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Pronoun Drop and Prosocial Behavior: Experimental Evidence from Japan^{*}

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Abstract: We join a growing body of literature suggesting that the languages people speak influence their decision-making. We tested whether dropping the first-person pronoun “I” affects prosocial behavior in a dictator game-like setting. To this end, we conducted an online randomized, incentivized experiment with a socially representative sample of 2,000 Japanese respondents. We provide compelling causal evidence that pronoun-dropping reduces pro-sociality. Given that our results provide little empirical support for previous research findings linking first-person pronoun use and lower pro-sociality, we prescribe caution in using languages as a proxy for culture in several cross-country empirical studies in economics.

Keywords: pronoun drop language, prosocial behavior, social value orientation, incentivized online experiment

JEL classifications: C92, D64, Z13

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1. Introduction

Since Keith Chen’s (2013) seminal study, a growing body of literature in economics has been devoted to exploring the effects of language on economic decision-making. This literature is motivated by the Sapir–Whorf linguistic relativity hypothesis, which posits that the language we speak shapes our thoughts and decisions.¹ Most of these existing economic studies focus on the link between the use of future tense and speakers’ future-oriented behavior (Chen, He, and Riyanto 2019; Falk et al. 2018; Pérez and Tavits 2017; Sutter et al. 2018).

In this study, we turn to another facet of linguistic structure and investigate the effects of “pronoun dropping” (hereafter, “pro-drop”) on one’s pro-sociality, with a focus on the first-person pronoun “I.” Linguists classify a language as pro-drop if speakers can omit pronouns in a sentence. We consider two competing hypotheses regarding how speaking a pro-drop language affects pro-sociality. The first hypothesis is generally accepted in the existing literature, pioneered by Kashima and Kashima (1998). They proposed that the linguistic licensing of pronoun drop, particularly the omission of the first-person pronoun, is linked to the psychological differentiation between the speaker and the context of speech. Explicit use of the pronoun “I” reminds the speaker of his or her independent self, whereas its absence reduces the speaker’s sense of self. They predicted that speakers of pro-drop languages would think less frequently about themselves, exhibiting a lower level of individualism (more pro-social).² Kashima and Kashima (1998) examined this relationship across 39 languages spoken in 71 cultures and found that cultures with pro-drop languages (e.g., Japanese and Chinese) tended to be less individualistic than those with non-pro-drop languages (e.g., English).³ Since the publication of this seminal study, the findings have been well-received in psychology and economics. Later studies reported consistent findings and extended the pro-drop effect to include other dimensions, such as a country’s economic performance (Kashima and Kashima 2003), human capital accumulation (Feldmann 2019), governance norms (Licht, Goldschmidt, and Schwartz 2007), and overall quality of government institutions (Tabellini 2010).

An alternative view is that the first-person pronoun “I” is a double-edged sword, opening the possibility that people tend to become more pro-social when they use first-person

¹ See Kay and Kempton (1984) for a survey of the literature.

² Licht, Goldschmidt, and Schwartz (2007), Tabellini (2010), Gorodnichenko and Roland (2011a), Breuer, Riesener, and Salzmann (2014), and Alesina and Giuliano (2015) also showed in cross-country studies that pro-drop languages are associated with a higher level of collectivism.

³ Kashima and Kashima (1998) treated each country as a culture because the border of a country typically coincides with the boundary of a culture.

pronouns. In other words, the first-person pronoun activates one's central values and enhances one's inherent social-value orientation (Utz 2004). This self-activation hypothesis predicts that inherently pro-social individuals primed with the first-person pronoun will exhibit a higher level of pro-sociality than those not primed.⁴

These two strands of psychological literature share a similar design caveat from an economist's perspective. Their measures of individualism are based on hypothetical survey responses rather than incentivized choices, raising potential external validity issues. Moreover, Kashima and Kashima's (1998) study and others like it are mainly based on cross-cultural or linguistic comparisons; however, this empirical strategy prevents researchers from distinguishing the influence of the linguistic rule from the role of cultural differences that extend beyond linguistic differences.

