RESEARCH ARTICLE

Language and Economic Behavior Among Filipino Bilinguals: Two Studies in Honor of Tereso S. Tullao, Jr.

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Abstract: We report the results of two studies motivated by Tereso S. Tullao, Jr.'s conviction, first articulated nearly four decades ago, that language matters in economic decision-making. In Study 1, following Chen (2013), we estimate a fixed-effects logit model on Wave 6 of the World Values Survey, and find that speakers of Cebuano (a "tenseless" language that only weakly distinguishes between present and future), are more likely to save than speakers of Tagalog (whose grammar clearly distinguishes between present and future). In Study 2, we conduct a large-scale dictator game experiment among 480 low-income students and find an unusual preponderance of fair and hyper-fair offers (as well as a dearth of selfish offers) when instructions are issued in English, compared to either Tagalog or Bikol, a result that moderates some of the more essentialist claims of *Sikolohiyang Pilipino*, while remaining consistent with Akerlof and Kranton's (2000) model of utility and identity.

Keywords: Language, future time reference, altruism, identity

JEL Classification: C93, D91, Z13

Ang una nating dapat gawin ay alamin kung papaano nag-iisip ang isang Pilipino at kung ano ang kaniyang konsepto ng mabuting buhay. May pagkapilosopikal ang mga katanungang ito ngunit ang pamimilosopiya ay unang hakbang sa pagtatalaga ng minimithi ng mga Pilipino. Ang mga kasagutan sa mga katanungang ito ang siyang magbibigay ng ibayong interpretasyon sa mga unibersal na prinsipyo ng ekonomiks ng mga Kanluranin sa pag-aaral natin ng ekonomiks sa diwang Pilipino, inaasahan na ang mga katangian, kaugalian, kultura at pananaw ng mga Pilipino ay mabisang maihalo sa mga prinsipyo at teoriya ng ekonomiks upang lutasin ang ating problemang pangkabuhayan at pangkaunlaran.

Ekonomiks sa Diwang Pilipino
Professorial Lecture, 1988

Among Tereso S. Tullao, Jr.'s main scholarly commitments — domestic integration and Philippine industrial policy, the intellectualization of Filipino, rationalizing access and financing in education, and migration and trade in services as agents of development — it is perhaps the second that remains under-theorized, at least in the formal language of Economics. Tullao has produced the country's first Filipino-English dictionary of economic terms as well as one of its most widely used textbooks in the vernacular; and many of us who were mentored by him now teach in Filipino. But a research program on the economics of language has yet to take root within his home department.

We present two modest empirical efforts that piggyback on theoretical breakthroughs by Chen (2013) and Akerlof and Kranton (2000). Both exploit the stylized fact of widespread bilingualism, even trilingualism, in the Philippines (Eberhard et al., 2019). Each approaches the question of linguistic relativity (i.e., does the language we speak influence the way we think about reality) differently. Study 1 posits language shaping cognition through grammatical rules and structures. It localizes Chen's work on grammar, time preferences, and saving, confirming that speakers of "future-less" languages are more likely to save, with additional evidence that this finding holds, even within samples of compound (native) bilinguals who speak both future-less and futured languages. Study 2 examines how cognition might be shaped by differing categories, meanings, and descriptions of the world contained in seemingly equivalent words across languages. It takes advantage of trilingualism within a school setting to implement language treatments in a one-shot dictator game. The field experiment yields results that temper nativist claims about the Filipino concept of self being inherently more relational or pro-social than its English counterpart. Instead, we find evidence of a more flexible, less essentialist role that language plays in framing decision contexts, possibly setting up prescriptive norms that, in this case, induce an unusually large proportion of fair and hyper-fair offers.

Study 1: Language, Future Time Reference, and Saving

Chen (2013) proposes that the speakers of languages with grammars that require a clear distinction between present and future are less inclined to exhibit future-oriented behavior. That is, speakers of *strong future time reference* languages such as English and Tagalog (following Dahl and Velupillai's 2013 typology) will find it more difficult to save, to avoid smoking, maintain a healthy weight, etc., compared to speakers of *weak future time reference* ("futureless" or "tenseless") languages, such as Cebuano, whose tenses do not require explicit grammatical markings for time.

In the case of language and saving, the connection is drawn from a simple model of the consumption-saving decision. Consider an individual who has the option to set aside assets as savings today, in anticipation of future returns. Effectively, these savings amount to a present cost C, for which one reaps a reward R in the future. Assume that future rewards are discounted at a rate δ, and that there is uncertainty about when the reward will be realized. One then holds particular beliefs regarding the timing of the reward, represented by the distribution function $F(t)$. An individual will choose to save if and only if the future benefits of saving are greater than its cost, the value of presently foregone consumption. That is, one will save if and only if:

$$C < \int e^{-\delta t} R \, dF(t)$$

Chen's model accounts for the effect of language in two ways. In the first mechanism, the future time reference (FTR) strength of the language influences how close or distant one feels to an event or an idea. The consistent use of specialized time markers in strong FTR languages like English and Tagalog may make speakers perceive the future as a separate or distant state of affairs. If Tagalog speakers feel detached from the future, they may undervalue the worth of saving for the future. This translates, in the model, to a higher savings discount rate or a narrower distribution function for speakers of Tagalog.

