Social Dilemmas in a Bilingual Society:
an Experiment in Two Languages in Uganda[*]

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Abstract

Multilingualism is the global norm, but the implications of this for cooperation and public goods provision are seldom studied. We test experimentally whether the language in which a public goods game is played affects subjects' contributions amongst a bilingual population, in Eastern Uganda. We find that subjects on average contribute a quarter less in the more local language. This treatment effect is solely driven by those most associated with the local identity, which is known to value autonomy as an ideal. The language used to conduct the game makes one of two identities salient but both are shared by all subjects. However, the heterogeneous effects imply identities have different weights or interpretations for different subjects. This has important implications for cooperation in multilingual societies, which include many developing countries.

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1 Introduction

Identities matter. Akerlof and Kranton (2000) formally introduced 'a person's sense of self' into economic analysis, where identities impose costs of deviation from category norms. The presence and size of these dis-utilities are determined by the salience of a category in a given situation, and the strength of identification with a category. A body of experimental literature has since provided empirical support. This research makes use of priming, temporarily making a certain social category salient, which has a much longer history in psychology. One strand of the literature compares decisions from primed subjects with a control group receiving a neutral prime. Benjamin et al. (2010) present a set of experiments in which priming ethnicity causes Asian-American subjects to make more patient decisions relative to a neutral prime, with the opposite effect for black subjects. Hoff and Pandey (2006, 2014) show that effort provision is affected by the salience of caste for lower-caste students in India, again using a neutral prime as a control. Benjamin et al. (2013) prime religious identity and find a range of different effects in the domains of cooperation, risk and reciprocity. The papers cited make salient a *single* identity (ethnicity, caste group, religion) and study the effect on behaviour. A second strand of the literature makes comparisons between subjects primed in different ways. Through randomly assigning subjects to treatments in which various identities are made salient, evidence is obtained that people have *multiple* identities and behave differently according to the identity that is brought to the fore. LeBoeuf et al. (2010) present evidence in which the salience of different social identities (e.g. student, socialite, family member) affect stated preferences for related goods. Cadsby et al. (2013) show that for women, priming a business identity (relative to a family/gender identity) increases the likelihood with which they choose a competition over a piece rate pay structure. There is no such difference for men. Looking at cooperation, Chen et al. (2014) study prisoner's dilemma and minimum effort games where either a fragmenting (ethnic) or common (university) identity is primed. As predicted, the fragmenting identity leads to less socially efficient outcomes.

Experimental research on identity faces the challenge of priming appropriately. To bring an identity to the fore, what is a good priming technology? The method chosen is typically to administer a questionnaire on a pertinent topic shortly before some experimental decision. A common concern regarding the validity of this method is that experimenter demand effects may be driving the results (Zizzo, 2010).[1] Sometimes it is possible to rely on subtle cultural cues. Hoff and Pandey (2006, 2014) obtain their treatment effect by calling out (for all subjects in a session to hear) the names of subjects (young boys), as well as the names of their father, paternal grandfather, village and caste.

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[1] Benjamin et al. (2010) try to assuage such fears by administering a questionnaire, asking subjects to guess the topic of the experiment. Although useful, this does not seem fully satisfactory, as the second set of questions could also be prone to experimenter demand effects and would only detect conscious biases.

This is seemingly innocuous but highlights the boys' social identity. The psychological literature provides a different priming technology, rarely adopted in the economics literature: using different languages to prime different identities.[2] In contexts where multiple languages are commonly spoken, different aspects of subjects' identities are primed in a way that is more normal than filling in a questionnaire. Here we study whether cooperation is affected by language use in a setting in which balanced bilingualism is the norm.[3] In the area of eastern Uganda that we selected, two languages are interchangeable for public purposes, so the language of the experimental script appeals to a particular identity without revealing the experiment's aims. More generally, language has value as an alternative priming technology; it would be troubling if priming only worked if questionnaires were used.

However, the main reason to study language is its sheer importance. Amongst the 200 or so countries in the world, there are 7,105 known living languages in current use (Lewis et al., 2013). Most readers of this article will live in countries with a clear and unambiguous 'national de facto language' which are populated by monolinguals. From a global perspective however, multilingualism is more common (Crystal, 1997). Romaine (2004, p.385) states that "Bilingualism and multilingualism are a normal and unremarkable necessity of everyday life for the majority of the world's population." Indeed, in developing countries 'societal multilingualism', where multiple languages co-exist within a given society, is particularly prevalent. Romaine (2001, p.517) gives a telling picture of daily life:

> "The average educated person in Hyderabad may use Telegu at home, Sanskrit at the temple, English at the university, Urdu in business, etc... In societies such as these, multilingualism is not an incidental feature of language use, but a central factor and an organising force in everyday life."

Despite their importance amongst the world's population, languages are rarely studied by economists. Recent exceptions include a high profile statistical relationship between certain linguistic features and savings behaviour (Chen, 2013), the findings that in their *weaker* language bilinguals are less prone to cognitive biases (Keysar et al., 2012; Costa et al., 2014a) and more likely to make utilitarian moral judgements (Costa et al., 2014b),

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[2]While psychology's use of questionnaires as a priming technology has been extensively adopted by economists in recent years, we are aware of only one other experiment that uses language to prime identity, despite potential advantages related to experimenter demand effects and external validity. Lambarraa and Riener (2012) conduct a field experiment on *giving*, using Arabic and French amongst Moroccan participants. Subjects are asked to fill in a questionnaire and can decide whether or not to denote their fee for doing so to a local orphanage. They find that donations are higher in the Arabic treatment, and argue that this is because subjects' Islamic identity, which promotes more charitable norms, is triggered. As discussed in Section 4, this study consciously chooses to exploit experimenter demand effects rather than avoid them, and should be seen as priming a religious identity with language being incidental rather than fundamental.