In the present study, we moved toward establishing a causal relationship between the two variables using an incentivized experiment. Different from psychological studies on pro-social behaviors, we followed the standard experimental economics procedure to properly incentivize subjects' decisions using monetary incentives when eliciting their social preferences. In principle, a monetary incentive may reduce one's degree of pro-sociality by making self-interest more salient. From a methodological viewpoint, it is also important to note that, as in Utz (2004), our study was conducted entirely in the monolingual and monocultural context of Japan, and we investigated within-country differences of pro-sociality caused by dropping the first-person pronoun. The literature stemming from Kashima and Kashima (1998) focused predominantly on the cross-cultural differences of pro-sociality due to differences between countries' languages. In contrast, we examined the effect of the pro-drop rule on pro-sociality through the dropping of the pronoun "I" during communication in a decision-making task, using a single language that allowed the retention or omission of the pronoun. This experimental design allowed us to bypass the challenge of isolating the effects of language on decision-making and behavior from those caused by differences in cultural background.⁵

Our investigation into the causal effects of language with respect to pro-sociality was conducted by randomly sorting our subjects into two experimental conditions. Pro-sociality

⁴ Kashima and Kashima (1998) focused on the linguistic rules across different cultures, while Utz (2004) examined the priming effect of the first-person pronoun at the individual level. These two lines of literature have a fundamental difference in methodology and thus we note that these two views do not contradict each other. In particular, Utz's (2004) prediction is consistent with Kashima and Kashima's (1998) if one's central value is individualistic.

⁵ See Chen (2013) and Roberts, Winters, and Chen (2015) for detailed discussions on the difficulty of bypassing contaminating effects arising from background cultures.

was measured using Murphy, Ackermann, and Handgraaf's (2011) social value orientation (SVO) task. In this task, subjects act as dictators and make decisions about allocating money to an anonymous beneficiary. The instruction reads, "I receive x JPY. The other receives y JPY," where x and y are assigned real values and varied within and across rounds. We systematically manipulated the use of the first-person pronoun "I" in the questionnaire by taking advantage of the fact that Japanese is a pro-drop language. In one condition, we omitted all first-person pronouns in the entire SVO task ("without-I" condition). In the other condition ("with-I" condition), all first-person pronouns were included.

We found that the presence of the first-person pronoun significantly impacts social decision-making in the SVO task. However, our results do not seem to be aligned with the previous cross-cultural and linguistic research, including that of Kashima and Kashima (1998). On the contrary, our respondents become more prosocial in the "with-I" condition. We also found that the effects of pro-drop are more pronounced among those who are older or more educated. To further ensure that our results were due to the self-activation mechanism induced by the repeated use of the first-person pronoun in the task, we conducted a follow-up study and successfully refuted an alternative explanation that Japanese subjects may perceive the omission of "I" as being careless or impolite, thus behaving less pro-socially in the pro-drop condition.

2. Experimental Design and Procedures

We measured pro-sociality using the SVO task developed by Murphy, Ackermann, and Handgraaf (2011).⁶ The task consisted of 15 decision items: six primary items and nine secondary items. In each item, a decision-maker (DM) was presented with nine different pairs of payoffs for himself or herself and anonymous others and acted as a dictator by choosing the most preferred pair out of nine options. Figure 1 illustrates the six primary items. Each of the six straight lines connecting two nodes represents a pair of payoffs available to the DM in a primary item. These six primary items mainly differ in the price of increasing one unit of the other's payoff as well as the maximum and minimum possible payoffs of both parties. Based on a DM's responses to these six primary items, we measured his or her pro-social propensity by summarizing the answers into a single score: the SVO angle.⁷ The SVO angle was then used to categorize the DM's behavioral types: altruistic, pro-social, individualistic, or competitive.

⁷ Please refer to the figure notes of Figure 1 for the calculation of the SVO angle.