That is, if

$$\delta_C < \delta_F, then \int e^{-\delta_C t} R \, dF(t) > \int e^{-\delta_F t} R \, dF(t)$$

or if

$$\forall t, F_C(t) \geq F_F(t), then \int e^{-\delta t} R \, dF_C(t) \geq \int e^{-\delta t} R \, dF_F(t).$$

In the second mechanism, languages whose grammar requires constant attention to the timing of an event may lead speakers to become systemically more precise when considering the placement of events along an intertemporal spectrum. Suppose that speakers of Tagalog, a strong-FTR language, are indeed more precise than their Cebuano-speaking counterparts in their beliefs about the timing of reward R. In such a case, $F_c(t)$, the distribution of a Cebuano speaker's beliefs about the timing of reward R, will be a mean-preserving spread of $F_F(t)$, the distribution of a Tagalog speaker's timing beliefs. Given a discounting function $e^{-\delta t}$ that is a strictly-convex function of time, saving is more attractive for Tagalog speakers. Proposition 1 and its proof show this effect.

Proposition 1. If $F_c(t)$ is a mean-preserving spread of $F_F(t)$, then $\int e^{-\delta t} R dF_C(t) > \int e^{-\delta t} R dF_F(t)$.

Proof. Note that if $F_c(t)$ is a mean-preserving spread $F_F(t)$, then $F_F(t)$ second-order stochastically dominates $F_c(t)$. Also note that for any discount rate $\delta > 0$, $e^{-\delta t}$ is a strictly-convex function. Therefore $\int e^{-\delta t} R dF_C(t) > \int e^{-\delta t} R dF_F(t)$.

Using data from a number of sources, Chen (2013) empirically tests his hypothesis in the domains of individual and national savings, smoking, retirement assets, and protected intercourse. In all cases, he is able to generate robust evidence that links the FTR nature of one's language to one's future-oriented behavioral outcomes.

Testing Chen's Saving Hypothesis Using Philippine Data

Sufficient material is available to analyze the validity of the hypothesis in the context of the Philippines. Currently, two Philippine languages are reliably classified in terms of their FTR features. Tagalog strongly codes its FTR through inflectional marking; while Cebuano, widely spoken all over the country, especially in Visayas and Mindanao, is generally weak in FTR marking, notably lacking inflectional markers (Chen, 2013 and Dahl and Velupillai, 2013) and specialized future meaning markers (Wolff, 1966 and Pielago et al., 2010).

Two criteria are used to characterize the FTR treatment of different languages. The first, which forms the basis for the FTR classification of languages in the World Atlas of Language Structures (WALS), distinguishes between inflectional future markers, which are embedded in the words they modify, and periphrastic future markers, which occur before or after their target words. The second criterion, which is useful to Dahl (2000), Thieroff (2000, as cited in Chen, 2013), and Chen (2013), classifies languages depending on whether FTR marking is obligatory in prediction-based statements or only required in intention-based statements. These two criteria, are not mutually exclusive and interact to characterize the FTR nature of languages.

Tagalog verb aspects primarily characterize a verb as completed or non-completed. Non-completed events are further classified as begun or not begun. The three basic aspects are contemplated, imperfective, and perfective (Schachter and Otanes, 1972). We are most interested in the contemplated aspect, which describes events which have not begun, because it is generally used for FTR marking. The contemplated aspect is formed inflectionally, using a prefixed duplication of the first consonant and first vowel of the verb base (Schachter and Otanes, 1972). For example, we say "*kakain ako*" (I will eat, from *kumain*) and "*pupunta siya*" (He will go, from *pumunta*). Only the contemplated aspect and its derivative FTR marking forms feature the duplication mechanism, which is obligatory in all contexts, whether prediction- or intention-based (Schachter and Otanes, 1972). Tagalog is thus classified as a strong-FTR language.

Now, in Cebuano, the unreal aspect is used to convey future meaning. It is used for actions that have not been completed or conditions that have not yet come into being (Wolff, 1966). The unreal volitional prefix *mo-* figures prominently in Cebuano FTR marking, as in "*Mo-kaon ko*" (I will/want to eat). However, it is also used in various other expressions that do not pertain to future time. It is used to express habitual action, as in "*Mo-adto ko sa Manila*" (I go to Manila), and after prepositives like *gusto* (want to), *mahimu* (may), and *kinahanglan* (need to), regardless of time meaning (Wolff, 1966 and Pielago, 2010). Overall, we observe that Cebuano grammar frequently marks future meaning, using various mechanisms. Nevertheless, unlike Tagalog, Cebuano only uses periphrastic markers and none of its devices are exclusively for FTR marking. Therefore, we confirm Cebuano's classification as a weak-FTR language.

Data and Methods

We use data from the World Values Survey (WVS) and the Family Income and Expenditure Survey (FIES)

to run regressions with varying sets of individual and group controls to estimate the effect on savings outcomes of speaking a language that strongly marks FTR.

We test the linguistic-savings hypothesis using Philippine data on the premise that in this case, speakers of Tagalog and Cebuano are a culturally, economically, and politically homogenous combined sample. That is, there is less cultural and socio-economic variation between the speakers of these two languages, allowing us to isolate the hypothesized effects of language on economic behavior. The use of this sample improves on estimation that uses more ethnically diverse groups that speak languages of varying FTR strength, which identify Chen's (2013) within-country regressions.

