ captures norm sensitivity. This framework comes from a focus (though not exclusive) on dictator games, where expectations do not play a role as one's utility is not determined by the other player's actions. Our interest is in examining norms in a public goods game, where both norms and expectations are likely to be relevant. This game in a similar setting has previously found that bilingual people playing in different languages contributed very different amounts, but Clist and Verschoor (2017) aren't able to distinguish between norms and expectations.

[1]See, amongst many others, Krupka and Weber (2013); Kimbrough and Vostroknutov (2016); Akerlof and Kranton (2000); Benjamin et al. (2010); Cappelen et al. (2007); Chang et al. (2019); Akerlof and Kranton (2000); Benjamin et al. (2010).

We augment equation 2 with an analogous term that captures the disutility in taking an action which is expected to be unpopular. E is a strictly convex increasing function and δ captures sensitivity to expectations, given the expected popularity of action a_c^e.

$$U_i(a_c) = V_i(a_c) - \gamma_i N(|a_c - a_c^*|) - \delta_i E(|a_c - a_c^e|) \quad (3)$$

As noted in the introduction, there is often a loose boundary between norms and expectations, with overlap between them. For example, Fehr and Schurtenberger (2018) reviews a substantial literature and argues that the norm of conditional cooperation is able to rationalise most of the evidence from public goods games (see Bicchieri, 2005, 2016, for related discussions). Here, the 'norm' is essentially an argument that *expectations* will influence behaviour: the norm of conditional cooperation is an expectation-based norm.

In our usage, we can be concrete about the terms by linking them directly to the data we will capture and how that is elicited. For the norms questions, subjects are attempting to guess the most popular option in their session. They are paid if they do so, and they know others are also engaged in the same pure coordination game (in the spirit of Mehta et al., 1994). For expectations, subjects are incentivised to correctly guess (within 10 points of) the percentage of subjects in their session that will contribute a given amount.

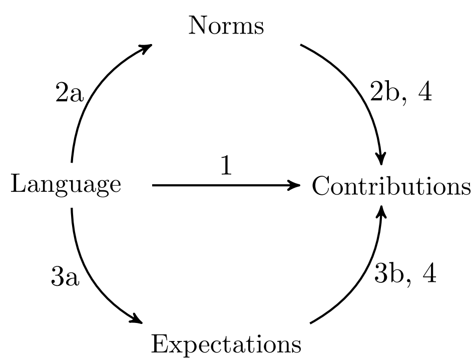
Conceptually, these are different propositions. We think it is perfectly possible for these two measures to be separate or dependent. For example, it might be common knowledge that there is a Gishu norm of low cooperation (Heald, 1989) which is recognised when subjects speak Lugishu, which is not the same as expecting others will feel bound by that norm. The difference between expectations and norms is of particular relevance in our study area. Clist and Verschoor (2017) found suggestive evidence that differences in contribution behaviour was not driven by conditional cooperation. Rather, when speaking Lugishu subjects were more likely to act as unconditional non-cooperators, and when speaking Luganda they were more likely to act as unconditional cooperators. Here, we will measure both expectations and norms directly, and test their strength.

3.1 Family-Wise Error Rate (FWER) strategy

Within each family of hypotheses, we will control for the number of tests conducted, controlling the FWER using the Hochberg procedure implemented in Stata by Newson (2010). We will use the 5% significance level for all decisions, using the appropriate q values. We list the families of hypotheses here by part/paper:

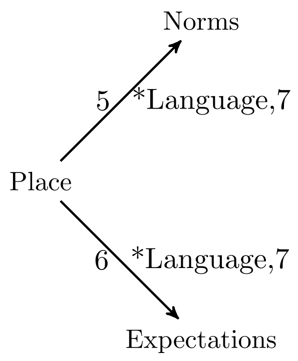
Part II: Paper 1 - Cooperation, language, norms and expectations

1. Does the language of the experiment affect contributions?
2. Does the language of the experiment affect contributions through norms?
3. Does the language of the experiment affect contributions through expectations?
4. What is the (additional) effect of expectations and norms on contributions, at individual and treatment level?



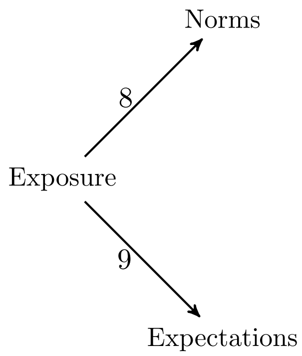
Part III: Paper 2 - place, norms and expectations

5. Does place affect norms?
6. Does place affect expectations?
7. Is there an interaction between place and language on norms or expectations?



Part IV: Paper 3 - exposure, norms and expectations

8. Does time in Kampala/Mbale affect norms and norm uncertainty?
9. Does time in Kampala/Mbale affect expectations and expectation uncertainty?



Part II

Paper 1 - Cooperation, language, norms and expectations

4 Family 1: Language → contributions

The first family of tests are simply whether language affects contributions in the public goods game, i.e. comparing $U_i(a_c)$ by language. We start with a parsimonious regression, with standard errors clustered at the session level. Given the likely small number of clusters, we will use wild cluster bootstraps (implemented by Roodman et al., 2019). The first regression will use the basic set up:

$$Y_i = \alpha + \beta Language_i + \epsilon_i$$

where Y_i is the contribution to the common pot. Clist and Verschoor (2017) found lower contributions in Lugishu than Luganda, but we keep the more conservative two-sided tests as the urban setting may mean different behaviour by language.

The second regression will include controls. These will comprise age (capped at 30, given the student population and the desire to not be overly influenced by outliers), gender, the number of people in the room a subject knows (which may increase cooperation) and the number of years a subject has spent in Kampala (coded as 0 for less than 2.5 years, 1 for 2.5-5.5 years and 2 for over 5.5 years).

Here, we show the complete stata code for family 1.

Stata code

```
replace age =30 if age>30
gen timeinurbanc = timeinurban
replace timeinurbanc=0 if timeinurbanc<2.5
replace timeinurbanc=2 if timeinurbanc>5.5
replace timeinurbanc=1 if timeinurbanc>2
global controls female age timeinurbanc knownpeopleinsession
```

```
* family 1: lang -> contribution15
gen pfamily1 = .
constraint 1 sessionlanguage = 0
regress contribution15 sessionlanguage , cluster(sessionid )
boottest
replace pfamily1=r(p) if _n==1
regress contribution15 sessionlanguage $controls, cluster(sessionid )
boottest
replace pfamily1=r(p) if _n==2

qqvalue pfamily1, method(hochberg ) qvalue(qfamily1)
list pfamily1 qfamily1 if qfamily1!=.
```

5 Family 2: Language → norms → contributions

This is a two-part hypothesis: first, that language affects norms, and in turn that norms affect contributions. We offer two FWER strategies: controlling for one family (2) or for each sub set (2a and 2b) separately. The rationale for this is that in order to conclude that evidence is supportive of 2a, it is best to control for all tests that are relevant to 2a. Similar logic can be applied to 2b. However, 2 rests on both 2a and 2b, and so all of the relevant tests need to be controlled for.

In the language of (3), the tests are that a) $N(|a_c - a_c^*|)$ differs by language, and b) that $\gamma > 0$. If there is support that contributions are different by language (family 1), but not for the mechanism through norms (family 2), it is possible that language changes the inherent preferences of individuals, i.e. that $V_i(a_c)$ differs by language (see Benjamin et al., 2010). Alternatively, the mechanism may be expectations rather than norms: that mechanism is explored in family 3.

5.1 Family 2a: Language → norms

The question for family 2a is whether norms differ by language. The standard approach (Krupka and Weber, 2013; Chang et al., 2019) has been to conduct a series of rank sum tests, to see whether the norm ratings differ between two groups. A concern here is that the series of tests mean that false positive results are made more likely. As such we follow the standard approach, but control for five tests. In translating a norm rating to a numerical scale we follow Krupka and Weber (2013) in coding the norm ratings as -1, -1/3, 1/3 and 1.

In the language of (3), this is a test of $N(|a_c - a_c^*|)$ by language for $c = [0, 12]$.