[3]Balanced bilingualism is a term from linguistics that means equal proficiency in two languages.

and the effect of language in strengthening identity (Aspachs-Bracons et al., 2008; Clots-Figueras and Masella, 2013). Within the experimental economics literature, language has been mentioned mainly as a factor to be controlled for (Roth et al., 1991) or seen as a proxy for ethnicity (Habyarimana et al., 2009), rather than worthy of study in its own right.[4]

If people have multiple identities, and they behave according to the one that is 'primed', then behaviour should be affected by the cues present in the social context. Our contribution to the literature is to treat language as a cue for one of a potential variety of identities, and investigate whether cooperation is affected accordingly. Specifically, we investigate multilingualism and multiple-identities by conducting a linear one-shot public goods game (PGG) in two languages amongst a bilingual population. Both languages are used locally, with around 90% of the local population understanding both languages, and neither has a stronger claim to being the dominant language in public settings. In effect two lingua francas are found in the study area: Luganda and Lugisu.[5] We find a strong treatment effect such that subjects in the Luganda treatment contribute 30% more to the public good. Moreover, this treatment difference is driven by subjects which are *most* associated with the local Bagisu identity, but this can't be interpreted strictly according to ethnic groups. These results provide strong evidence that the co-existence of various languages affects important economic interactions. They may also help explain common findings of low provision of public goods in diverse societies, described as "one of the most powerful hypotheses in political economy" (Banerjee et al., 2005, p.639).

PGGs have been played extensively; for reviews see Zelmer's (2003) meta analysis, Cardenas and Carpenter's (2008) review of evidence from developing countries and Levitt and List's (2007) critique of the method. The game can be seen as a general measure of cooperation given the trade-off between social efficiency and the maximisation of private profit. Two strands of the previous literature are worth discussing here. First, natural (externally relevant) groups have been used to examine whether contributions are affected by information regarding whether one's partner shares a given group membership. The information has included village of residence (Etang et al., 2011), tribe (Bernhard et al., 2006), ethnicity (Habyarimana et al., 2009) and nationality (Finocchiaro Castro, 2008). Results show higher cooperation, trust and norm enforcement amongst one's own group. Second, a separate strand has compared contribution rates between different societies, since Roth et al.'s (1991) seminal work showed significant differences between subjects

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[4]Desmet et al. (2012, p.337) argue that linguistic distinctions are more objective than ethnic boundaries ("it is easier to judge whether two populations speak different languages than to decide whether two populations belong to different ethnicities, a more amorphous concept...") and thus more amenable to study. In our study language is not a signal of the ethnicity of one's partner and so any treatment differences are due to a subject's own response to the language.

[5]Luganda is a 'national language' and Lugisu is the language of the people (the Bagisu) that historically dominate Bugisu, in eastern Uganda. The sub-county of Nakaloke, our study area, is found in Bugisu and ethnically highly diverse, resulting from large inflows of migrants in the early twentieth century.

in four countries. More recent cross-country comparisons have shown that cross-society differences are correlated with characteristics such as their market integration or the strength of the rule of law, using comparisons between up to 16 societies (Henrich et al., 2001; Herrmann et al., 2008).

While the papers mentioned here are just a fraction of the PGGs that have been conducted, we are not aware of any other that uses language as its treatment. There are also two more fundamental differences. First, the two strands of literature discussed above are interactions or comparisons *between distinct groups.* In our experiment, all subjects belong to both groups in the sense that they speak both languages fluently. The language of the experiment makes salient one of those group memberships, but does not divide the group in either expectation or reality. We use language as a priming technology for making a particular identity salient among all subjects in a session and investigate whether interactions in the group thus activated are affected by such priming. Our results provide support for the hypothesis that an individual's multiple group memberships (identities) have specific norms associated with them.[6]

Second, we study whether the effects of language on behaviour, through making a particular identity salient and thereby activating group-specific norms, are heterogeneous. Our subjects are all similar in one key respect and different in another. All subjects are accustomed to using either of the two languages for public communication. However for almost half of our subjects, one of the languages used, Lugisu, is also a language for the private sphere. The local (Bagisu) culture is known in the ethnographic literature for valuing individual autonomy highly (see Section 2.3). As mentioned, those most strongly associated with that culture contribute less in our experiment, *but only when* the experiment is conducted in the language of the Bagisu: Lugisu. For this group only, language effectively triggers an identity and associated norms that are latent when another language is used. This result suggests that language activates group norms in a heterogeneous fashion: if different people's latent identities differ they can respond in very different ways to identical linguistic cues. We discuss this in the article in terms of the dynamic constructivist approach to bilingualism (Hong et al., 2000; Luna et al., 2008) and spell out implications for thinking about groups and public goods provision.

The article proceeds with Section 2 in which we describe the study area, sample, experiment and hypotheses. Section 3 presents the main results, which are discussed in Section 4. Section 5 contains a brief conclusion.

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[6]Akerlof and Kranton (2000, p.731) describe this case, where different identity-based pay-offs become salient in different situations, which may result from group-specific norms.