We regress savings outcomes on the FTR strength of one's native language. The dependent variable is saving outcome for the year. Savings may have increased, remained the same (zero net savings), diminished, or completely depleted, with debt incurred. We include other variables as additional independent variables and use a host of individual characteristics as group controls to isolate language effects by comparing only individuals who are similar in all other aspects that may influence saving behavior and outcomes.

The fixed-effects specification we use is modeled after Chen's (2013) within-country regressions, which use World Values Survey (WVS) data. Wave 6 of the WVS allows us to extract a Philippine sample of Tagalog and Cebuano speakers, as it is so far the only wave that identifies the specific Philippine language a respondent speaks at home; previous WVS waves code the language variable more generally as either "Tagalog" or "Other Philippine Languages". Our sample includes 816 observations, with 509 Tagalog speakers and 307 Cebuano speakers. It does not include a few respondents who are immigrants or who have immigrant parents, to avoid conflating the effect of language and that of being an immigrant or belonging to an immigrant family.

Our fixed-effects logit model is specified as follows:

$$\Pr(save_i) = \frac{\exp(z_i)}{1 + \exp(z_i)}$$

where

$$z_i = \beta_1 StrongFTR + \beta_2 X_i + \beta_3 F_i^{ex} \times F_i^{en}$$

In the kernel function z_i, $StrongFTR$ indicates that one uses a language that strongly and consistently marks FTR, i.e., Tagalog. X_i introduces individual characteristics of respondent i, particularly employment status and declared beliefs about the value of saving. F_i^{ex} is a set of exogenous fixed effects over which individuals have no control, like age and sex. F_i^{en} is a set of fixed effects, such as income, education, religion, and family structure, that likely affect an individual's attitude towards saving. Table 1 explains in detail the variables and fixed effects reflected by the model.

Up to 480 groups are formed by the jointly interacted F variables; but groups wholly composed of people who speak the same language are dropped, because the observations in these groups do not affect the maximum likelihood estimate of the structural parameters. Each of the groups that identifies the conditional-likelihood function is composed of individuals who speak languages of differing FTR strength, but are otherwise identical in all aspects for which we control. We account for the bias stemming from individual and cultural values by including the belief that saving is important as an independent variable. Unlike Chen (2013), we are unable to control for the extent of trusting others and believing in the importance of family, because the Philippine responses for these variables hardly vary; 96% generally mistrust others and 99% believe family is very important.

The coefficient of $StrongFTR$, β_1, is the focus of the analysis in the next section. It is presented as an odds ratio, and so are the β_2 coefficients. In our application, the probability that an individual saved in the past year divided by one, minus that probability is that individual's odds of having saved. Now, the odds ratio β_1 is the ratio of a Filipino speaker's odds of saving to that of a Cebuano speaker's. So, coefficients that have a null value of 1 or are insignificant indicate that speaking Tagalog, being unemployed, or believing saving to be important has no effect on saving outcomes. Alternatively, we predict β_1 to be significantly less than one, signifying that Tagalog speakers are only a fraction as likely as Cebuano speakers to have saved in the past year. We also expect unemployment and a positive attitude to have significant but independent effects on saving; that is, their isolated effects will not attenuate the language effect.

Table 1. *Variables and Control Groupings in the WVS Fixed-Effects Logit Model*

Dependent Variable	
Saved (1 = Cash savings this year, 0 = Otherwise)	Dependent variable is binary-coded, based on WVS question: *During the past year, did your family (1) save money, (2) just get by, (3) spend some savings, or (4) spend savings and borrow money?*

Independent Variables	
Strong FTR [1 = Strong FTR (Tagalog), 0 = Weak FTR (Cebuano)]	Main independent variable is FTR-nature of language that structures respondent's thoughts, proxied by *Language Spoken at Home* reported in WVS.
Unemployed (1 = Unemployed, 0 = Otherwise)	WVS uses seven employment categories: *full time, part time, self-employed, retired, housewife, student,* and *unemployed.*
Saving is Important (1 = Saving is important, 0 = Otherwise)	From WVS question: *Here are a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important?* Variable is coded 1 if *thrift, saving money and things* is identified as important.

Group Controls	
Sex (1 = Male, 2 = Female)	Each observation is either male or female.
Age Group (10 if age < 30, 30 if 30 ≤ age < 50, 50 if age ≥ 50)	Each observation is put in one of three 20-year bins. Chen (2013) uses nine 10-year bins. All respondents are aged 18 years old and above.
Income Group (1 = 1st or 2nd decile, 2 = 3rd or 4th decile, 3 = 5th or 6th decile, 4 = 7th or 8th decile, 5 = 9th or 10th decile)	WVS respondent identifies to which income decile within his country he belongs. Five aggregated income groups created. Each represents two of the original deciles. Chen (2013) uses all 10 income deciles.
Educational Attainment (1 = Primary school or less, 2 = Beyond primary school)	WVS respondent identifies his highest educational attainment according to a nine-point scale. Two broad groups created; primary school completion set as threshold. Chen (2013) uses the full nine-point scale.
Cohabitation Status (1 = Married or living together as married, 0 = Otherwise)	WVS respondent's marital status can be *married, living together as married, divorced, separated, widowed,* or *single.* Married or living together as married classified as cohabiting. Chen (2013) uses all categories.
Number of Children (1 = 3 children or less, 2 = more than 3 children)	WVS respondent specifies number of children, if any. Binary classification created; three children set as threshold. Chen (2013) uses all reported numbers of children.
Religion (1 = Roman Catholic / member of dominant religion, 0 = Otherwise)	Nine religious denomination categories in Philippine WVS Wave 6: *None, Aglipayan, Iglesia ni Cristo (INC), Muslim, other (not specific), Other (Christian), Episcopalian, Protestant,* and *Roman Catholic.* Binary classification created; being Roman Catholic used as identifier. Chen (2013) uses all reported world religions, except in cases in which merging religions do not change results.