Stata code

```
gen pfamily2a = .
ranksum NormContribution0, by( sessionlanguage)
replace pfamily2a=2 * normprob(-abs(r(z))) if _n==1
ranksum NormContribution3, by( sessionlanguage)
replace pfamily2a=2 * normprob(-abs(r(z))) if _n==2
ranksum NormContribution6, by( sessionlanguage)
replace pfamily2a=2 * normprob(-abs(r(z))) if _n==3
ranksum NormContribution9, by( sessionlanguage)
replace pfamily2a=2 * normprob(-abs(r(z))) if _n==4
ranksum NormContribution12, by( sessionlanguage)
replace pfamily2a=2 * normprob(-abs(r(z))) if _n==5

qqvalue pfamily2a, method(hochberg ) qvalue(qfamily2a)
list qfamily2a if qfamily2a!=.
```

5.2 Family 2b: Norms → contributions

The question for 2b is whether norms affect contributions, effectively testing γ parameter in (3). We follow Gächter et al. (2017) in modelling unobserved heterogeneity in the response to the treatment-level norm by using a mixed logit. The result is an estimated mean and standard deviation for γ. We include the level of the contribution as a control. If people were purely selfish and only constrained by norms, this would have a negative coefficient. However, we have no prior expectations over this parameter. It is worth noting that the identification of the effect of norms will be in relation to this linear effect of contributions.

Stata code

```
expand 5 // data manipulation: long from wide
sort id
gen contribution=0
replace contribution=contribution[_n-1]+3 if id==id[_n-1]
gen choice=(contribution==contribution15)
gen NormIndividual = .
forvalues i = 0(3)12 {
replace NormIndividual=NormContribution‘i’ if contribution==‘i’
}
```

```
bysort sessionl contribution: egen NormSession=mean(NormIndividual)
gen pfamily2b = .
mixlogit choice contribution , rand(NormSession) group(id)
matrix m2b= r(table)
mat list m2b
replace pfamily2b =c[4,2] if _n==1
replace pfamily2b =c[4,3] if _n==2
qqvalue pfamily2b, method(hochberg ) qvalue(qfamily2b)
list qfamily2b if qfamily2b!=.
```

5.3 Family 2: Exploratory test

We also include an exploratory check, which doesn't directly relate to the main hypotheses. The questions is whether self-reported norm sensitivity is predictive. In the survey part of the experiment, we have asked subjects to self-report their norm sensitivity by answering the question "How important is it to follow social rules, even if there is a cost?" on a four-point scale. We wish to test whether this simple approach is able to observe norm sensitivity. In order to do so, we will regress the self-reported measure on the estimated norm sensitivity, recovered from the mixed logit. This test stands alone: it does not influence our conclusions on the relationship between language and norms. Rather, it is included as an extra, as if it is predictive, this may offer an easy way of capturing norm sensitivity. This test controls for wild clusters bootstraps.

Stata code

```
rename NormIndividual gamma
mixlogit choice contribution , rand(gamma) group(id)
mixlbeta gamma if e(sample), nrep(1000) saving(temp) replace
rename gamma NormIndividual
joinby id using "temp.dta", unmatched(none)
constraint 1 normsimportant = 0
reg gamma normsimportant, cluster(sessionid )
boottest
```

6 Family 3: Language → expectations → contributions

We now move to examining whether expectations can explain any differences in contribution levels by language. As in family 2, we provide 3 FWER strategies: a, b and together, and do not control for the other mechanism.

6.1 Family 3a: Language → expectations

The mechanism is analogous to family 2a, and so we keep all tests the same. There are differences in the nature of the data: norms is a four-point scale, whereas expectations could be any percentage that is a multiple of 10 between 0 and 100. However, pilot experiments lead us to expect a similar level of variation, with most guesses likely to be in the 10-40% range.

Stata code

```
gen pfamily3a = .
ranksum expectation0kampala, by( sessionlanguage)
replace pfamily3a=2 * normprob(-abs(r(z))) if _n==1
ranksum expectation3kampala, by( sessionlanguage)
replace pfamily3a=2 * normprob(-abs(r(z))) if _n==2
ranksum expectation6kampala, by( sessionlanguage)
replace pfamily3a=2 * normprob(-abs(r(z))) if _n==3
ranksum expectation9kampala, by( sessionlanguage)
replace pfamily3a=2 * normprob(-abs(r(z))) if _n==4
ranksum expectation12kampala, by( sessionlanguage)
replace pfamily3a=2 * normprob(-abs(r(z))) if _n==5

qqvalue pfamily3a, method(hochberg ) qvalue(qfamily3a)
list qfamily3a if qfamily3a!=.
```

6.2 Family 3b: Expectations → contributions

To keep comparability with 2b, we will approach expectations in the same way as norms: as averaged over the entire treatment for a given contribution level (in family 4 we will return to the issue of individual level expectations/norms). This means we are not at this stage asking whether a given individual is a conditional cooperator. Rather, we ask whether the session-level differences in contributions can be explained by the session-level differences in expectations, as would be expected if conditional cooperation plays a part in determining behaviour.

Stata code

```
gen ExpIndividual = .
forvalues i = 0(3)12 {
replace ExpIndividual =expectation‘i’kampala if contribution==‘i’
}
bysort sessionl contribution: egen ExpSession=mean(ExpIndividual)
mixlogit choice contribution , rand(ExpSession) group(id)
matrix m3b= r(table)
mat list m3b
gen pfamily3b = .
replace pfamily3b =m3b[4,2] if _n==1
replace pfamily3b =m3b[4,3] if _n==2
qqvalue pfamily3b, method(hochberg ) qvalue(qfamily3b)
list qfamily3b if qfamily3b!=.
```

7 Family 4: Norms, expectations and contributions

Family 2 focuses on norms and family 3 focuses on expectations: here we will bring the two together. To make the argument visually clear, we will construct a graph with three panels:

contributions, expectations and norms: the basic code is included below in the interest of completeness.

Stata code

```
 set scheme plottig
twoway (line NormSession contribution if sessionl==0, lcol(plb1) sort) ///
 (line NormSession contribution if sessionl==1, sort lcol(plr1)///
  xlabel(0(3)12) legend(off)) , name(norm, replace) nodraw
twoway (line ExpSession contribution if sessionl==0, lcol(plb1)sort) ///
 (line ExpSession contribution if sessionl==1, sort lcol(plr1) ///
 xlabel(0(3)12) legend(off)) , name(exp, replace) nodraw
twoway (histogram contribution15 if sessionl==0, lcol(plb1) discrete ///
 recast(line)) (histogram contribution15 if sessionl==1, discrete  ///
 recast(line) lcol(plr1) xlabel(0(3)12) ), ///
name(cont, replace) nodraw legend(off)
gr combine norm exp cont,  col(1) imargin(tiny)
```

In testing family 4, we present two strategies. First, we follow the standard approach of the norms literature (e.g. Krupka and Weber, 2013) by including treatment-level ratings, in our case for norms and expectations. Second, we depart by running the same tests but using individual-level ratings. This second test is able to show whether individuals are conditional cooperators, and whether they feel bound by the norm as they perceive it.

As coded below, the spread of estimated sensitivity to norms and expectations can be shown visually. In the language of (3), this displays the estimated γ and δ. As expectations and norms are measured on different scales, these cannot be compared directly. However, a calculation can be made to equate the relative strength of a 10 percentage point increase in expectations, for example.

Stata code

```
mixlogit choice contribution , rand(NormIndividual ExpIndividual ) group(id)
matrix m4a= r(table)
mat list m4a
gen pfamily4 = .
replace pfamily4 =m4a[4,2] if _n==1
replace pfamily4 =m4a[4,3] if _n==2
replace pfamily4 =m4a[4,4] if _n==3
replace pfamily4 =m4a[4,5] if _n==4
preserve
mixlbeta NormIndividual ExpIndividual , nrep(1000) saving(temp) replace
use temp, clear
twoway (kdensity NormIndividual) (kdensity ExpIndividual, title(""))
restore
```

```
mixlogit choice contribution , rand(NormSession ExpSession ) group(id)
matrix m4b= r(table)
mat list m4b
replace pfamily4 =m4b[4,2] if _n==5
replace pfamily4 =m4b[4,3] if _n==6
replace pfamily4 =m4b[4,4] if _n==7
replace pfamily4 =m4b[4,5] if _n==8
```

```
mixlbeta NormSession  ExpSession , nrep(500) saving(temp) replace
preserve
use temp, clear
twoway (kdensity NormSession) (kdensity ExpSession, title(""))
restore
qqvalue pfamily4, method(hochberg ) qvalue(qfamily4)
list qfamily4 if qfamily4!=.
```

In terms of multiple hypothesis testing, we then have eight relevant p values: the estimated mean and standard deviation of sensitivity to norms and expectations at the individual and session level.

Family 4 represents the most conservative tests of families 1-4. It examines whether norms and expectations can be separately identified as determinants of contribution behaviour. It does not consider whether language induces these different norms (for these, see families 2a and 3a). Sensitivity is measured in population-level and individual level senses, in terms of means and norm uncertainty.