2 Experimental Details

2.1 Site and sample selection

We selected as our study area the Nakaloke sub-county of Mbale, Eastern Uganda (a rural, predominately agricultural region). We selected this sub-county because of its high level of balanced bilingualism. For historical reasons, there are two interchangeable languages for public purposes in Nakaloke: Luganda and Lugisu.[7] Local informants estimate the degree of bilingualism of the two languages in question was 90% for language comprehension, but we used a strict screening process regarding language production which 68% met.[8] It is locally expected that virtually all residents can communicate in both languages, but we wished to ensure subjects met a high bar of balanced fluency in the two languages. In the weeks before the experiment each potential subject was interviewed for some basic personal information, which gave an opportunity to assess whether they could fluently produce both languages.

Subjects were drawn from a multi-stage cluster randomisation such that they came from five randomly-selected villages in the area of four randomly-selected central meeting places (so twenty villages in total). Table 1 reports summary statistics for key characteristics for the sample as a whole and by treatment. This gives an insight into the local language situation. For example, only 115 out of 218 subjects report using their tribe's language as their main language at home. Of the remaining 103, only 33 are using the language of their spouse's tribe. This explains how while only 3.2% are Baganda, some 28% use Luganda (the associated language) as their main language at home. This language situation is not due to recent high levels of movement: only 21 subjects have lived in the region for less than 5 years, and 36 subjects for less than 10 years.

2.2 Implementation of experiment

We played a (slightly modified) one-shot linear public goods game. Sessions were conducted in either Lugisu or Luganda on four consecutive days in January 2013. All interactions between experimenters and subjects took place in a single language, from the elaborate, culturally prescribed welcoming act to unscripted directions regarding where to wait. Morning and afternoon sessions were run in each central location with a random

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[7]The British colonisers collaborated with a Ganda general, Semei Kakungulu, to pacify the Bagisu in the early 20th century. His followers from many different peoples settled in Nakaloke, part of the region of Bugisu, which therefore became ethnically highly diverse. The language spoken in Bugisu, Lugisu, was one natural lingua franca, and the language spoken among Kakungulu's followers, Luganda, became the other lingua franca (cf. Heald, 1998, pp. 23 ff.).

[8]This was interpreted very strongly by local experimenters, so that 27.7% met only the Luganda standard, 3.1% met only the Lugisu standard and 1.3% met neither. In neighbouring sub-counties fluency in Luganda is less prevalent and fluency in Lugisu is higher. Another experiment was conducted simultaneously, and so subjects which did not meet the criterion of true bilingualism were selected, by default, into the other experiment.

Table 1: Summary Statistics

Characteristic	Whole Sample		Frequency By Treatment	
	Frequency	% of Sample	Luganda	Lugisu
Total	218	100	116	102
Male	93	42.7	50	43
Education				
None	20	9.2	8	12
Some Primary	102	46.8	57	45
Some Secondary	90	41.3	47	43
Some Tertiary	6	2.8	4	2
Religion				
Muslim	133	61.3	68	65
Catholic	22	10.1	13	9
Born Again	14	6.5	8	6
Anglican	48	22.1	27	21
Tribe (inherited from Father)				
Bagisu	102	46.8	54	48
Baganda	7	3.2	3	4
Bagwere	43	19.7	21	22
Banyole	33	15.1	19	14
Itesot	6	2.8	4	2
Basoga	18	8.3	10	8
Other	9	4.1	5	4
Main Language Used at Home				
Lugisu	67	30.7	32	35
Luganda	60	27.5	36	24
Lugwere	65	29.8	33	32
Lunyole	14	6.4	7	7
Lugosa	8	3.7	5	3
Swahili	1	0.5	0	1
English	2	0.9	2	0
Other	1	0.5	1	0
	Mean	SD	Mean	Mean
Years in Nakaloke	26.6	16.4	25.7	25.6
Age	35.2	13.8	35.3	35.2
Acres of Land	2.4	5.6	2.8	1.9
Number of Businesses	0.83	0.97	0.9	0.8

Other Linguistic and Ethnic Features

Number who use own tribe's language as main language at home	115
Number whose father and mother come from the same tribe	115
Number whose spouse is from their tribe	59
Number whose spouse is not from their tribe	116

Perception of portion of the sub-county that shares the subject's own:

	Very Few	Few	Some	Most
Main Language	3	17	75	123
Tribe	4	14	104	96

order of the two languages. Communities are such that co-villagers would be expected to know each other, and other players would be a mixture of friends, acquaintances and unknowns. Each player was endowed with 8,000 Ugandan Shillings (UGS, approximately two daily wages for an agricultural labourer), in the form of twenty tokens each worth 400 UGS. Each subject was anonymously paired with another subject in the same session, which had between 18 and 30 subjects. Subjects chose to invest a number of tokens $g_i = [0, ..., 20]$ in the public good. The value of this public good was then increased by 50%, and split equally between the two players. The payoff for each player is then calculated as $\pi_i = 20 - g_i + 0.75(g_i + g_j)$ where i is a given player, j is their partner and the last term describes the payoff from the public good. The game is a social dilemma as the socially efficient choice is to contribute all of the endowment (such that each subject receives 12,000 UGS) but the dominant strategy is to contribute nothing.