Source: World Values Survey Wave 6 questions and author's classification

Table 2. *Individual Saved This Year*

	1	2	3	4	5	6
	Saved	**Saved**	**Saved**	**Saved**	**Saved**	**Saved**
Strong FTR	0.874	0.693	0.689	0.587	0.586	0.630
	(0.126)	(0.116)*	(0.119)*	(0.104)**	(0.107)**	(0.106)**
Unemployed			0.559	0.521	0.512	0.535
			(0.105)**	(0.115)**	(0.106)**	(0.133)*
Saving is Important					1.239	1.394
					(0.308)	(0.146)**
Fixed Effects:						
Age Sex	Yes	Yes	Yes	Yes	Yes	Yes
Income Educ	No	Yes	Yes	Yes	Yes	Yes
Cohabit Children	No	No	No	Yes	Yes	Yes
Religion	No	No	No	No	No	Yes
All FEs Interacted	Yes	Yes	Yes	Yes	Yes	Yes
Observations	816	632	632	468	468	357

Regressions are fixed-effect logistic regressions with coefficients reported as odds ratios. Robust standard errors are reported in parentheses; all regressions are clustered based on income groups. *significant at 5%; **significant at 1%.

Regression 1 controls for the exogenous or non-choice fixed effects F_i^{ex}, age and sex. Here, the coefficient of *StrongFTR*, reported as an odds ratio, attempts to summarize the average difference between Tagalog and Cebuano speakers in the propensity to save; however, the coefficient in this first regression is insignificant. Regressions 2 and 3 add interacted fixed effects for income and education to the first specification and yield significant parameter estimates. Regression 2 suggests that Tagalog speakers are 31% less likely than Cebuano speakers to save. This effect is not attenuated, but rather strengthened, by controlling for unemployment in Regression 3.

Regressions 4 and 5 consider the fixed effects of family structure, particularly one's cohabitation status and number of children. With these additional controls, Regression 4 shows Tagalog speakers to be 42% less likely than Cebuano speakers to save. The strong-FTR speaker's propensity to save (58%) is only slightly higher than that of the unemployed (52%). Regression 5 attempts to account for the belief that saving is important; but the effect of this variable is not shown to be significantly different from zero using the present specification.

Regression 6 incorporates the effect of religion, particularly that of being Roman Catholic and, in the context of the sample, of belonging to the country's dominant religion. This time, as expected, those who value saving are shown to be 39% more likely to save. Nevertheless, this consideration does not appreciably diminish the negative effect of speaking a strong-FTR language, which stands at 37%, and is almost strong enough to reverse the positive effect of recognizing saving as an important cultural value. A correlation test shows that believing saving is important is independent of the FTR strength of one's language; so, both variables are indeed valid and separately significant regressors.

Discussion

Results show that speakers of Tagalog, a strong-FTR language, are less likely to save than their Cebuano-speaking counterparts. The two other independent variables are unemployment and the belief that saving is important. As expected, the unemployed are less likely to save; and those who believe that saving is an important cultural value are more likely to save. Nevertheless, after accounting for these major influences on saving behavior, the negative effect of speaking a strong-FTR language holds. Ultimately, the analysis compares individuals who are similar in age, sex, income level, educational attainment, cohabitation

status, number of children, and religion. Therefore, the estimated effect is observed for individuals who are statistically identical, except for the language they speak at home. In this section, we discuss issues that follow from the nature of our particular theoretical and empirical application to the Philippines, as well as those raised during a preliminary presentation of this research and the results.

Chen's (2013) methodology considers monetary savings in the context of a WVS respondent's savings outcome for the year prior to the interview. He looks at personal saving based on the WVS as just one among a number of behavioral outcomes. These outcomes cover retirement savings, national savings, health, and contraception. In all these other dimensions, language is shown to be a significant factor that contributes to future-oriented outcomes. Our Philippine application corroborates Chen's (2013) findings and encourages the further exploration of different manifestations of the language effect.

In the Philippines, not all savings may be monetary. The lack of access to and low usage rates of financial services perpetuate reliance on traditional physical stores of value, especially in rural areas (Bangko Sentral ng Pilipinas, 2013). Banerjee and Duflo (2011) make the same observation in a number of other developing countries. They particularly point out that in the absence of access to savings accounts and other financial services, it is a common practice to build a house "brick by brick" whenever extra money is available. In fact, people who are determined to save or allocate for the future make it a point to immediately convert their cash into commodities like fertilizer because cash savings are easily spent when unexpected, but not necessarily important or urgent, needs arise. Now, if cash savings are not a household's main form of savings, do this study's results hold?