By design, the nine secondary items were used to distinguish motivations for pro-sociality (total-payoff maximization vs. egalitarianism), once a DM has been classified as pro-social type.

The main advantages of adopting the SVO task were that it was easy for participants to understand and involved no interaction among subjects, which eliminated potential alternative explanations related to strategic reasoning.⁸ Also, the simple structure of the question items allowed us to directly manipulate the use of the first-person pronoun in the question items.

To examine the effect of the first-person pronoun on people's social decision-making, we employed the between-subject design and implemented two conditions: the "with-I" condition and "without-I" condition. The upper (resp., lower) panel of Figure 2 shows an example of the "with-I" ("without-I") condition. In the "with-I" condition, each option of the SVO items was spelled out, such as "I receive 100 JPY; the other receives 50 JPY." In the "without-I" condition, we dropped the first-person pronoun, and the option was spelled out as "Receive 100 JPY; the other receives 50 JPY."⁹ The first-person pronoun occurred 135 times in the "with-I" condition and never in the "without-I" treatment condition throughout the SVO task. As such, our linguistic manipulation was naturally embedded in the decision items so that subjects were unlikely to notice the subtle manipulation in pronoun use, which mitigated the experimenter demand effect. Experimental instructions are in online Appendix I.

To obtain a representative sample of the Japanese population, we hired MyVoice Inc. to administer the experiment. This local survey company has more than 1 million pre-registered participants, each of whom, on average, takes part in about 15 online surveys annually. The survey was conducted during February 22–26, 2016; participants were not informed of the purpose of the survey except that it was being conducted for academic research. We had a contract with the survey company to ensure that the total number of subjects was 2,000 and that they were randomized into one of the two treatment groups. Online Appendix II describes the recruitment procedures in detail.

⁸ In our experiment, we controlled for reciprocity by excluding the possibility of being each other's beneficiary.

⁹ We followed Murphy, Ackermann, and Handgraaf's (2011) SVO task and used the same phrasing as they did. The verb choice of "receive," instead of other alternatives such as "give" (Yamamori et al. 2004), might have affected our findings. For example, if the subjects associated "receive" with a passive role (as opposed to associating "give" with an active role) in determining money allocation in a dictator game, they may have assumed lesser ownership over the endowment, leading to more pro-social choices. If this effect is enhanced by the use of "I," then we would have observed a higher level of pro-sociality in the "with-I" condition.

Eligible subjects made decisions on 15 SVO items presented in a randomized order. One item was randomly chosen to implement payment. Subjects completed a post-experiment questionnaire eliciting their demographic information at the end of the study. Completing the whole survey took each participant 5–10 minutes, and the average payment was 215 JPY (roughly 2 USD).¹⁰

3. Results

3.1 Summary statistics and randomization check

We used stratified random sampling over the joint distribution of gender (two cells), age category (four cells), and educational attainment (four cells) to mimic the characteristics of the Japanese population.¹¹ Table 1 provides descriptive statistics for our sample. Column 1 shows the summary statistics of the whole sample. Among the 2,000 subjects, the average age was 36.3 years, 49.3% were male, and 54.3% were married. More than a quarter of our subjects had a college degree or higher. The average pre-tax household income was 5.84 million JPY.¹² Our stratified random sampling procedure ensured the equality of gender, age, and educational attainment among the two treatment conditions, shown in Columns 2 and 3. For the three variables that were not used in stratified random sampling—marital status, pre-tax income, and household size—the difference of means between the “with-I” group and the “without-I” group is shown in Column 4, along with the p-values for the null hypothesis that the means are the same across the two groups reported in Column 5. Overall, the results clearly show that random assignment is valid.

3.2 Results from the main experiment

The main results from the experiment are summarized in the lower panel of Table 1. The mean SVO angle of the “with-I” group is significantly higher than that of the “without-I” group (p-value = 0.036, two-sided Mann-Whitney test), suggesting that our Japanese subjects

¹⁰ The payment consisted of three components: (1) the reward from their own choices, (2) an allocation received from a randomly matched anonymous participant, and (3) a 50 JPY base participation amount. Our relatively small stakes might be a concern for some readers. However, Amir, Rand, and Gal (2012) validated experimental results with smaller stakes. The average earnings in our experiment were no smaller than those of a typical survey administered on an online platform, like Amazon Mechanical Turk.