The original feature of the game played is the addition of a unidirectional controlled cheap talk element, where each subject is randomly assigned to the role of either *sender* or *receiver*. The *sender* is able to send one of two messages to the *receiver*:

1. Let us both put everything into the box. That way we can both earn more money.

2. I won't put anything into the box. Let us each keep what we have.

The somewhat clunky English of these messages reflects the fairly literal back-translation from Luganda and Lugisu. The *sender* decides upon this message before deciding how much to contribute to the public good. As we cannot guarantee literacy amongst our subject pool, each decision was communicated orally to one of two experimenters (see table 2 for details). The decision of which message to send was communicated to the first experimenter (who also asked three control questions), and the decision of how much to contribute to the public good was communicated to the second experimenter (who subsequently asked eight survey questions). The four combinations of contributing all/nothing are used as examples in the explanation, and control questions check understanding of the mechanisms. Of the 218 subjects 214 answered all three control questions correctly, and so we use all of the available data.[9] While public goods games are typically taken as a measure of cooperation, the unidirectional cheap talk element means that it is usefully extended to measure the extent of trusting/trustworthy behaviour, and includes some variation in expectations given the two signals. Both features of the data prove useful additions in discussing competing hypotheses.

A rigorous process of translation was used, where the local experimenter team (consisting of two experimenters involved in this experiment, and six in another) were involved in translating and/or checking the translation of the script to ensure comparability. The

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[9]One subject did not answer questions relating to any land, business or religious affiliation, and so is excluded in related regressions.

two experimenters used are from the local area and live within the region, meaning they speak both languages with the local accent. Neither of them was known in the sample villages, though.

Table 2: Order

Sequence	Setting	Task
1	Before Game Day	Assess language fluency
2	In the Main Room	Experimental instructions
3	With Experimenter 1	Control questions, signal choice/reception
4	With Experimenter 2	Contribution choice, survey questions

2.3 Hypotheses

Building on Akerlof and Kranton's (2000) formal economic modelling of psychology's self-categorisation theory, Benjamin et al. (2010) present a simple model of identity which provides a useful framework for organising hypotheses for the current setting. Consider some choice x, where x_0 represents an individual's preferred option in the absence of identity considerations. An individual belongs to a social category C with strength $s \geq 0$, and x_C is the 'action prescribed for members of C'. An individual then chooses x so as to maximise

$$U = -(1 - w(s))(x - x_0)^2 - (w(s))(x - x_C)^2, \tag{1}$$

where $0 \leq w(s) \leq 1$ is the weight on the social category. This can be temporarily increased away from its steady state $\bar{s}$ to $\bar{s} + \epsilon$ through priming, where $\epsilon > 0$. Priming then aims to affect the saliency of a category norm x_C and thus (partially) reveal it. Our experiment aims to make salient two different category norms, which we call $x_{Luganda}$ and x_{Lugisu}, and take advantage of existing heterogeneity.

Null Hypothesis 1 $x_{Luganda} = x_{Lugisu}$ *i.e. equal contributions in the two languages.*

Hypothesis 1 $x_{Luganda} > x_{Lugisu}$ *i.e. that the contribution norm, and thus contributions, will be lower when Lugisu is spoken.*

Hypothesis 2 $x_{Luganda} > x_{Lugisu}$ *in Bagisu culture, i.e. that the contribution norm, and thus contributions, are lower among partakers in that culture, and that the norm is activated when Lugisu is spoken.*

Hypotheses 1 and 2 are complementary; hypothesis 2 is a restricted form of hypothesis 1.[10] Both are rooted in well-documented group norms for the Bagisu people, which differ

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[10]We abstract from arguments to do with group size. Henrich (2004, p.11) argues that cooperation declines exponentially with group size, which implies that languages spoken by smaller numbers of people would, ceteris paribus, have higher cooperation (this result is contested within experimental economics, see Isaac et al., 1994).

markedly from oft-proposed stylised facts for African village life; see Hargreaves Heap et al. (2012) for a review of the relevant ethnographic literature. The Bagisu are known for a remarkable degree of self-reliance: values of autonomy are instilled in them from a young age. The difference between the hypotheses is that in the second, the effect of language in activating a group norm would be limited to those who have absorbed Bagisu culture. We discuss the psychological plausibility of hypothesis 2 in Section 4. The null hypothesis of no treatment effect is to be expected if one holds to the 'fixed-self' view of identity (see Hoff and Pandey, 2014, for discussion), where one's preferences are constant and not easily influenced in the short run.

Null Hypothesis 2 *Equal contribution by signal sent*

Null Hypothesis 3 *Equal contribution by signal received*

Null hypotheses 2 and 3 are useful to frame interpretation, and relate to whether subjects respond to signals with trustworthy/trusting behaviour.
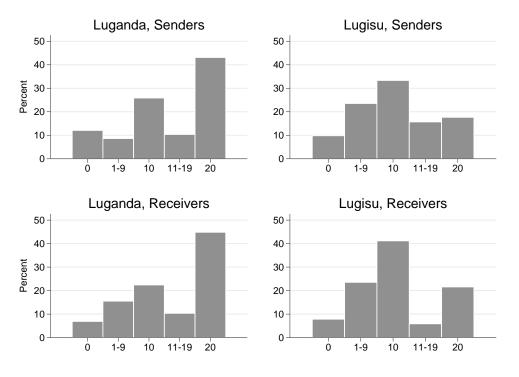
3   Results

Figure 1: Number of tokens contributed by Language and Game Role

Figure 1 shows the number of tokens contributed to the public good by language, presented by treatment and game role. The number of tokens contributed are grouped into five categories: those contributing nothing, half, all or intermediate amounts (table

4 reports OLS regressions using the same 5 point dependent variable). This is because these three focal points (contributing nothing, half or all) are the most popular options; there is discontinuity in the data.