Part III
Paper 2 - Place, norms and expectations

8 Family 5: Place → norms

If language acts as a cue for one of a potential variety of identities (Clist and Verschoor, 2017; Lambarraa and Riener, 2015), then by extension a geographical context could also have a similar effect. Differences in preferences have already been shown between recent arrivals and others (Berge et al. (2018), Cameron et al. (2015)), though the mechanism for these differences is not fully understood.

All participants in our experiment will have migrated from Bugishu region to Kampala or have some link to Gishu identity. From the ethnographic literature we know that the Gishu are highly autonomous and individualistic (Heald, 1989). In the Bugishu region, land shortage and resource scarcity gives rise to competition amongst male Gishu kin, who compete for early partible inheritance as they approach manhood (Hargreaves Heap et al., 2012). This apportionment of land is a key source of conflict and shapes the economic prosperity of the next generation.

In this context, it is unsurprising that the primary reason cited for migration from rural eastern Uganda to Kampala is economic, with the majority of migrants being under 25 years old (Mukwaya and Bamutaze, 2012). Greater economic opportunities exist in urban areas such as Kamapala relative to the largely rural Bugishu region. Even Mbale, a small city of circa 70,000 inhabitants, will present significantly fewer economic opportunities when compared to the capital city. Thus migrants to Kampala are less reliant on inheritance for economic independence and therefore are likely to have different psychological associations relative to Bugishu region. This moves away from the assumption of inter-generational transmission of cultural traits towards one where preferences adapt (Bisin and Verdier, 2001). The clear socio-economic differences between Mbale (within Bugishu region) and Kampala are likely to activate alternative group-specific norms.

A contribution of this paper is to use hypothetical conditions to elicit norms, in this case asking subjects to rate actions 'as if' they and the others in their session were in a different location. If successful, this is a powerful method for eliciting norms under different conditions. It remains incentive compatible.

8.1 Family 5: Main specification

We hypothesise that in different contexts different identities becomes salient. Norms have been elicited in Kampala for both Kampala and Mbale, across two language treatments. We follow the same strategy as for families 2a and 3a: we use a Wilcoxon rank-sum test for each action, and then corrected for multiple testing across the five points of the distribution.

Stata code

```
preserve
expand 2
sort id
gen mbale=0
replace mbale=1 if id==id[_n-1]
forvalues i=0(3)12 {
replace NormContribution`i'=norm`i'mbale if  mbale==1
}
```

```
gen pfamily5 = .
ranksum NormContribution0, by( mbale)
replace pfamily5=2 * normprob(-abs(r(z))) if _n==1
ranksum NormContribution3, by( mbale)
replace pfamily5=2 * normprob(-abs(r(z))) if _n==2
ranksum NormContribution6, by( mbale)
replace pfamily5=2 * normprob(-abs(r(z))) if _n==3
ranksum NormContribution9, by( mbale)
replace pfamily5=2 * normprob(-abs(r(z))) if _n==4
ranksum NormContribution12, by( mbale)
replace pfamily5=2 * normprob(-abs(r(z))) if _n==5
```

```
qqvalue pfamily5, method(hochberg ) qvalue(qfamily5)
list qfamily5 if qfamily5!=.
```

8.2 Family 5: Exploratory comparison

If both language (family 2a) and place (family 5) are shown to affect norms, it is useful to visually inspect the relative effect size of each. While not a test, the code below visually compares the mean effect of language (Luganda/Lugisu) against place (Kampala/Mbale). However, this does not investigate interaction effects between place and language on norms, which is the subject of family 7, but is informative nonetheless.

Exploratory comparison graph:

```
gen tempmeank=.
gen tempsdk=.
gen kampala=.
forvalues i =0(3)12{
sum NormContribution`i'
replace tempmeank= r(mean) if _n==`i'+2
replace tempsdk= r(sd) if _n==`i'+2
replace kampala= 1 if _n==`i'+2
}
```

```
forvalues j =0(3)12{
sum norm`j'mbale
replace tempmeank= r(mean) if _n==`j'+1
replace tempsdk= r(sd) if _n==`j'+1
replace kampala= 0 if _n==`j'+1
}
```

```
gen category=.
forvalues i =0(3)12{
replace category= ‘i’ if _n==‘i’+1
replace category= ‘i’ if _n==‘i’+2
}
```

```
bysort category : gen placemean = tempmeank - tempmeank[_n-1]
bysort category : gen placesd = tempsdk - tempsdk[_n-1]
bysort category : gen langmean = tempmean - tempmean[_n-1]
bysort category : gen langsd = tempsd - tempsd[_n-1]
```

```
twoway (line placemean category) (line langmean category) ///
(line placesd category) (line langsd category), ///
ytitle(Social acceptability) xtitle(Contribution) ylabel(-1(.25)1) xlabel(0(3)12)
```

9 Family 6: Place → expectations

9.1 Family 6: Main specification

Irrespective of whether norms vary by place, expectations of norm compliance could be independently influenced by geographical context. Consider the following example, where an individual finds a wallet on the street. Suppose that in both Mbale and Kampala, the most socially acceptable action (norm) is to hand in the wallet to the authorities. However an individual's actual behaviour will be influenced by their expectation of norm compliance in that context (‘empirical expectations’ in the language of Bicchieri, 2010). The expected behaviour of others is likely to be affected by a range of issues. For example, differences in crime rates and monitoring (Wells and Weisheit, 2004) exist between rural and urban environments. Reduced monitoring (or increased anonymity) lowers the probability of being punished should an individual choose to take the wallet. Rationally, an individual would expect less norm compliance in the more anonymous urban context. Alternatively, if an individual finds a wallet in a village, it is more likely that it will belong to someone who shares the individual's identity than in a city (Akerlof and Kranton, 2000).

Thus it can be suggested that expectations are sensitive to contextual factors which influence norm compliance. Consistent with family 5, expectations have been recorded in Kampala for both Kampala and Mbale. Again, we use a series of Wilcoxon rank-sum tests and correct according to our FWER strategy.

9.2 Family 6: Exploratory comparison

If both language (family 3a) and place (family 6) are shown to affect expectations, it is useful to visually inspect the relative effect of each. Consistent with family 5, the code below visually compares the mean effect of language (Luganda/Lugisu) against place (Kampala/Mbale) on expectations.

Stata code

```
forvalues i=0(3)12 {
replace expectation‘i’kampala=expectation‘i’mbale if  mbale==1
}
gen pfamily6 = .
ranksum expectation0kampala, by( mbale)
replace pfamily6=2 * normprob(-abs(r(z))) if _n==1
ranksum expectation3kampala, by( mbale)
replace pfamily6=2 * normprob(-abs(r(z))) if _n==2
ranksum expectation6kampala, by( mbale)
replace pfamily6=2 * normprob(-abs(r(z))) if _n==3
ranksum expectation9kampala, by( mbale)
replace pfamily6=2 * normprob(-abs(r(z))) if _n==4
ranksum expectation12kampala, by( mbale)
replace pfamily6=2 * normprob(-abs(r(z))) if _n==5
```

```
qqvalue pfamily6, method(hochberg ) qvalue(qfamily6)
list qfamily6 if qfamily6!=.
restore
```

Exploratory comparison graph:

```
gen tempEmeank=.
gen tempEsdk=.
gen Ekampala=.
forvalues i =0(3)12{
sum expectation‘i’kampala
replace tempEmeank= r(mean) if _n==‘i’+2
replace tempEsdk= r(sd) if _n==‘i’+2
replace Ekampala= 1 if _n==‘i’+2
}
```

```
forvalues j =0(3)12{
sum expectation‘j’mbale
replace tempEmeank= r(mean) if _n==‘j’+1
replace tempEsdk= r(sd) if _n==‘j’+1
replace Ekampala= 0 if _n==‘j’+1
}
```

```
gen categoryE=.
forvalues i =0(3)12{
replace categoryE= ‘i’ if _n==‘i’+1
replace categoryE= ‘i’ if _n==‘i’+2
}
```

```
bysort categoryE : gen placeEmean = tempEmeank - tempEmeank[_n-1]
bysort categoryE : gen placeEsd = tempEsdk - tempEsdk[_n-1]
bysort categoryE : gen langEmean = tempEmean - tempEmean[_n-1]
bysort categoryE : gen langEsd = tempEsd - tempEsd[_n-1]
```

```
twoway (line placeEmean categoryE) (line langEmean categoryE) ///
(line placeEsd categoryE) (line langEsd categoryE), ///
ytitle(Social acceptability) xtitle(Contribution)  xlabel(0(3)12)
```

10 Family 7: Place*language $\rightarrow$ norms or expectations

The separate effects of language and place on norms and expectations have been explored in families 2 - 4 and 5 - 6 respectively. Family 7 is concerned with the interaction *between* place and language and the affects on norms or expectations.