We implement an additional test for language effects in non-cash forms of saving using the FIES of 2012. The FIES reports whether a household has altered its house between a first and second visit that are six months apart. In a different set of regressions, the presence of house alteration takes the place of the "Saved" variable in the WVS regressions. House alteration and improvement may imply excess funds having been accumulated or at least allocated to a durable purchase. This outcome may be compared to saving as a future-oriented activity, where immediate consumption is postponed to accumulate enough funds

for a relatively large one-off expense at a later time period, as supported by Banerjee and Duflo's (2011) observations in other developing countries. The same group controls as in the main regressions are applied to compare respondents with the same characteristics. The FIES regressions do not include the belief that saving is an important value as an independent variable. They also do not control for religion. Family size, rather than number of children, is used, in addition to cohabitation status, to account for family structure.

The results of the FIES regressions, similar to the main regressions in Table 2, show that speaking a strong-FTR language diminishes a household's likelihood to save, this time in the form of home improvement. Tagalog-speaking households altered their homes only about half (48%) as frequently as Cebuano-speaking households. The language effect is significant and strong in all four iterations with increasing controls. The unemployed also undertook fewer home alterations; but the unemployment effect for home alteration (8% less likely to alter the house) is not as strong as that for saving cash (48% less likely to save).

We use the language one speaks at home as a proxy for the language that shapes one's thoughts and decisions. However, in practice, the language one speaks at home is not necessarily the only language used. In the Philippines, one's mother tongue or first language is learned from birth and is usually the medium of instruction in pre-school and the first three grades of elementary school (Department of Education, 2012). Thereafter, the medium of instruction in school shifts to English or Tagalog. English, recognized as a global lingua franca, and Tagalog, the national language, are studied as separate language subjects from Grades 1 to 10, nationwide. For those who belong to within-country migrant families, it is possible that an individual's mother tongue is not the language used in conducting affairs outside the home.

A relevant issue that may arise from this setup is how the language effect on saving may be explained for speakers of more than one language, considering that most Cebuano speakers also know and use English and Tagalog, which are both strong-FTR languages. Cebuano speakers, like other Filipinos in general, are bilingual in the sense of Grosjean's (1993) definition, which means they are able to fully function communicatively by using two or more languages in everyday life, but not necessarily in all and the same

settings or with a uniformly high level of proficiency. Now, if their mother tongue is weak-FTR but the other languages they use are strong-FTR, what may explain the observed language effect?

A look at the geographic distribution of respondents reveals that almost all of the Cebuano speakers were interviewed in Cebuano-speaking regions. Given this information, we assume that these individuals use Cebuano not just at home but in their everyday activities outside the home. This should help maintain, if not reinforce, any effect speaking Cebuano at home may have on their behavior. Moreover, because they live in a Cebuano-speaking region, we further assume that their knowledge and use of Tagalog, the strong-FTR language this study focuses on, is as if it is a foreign second or third language. Leclerq (2007) finds that even advanced second or foreign language learners with near native proficiency in the target language still conceptualize and verbally reorganize events according to their mother tongue's grammar. Therefore, Cebuano speakers, even if they speak Tagalog considerably well, still harbor a rhetorical and, arguably, conceptual bias towards Cebuano structures, which may explain the endurance of the language effect in their saving behavior.

The next step in investigating the effect of bilingualism might be to integrate it into the saving model. Recall that the condition for saving is for its present cost to be less than the perceived future reward. This reward is discounted by a rate determining how much less the future consumption is valued relative to present consumption, and it is viewed based on a distribution that accounts for perceptions of the future, depending on one's language. Accounting for bilingualism, we may add to the present model a parameter that accounts for bilingualism in three ways.

First, by determining the level of bilingualism. The age of three is widely recognized as the threshold at which a child's mother tongue or tongues are defined (Grojean, 1993 and Leclerq, 2007). At this age, a child is able to learn one, two, or more languages simultaneously and well. Thereafter, learning is successive as the structures of the mother tongue or tongues already contribute or interfere with the pick-up of others. This determines a split between early bilinguals and late bilinguals. The former are comparable to native speakers of both their languages; while the latter may be perfectly communicative in both languages but still exhibit grammatical or

syntactic reflections of their first language on their use of the second (which are not necessarily incorrect, just noticeably divergent from native speaker usage).

Second, by parameterizing the different cases of bilingualism, in terms of the FTR nature of languages. Do bilinguals who speak two strong-FTR languages perform future-oriented actions more poorly than speakers of just one strong-FTR language? Are speakers of two weak-FTR language superior to everyone else, even the speakers of just one weak-FTR language? This means the effect accumulates. Of course, the immediately relevant case pertains to speakers of a strong-FTR language and a weak-FTR language. Will the effects cancel each other out?

Finally, by considering the possibility that the effect of bilingualism is not uniform. Grojean (1993) acknowledges that bilinguals may actually use their two languages in very different settings. The language at home may be different from the medium of instruction in school, the professional language at work, or the language in the streets. Therefore, it is possible for the same person to use different decision frameworks, depending on the language that is being used at the moment and what it is being used for.