Result 1 *There is a sizeable and significant treatment effect.*

Result 2 *Contributions are significantly higher in the Luganda treatment than the Lugisu treatment.*

On average subjects in the Lugisu treatment contribute 30% fewer tokens. The treatment effect is large (figure 1) and significant at all conventional levels (tables 3 and 4). This is also large compared to demographic correlates such as gender; on average men contribute 9.5% more than women. The direction of the effect is important: hypothesis 1 receives support and the null hypothesis is rejected. While a general shift to lower contributions is evident in figure 1, the striking difference is in the reduction of people who contribute all 20 tokens to the public good. For both senders and receivers, just over 40% of subjects in the Luganda treatment contribute everything, while in the Lugisu treatment only around 20% of people do the same.

Result 3 *Messages contain some value, but strategic play is limited.*

Tables 3 and 4 show that both senders and receivers of signal 2 contribute fewer tokens to the public good. However, there are considerable contributions even when subjects have received or given a signal that suggests their partner will not do the same. Senders of signal 2 contribute around 37% on average, with receivers' contributions averaging around 50%. Thus while null hypotheses 2 and 3 are rejected, subjects adjust much less to messages of non-cooperation than we might expect. While the relative frequency of the messages does not vary by treatment, the result of lower contributions in Lugisu holds consistently for senders and receivers of either message (not shown in the tables).[11]

Result 4 *The treatment difference is driven entirely by those most associated with Bagisu culture.*

Tables 5 and 6 present the related evidence for our experimental results. Specifically, we should expect to see lower contributions, due to the the norm of autonomy, for people who have internalised (to some extent) Bagisu culture when Bagisu culture is primed. The tables present three different ways of separating the data relating to Bagisu identity:

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[11]The frequency of the "let's pool" message is virtually identical in the Luganda and Lugisu treatment: 72.4% and 72.5%, respectively. Both senders ($t = 2.82; p = 0.005$) and receivers ($t = 1.93; p = 0.055$) contribute more in Luganda than in Lugisu when the message is "let's pool". Conditional on the "let's keep" message, receivers of the message in Luganda contribute more than those in Lugisu ($t = 1.78; p = 0.077$), as do senders, although in this case the difference is not significant ($t = 0.56; p = 0.576$). All of these tests are two-sided.

Table 3: Tests of Null Hypotheses

Null Hypothesis 1: Equal Contributions in the two languages					
Language	Luganda	Lugisu	Test	T Test	Mann-Whitney
Mean Contribution	5400	4141.2	Test Statistic	T=3.55	Z=3.55
N	116	102	P Value	P< 0.00	P< 0.00
Null Hypothesis 2: Equal Contributions by Signal Sent					
Signal	Contribute	Keep	Test	T Test	Mann-Whitney
Mean Contribution	5448.1	2986.7	Test Statistic	T=4.61	Z=4.02
N	79	30	P Value	P< 0.00	P< 0.00
Null Hypothesis 3: Equal Contributions by Signal Received					
Signal	Contribute	Keep	Test	T Test	Mann-Whitney
Mean Contribution	5149.4	4066.7	Test Statistic	T=1.92	Z=1.99
N	79	30	P Value	P= 0.06	P= 0.047

Table 4: Treatment Effect, Signal and Games Roles, OLS regression

Variable	(1)	(2)
Lugisu Session	-0.585***	-0.595***
	(0.168)	(0.164)
Sender * Don't Contribute	-1.302***	-1.228***
	(0.266)	(0.269)
Receiver * Contribute	-0.152	-0.023
	(0.197)	(0.196)
Receiver * Don't Contribute	-0.735**	-0.760***
	(0.266)	(0.260)
Controls	No	Yes
N	218	217
R^2	0.15	0.25

Note: The dependent variable is the number of tokens contributed to the public good, but has been transformed to span 1-5, as in figure 1. Standard Errors are provided in parentheses. Controls are included but not reported: see table 7 in the appendix for full results. Personal characteristics controlled for are a subject's age, gender, time resident in the sub-county, education, wealth and religion. Dummies are also included for game role, signal and their interaction.

Table 5: Tests Relating to Bagisu-Influenced Subjects

Treatment:	Luganda		Lugisu		Tests	
Personal Characteristics	Mean	Obs	Mean	Obs	T Test	P Value
Bagisu	6140.7	54	4016.7	48	4.27	P<0.000
Not Bagisu	4754.8	62	4251.9	54	1.03	P=0.310
Main Language is Lugisu	6375.0	32	3657.1	35	4.43	P<0.000
Main Language is not Lugisu	5028.6	84	4394.0	67	1.49	P=0.139
Bagisu Mother	5737.9	58	4000.0	55	3.53	P<0.000
Non-Bagisu Mother	5062.1	58	4306.4	47	1.47	P=0.142

Table 6: Identity and Language Interaction Effects, OLS Regression

Gisu Identity:	Ethnically Bagisu		Main Language		Bagisu Mother	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Lugisu*Gisu ID	-0.522**	-0.767***	-0.233	-0.416**	-0.315	-0.417**
	(-2.17)	(-3.36)	(-1.06)	(-2.00)	(-1.45)	(-2.03)
Luganda*Gisu ID	0.899***	0.729***	0.878***	0.829***	0.546**	0.462**
	(3.59)	(3.05)	(4.17)	(4.14)	(2.55)	(2.26)
Controls	No	Yes	No	Yes	No	Yes
Observations	218	217	218	217	218	217
Adjusted R Squared	0.081	0.248	0.090	0.261	0.047	0.206

Note: The reported coefficients should be interpreted against the default category of subjects with a non-Gisu identity playing the game. The dependent variable is the number of tokens contributed to the public good, but has been transformed to span 1-5, as in figure 1. Controls are included but not reported: see table 7 in the appendix for full results. Personal characteristics controlled for are a subject's age, gender, time resident in the sub-county, education, wealth and religion. Dummies are also included for game role, signal and their interaction.

father is (not) Bagisu, main language is (not) Lugisu and mother is (not) Bagisu. Only the first of these comparisons is strictly ethnic, as in Ugandan culture ethnicity is a paternal inheritance. Table 5 shows that in each of the three ways of separating the data, there is only evidence of a treatment effect where subjects may be expected to have internalised Bagisu culture. Given that table 5 establishes that there is no treatment effect for non-Gisu subjects, table 6 presents regressions showing the treatment effects for those with Gisu identity. These confirm the expected pattern (with or without controls): those with a Gisu-influenced identity contribute more in Luganda and less in Lugisu than non-Gisu subjects (in either language).