Language (Jakiela and Ozier (2018), Clist and Verschoor (2017), Chen (2013)) and place (Berge et al. (2018), Cameron et al. (2015)) have individually been shown to affect preferences. However the interaction between the variables has not yet been explored. We test this interaction in two separate specifications, considering norms or expectations. Conceptually, families 2a and 5 explore how language and place affect norms respectively. However a scenario may occur where Lugisu only affects norms in Mbale, for example. This is equally true for expectations (families 3a and 6).

To explore this we use the following regression:

$$N_{ic} = \beta_1 Language_{ic} + \beta_2 Place_{ic} + \beta_3 Language_{ic} * Place_{ic} + \epsilon_{ic}$$

$$E_{ic} = \beta_1 Language_{ic} + \beta_2 Place_{ic} + \beta_3 Language_{ic} * Place_{ic} + \epsilon_{ic}$$

Where N_{ic} represents norms on a four-point scale between -1 and 1 and E_{ic} represents expectations on a percentage scale. Throughout, i indexes an individual and c the contribution level between 0 and 12,000, in 3,000 intervals. $Language_{ic}$ is a dummy variable for Luganda (1) and Lugisu (0) and $Place_{ic}$ a second dummy variable for Kampala (1) and Mbale (0). $Language_{ic} * Place_{ic}$ is the the interaction effect. While norms and expectations are distinct the interaction between place and language is theoretical focus of family 7. Thus, the above presents two p values for correction in line with our FWER strategy.

Stata code

```
gen pfamily7 = .
gen interaction1=contribution*kampaladummy
gen interaction2=contribution*sessionlanguage
gen interaction3=contribution*sessionlanguage*kampaladummy
regress  NormIndividual contribution interaction*,  vce(cluster id)
test interaction3==0
replace pfamily7=r(p) if _n==1
regress  ExpIndividual contribution interaction*,  vce(cluster id)
test interaction3==0
replace pfamily7=r(p) if _n==2
qqvalue pfamily7, method(hochberg ) qvalue(qfamily7)
list pfamily7 qfamily7 if qfamily7!=.
```

Part IV
Paper 3 - Exposure, norms and expectations

11 Family 8: Exposure → norms

11.1 Family 8a: Kampala - learning norms

Economists have long been aware that preferences differ both between and within nations (Falk et al., 2018; Vieider et al., 2015; Guiso et al., 2006). These comparisons do not typically investigate how being exposed to multiple cultures affects preferences. Migration involves an individual physically moving, potentially to a social environment that differs in important dimensions. This can be national or international in nature. Theories of cultural integration have an established heritage within social sciences, broadly summarised as assimilation theory, structuralism and multiculturalism (for a review see Algan et al., 2012). Fundamentally, these theories attempt to explain how cultural integration reflects learning about (and adherence to) a new country's social norms, or a change in one's own identity and norms.

Further, there is a well-established literature that suggests preferences are influenced by social factors. For example, Cipriani et al. (2007) investigate pro-social values and find no correlation between children's and parent's behaviour. This is consistent with psychological theories which emphasise the importance of peer effects in socialisation, which may mean that migration, a new set of peers, could result in an individual adapting their preferences substantially (Bisin and Verdier, 2001).

However, there is relatively little evidence exploring how exposure to different cultures represents learning about social norms. Cameron et al. (2015) investigate the migration of Chinese students to Australia, finding evidence for the assimilation of preferences over time. However, where migrants had been in Australia for less than one year, the differences in preferences persist. Thus, migrants are shown to assimilate as exposure increases. While preferences are shown to assimilate, the mechanism for change is unclear. Additionally, while Cameron et al. (2015) only explore international migration, national migration will frequently involve multiple distinct cultures. How exposure to different national cultures affects learning about norms is currently not explored by the literature.

If language and place activate different social identities, with specific associated norms and expectations, we suggest cultural exposure can be conceptualised as learning about norms and expectations. An individual moving from Mbale to Kampala will initially be uncertain of local norms and how they expect others to conform to them. In the language of (3.2), exposure permits an individual to learn about local customs and update their estimations of a_c^* and a_c^e .

Our sample only includes individuals who originate from Bugishu region, with families 2b) and 3b) already exploring the link between contributions in a cooperative social dilemma game and norms. Thus we hypothesise that as time in Kampala increases, the elicited norms for Kampala will become more certain ('learnt') and norms and expectations will increasingly become aligned to those of Kampala.

In order to maintain power, we intend to compare the average norms of the 1/3 most recent arrivals to Kampala with the 2/3 least recent arrivals. This comparison will be conducted at each contribution level using Wilcoxon rank-sum tests, before controlling for multiple tests.

Stata code

```
sort timeinurban
gen kampaladummy=0
sum kampaladummy
replace kampaladummy=1 if _n<r(N)/3
gen pfamily8a = .
ranksum NormContribution0, by( kampaladummy)
replace pfamily8a=2 * normprob(-abs(r(z))) if _n==1
ranksum NormContribution3, by( kampaladummy)
replace pfamily8a=2 * normprob(-abs(r(z))) if _n==2
ranksum NormContribution6, by( kampaladummy)
replace pfamily8a=2 * normprob(-abs(r(z))) if _n==3
ranksum NormContribution9, by( kampaladummy)
replace pfamily8a=2 * normprob(-abs(r(z))) if _n==4
ranksum NormContribution12, by( kampaladummy)
replace pfamily8a=2 * normprob(-abs(r(z))) if _n==5
qqvalue pfamily8a, method(hochberg ) qvalue(qfamily8a)
list qfamily8a if qfamily8a!=.
```

11.2 Family 8b: Mbale - unlearning norms

A secondary set of hypotheses will provide further contributions to existing literature. Unlike international migration, domestic migration more easily permits migrants to return to their originating communities. While migration from one nation to another has been shown to cause a change in preferences (Cameron et al., 2015), it is not clear whether the same is true for domestic migration.

If exposure to a new culture can be conceptualised as learning, does reduced exposure to the original culture constitute unlearning? To explore this, within the survey, we will ask participants how many days (in the last year) have they spent in Bugishu region. Akin to the above we will split the sample using the 1/3 that has spent the least amount of time in Bugishu with the rest. Using the elicited hypothetical Mbale norms, we will then compare the two groups.

It is hypothesised that the mean of the Mbale norms will not be equal for the two groups, as more frequent visits to Mbale maintain exposure and maintain the importance of these norms. Additionally, if the frequency of visits to Mbale is expected to increase norm certainty for Mbale, the standard deviation of the two groups is expected to be unequal.

We acknowledge that this is not a perfect test as participants are actually located in Kampala and are making hypothetical elicitations about norms and expectations in Mbale. While we are aware of this limitation, this is still a valuable test. We again conduct one Wilcoxon rank-sum test per contribution level, before correcting for multiple testing.

Stata code

```
sort returnhome
gen homedummy=1
sum homedummy
replace homedummy=0 if _n<r(N)/3
gen pfamily8b = .
ranksum NormContribution0, by( homedummy)
replace pfamily8b=2 * normprob(-abs(r(z))) if _n==1
ranksum NormContribution3, by( homedummy)
replace pfamily8b=2 * normprob(-abs(r(z))) if _n==2
ranksum NormContribution6, by( homedummy)
replace pfamily8b=2 * normprob(-abs(r(z))) if _n==3
ranksum NormContribution9, by( homedummy)
replace pfamily8b=2 * normprob(-abs(r(z))) if _n==4
ranksum NormContribution12, by( homedummy)
replace pfamily8b=2 * normprob(-abs(r(z))) if _n==5
qqvalue pfamily8b, method(hochberg ) qvalue(qfamily8b)
list qfamily8b if qfamily8b!=.
```

12 Family 9: Exposure → expectations

12.1 Family 9a: Kampala - learning expectations

To maintain comparability, we will adopt an analogous approach to family 8 for expectations. Much of the same logic for the effect of exposure on norms also applies to expectations. As discussed, an individual's behaviour is dependent on both what is socially prescribed ('norms') and the anticipation around how individuals adhere to those norms ('expectations'). If expectations of norm compliance vary by place (family 6), then an individual moving from Bugishu region to Kampala can reasonably be expected to learn about norm compliance in Kampala over time.

Thus we hypothesise that as exposure to Kampala increases, the expectations for Kampala will become more certain (consistent) and participants' expectations will become aligned to those of Kampala. The sample will be split in a manner consistent with family 8 (1/3 against 2/3), comparing the 1/3 of most recent arrivals to others. We will apply five Wilcoxon rank-sum tests.