¹¹ The statistics are based on the Final Report of the 2010 Population Census, Japan. The number of subjects assigned to each of the 32 cells is reported in Table A.1 in online Appendix II.

¹² We also asked respondents to indicate their income level from a list of 11 categories, where category 1 denoted an annual household income of under 2 million JPY and category 11 corresponded to an annual income level of over 50 million JPY. We used the mid-point in each of the nine intermediate categories as the measure of pre-tax household income levels, except for the two extremes. Thus, respondents who reported categories 1, 2, ..., 11 as their income level were assigned annual household incomes of 1.5; 3; ...; 60 million JPY, respectively. Thus, the average pre-tax household income calculated was 5.84 million JPY.

exhibited a higher level of pro-sociality when they were repetitively exposed to the pronoun “I.” Additionally, we plotted the distributions of SVO angles by treatment in Figure 3 and performed the Kolmogorov–Smirnov test (p -value = 0.121). The results indicate that, although the overall SVO distributions do not significantly differ, they differ in the means of SVO angles. This implies that the treatment only shifts parts of the distribution. A casual inspection of Figure 3 suggests that the shift happens in the higher SVO values range.

We further classified each subject’s behavioral type according to his/her SVO angle. Regardless of the treatment condition, pro-social and individualistic types combined accounted for 98% of subjects in our entire sample. Consistent with the results based on the average SVO angle, we observed a higher proportion of pro-social subjects in the “with-I” group than in the “without-I” group. Following Ackermann and Murphy (2012), we calculated the inequality-aversion (IA) index based on responses in the nine secondary items. The difference in the IA index between the two treatment conditions was not statistically significant, meaning that the use of the pronoun “I” increased our subjects’ pro-sociality but did not influence their underlying pro-social motivations (results available upon request).

To formally investigate the effects of the first-person pronoun on pro-sociality, we performed OLS regressions to estimate the following equation:

$$SVO_i = \alpha + \beta WITH_i + X_i' \pi + \varepsilon_i \quad (1)$$

where SVO_i is the SVO angle of individual i . The term $WITH_i$ captures the treatment effect of “I” and is a dummy variable taking the value of 1 if a respondent is in the “with-I” condition, and 0 otherwise. X_i' is a vector of demographic variables.

Table 2 reports the regression results. Column 1 shows that our main treatment effect, without including any demographic controls, was statistically significant at the 5% level. Because the treatment condition was randomly assigned, we inferred a causal relationship between language and pro-sociality.¹³ An intriguing finding here is that the subjects became more pro-social when they were repetitively exposed to the pronoun “I.” In terms of the size of the effect, relative to that in the “without-I” group (as shown by the coefficient of the constant term), we observed a 6.7% increase in the SVO angles among respondents in the “with-I” group. We further included demographic controls in Column 2. It can be seen that

¹³ We also checked whether the treatment effect was more pronounced in the first period and then decayed with repetitions and found that it did not. Instead, it persisted throughout the course of the experiment. The results are available upon requests.

adding these covariates had little effect on the estimated treatment effect, although we observed that respondents from larger households tended to be more generous. In Column 3, we further added the interaction terms between $WITH_i$ and Xi' to explore the heterogeneity of the treatment effect. First, although marginally significant, younger people behaved more individualistically when they were instructed with “I.” Although the variance was high, being young and in the treatment group reduced the SVO angle by around 18.5% compared with the baseline. Second, we observed that more educated subjects tended to be more pro-social when they were instructed with “I,” and the interaction effect was statistically significant at the 5% level. Being more highly educated increased the SVO angle by around 14.2% relative to the baseline.¹⁴

3.3 Ad hoc follow-up survey

An intriguing finding from the main experiment is that our respondents behaved more pro-socially when they were repetitively exposed to the first-person pronoun, which is the opposite of the seminal result from Kashima and Kashima (1998). This finding suggests that something other than individualism is induced by dropping the first-person pronoun and is responsible for the change in behavior. We argue that this change could be explained by the self-activation effect by Utz (2004), as discussed earlier.