4   Discussion

We study the importance of language in making salient one of potentially multiple identities. As indicated in the introduction, the study of language is limited among economists, and its connection with identity even more so. Exceptions include two studies that use survey data to examine whether the introduction of bilingual education strengthens the identity associated with the newly introduced language of instruction (Aspachs-Bracons et al., 2008; Clots-Figueras and Masella, 2013). The use of survey data leaves unexamined the role of a potentially large number of confounds. The only experimental exception known to us uses treatments in Arabic and French to examine donations to charity among Moroccan participants (Lambarraa and Riener, 2012). The purpose of using Arabic is explicitly to remind subjects of their religious duties in Islam. This implies that experimenter demand effects are consciously built into the design of the study and

its findings cannot be interpreted as evidence of the intimate connection of language and identity.[12]

Language and identity are connected

With multilingualism being the global norm, the study of language and identity clearly has a large reach. We selected a bilingual subject pool who, for historical reasons, have two de facto lingua francas. One of these, Lugisu, is associated with a well-documented social identity of remarkable individual autonomy (by African standards). As both languages are public languages and can be used interchangeably in the study area, the use of one or the other as the language of instruction in the experiments provides a seemingly innocuous cue as to the social identity that is being appealed to. We therefore present experimentally-obtained evidence on the connection of language and identity for which language has been used as a subtle priming technology, untroubled by experimenter demand effects. Moreover, we take advantage of heterogeneity in the subject pool. For a considerable proportion of our sample, one of the lingua francas is *also* a private language, whereas for the remainder both are only for public use.

We find that contributions to the public good are much lower in the Lugisu treatment and that this is driven by the behaviour of those most strongly associated with the Bagisu culture. This provides strong support for the hypothesis that the Bagisu norm of individual autonomy is triggered when Lugisu is used but not when Luganda is used. In psychology, it would be natural to interpret this finding in terms of a theory of bilingualism called dynamic constructivism. Mirroring Akerlof and Kranton (2000), Hong et al.'s (2000) work was seminal in psychology as it presented empirical evidence in support of the dynamic constructivist approach that argues biculturals have a variety of cultural frames which when primed become dominant. Luna et al. (2008) extended this work by using languages as their priming technology, showing in their experiments (using non-incentivised decisions and small samples) that only bicultural subjects were influenced by the language prime. They argue that the different cultural frames only exist for people who have internalised two cultures, and only for them will priming lead to different cultural frames. In our experiment, the Bagisu are biculturals: for them Luganda is a language for the public sphere and Lugisu (also) a language for the private sphere. For everybody else, both languages are only for the public sphere; their position in our experiment is that of monoculturals.[13] The crucial distinction between biculturals and monoculturals in our experiment is that the former's various identities are appealed to once through a language that belongs only to the public sphere and once through a language that belongs also to the private sphere; the latter are only ever instructed in languages for public use.

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[12]In fairness to the authors, nor were they meant to be interpreted as evidence of that kind.

[13]Strictly speaking, the 7 (3.2%) Baganda are also biculturals in our experiment; we do not have clear predictions regarding these, nor the statistical power to test any.

Dynamic constructivism predicts that language is a cue for identity for biculturals but not for monoculturals, which is consistent with what we find.

Moving beyond mutually exclusive groups

As well as providing experimental evidence on a link between language and identity, we contribute a nuance to the experimental literature on cultural differences in willingness to contribute to a public good.[14] PGGs that are conducted to explore cultural differences between different groups can be interpreted, in the language of Benjamin et al.'s (2010) model, as examining differences in the spread of x_0 (assuming no category norms have been made salient). Previous research is thus looking for static differences between societies, whereas our paper examines how multiple group identities, triggered by language, affect economic behaviour. It is an attempt to reveal behaviour mediated through x_C; and to examine whether multiple x_Cs may co-exist.[15] In doing so, we study both the way in which different group norms can be activated and how these group norms have heterogeneous effects on category members.

We believe this is a more useful and realistic account of human behaviour. People rarely have one identity or group membership, with a clearly defined in- and out-group. To take a commonplace example, the authors of this article share a common European identity but not a national one. Outside of the lab and well-publicised episodes of ethnic violence, ethnic identities are rarely clear-cut or mutually exclusive. As such, the results presented here are informative. Our experimental subjects are all members of at least two language groups, but these memberships trigger different norms depending on one's exposure to group norms. Different groups have different norms, and daily life for the majority of the world's population involves interacting with people who in one context are group members and in other contexts are not. Contextual cues may activate group-specific norms and we have shown that in a multilingual setting one such cue is language.