Stata code

```
gen pfamily9a = .
ranksum expectation0kampala, by( kampaladummy)
replace pfamily9a=2 * normprob(-abs(r(z))) if _n==1
ranksum expectation3kampala, by( kampaladummy)
replace pfamily9a=2 * normprob(-abs(r(z))) if _n==2
ranksum expectation6kampala, by( kampaladummy)
replace pfamily9a=2 * normprob(-abs(r(z))) if _n==3
ranksum expectation9kampala, by( kampaladummy)
replace pfamily9a=2 * normprob(-abs(r(z))) if _n==4
ranksum expectation12kampala, by( kampaladummy)
replace pfamily9a=2 * normprob(-abs(r(z))) if _n==5

qqvalue pfamily9a, method(hochberg ) qvalue(qfamily9a)
list qfamily9a if qfamily9a!=.
```

12.2 Family 9b: Mbale - unlearning expectations

This section will apply the same approach as the second specification, set out in family 8. Consistent with family 8, both family 9 specifications are concerned with learning about expectations. Thus, there are five p-values for correction as per our FWER strategy set out in family 1.

Stata code

```
gen pfamily9b = .
ranksum expectation0mbale, by( homedummy)
replace pfamily9b=2 * normprob(-abs(r(z))) if _n==1
ranksum expectation3mbale, by( homedummy)
replace pfamily9b=2 * normprob(-abs(r(z))) if _n==2
ranksum expectation6mbale, by( homedummy)
replace pfamily9b=2 * normprob(-abs(r(z))) if _n==3
ranksum expectation9mbale, by( homedummy)
replace pfamily9b=2 * normprob(-abs(r(z))) if _n==4
ranksum expectation12mbale, by( homedummy)
replace pfamily9b=2 * normprob(-abs(r(z))) if _n==5

qqvalue pfamily9b, method(hochberg ) qvalue(qfamily9b)
list qfamily9b if qfamily9b!=.
```

Part V
Appendix

13 Proposed timeline

A small pilot was completed in April 2019, with the full experiment scheduled for September 2019. This will be run by the Field Lab (`https://thefieldlabuganda.com/`) with support from the authors.

14 Funding

Funding for this study have been provided by the Centre for Behavioural and Experimental Social Science, UEA (`https://www.uea.ac.uk/cbess`). No other funding is attached to the project. Ethics approval for both the pilot and full study has been granted by the International Development Ethics Committee, University of East Anglia.

15 Experimental script (English)

Script: Kampala
Preparation of the experiment

Material needed:

- Pre-regristration sheets
- ID numbers
- A basket
- Two envelopes
- Money
- Paper and pen, data entry sheets, randomisation sheets
- Visual aids (manila paper)
- Box to collect tokens

Brief Explanation For Experimenters Only *We will play a public goods game in Luganda or Lugisu (randomly determined in advance of each session). Each subject will play it only once in one language and it is important that we don't draw extra attention to the fact that two different languages are used. This means all communication in a session must take place in the language of that session (even between experimenters). We need an even number of players in each session as players are paired. If there is an odd number players, choose the last person to arrive and give them a show-up fee of 9,000 Ugandan Shillings and send them away. It is important that subjects do not know who their partner is.*

Pre-screening *In advance of the experimental sessions, pre-screening sessions will have been completed in order to ensure that all participants have a Bagisu background and that they can speak Lugisu fluently (proficiency in Luganda is assumed, based on local information). During the pre-screening, candidates were asked questions to ensure fluency.*

As subjects arrive *When people enter the meeting room, they are asked for their name and student number as recorded during pre-screening. These should match exactly. If participants are not pre-registered, they will not be able to participate.*

Their name should then be recorded on the attendance register, alongside their game ID, which we give them on a card. We randomly match subjects, so these ID cards are important. At the end of the experiment, they hand in their card in exchange for their payment. The ID card allows us to identify them during the exercise while guaranteeing complete confidentiality. This is important, as they are able to earn real money in the exercise. Further instructions are given once sufficient people [10 - 30] have shown up.

Formal Introduction
Welcome. Thank you for taking the time to come today. [Introduce Experimenters and Assistants.] Later, you can ask any of us questions during today's programme. For this raise your hand so that we can come and answer your question in private.

We are from the Field Lab in Mbale, and are doing research in Kampala. We have invited you here today, because we want to learn about how people that are Bagishu, or from Bugishu region, make decisions. You are going to be asked to make decisions about money. The money that results from your decisions will be yours to keep.

What you need to do will be explained fully in a few minutes. But first we want to make a couple of things clear. First of all, this is not our money. We belong to a university in the UK, and this money has been given to us for research. Second, participation is voluntary. You may still choose not to participate in the exercise. Third, this is research about your decisions. Therefore you cannot talk with others. This is very important. I'm afraid that if we find you talking with others, we will politely ask you to leave, and you will not be able to earn any money here today. Of course, if you have questions, you can ask one of us. We also ask you to switch off your mobile phones.

Make sure that you listen carefully to us. You will be able to make some money here today, and it is important that you follow our instructions. During today's programme, you will be asked to make several decisions, which will be explained to you very clearly. Now, before we explain what you need to do, it is really important to bear one more thing in mind. The first decision that you will make is not a matter of getting it right or wrong. It is about what you prefer. It is important to think seriously about all your choices because they may affect how much money you can take home.

Explaining the Game
Today, you have randomly been paired with someone else in this room. You will not find out the identity of your partner, and they will not find out any information about you. All decisions are anonymous. However, we can tell you that your partner is (or was) also a student here at Makerere [*or other university*] and is either a Mugishu or spent time in the Bugishu region. I will explain all of the decisions slowly, and ask you to write down your answers the paper in front of you. You cannot change your answers after they've been written down, so think carefully before you write anything. Any questions that you have can be answered privately.

You will be given 12,000 Ugandan shillings, and you can decide what to do with it. First, we will demonstrate the decision using real money. You will make your choice on paper in front of you. You have two possible options: you can place money in either a private envelope (show) or a common basket (show). You can choose to put some of the money in the common basket, and the rest in the private envelope, but only in intervals of 3,000 Shillings. You can choose to keep this money for yourself, by placing it in the private envelope (show). This is your money to take home with you. There is also a common basket, which both you and you partner can put money in (show). We will add half of the money in the common basket (show). It will then be shared equally between the two players (show).

Recap, together [short, direct answers only]:

- What happens with any money you decide to put in your private envelope? [*You take it home*]
- How much is added to any money you and your partner put in the common basket? [*Half*]
- And after half is added, how do we split the money in the common basket between you and your partner? [*Equally*]

1. Control questions
We will now check for your understanding, using 3 examples. Imagine two people are paired: person A and person B. They would not know who they are paired with. [*Demonstrate with real money, and using the visual aid. Read question number, pause with each instruction to write down, indicating where to write down.*]

***[To be determined during final piloting** - One or two of the following control questions should be solved collectively in the room with discussion. One or two will be answered seperately.]*

1. Imagine that person A chooses to put nothing in the common basket, and everything in the private envelope. And imagine that person B chooses to put nothing in the common basket, and everything in the private envelope. Write on your paper, in the appropriate boxes, how much is in the common basket. How much is there after we have added half. And how much each player goes home with.
2. Imagine that person A chooses to put everything in the common basket, and nothing in the private envelope. And imagine that person B chooses to put everything in the common basket, and nothing in the private envelope. Write on your paper, in the appropriate boxes, how much is in the common basket. How much is there after we have added half. And how much each player goes home with.
3. Imagine that person A chooses to put everything in the common basket, and nothing in the private envelope. But, imagine that person B chooses to put nothing in the common basket, and everything in the private envelope. Write on your paper, in the appropriate boxes, how much is in the common basket. How much is there after we have added half. And how much each player goes home with.

Thank you. These are just examples, you can decide what you prefer. When you make the decision, you can choose an amount, between 0 and 12,000 shillings, to put in the private envelope. You can choose an amount, between 0 and 12,000 shillings, to put in the common basket. Remember that we will pay you real money at the end of the experiment, depending on what you and your partner decide. Please make your choice now, by ticking once for question 4. [*Indicate where on visual aid*]

2. Expectations
We will now ask you questions 5-16 about behaviour in this game. Once you have made all of these decisions on this page, we will randomly pick one question. If you get the answer correct in the question we pick, we will give you another 4,000 shillings as a bonus. Let us remind you that it is very important that you do not talk during the experiment, and that you only mark one box per question. If you mark more than one box you will not be able to receive the bonus.

We will now ask you to make 4 guesses on what people decided in this game. If this question is chosen you could earn another 4,000 shillings on top of the money from the first section of the experiment. You would win the bonus if you are within 10% of the real answer. So, if your guess is good but not perfect, you will still get the bonus.