However, a rival explanation derives from the “impoliteness effect” of omitting the first-person pronoun: if one explains something without using the first-person pronoun, it can be perceived as rude. Indeed, it is important to use honorific words appropriately in Japanese society, and the lack of the first-person pronoun (and consequent apparent lack of respect) can lead to a reduction of pro-social feeling. In line with this speculation, we found in the first survey that those who were more educated or older (and thus, were more aware of the importance of using honorific words) behaved more pro-socially when instructed with “I.” For this reason, we conducted an ad hoc follow-up study to test the politeness explanation.

The same company implemented the follow-up survey within two months of the first survey’s completion. The original 2,000 subjects were invited through email, and 1,695 (roughly 85%) completed the survey.¹⁵ This survey consisted of two parts (refer to Appendix III, Section A3.1). In Part 1, we aimed to test whether our subjects perceived the two linguistic

¹⁴ We mentioned earlier that the passing rates of our participants in the comprehension test between “with-I” and “without-I” treatments were significantly different. Thus, one might argue that both groups differ in respects other than the language of manipulation. If there is any difference, perhaps it is in the cognitive burdens that two different manipulations of language cause. We relegate this investigation for future research.

¹⁵ Subjects received a fixed participation fee of 20 JPY in the follow-up survey.

conditions, “with-I” and “without-I,” differently. Subjects were presented with both versions of the SVO task and asked to predict the behavioral differences, if any, between these two conditions for themselves (Q1) and for other participants (Q3).¹⁶ Subjects were asked to provide their justifications for their predictions (Q2 and Q4). In designing Part 2 of the survey, our presumption was that if politeness is the mechanism in action, we should observe a more pronounced treatment effect among those who consider politeness to be important. Thus, we developed a six-item questionnaire (Q5–Q10) to elicit the subjects’ attitudes toward politeness. The responses on a Likert scale of 1 (strongly disagree) to 7 (strongly agree) indicated their subjective views about politeness.

Analysis of the data from the follow-up survey is relegated to Section A3.2 of Appendix III. Overall, we did not find support for the politeness hypothesis. First, based on their responses in Part 1, the majority of the subjects did not expect any behavioral difference between the two conditions. Second, the treatment effect was not significantly different among those who valued politeness relatively highly and those who did not. These results jointly suggest that the alternative explanation based on politeness can be plausibly refuted.

4. Discussion and Conclusion

This paper presents the results of an experimental investigation into the effect of pronoun-dropping on people’s prosocial behavior in a dictator game-like setting. The experiment featured unobtrusive linguistic manipulation of a large, socially representative sample of monocultural and monolingual Japanese subjects, which controlled for any potential confounding effects from culture and thus facilitated the identification of the causal link between first-person pronoun use and pro-sociality. We found that our results did not align with Kashima and Kashima’s (1998) and similar studies; rather, our subjects exhibited a higher level of pro-sociality when the first-person pronoun “I” was included.

Our paper casts doubt on the practice of using *pro-drop language* as an instrument for culture in cross-country studies, such as those of Licht, Goldschmidt, and Schwartz (2007), Tabellini (2010), Gorodnichenko and Roland (2011a, 2011b), Klasing (2013), Davis and Abdurazokzoda (2016), Gorodnichenko and Roland (2017), Kammas, Kazakis, and Sarantides (2017), and Feldmann (2019). This empirical economic approach originated from Kashima and Kashima’s (1998) seminal work. In these studies, the categorical variable *pronoun dropping* is