A common language may encourage cooperation

Finally, our findings suggest an optimistic twist to the common finding that ethnic diversity leads to lower provision of public goods (Alesina et al., 1999; Miguel and Gugerty, 2005, etc.). Take a group such as the Bagisu, who value individual autonomy when left to themselves. By contrast, when members of this group find themselves in an ethnically diverse society, they *may* become more willing to contribute to public goods than they

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[14]For a brief review of this literature, see the introduction.

[15]As Benjamin et al. (2013, p.16) argue, priming only reveals behaviour that is mediated through x_C, not behaviour that is mediated through x_0. As such, subjects who have fully internalised the norms of a particular category will not be affected by priming. In the context of our experiment, subjects who truly hold autonomy as an ideal will not be influenced by the Lugisu prime but contribute no tokens in all settings.

would have been in an unfragmented Bagisu society. The trigger for such public-spirited norms is sharing a common language with other groups in a society. The father of modern linguistics, de Saussure (1959, p.14) argued that language itself is an example of cooperation as it exists "only by virtue of a sort of contract signed by members of a community". This provides the hope that more ethnically diverse societies are not condemned to higher crime, worse schools, dirtier drinking water, and so forth. A common language may activate norms of cooperation. This chimes with the findings and references in Glennerster et al. (2013), where Sierra Leone's common language is used to explain why its high ethnic diversity has not undermined the provision of public goods.

5   Conclusion

We present the results from a Public Goods Game amongst a bilingual population in Eastern Uganda. Subjects are randomly assigned to a Luganda treatment or a Lugisu treatment. For historical reasons, these two languages are interchangeable for public purposes in the study area. We test the hypothesis that Lugisu will invoke the social identity associated with the local Bagisu culture, which places a high value on individual autonomy. We find strong support for this hypothesis: among all subjects, contributions are some 30% higher in the Luganda treatment than in the Lugisu treatment. Furthermore, this effect is entirely driven by the behaviour of those most closely associated with the local Bagisu culture (which is not the same as being Bagisu).

The findings suggest that language and identity are intimately connected. Group-specific norms associated with a particular identity may be activated by the language that acts as a cue for that identity and remain latent when another language is used. In addition, it seems that people who share an identity may not place the same weight on it when responding to identical contextual cues. With multilingual societies being the global norm, we take from our findings an important implication for the prospects for cooperation in them. Groups are neither static nor mutually exclusive; in a sense, groups only come into being in response to particular contextual cues, one of which is language. Group-specific norms vary in terms of the cooperativeness they prescribe and may be activated or remain latent. A common language connected with a social identity of being cooperative may thus encourage cooperation, but only for people who have truly internalised the norms of that identity.

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Appendix A

Provided below are the expanded versions of tables 4 and 6, for which controls were included. See those tables, and related text, for details.

Table 7: OLS Regressions, Full Controls

Gisu Identity Marker:	-	Ethnically Bagisu	Main Language	Bagisu Mother
Table (Column):	4(2)	6(2)	6(4)	6(6)
Variable	(1)	(2)	(3)	(4)
Lugisu*Gisu ID		-0.767***	-0.416**	-0.417**
		(-3.36)	(-2.00)	(-2.03)
Luganda*Gisu ID		0.729***	0.829***	0.462**
		(3.05)	(4.14)	(2.26)
Lugisu Session	-0.595***			
	(-3.62)			
Sender * Don't Contribute	-1.228***	-1.243***	-1.225***	-1.202***
	(-4.56)	(-4.76)	(-4.70)	(-4.45)
Receiver * Contribute	-0.0233	-0.0431	-0.00638	0.0148
	(-0.12)	(-0.23)	(-0.03)	(0.08)
Receiver * Don't Contribute	-0.760***	-0.877***	-0.882***	-0.763***
	(-2.92)	(-3.45)	(-3.50)	(-2.93)
Age	0.0145*	0.0136*	0.0138*	0.0155*
	(1.75)	(1.66)	(1.72)	(1.87)
Gender	-0.112	-0.0743	-0.135	-0.147
	(-0.62)	(-0.42)	(-0.78)	(-0.82)
Education Level	-0.0327	-0.0387	-0.0231	-0.0346
	(-0.25)	(-0.30)	(-0.18)	(-0.26)
Years in Nakaloke	0.00540	0.00608	0.00706	0.00552
	(0.74)	(0.86)	(1.00)	(0.75)
Catholic	0.102	0.188	0.0828	0.167
	(0.36)	(0.67)	(0.30)	(0.59)
'Born Again'	0.444	0.318	0.292	0.352
	(1.30)	(0.94)	(0.88)	(1.01)
Anglican	0.421**	0.480**	0.424**	0.429**
	(1.99)	(2.31)	(2.07)	(2.04)
# of Businesses	-0.0124	-0.0192	-0.0129	0.0115
	(-0.14)	(-0.22)	(-0.15)	(0.13)
Land (Acres)	-0.0467***	-0.0450***	-0.0428***	-0.0439***
	(-3.09)	(-3.06)	(-2.94)	(-2.91)
Constant	4.122***	3.244***	3.153***	3.204***
	(7.30)	(6.64)	(6.47)	(6.21)
Observations	217	217	217	217
Adjusted R Squared	0.203	0.248	0.261	0.206

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SCRIPT: THE LANGUAGE GAME

Version 3: 14/01/13

PREPARATION OF THE EXPERIMENT
Material needed:

- *Sticky notes (for ID numbers)*
- *20 Counters*
- *Two small boxes*
- *Envelopes*
- *Money*
- Paper and Pen, data entry sheet

BRIEF EXPLANATION FOR EXPERIMENTERS ONLY:

We will play a public goods game in Luganda or Lugisu (randomly determined). 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; each subject is randomly allocated to either send or receive a pre-written message to/from their partner. It is important that subjects do not know who their partner is.