- For question 5, there are five boxes, each showing difference scenarios.
- The left hand box shows that the entire 12,000 shillings have been placed in the private envelope.
- The right hand box shows that the entire 12,000 shillings has been places in the common basket.
- In each of the boxes, in intervals of 10%, how many people in this room do you think contributed the amounts shown? For example, 0, 10, 20, 30, 40%?

We previously played this game with over one hundred, randomly selected people in Nakaloke sub-county, near Mbale.

- Again, for question 6, there are five boxes, each showing difference scenarios.
- The left hand box shows that the entire 12,000 shillings have been placed in the private envelope.
- The right hand box shows that the entire 12,000 shillings has been places in the common basket.
- In each of the boxes, in intervals of 10%, how many people in Mbale do you think contributed the amounts shown?

3. Norms

Now we will give a series of situations where someone made a decision. I will ask you to consider the different possible choices available and to decide, for each of the possible actions, whether taking that action would be "socially acceptable" and "consistent with moral or proper social behaviour" or "socially unacceptable" and "inconsistent with moral or proper social behaviour."

By socially acceptable, we mean behaviour that most people agree is the "correct" or "ethical" thing to do. Another way to think about what we mean is that if someone were to select a socially unacceptable choice, then someone else might be angry at them for doing so.

If this set of questions is chosen, you could earn another 4,000 shillings on top of what you earned in the first section of the experiment. You would earn that money if you give the same answer as the *most popular choice*. For these questions, we are not interested in your preferences. Rather, we are interested in what you think the *most popular* choice would be.

We will now go through an example. Imagine someone is at a local coffee shop near campus. While there, they notice that someone has left a wallet at one of the tables. Someone sees, and must decide what to do. They have four possible choices, and you need to rate how socially acceptable, "correct" or "ethical" that action is.

[*Read each choice out, ask 'how would you rate that action?' give the 4 possible ratings, and get experimenter 2 to answer using the below scale. Use visual aid throughout*]

	Very socially unacceptable	Socially unacceptable	Socially acceptable	Very socially acceptable
	- -	-	+	++
Take the wallet	X			
Ask others nearby if the wallet belongs to them			X	
Leave the wallet where it is		X		
Give the wallet to the shop manager				X

[**Experimenter 2:**] I think most people in this room would say 'action' is 'rating'. So I would tick *here*.

Now that we've gone through an example, we will turn to our questions. Remember that if you give the same answer as the most popular option, and if that question is randomly chosen, you could earn extra money.

For questions 7-11 in Kampala, for the people in this room, imagine someone put nothing in the private envelope and everything in the common basket. Please rate this as either very socially unacceptable (–), somewhat socially unacceptable (-), somewhat socially acceptable (+) or very socially acceptable (++) by ticking once in that row.

You will see another four possible choices, where someone put either 3,000, 6,000, 9,000 or 12,000 in the private envelope. Please rate each choice as either very socially unacceptable (–), somewhat socially unacceptable (-), somewhat socially acceptable (+) or very socially acceptable (++). Remember, you can only get a bonus if you tick once per row.

For questions 12-16, imagine that instead of playing in Kampala, we are playing in Mbale. Everyone in this room is also playing the game, and that everything else is the same. The only difference is that we are imagining playing the game in Mbale. Please rate the same 5 choices as either very socially unacceptable (–), somewhat socially unacceptable (-), somewhat socially acceptable (+) or very socially acceptable (++). Remember, you can only get a bonus if you tick once per row.

4. Choice of bonus question

Now collect each the participants' answer sheets, with assistants writing ID number on answer sheets as they are collected. At the same time hand out the survey questions, again adding ID numbers. It is important that participants keep their ID cards as they will require this to collect their earnings at the end of the session.

Before participants begin to complete the survey questions, select someone at random to choose the bonus question blind from a cup. This cup should include the numbers from 5 - 16, denoting the different questions. Note questions 5 and 6 will need five intervals. There will be 20 questions to select from.

5. Survey

We will give you a new sheet. While we calculate your earnings, we'd like to ask a few general questions, to understand more about you. All information is anonymous, will not affect your earnings and is given voluntarily. If you wish not to answer a question, you are allowed to skip it.

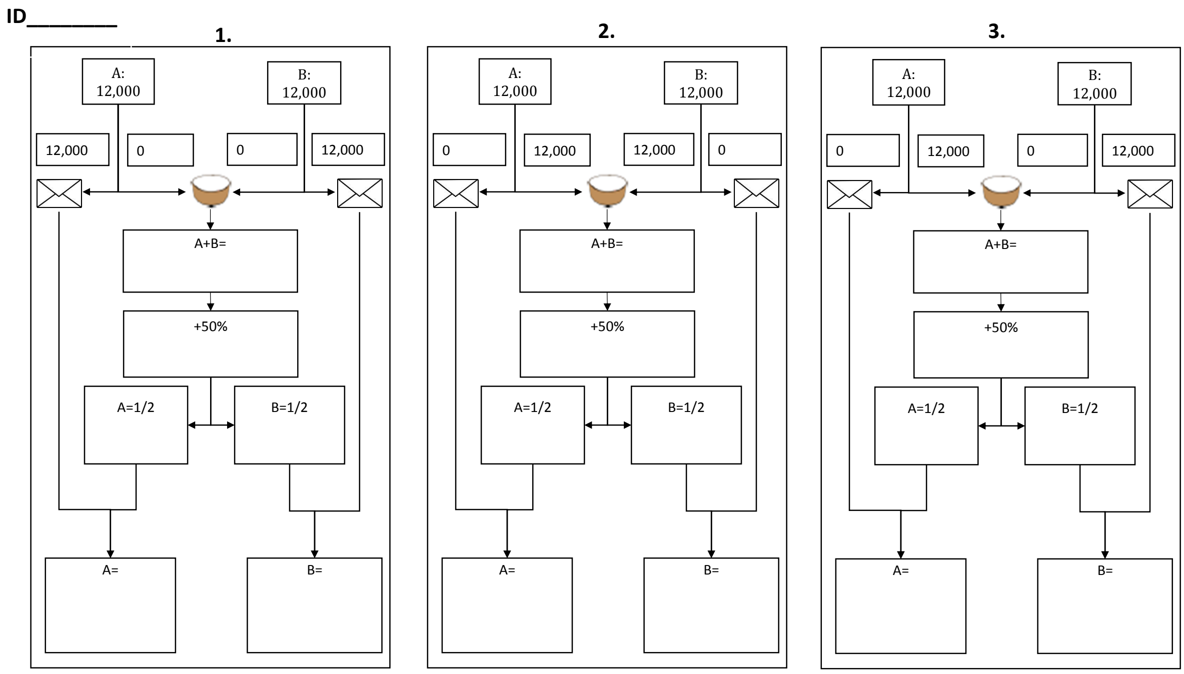
1. How old are you? [In years]
2. What is your gender? [Male/Female]
3. How many years, in total, have you spent in Kampala? [Answer in whole years]
4. How many people in this room do you know by name? [Please don't include the experimenters].
5. How many days in the last year have you spent in Bugishu region?
6. Which language did you learn first?
7. Where were you born?
8. Where is your father from?
9. Where is your mother from?

10. Which language do you prefer to speak at home?
11. How important is it to follow social rules, even if there is a cost? Please answer [1] not at all important, [2] not very important, [3] somewhat important or [4] very important.

Thank you very much for your answers. You have now all completed all of the tasks. We now invite you to come forward, one by one, to collect up your earnings. Thank you for coming today, your participation has been greatly appreciated.

16 Decision Sheets

Below is the first page of the decision sheet, showing the control questions.



On the following page, the answer sheet shows the contribution decision (4), the two sets of expectations (5 and 6) and norms (7 and 16).

ID________

4.

12,000	9,000	6,000	3,000	0	
☐	☐	☐	☐	☐	
0	3,000	6,000	9,000	12,000	

	12,000 0	9,000 3,000	6,000 6,000	3,000 9,000	0 12,000
5. Kampala	%	%	%	%	%
6. Mbale	%	%	%	%	%

Kampala	--	-	+	++
7. : 12,000 : 0				
8. : 9,000 : 3,000				
9. : 6,000 : 6,000				
10. : 3,000 : 9,000				
11. : 0 : 12,000				

Mbale	--	-	+	++
12. : 12,000 : 0				
13. : 9,000 : 3,000				
14. : 6,000 : 6,000				
15. : 3,000 : 9,000				
16. : 0 : 12,000				

The final sheet shows where survey questions are answered. Note no language is used at any point.