Following theoretical representation, experiments can test the different scenarios for which we have expected results based on the model. A pool of bilinguals with different sets of languages and proficiency levels, depending on the scenario being tested, can be gathered. They may be asked to make future-oriented decisions under different circumstances involving the specific use or disuse of certain languages. This provides preliminary evidence to support claims about the persistence of the effect based on the setup of the empirical application, and spurs more research into the many nuances of studying the effect of language on economic behavior.

Study Two: *Loob* in a Dictator Game

Is there any evidence that terms for personhood or the self might, in some languages, embed norms that lead to more altruistic or pro-social behavior? For example, Alejo (1990, 2018) describes the Filipino concept of self *loob (*pronounced *loôb)*, as "relational interiority". Using a memorable image (2018, pp. 31-32), he writes, "In my voyages and travels, I noticed that on the surface of the water, islands appear to be separated from one another. But if you swim deep

enough, you will find that in the depths of the water, they are actually connected. Similar to these islands, it can be seen — though not yet very clearly — that *loob* is not just a corner in one's chest, but a world of meaningful connections."

Does this conception of the Filipino's inner self as inherently *relational* allow us to predict higher levels of pro-social behavior and lower selfishness among speakers primed to use the expression, compared to those who use presumably less explicitly relational terms for self, say in English?

It may be that we are committing a category error by treating Alejo's phenomenological reflections as though they were empirical claims meant to be tested. Yet there is a broad and vexed literature on the relationship between language and cognition. The Sapir-Whorf linguistic relativity hypothesis (Whorf, 1956) first proposed language as a source of habitual thought and behavior. This came under serious challenge in the 1970s when Chomsky and others theorized that human brains contain an innate mental grammar that aids in language acquisition and that these universal mechanisms are more fundamental than any idiosyncratic differences in meaning and perception found throughout the world's over 7,000 languages.

For decades, compelling evidence for either view remained sparse. Yet since 2000, Boroditsky and others have produced a growing body of findings in fresh support of the linguistic relativity hypothesis, first in the domains of cognition and perception, then to behavior and culture. For example, there are experiments confirming how speakers of different languages perceive time, color, space, and direction differently, choose different categories when distinguishing between objects, and respond differently depending on the metaphors used to describe abstract concepts. Research in culture and cognition now recognizes that cultural systems produce different concepts of the self, which in turn activate different specific concerns for individuals (Mesquita, 2001; Mesquita and Karasawa, 2002).

Further, the so-called dynamic constructivist approach (see Hong et al., 2000 for a survey) has been helpful in recasting culture not as a monolithic, highly integrated worldview that acts like a contact lens, continuously framing the world for an individual, but rather as a network of discrete, specific constructs that affect cognition only when they come to the fore,

or are made salient in an individual's mind. This more convincingly explains multi-cultural individuals who can "frame-switch" between meaning systems whenever appropriate. It means individuals do not have to "blend" their cultural influences, nor replace one with another. Instead, they simply frame-switch in response to social cues, among them words, phrases, inflections, icons, and other "magnets of meaning" (Betsky, 1997).

What follows is an experiment that takes advantage of these developments to test whether cueing "relational" selves in Tagalog or Bikol among participants yields more pro-social outcomes in a controlled decision setting than cueing equivalent yet non-relational terms for the self in English.

Design

We recruited 480 high school students from Nabua National High School in Camarines Sur, whose average daily allowance was PhP 20. All spoke Bikol (Rinconada), Tagalog, and English, although with varied facility. Linguistically, all would be considered *coordinate* trilinguals, native in their mother tongue, and only later having acquired a further two languages.

Each was asked to play a one-shot dictator game, taking on the role of a "dictator" who would unilaterally split the amount PhP 50 between himself or herself, and a stranger. The decision would be made with complete and demonstrable privacy; no names were taken, and the payments were contactless. A dictator game presents a clear and straightforward task; and its one-shot variant minimizes strategic considerations such as reciprocity.

The main treatment was language. Participants were randomly assigned into three groups that would receive instructions purely in English, Tagalog, and Bikol, respectively (because Bikol is the mother tongue, we regard it as control). Secondary treatments further divided the participant pool according to additional conditions we wished to account for —

Primed versus Unprimed. Priming is a technique in psychological experiments in which participants are exposed to a stimulus in order to activate a particular mental representation or association. Priming was necessary in order to reinforce the exclusive use of a language during treatment. We implemented this by asking half the participants to spend 10-15 minutes composing a paragraph about their personal ambitions

and goals in life, thinking and writing in the assigned language.

Hot versus Cold. To control for the possible presence of "warm glow" versus "cold prickle" effects in donating (Andreoni, 1990; Kohler, 2011), we introduced "hot" and "cold" secondary treatments. In the Hot treatment (active donation), participants at the end of the experiment would file out one by one onto an empty corridor in which chairs were set up, on which they could leave their donations in envelopes. In the Cold treatment (passive donation), participants at the end would fold their experiment sheets, hand them to the experimenter, then proceed one by one to an unmanned table piled with coins and small bills, and instructed to take their allocation (PhP 50 minus their donated amount) before leaving.

The secondary treatments required 12 classrooms; for better crowd control, we divided the experiment into an 0800 and a 1000 session, each requiring simultaneous use of only six classrooms (see Table 4, Appendix).