¹⁶ In these two questions, subjects were asked to choose one of three options: (1) allocating more resources to the beneficiary in Version A (the “with-I” condition), (2) allocating more resources to the beneficiary in Version B (the “without-I” condition), and (3) indifferent among the two conditions.

employed as an instrument for “individualism,” an important dimension of culture proposed by Hofstede (2001). Using pro-drop language as an instrument for individualism rests on the premise that a language that allows pronouns to be dropped would subconsciously influence its speakers to be less self-centered (less individualistic). Our results show that the direction of influence of pronoun drop on individualism is the opposite of that postulated by Kashima and Kashima (1998) and succeeding studies. Instead, in our study, it is the presence of pro-drop, rather than the absence of it, that induces people to be less self-centered. It is also worth mentioning that in what is likely the most comprehensive paper exploring global evidence on economic preferences written to date, Falk et al. (2018) also cast doubt on the link between pronoun drop and individualism (or social preferences in the context of their paper); instead, they found that pronoun drop is strongly correlated with time preference.

In conclusion, the link between pronoun drop languages and individualism may not be as robust as what previous studies have suggested. This challenges the validity of using the constructed measure of pro-drop language as an instrument for culture (e.g., individualism), and thus more research utilizing experimental methodology and other causal inference techniques needs to be done to uncover the causal link between the pro-drop rule and individualism using other flexible pro-drop languages, such as Chinese and Indonesian, that allow speakers to switch pronouns on and off without violating a grammatical rule.

References

- Ackermann, Kurt A., and Ryan O. Murphy. 2012. "Tutorial on How to Evaluate the SVO Slider Measure's Secondary Items." http://ryanomurphy.com/resources/SVO_second_item_tutorial.pdf.
- Alesina, Alberto, and Paola Giuliano. 2015. "Culture and Institutions." *Journal of Economic Literature* 53, no. 4: 898–944.
- Amir, Ofra, David G. Rand, and Ya'akov Kobi Gal. 2012. "Economic Games on the Internet: The Effect of \$1 Stakes." *PLoS ONE*.
- Breuer, Wolfgang, Michael Riesener, and Astrid Juliane Salzmänn. 2014. "Risk Aversion vs. Individualism: What Drives Risk Taking in Household Finance?" *The European Journal of Finance* 20, no. 5: 446–62.
- Chen, Josie I, Tai-Sen He, and Yohanes E Riyanto. 2019. "The Effect of Language on Economic Behavior: Examining the Causal Link between Future Tense and Time Preference in the Lab." *European Economic Review* 120: 103307.
- Chen, M. Keith. 2013. "The Effect of Language on Economic Behavior: Evidence from Savings Rates, Health Behaviors, and Retirement Assets." *American Economic Review*.
- Davis, Lewis S., and Farangis Abdurazokzoda. 2016. "Language, Culture and Institutions: Evidence from a New Linguistic Dataset." *Journal of Comparative Economics*.
- Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde. 2018. "Global Evidence on Economic Preferences." *Quarterly Journal of Economics* 133, no. 4: 1645–92.
- Feldmann, Horst. 2019. "Do Linguistic Structures Affect Human Capital? The Case of Pronoun Drop." *Kyklos*.
- Gorodnichenko, Yuriy, and Gerard Roland. 2011a. "Individualism, Innovation, and Long-Run Growth." *Proceedings of the National Academy of Sciences of the United States of America*.
- . 2011b. "Which Dimensions of Culture Matter for Long-Run Growth?" *American Economic Review*.
- . 2017. "Culture, Institutions, and the Wealth of Nations." *The Review of Economics and Statistics* 99, no. 3: 402–16.
- Hofstede, Geert. 2001. *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations*, 2nd ed. Thousand Oaks, CA: Sage.
- Kammas, Pantelis, Pantelis Kazakis, and Vassilis Sarantides. 2017. "The Effect of Culture on Fiscal Redistribution: Evidence Based on Genetic, Epidemiological and Linguistic Data." *Economics Letters*.
- Kashima, Emiko S., and Yoshihisa Kashima. 1998. "Culture and Language: The Case of Cultural Dimensions and Personal Pronoun Use." *Journal of Cross-Cultural Psychology*.
- Kashima, Yoshihisa, and Emiko S. Kashima. 2003. "Individualism, GNP, Climate, and Pronoun Drop." *Journal of Cross-Cultural Psychology*.
- Kay, Paul, and Willett Kempton. 1984. "What Is the Sapir–Whorf Hypothesis?" *American Anthropologist* 86, no. 1: 65–79.
- Klasing, Mariko J. 2013. "Cultural Dimensions, Collective Values and Their Importance for