ID:________

1. ____

2. ____

3. ____

4. ____

5. ____

6. ____

7. ____

8. ____

9. ____

10. ____

	1	2	3	4
11.	☐	☐	☐	☐

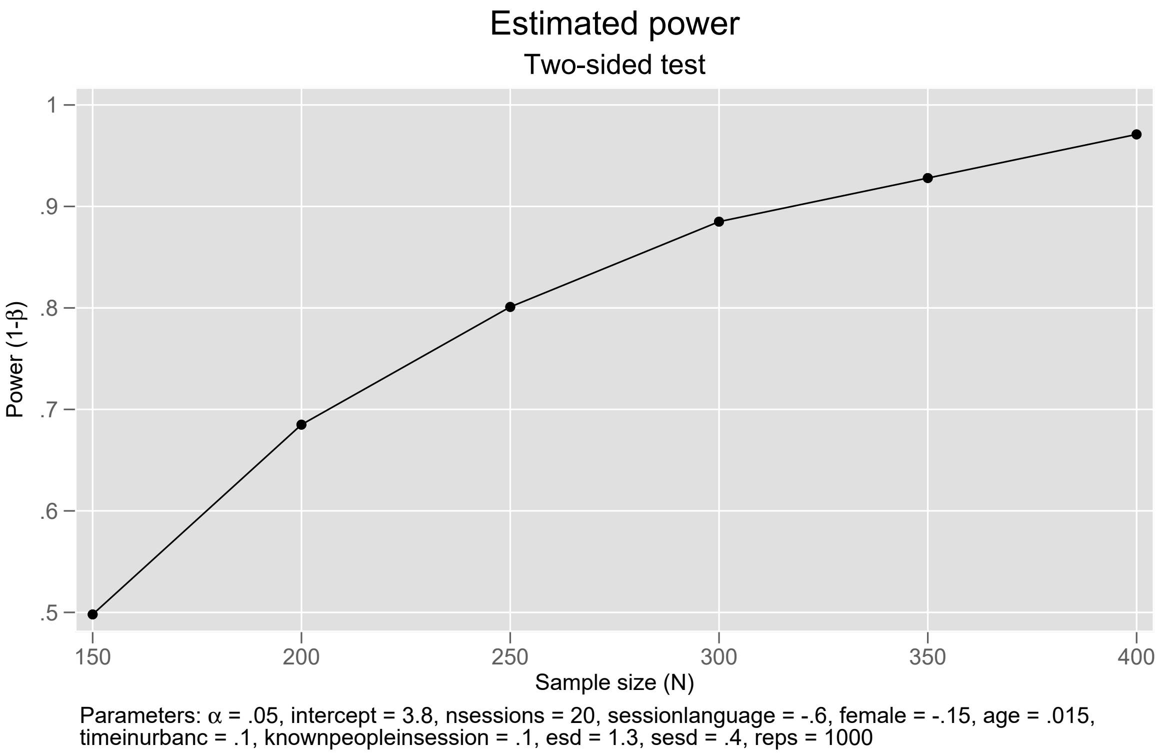
17 Power Calculation

Below is the (long) code required to simulate power for family 1: using the three p values of family 1, and making a decision based on at least one q value being under 0.05. All parameters were based on Clist and Verschoor (2017) where possible, or decided conservatively if not. Figure 2 shows that with a sample size of 300 there is power of greater than 0.8 to detect the previously found effect size.

After the code for family 1, we include the *results* of power calculations for families 2a and 3a. These two power calculations (families 2a and 3a) show that the experiment is well powered for the strategy of using a series of Wilcoxon rank-sum tests for norms or expectations. As long as we can expect similar effect sizes, the experiment is then well powered for families 5, 6, 8 (a & b) and 9 (a & b). In many cases this is a very conservative assumption. For example, family 5 tests whether place affects norms by comparing a population of norms for behaviour 'as if' subjects were playing in Mbale to norms elicited for Kampala. This means that there are two observations per subject rather than one, and so the power for family 5 (and 6) are much greater than those calculated here.

A power calculation for family 7 follows the calculations for families 1, 2a and 3a.

Figure 2: Power Calculation for Different Sample Sizes, Family 1: 1,000 Replications



Stata code

```
clear
set seed 092019
global controls female age timeinurbanc knownpeopleinsession //  ALL CONTROLS
capture program drop simregress
program simregress, rclass
    version 15.1
    // DEFINE THE INPUT PARAMETERS AND THEIR DEFAULT VALUES
    syntax, n(integer)          /// Sample size
          [ nsessions(integer 20) alpha(real 0.05) intercept(real 3.805)
sessionlanguage(real -.58)          female(real -.17) age(real .015)
timeinurbanc(real .1)        knownpeopleinsession(real .1)         ///
esd(real 1.296)         ///  Standard deviation of the error
sesd(real 0.45) ]        //  Standard deviation of session effect
```

```
 quietly {         // GENERATE THE RANDOM DATA
        clear
        set obs `n'
                generate sessionlanguage = rbinomial(1,0.5)
        generate e = rnormal(0,`esd')

                generate sessionid = runiformint(1,(`n'/`nsessions'))
                sort sessionid
                generate sessioneffect = rnormal(0,`sesd')
replace sessioneffect=sessioneffect[_n-1] if sessionid==sessionid[_n-1]
```

```
                generate female= rbinomial(1,0.5)
                generate age = runiformint(18,30)
                generate timeinurbanc = runiformint(0,12)
                replace timeinurbanc=0 if timeinurbanc<2.5
                replace timeinurbanc=2 if timeinurbanc>5.5
                replace timeinurbanc=1 if timeinurbanc>2
                generate knownpeopleinsession = round(abs(rnormal(0,3)),1)

generate contribution15 = `intercept' + `sessionlanguage'*sessionlanguage ///
+ sessioneffect + female*`female' + age*`age' + timeinurbanc*`timeinurbanc' ///
+ knownpeopleinsession*`knownpeopleinsession'         + e

replace contribution15 =round(contribution15 ,1) // keep it in the 1-5 range
replace contribution15=1 if contribution15<1
replace contribution15=5 if contribution15>5
```

```
// TEST THE NULL HYPOTHESIS
        gen pfamily1 = .
        escftest contribution15, group(sessionlanguage)
        replace pfamily1=r(p_val) if _n==1

        constraint 1 sessionlanguage = 0
        regress contribution15 sessionlanguage , cluster(sessionid )
        boottest
        replace pfamily1=r(p) if _n==2

        regress contribution15 sessionlanguage $controls, cluster(sessionid )
        boottest
        replace pfamily1=r(p) if _n==3

        qqvalue pfamily1, method(hochberg ) qvalue(qfamily1)
        list pfamily1 qfamily1 if qfamily1!=.
        sum qfamily1
            }
    // RETURN RESULTS
    return scalar reject = (r(min)<‘alpha’)
end
```

```
capture program drop power_cmd_simregress
program power_cmd_simregress, rclass
    version 15.1
    // DEFINE THE INPUT PARAMETERS AND THEIR DEFAULT VALUES
    syntax, n(integer)          /// Sample size
          [ nsessions(integer 20) alpha(real 0.05)
intercept(real 3.8) sessionlanguage(real -.6)
female(real -.15)         age(real .015)         timeinurbanc(real .1)
knownpeopleinsession(real .1)         esd(real 1.3)
sesd(real 0.4)  reps(integer 100) ]
```

```
    // GENERATE THE RANDOM DATA AND TEST THE NULL HYPOTHESIS
    quietly {
simulate reject=r(reject), reps(‘reps’):               ///
simregress, n(‘n’) age(‘age’) female(‘female’)  intercept(‘intercept’)  ///
esd(‘esd’) sesd(‘sesd’) alpha(‘alpha’) sessionlanguage(‘sessionlanguage’) ///
timeinurbanc(‘timeinurbanc’) nsessions(‘nsessions’) ///
 knownpeopleinsession(‘knownpeopleinsession’)
        summarize reject
    }
```

```
// RETURN RESULTS
        return scalar power = r(mean)
        return scalar N = `n'
        return scalar alpha = `alpha'
        return scalar intercept = `intercept'
        return scalar sessionlanguage = `sessionlanguage'
        return scalar female = `female'
        return scalar age = `age'
        return scalar timeinurbanc = `timeinurbanc'
        return scalar knownpeopleinsession =`knownpeopleinsession'
        return scalar esd = `esd'
        return scalar sesd = `sesd'
        return scalar nsessions=`nsessions'
end

capture program drop power_cmd_simregress_init
program power_cmd_simregress_init, sclass
sreturn local pss_colnames "intercept nsessions sessionlanguage ///
female age timeinurbanc knownpeopleinsession esd sesd"
sreturn local pss_numopts  "intercept nsessions sessionlanguage ///
female age timeinurbanc knownpeopleinsession esd sesd"
end

power simregress, n(150(50)400) reps(10000)  graph
```

Power Calculation: Family 2a

Using a similar methodology, we calculate power for family 2a. This is somewhat more complicated: the question is novel and so we cannot know the appropriate ratings or effect sizes. Based on a small pilot, we use the data in table 3 to simulate data, resulting in the power calculations of figure 3. Table 3 requires further explanation. 50% of people in language '0' rate giving nothing as very socially unacceptable. 38%(=50-12) in language '1' rate it in the same way.