AS SUBJECTS ARRIVE

When people enter the meeting room, they are asked for their name. We have a list of invited candidates. Their name is marked and they are given a sticker with an identity number, which we ask them to stick on their shirt.

We will also give them a game ID sticker (1-32) for this specific game. We randomly match subjects beforehand, but odd numbers (game ID) are senders of the messages and so must be called first.

It is explained that this identity number is unique and 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. They are asked to take a seat in the meeting room. Further instructions are given once sufficient people 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 have invited you here today, because we want to learn about how people in this area take decisions. You are going to be asked to take 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, 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 have to send you home,

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 a good amount of money here today, and it is important that you follow our instructions. During today's programme, you will be asked to make 1 decision, 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. You will be asked to take decisions that are not a matter of getting it right or wrong; they are about what you prefer. However, it is important to think seriously about your choices because they will affect how much money you can take home.

EXPLAINING THE GAME

You have randomly been paired with someone else for this experiment. This was done by computer before you came today. 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 also lives in this area, in the Nakaloke sub-county [emphasise]. I will explain the decision now, and then each person will go into a separate room in order to make their decision in private. Any questions that you have can be answered in the private room. We will also ask you a few questions after you have made your decision, but those questions have no effect on how much money you will be paid.

You will be given 8,000 Ugandan shillings, and you can decide what to do with it. First we will demonstrate the decision using real money, but you will make the decision using counters. You will be given a private envelope. You can decide to place your money in a private envelope; this is your money to take home with you. There is also a common box, which both you and you partner can put money in. We will add half of the money in the box. It will then be shared equally between the two players. For example, imagine that experimenter 2 is paired with LC1 chariman. They would not see each other, or know who they are paired with. Let us give 4 examples. [Demonstrate with real money]

1. Imagine that when Experimenter 2 makes his choice, he chooses to put nothing in the common box, and everything in the private envelope. And imagine that the LC1 chairman puts nothing in the common box. If they do this, they both go home with 8,000 shillings.
2. Now imagine that when Isaac makes his choice, he chooses to put nothing in the common box, and everything in the private envelope. And imagine that the LC1 chairman puts everything in the common box. If they did this, Isaac would go home with 14,000 and the LC1 chairman would go home with 6,000,
3. Now imagine the LC1 chairman puts nothing in the common box, and Isaac put everything in the common box. This time the LC1 chairman goes home with 14,000 and Isaac with 6,000.
4. Now imagine that when Experimenter 2 makes his choice, he chooses to put everything in the common box, and nothing in the private envelope. And imagine that the LC1 chairman also puts everything in the common box. If they do this, they both go home with 12,000 shillings.

These are just examples, you can decide what you prefer. When you make the decision we will use counters – you will get 20 counters which are each worth 400 shillings. In total this means you have 8,000 shillings. Don't worry – these will count for real money at the end of the experiment, just like in our example. You are free to divide your counters however you want – any number from 0 to 20. You will now be called into the private room where we can answer any questions and you can make your decision.

Call the subjects through in random order. Note that the senders of messages (odd number game ID) must be called through first, and the receivers (even number game ID) must be called second.

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WITH EXPERIMENTER 1: CONTROL QUESTIONS

First, do you have any questions about the experiment? [Answer any questions.]

Control questions:

1. What happens with any money you decide to put in your private envelope?
2. How much is added to any money you and your partner put in the common box?
3. And after half is added, how do we split the money in the common box between you and your partner?

[Answer any questions the subject has. If a subject is not clear or gets a question wrong, ask what is not clear and explain.] **Record if control questions right/wrong.**

SEND/RECEIVE SIGNAL

[...with one experimenter] Before you make a decision....

[For Senders]	[For Receivers]
...we would like to give you the opportunity to send your partner a message. You can choose one of two statements: 1. "Let us both put everything into the box. That way we can both earn more money." 2. "I won't put anything into the box. Let us each keep what we have." Which one would you like to send? **[Record their decision of which message to send, they must send one message or the other. If they are reluctant to do so, note this down.]**	...we have a message from your partner. Unfortunately, you cannot send them a message. Your partner says: **[read statement 1 or 2 from a piece of paper, without letting the subject see the piece of paper.]**

You may now go through to the next experimenter.

WITH EXPERIMENTER 2: DECISION

Here are 20 counters: you can split the counters however you want: any number from 0 to 20. Each counter is worth 400 Ugandan shillings: in total you have 8,000 shillings. How many counters would you like to put in the common box, and how many would you like to put in the private envelope?

[Record the decision of how many shillings they want to put in the common box. They must place all the money in either the common box or their private envelope.]

QUESTIONS AFTER THE DECISION

Before you go back to the main room, we would like to ask a few general questions, to understand more about the people that live in the Nakaloke sub-county. 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 long have you/your family lived in Nakaloke sub-county?
2. What tribe are you?
3. What tribe is your mother, spouse and children (if any)?
4. What proportion of Nakaloke sub-county are from the same tribe as you? [very few, few, some, most, all]
5. Which languages can you understand?
6. Which languages can you speak?
7. Which language(s) do you speak at home? If multiple, which one do you speak most?
8. What proportion of Nakaloke sub-county speak the same language in their home as you do in your home? [very few, few, some, most, all]

Thank you very much for your answers. You may go back to the waiting room now.

FINAL INSTRUCTIONS

"Thank you, 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."