- Institutions.” *Journal of Comparative Economics* 41, no. 2: 447–67.
- Licht, Amir N., Chanan Goldschmidt, and Shalom H. Schwartz. 2007. “Culture Rules: The Foundations of the Rule of Law and Other Norms of Governance.” *Journal of Comparative Economics*.
- Murphy, Ryan O., Kurt A. Ackermann, and Michel J. J. Handgraaf. 2011. “Measuring Social Value Orientation.” *Judgment and Decision Making*.
- Pérez, Efrén O., and Margit Tavits. 2017. “Language Shapes People’s Time Perspective and Support for Future-Oriented Policies.” *American Journal of Political Science* 61, no. 3: 715–27.
- Roberts, Seán G., James Winters, and Keith Chen. 2015. “Future Tense and Economic Decisions: Controlling for Cultural Evolution.” *PLoS ONE*.
- Sutter, Matthias, Silvia Angerer, Daniela Glätzle-Rützler, and Philipp Lergetporer. 2018. “Language Group Differences in Time Preferences: Evidence from Primary School Children in a Bilingual City.” *European Economic Review* 106 (July): 21–34.
- Tabellini, Guido. 2010. “Culture and Institutions: Economic Development in the Regions of Europe.” *Journal of the European Economic Association*.
- Utz, Sonja. 2004. “Self-Activation Is a Two-Edged Sword: The Effects of I Primes on Cooperation.” *Journal of Experimental Social Psychology*.

Tables and Figures

Figure 1: Illustration of the SVO Task

Note: The SVO task categorizes a DM into four types—altruistic, pro-social, individualistic, and competitive, represented by each of the four black nodes. This task consists of six items in which a DM chooses his preferred money allocation between himself and the other participant. Each item is represented by a straight blue line connecting two black nodes. Theoretically, a DM can choose his most preferred point along any point on a blue line; however, we adopt the discrete version which constrains a DM's choice to one of the nine options evenly spread out across the whole line. A DM makes a total of six self-other payoff allocation decisions which are then summarized into the SVO angle, measuring the DM's pro-sociality. The SVO angle can be calculated as follows. First, for each respondent i , we compute the mean allocation for self ($\overline{A_{s,i}}$) as well as the mean allocation for the other ($\overline{A_{o,i}}$). Then, 50 is subtracted from each of these means in order to shift the base of the resulting angle to the center of the circle (50; 50). Finally, the inverse tangent of the ratio between these means is computed, resulting in a single index of SVO for respondent i as

$$SVO_i = \arctan \left(\frac{\overline{A_{o,i}} - 50}{\overline{A_{s,i}} - 50} \right).$$

As an example, the red dot illustrates the SVO angle of 20 degrees.

Figure 2: “With-I” and “Without-I” Conditions

Q7. 次の選択肢のうち、最も好ましいものを選んでください。

- わたしは 100 円もらう。 もうひとりは 50 円もらう。
- わたしは 94 円もらう。 もうひとりは 56 円もらう。
- わたしは 88 円もらう。 もうひとりは 63 円もらう。
- わたしは 81 円もらう。 もうひとりは 69 円もらう。
- わたしは 75 円もらう。 もうひとりは 75 円もらう。
- わたしは 69 円もらう。 もうひとりは 81 円もらう。
- わたしは 63 円もらう。 もうひとりは 88 円もらう。
- わたしは 56 円もらう。 もうひとりは 94 円もらう。
- わたしは 50 円もらう。 もうひとりは 100 円もらう。