A final set of tertiary controls was administered to all participants. We elicited information on their sex, age, the number of persons living in their house, employment status, current happiness, and relative social status. Post-experiment, we asked participants to indicate how they believe another person would have partitioned the PhP 50. Donated amounts were then collected, for use in a subsequent but unrelated ultimatum game experiment, in which participants would respond to various levels of donation offers.

The three sets of instructions (back-translated by native speakers) are reproduced in the Appendix.

Results

Table 3 compiles the range of offers across language treatments. The Nash equilibrium offer of PhP 0 was recorded in 13 out of 480 cases, expanded to include offers of PhP 1 and PhP 5, as well as the single instance in which a participant declared a 30-20 split but left nothing in the envelope. Otherwise, modal offers were for 25-25 splits, followed by offers of 20-30 and 30-20.

A remarkable 39 took nothing for themselves, 29 of them from the four classrooms that received instructions in English. When combined with other "fair" (equal split) and "hyper-fair" offers (more than half donated), a total of 61 percent of participants exhibited high levels of altruism or pro-sociality. The mean offer across the entire pool was PhP 24.89.

Table 3. *Amounts offered by participant-dictators to strangers, by language treatment*

Actual Offers (PhP)	Frequency			
	English	**Tagalog**	**Bikol**	**Sum**
0	4	3	1	8
1	1			1
5	2	2		4
10	5	18	17	40
13		1		1
15	3	7	5	15
20	33	37	50	120
25	55	55	55	165
27	2			2
29	1			1
30	18	26	19	63
35	3	1		4
40	3	4	6	13
45	1		3	4
50	29	6	4	39
Fair + Hyper-Fair	112	92	87	291
Percentage	70%	58%	54%	61%

These results stand in stark contrast to most dictator game outcomes worldwide, with average offers ranging from 10 to 25 percent (Korenok et al., 2014). Modal offers of 50-50 splits have been noted, but our experiment records an *average* of 50-50 offers.

The table further suggests those with hyper-fair offers donate amounts centered around numerically focal points, notably PhP 30 and PhP 50. These spikes within the distribution make it more difficult to estimate an overall regression line, yet we fitted a general linear model with Offers (PhP) on Language (base category=Tagalog), Hot/Cold, Primed/Unprimed, and the remaining tertiary controls. It confirms that participants in the English treatment offered PhP 4 more than those in the reference category Tagalog. Neither of the secondary treatments was statistically significant, as were any of the remaining controls. The constant represented average minimum offers of PhP 21.59.

The overall sample is large, but we conducted additional Kruskall-Wallis tests for the much smaller sub-samples of Unfair offers (< PhP 15) and Hyper-Fair offers (> PhP 35). We find no differences across the language treatments for Unfair offers, but confirm differences in equality-of-population tests within the Hyper-Fair subsample, specifically between the English group and the Tagalog-Bikol groups.

Discussion

Our experiment was set up to examine the claim that seemingly equivalent terms for self across different languages might in fact embed norms that can cue varying levels of directly observable altruism or selfishness. Given the results, what is the status of such a claim?

In all three cases, simply asking participants to partition the amount based on their innermost self/ *kalooban*/*bo*ôt seems to have activated unusually high levels of altruism, centered around a 25-25 split. The invitation to self-reflection then seems to carry normative content, such as the prescription to deal fairly, even hyper-fairly, with others. It may well explain the significantly higher offers observed here compared to dictator games run worldwide, whose instructions likely do not invoke the participant's inner self.

It is worth detailing the surrounding conditions and protocols implemented during the experiment: PhP 50 represented more than double the average daily

allowance of participants. There were real costs to attending the activity; a good number were late because they had to walk to the town center. The experiment was held during the week in which school accounts had to be settled; for the seniors, failure to settle meant a delay in graduation.

Most importantly, even after the participants had declared an allocation, a moment of real anonymity as they left the classroom provided each with the opportunity to renege on their decision and take the entire amount, an outcome wryly predicted by many, although we recorded only one instance of this actually happening.

Yet the altruism observed is, crucially, not limited to Tagalog nor Bikol. Exactly the same number of equal splits was recorded in English, and indeed majority of the 50-0 hyper-fair offers came from the English pool. *Loob/Bo*ôt may be phenomenologically relational as concepts for personhood, but at least within our experiment, no more so than the English *inner self*. Rather, the across-the-board fairness outcome seems consistent with Akerlof and Kranton's (2000) model of utility and identity:

$$U_j = Uj(\mathbf{a}_j, \mathbf{a}_{-j}, I_j)$$

Where *j*'s utility depends on *j*'s choices, others' actions $\mathbf{a}_{-j}$, and identity or self-image *I*. In turn,

$$I_j = I_j(\mathbf{a}_j, \mathbf{a}_{-j}; \mathbf{c}_j, e_j, \mathbf{P}).$$

Person *j*'s identity *I* depends first on social categories $\mathbf{c}_j$ whose social status is given by $I_j(\cdot)$. Each category is paired with a prescription **P** that defines ideal behavior. Identity (and thus utility) is then gained or lost by the difference between what is prescribed per social category, and *j*'s own given characteristics e_j. Maximizing utility means choosing actions that take $\mathbf{c}_j$ and **P** as given, while minimizing the difference between $\mathbf{c}_j$ and e_j.