Table 3: % of Each Norm Rating and Effect Sizes, Used for Power Calculation for Family 2a

	Contribution				
Norm Rating	0	3,000	6,000	9,000	12,000
−−	50	40	30	20	10
−	20	20	20	20	20
+	20	20	20	20	20
++	10	20	30	40	50
Effect Size	12	8	2	8	12

Figure 3: Power Calculation, Family 2a

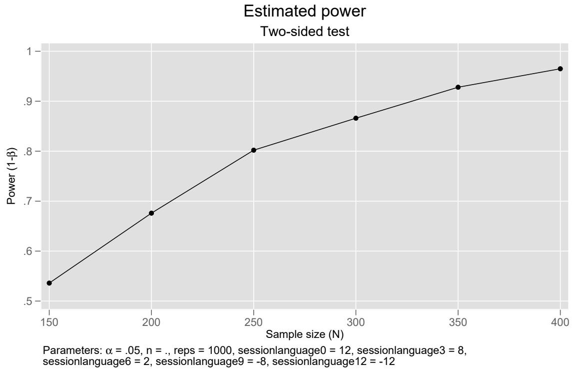
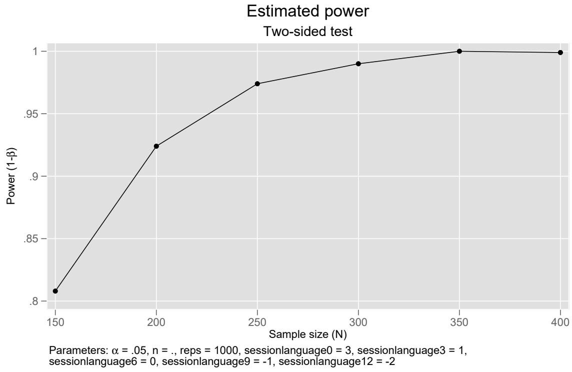


Figure 4: Power Calculation, Family 3a



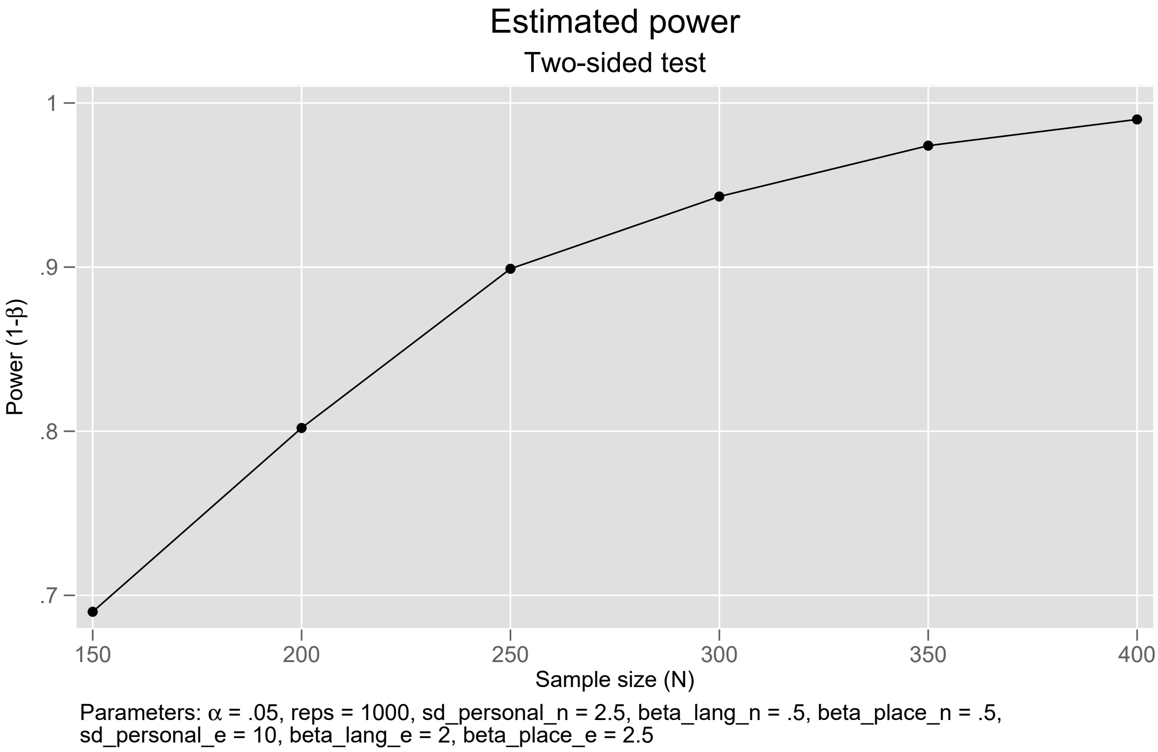
Power Calculation: Family 3a

For family 3a, the assumptions are easier to explain: we assume effect sizes (in percentage point terms) over the 5 point distribution of 3, 1, 0, 1 and 2 respectively. In each case, we assume the data generating process is that people's guesses come from a normal distribution with a mean of 15 and a standard deviation of 5. Guesses are rounded to the nearest 10 after the language effect has been simulated.

Power Calculation: Family 7

Figure 5 show the results of a power calculation for family 7, with individual effect sizes of between 1/6th and 1/3rd of a standard deviation for expectations or norms. The interaction effect is assumed to be the 1:1 interaction of these effects. Extracts of the code follows, with omitted portions the same as those included above.

Figure 5: Power Calculation for Different Sample Sizes, Family 7: 1,000 Replications




```
    // DEFINE THE INPUT PARAMETERS AND THEIR DEFAULT VALUES
    syntax, n(integer)        /// Sample size
          [ alpha(real .05)        /// Number of subjects in a session
sd_personal_n(real 2.5)        ///
beta_lang_n(real .5)        ///
beta_place_n(real .5)        ///
sd_personal_e(real 10)        ///
beta_lang_e(real 2)        ///
beta_place_e(real 2.5)        ///
reps(integer 100) ]        //
```

```
   quietly {
        clear
        set obs ‘n’
                gen id=_n
                expand 5
                sort id
                gen contribution=0
                replace contribution=3+contribution[_n-1] if id==id[_n-1]
```

```
                gen normrandom                         = runiform(100,200)
                generate sessionlanguage         = rbinomial(1,0.5)
                generate kampaladummy        = rbinomial(1,0.5)
        generate e_personal_n = rnormal(0,‘sd_personal_n’)
        generate e_personal_e = rnormal(0,‘sd_personal_e’)

gen NormIndividual_temp=-5 + contribution*.1 +e_personal_n ///
+ ‘beta_place_n’*kampaladummy + ‘beta_lang_n’*sessionlanguage ///
+ ‘beta_place_n’*kampaladummy*‘beta_lang_n’*sessionlanguage
```

```
        gen         NormIndividual=1/3         if NormIndividual_temp>0
        replace NormIndividual=1         if NormIndividual_temp>5
        replace NormIndividual=-1/3 if NormIndividual_temp<0
        replace NormIndividual=-1        if NormIndividual_temp<-5

gen ExpIndividual_temp=5 + contribution*.1 + ‘beta_place_e’*kampaladummy + ///
‘beta_lang_e’*sessionlanguage + e_personal_e + ///
‘beta_place_e’*kampaladummy*‘beta_lang_e’*sessionlanguage

gen         ExpIndividual=round(ExpIndividual_temp+10,10)
replace ExpIndividual=0 if ExpIndividual<0
}
```

```
        // TEST THE NULL HYPOTHESIS
gen pfamily7 = .
gen interaction1=contribution*kampaladummy
gen interaction2=contribution*sessionlanguage
gen interaction3=contribution*sessionlanguage*kampaladummy
regress  NormIndividual contribution interaction*,  vce(cluster id)
test interaction3==0
replace pfamily7=r(p) if _n==1
regress  ExpIndividual contribution interaction*,  vce(cluster id)
test interaction3==0
replace pfamily7=r(p) if _n==2
qqvalue pfamily7, method(hochberg ) qvalue(qfamily7)
sum qfamily7 if qfamily7!=.
}
    // RETURN RESULTS
    return scalar reject = (r(min)<‘alpha’)
end
```

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