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- 88 円もらう。 もうひとりは 63 円もらう。
- 81 円もらう。 もうひとりは 69 円もらう。
- 75 円もらう。 もうひとりは 75 円もらう。
- 69 円もらう。 もうひとりは 81 円もらう。
- 63 円もらう。 もうひとりは 88 円もらう。
- 56 円もらう。 もうひとりは 94 円もらう。
- 50 円もらう。 もうひとりは 100 円もらう。

Note: In the upper panel, we show an example of “with-I (わたし) condition.” The lower panel shows the corresponding example of “without-I condition.” The bullets for each condition read “I receive ___ JPY. The other receives ___ JPY.”

Figure 3: Distributions of SVO Angles by Treatment

Table 1: Summary Statistics

	All sample (1)	With-I group (2)	Without-I group (3)	Mean differences (4)	p value (5)
Male	0.493	0.493	0.493		
Age category					
Age (<30)	0.179	0.179	0.179		
Age (30-39)	0.284	0.284	0.284		
Age (40-49)	0.269	0.269	0.269		
Age (50-64)	0.268	0.268	0.268		
Age (in years)	36.260 (10.624)	36.260 (10.627)	36.260 (10.627)		
Education					
Middle School	0.070	0.070	0.070		
High School	0.457	0.457	0.457		
Tech School/Some college	0.209	0.209	0.209		
Undergrads/Grads	0.264	0.264	0.264		
Married	0.543	0.551	0.535	0.016	0.473
Household income (in millions, JPY)	5.84 (4.31)	5.88 (4.31)	5.80 (4.32)	0.080	0.660
The number of family members	3.005 (1.331)	3.034 (1.348)	2.975 (1.314)	0.059	0.322
SVO angle	22.525 (15.642)	23.257 (15.618)	21.793 (15.640)	1.464	0.036**
SVO categories					
Altruistic	0.010	0.011	0.009		
Pro-social	0.510	0.519	0.500		
Individualistic	0.471	0.465	0.477		
Competitive	0.010	0.005	0.014		
No. of observatoins	2,000	1,000	1,000		

Note: All figures, except for age (in years), household income (in million JPY), and the number of family members are percentages for each category. * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 2: The effect of “I” on pro-sociality

Outcome: SVO	(1)	(2)	(3)
With-I	1.464** (0.699)	1.435** (0.699)	0.453 (2.141)
Male		0.407 (0.716)	-0.411 (1.012)
Young		0.050 (0.966)	1.932 (1.355)
High education		0.451 (0.716)	-1.010 (1.016)
Married		-0.163 (0.806)	0.394 (1.129)
Household income		-0.000 (0.000)	-0.000 (0.000)
Number of family members		0.579** (0.283)	0.734* (0.400)
Interaction terms with With-I			
Male			1.654 (1.431)
Young			-3.776* (1.931)
High education			2.906** (1.431)
Married			-1.034 (1.613)
Household income			0.000 (0.000)
Number of family members			-0.346 (0.565)
Constant	21.793*** (0.494)	19.917*** (1.120)	20.406*** (1.509)
Observations	2,000	2,000	2,000
R-squared	0.002	0.005	0.011

Notes: The dependent variable is the SVO angle. Standard errors are reported in parentheses. *With-I* is the treatment dummy which equals 1 if the subject is the “With-I” condition and 0 otherwise. *Male* is a dummy which equals 1 if the subject is male and 0 otherwise. *Young* is a dummy which equals 1 if the subject is his/her 20s and 0 otherwise. *High education* is a dummy which equals 1 if the subject has a college degree or higher and 0 otherwise. *Married* is a dummy which equals 1 if the subject’s self-reported marriage status is married and 0 otherwise. *Household income* is the subject’s self-reported pre-tax household income. *Number of family members* is the number of members in the subject’s household. *** p<0.01, ** p<0.05, * p<0.1.