DO LANGUAGES GENERATE FUTURE ORIENTED ECONOMIC BEHAVIOR? EXPERIMENTAL EVIDENCE FOR CAUSAL EFFECTS

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Abstract

Studies have shown that the use of languages which grammatically associate the future and the present tends to correlate with more future-oriented behavior. We take an experimental approach to go beyond correlation. We asked bilingual research participants, people fluent in two languages (12 language pairs) which differ in the way they encode time, to make a set of future-oriented economic decisions. We find that participants addressed in a language in which the present and the future are marked more distinctly tended to value future events less than participants addressed in a language in which the present and the future are similarly marked. We supplement the analysis with a within-person experiment.

Introduction

Do languages affect or merely reflect the attitudes, preferences, and behaviors of the people who speak them? Numerous studies have documented correlations between the linguistic features and grammatical structures of languages and the attitudes, preferences, and behaviors of the people who speak them. Thus, for example, it has been shown that speakers of languages with different structures and features differ accordingly in their processing of colors, future-oriented economic behaviors, and gendered attitudes (Chen 2013, Davis and Reynolds 2018, Gay et al. 2013, Jakiela and Ozier 2018, Mavisakalyan et al. 2018, Prewitt-Freilino et al. 2012, Galor et al. 2020, Ladd et al. 2015).

However, evidence for the causal effects of the features and structure of languages on attitudes, preferences, and behaviors is harder to establish (see Sutter et al. 2018 and Galor et al. 2018 for some attempts). It is a challenge to demonstrate empirically that using a specific language can affect, and not just merely reflect, the way we perceive the world. Indeed, scholars across several disciplines have debated, and continue to debate, the relationship between language and thought (Ladd et al. 2015). Whereas some have argued that languages do not restrict people's perceptions and behavior (Li and Gleitman 2002), others (who subscribe to the linguistic relativity hypothesis) have asserted that speakers of languages develop language-specific schemas and structures which affect their perceptions and behavior (Whorf 1956, Carroll et a. 2004, Levinson 2012, Lucy 1996).

We contribute to this longstanding debate by providing evidence for the causal impact of the encoding of time in the language spoken on the intertemporal economic choices that people make. Languages vary in the ways in which they encode time. In some languages, like German, the same grammatical tense is often used to refer to both present and future events ("futureless languages"; "weak FTR languages"). Other languages, like English and French have the obligatory grammatical marking of the future tense. ("futured languages"; "strong FTR languages"). we hypothesize that when people are addressed in a futured language, one that grammatically differentiates between the present and the future (strong FTR), they tend discount future events more. This, in turn, encourages less future-oriented behavior, such as spending more in the present or preferring to be paid in the present rather than receiving higher delayed payments.

Methods and Materials

We used a randomized between-subject experimental design. We asked bilingual people, fluent in two languages which differ in the way that they encode time, to make a future-oriented economic decision: specifically, we asked participants, in one of the two languages in which they are fluent, to make a set of binary choices about whether they wished to be paid $3 today, or a larger amount of money (ranging from $3.05 to $7) in a week (Daniel et al. 2010, Frederick et al. 2002). We then tested whether the people randomly assigned the question in a strong-FTR language required more by way of future compensation than those who were asked the question in a weak-FTR language.
- Participants were recruited via Mturk in the spring and summer of 2019.
- The experiment involved 717 bilingual participants, proficient in one weak-FTR language (German, Dutch, Mandarin) and one strong-FTR language (English, French, Spanish, Hindi), of which 565 passed the attention test.

Results

For each participant, we capture the lowest amount for which she indicated a preference to be paid a week from now, rather than being paid $3 immediately. The results from a Tobit regression models predicting participants' lowest accepted delayed payment value are presented in the table below. As predicted -
1. **Being addressed in the strong-FTR language generated a higher time discount rate than being addressed in the weak-FTR language** (In Models 1,2,4, and 5, the lowest accepted delayed payment for participants addressed in a strong FTR language was at least 50 cents higher than the lowest accepted delayed payment for participants who were addressed in the weak FTR ($p<0.001$)).
2. **Proficiency mattered**: The significant and positive interaction in Model 3 (asked in the strong-FTR * strong-weak gap, $p<0.001$) suggests that the effects of being asked the payment questions in the strong-FTR language are significantly stronger for participants who are more proficient in the strong-FTR language.

TOBIT Regression Models Predicting Lowest Accepted Delayed Payment					
	(1)	(2)	(3)	(4)	(5)
Asked in Strong FTR	0.504***	0.497***	0.276[i]	0.521***	0.515***
	(0.145)	(0.145)	(0.149)	(0.143)	(0.144)
Proficiency in the Addressing Language	-0.437***	-0.431***	-0.603***	-0.451***	-0.433***
	(0.063)	(0.063)	(0.073)	(0.066)	(0.066)
Strong Weak Proficiency Gap		0.118*	-0.189[i]	0.077	0.074
		(0.056)	(0.085)	(0.061)	(0.059)
Asked in Strong FTR X Strong Weak Proficiency Gap			0.607***		
			(0.130)		
Gender, Race and Education Fixed Effects				Y	Y
Language Pairs Dummies				Y	
Strong-FTR Genus Indic					-0.133
					(0.219)
Strong-FTR Genus Romance					-0.105
					(0.161)
Weak-FTR Genus Indic					-0.186
					(0.168)
Constant	6.744***	6.638***	8.086***	7.165***	7.272***
	(0.472)	(0.473)	(0.564)	(0.565)	(0.570)
Sigma	2.162***	2.148***	2.062***	1.949***	2.021***
	(0.186)	(0.184)	(0.177)	(0.168)	(0.175)
N	523	523	523	509	509
Pseudo R-square	0.032	0.035	0.049	0.063	0.054

[i] $p<0.1$ * $p<0.05$ ** $p<0.01$ ***$p<0.001$

Discussion

Our experimental design enabled us to identify causality between the encoding of time in the language in which people are addressed and their tendency to discount future monetary payments. To ensure the results are not confounded by other determinants, we conducted a few tests:
(a) To eliminate the possibility that the strong-FTR languages we chose are associated with countries with less wealthy economies than the countries associated with the weak-FTR languages we chose, we reran our analysis on a sample which excluded Hindi and Spanish speakers. Results remained similar.
(b) We verified that the strong–weak FTR distinction used in this study is not confounded by any of the linguistic features that appear in the World Atlas of Language Structures.
(c) To provide stronger evidence for causality and eliminate selection concerns, we also supplemented the analysis with a within person experiment that yielded similar results to those obtained in the main analysis.
In future research we aim to uncover the mechanism. We plan to show that speaking about future events in the present tense can make the future seem more immediate (Trope and Liberman 2010).

Conclusions

Our results suggest that the time-related schemas embedded in languages are easily and immediately activated and can impact everyday human behavior. Asking the same payment questions in a different language resulted in different time preferences for otherwise similar participants. Languages both reflect and enforce time-related attitudes, preferences, and behaviors.

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