The link between language, cognition, and behavior in this case would be as follows: participant *j* in the game would be assigned the social category $e_j = $ *dictator*. The instructions introduce a category $\mathbf{c}_j = $ *inner self/loob/bo*ôt that carries similar prescriptions **P** = altruism (across the board, not limited to Tagalog/ Bikol self-concepts). Participant *j*, faced with a one-shot anonymous decision, avoids the Nash strategy of pure selfishness, opting instead to maximize utility

from *I* by minimizing the difference between his position as dictator and the prescriptions of an idealized inner self.

Finally, what to make of the unusual spate of hyper-fair offers from the English pool? It is unlikely they arose from a lack of comprehension; the instructions had previously been piloted with non-participants, and the priming essays did not indicate disqualifying levels of English proficiency. Most of all, each of the 29 envelopes really did contain the promised PhP 50 in donations.

We are less able to discount experimenter effects. For the participants, English is encountered chiefly as a medium of instruction in school, so the experimenter speaking in English might have activated authority stereotypes, possibly encouraging fawning behavior (although again, the cost of virtue signaling was considerable). If so, the most obvious follow-up experiment would involve a treatment group populated by English monolinguals, or bilinguals for whom English is used across many domains and holds no special status. Nonetheless, the presence of hyper-fair offers does not detract from the main result, which is that equal splits are observed every bit as frequently in the English group as they were in the Tagalog treatment and Bikol control groups.

Conclusion

Studies linking language, cognition, and behavior have produced some of the most contentious yet tantalizing research in the last 70 years, and have been recently buoyed by breakthroughs in theorizing and empirical testing. The two studies reported here are possibly among the first on language and economic behavior conducted in the Philippines, one of the world's "linguistic hotspots" (Institute for Endangered Languages, 2007). Both provide reasons to rethink standard accounts of the determinants of saving, such as those reviewed by Adee and Lau in this journal (2023), as well as longstanding claims about the inherent and unique qualities of linguistic concepts in Filipino. In both cases, further research is needed in specifying the precise relationship between grammar and psychological discounting (such as the role of "modal" FTR structures investigated by Robertson and Roberts, 2023), which should, among other things, improve control over the attributes of multi-lingual participants and the

mechanisms at work within experiments in which languages are used as treatments.

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Appendix

Table 4. *Distribution of participants across main and secondary treatments*

0800 session 40 students English instructions Hot treatment Primed	0800 session 40 students Tagalog instructions Hot treatment Primed	0800 session 40 students Bikol instructions Hot treatment Primed
0800 session 40 students English instructions Hot treatment Unprimed	0800 session 40 students Tagalog instructions Hot treatment Unprimed	0800 session 40 students Bikol instructions Hot treatment Unprimed
1000 session 40 students English instructions Cold treatment Primed	1000 session 40 students Tagalog instructions Cold treatment Primed	1000 session 40 students Bikol instructions Cold treatment Primed
1000 session 40 students English instructions Cold treatment Unprimed	1000 session 40 students Tagalog instructions Cold treatment Unprimed	1000 session 40 students Bikol instructions Cold treatment Unprimed

Instruction set, back-translated by native speakers:

English

Please have a look inside the envelope. The money there is for you because you came to school today. It is paid for by a research foundation and does not come from me.

Please decide based on your innermost self: how much would you give to a stranger and how much would you take for yourself? You do not know this person but he/she is real and will receive what you leave tomorrow.

There is no right or wrong answer. Just let your self decide. We respect your decision and did not ask for your name.

When you have decided, please fill in the blanks:

For me: (amount)
For Person X: (amount)

Thank you and have a nice day!

Tagalog

Paki tingnan lamang ang laman ng maliit na sobre. Yung perang nasa loob ay para sa iyo dahil ikaw ay pumasok ngayon. Hindi siya galing sa akin – galing siya sa isang research foundation.

Pagdesisyonan mo ito ayon sa kalooban mo: magkano ang ibibigay mo sa isang taong di mo kilala, at magkano ang kukunin mo para sa iyo? Hindi mo kilala ang taong ito, pero totoo siya at makukuha niya ang halagang iniwan mo bukas.

Walang tama o maling sagot, basta't mag☐desisyon ka ayon sa nasasa☐loob mo. Rerespetuhin ang iyong desisyon at hindi namin hiningi ang pangalan mo.

Pakisulat lamang ang iyong desisyon:

Para sa akin: (halaga)
Para sa taong di ko kilala: (halaga)

Maraming salamat muli!

Bikol (Rinconada)

Adi sentabo sadi loog kadi sobre para kanimo ta nag iyan ika sadi ngowan. Boko ading galin kanako – galin adi sa usad na research foundation.

Sadi sobre agko sentabo, sa maray na boôt mo, pira mo itatao sa tawong di mo bisto saka pira ikukuun sa kanimo? Di mo bisto adi tawong tatawan mo, pero matood iya saka makukuon niya a sentabong itinagama mo para kanya udma.

Mag-desisyon ika segun sa booôt mo. Irinerespeto namo a desisyon mo saka di namo aayaton a ngaran mo.

Pakisurat man tabi a desisyon mo:

Para kanako: (kantidad)
Para sa tawong di ko bisto: (kantidad)

Dios mabalos nanggad kanimo!