Using Verbal Fluency to Understand the Impact of Language Use and Self-Rated Proficiency on Lexical Access in Bilingualism

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Introduction

Bilinguals are not a homogenous group; they vary greatly in their performance on language tasks.

- Bilinguals differ in many ways, including how much they use each language, their proficiency in each language, the contexts where their languages are used, etc. (Luk & Bialystok, 2013).
- One of the challenges of bilingualism research is to capture how different sources of variation in bilingual language experience shape language use and cognitive functioning.
- Variation in bilingual language experiences is a tool that can be used to investigate the factors that shape bilingual language processing. Heritage speakers are one of the most variable groups of bilinguals.

Although the majority of bilinguals in the U.S. are heritage speakers, relatively little is known about how their experience contributes to the ways that they use the two languages.

- Heritage speakers are bilinguals who:
  - first acquired a home language other than the language of the community
  - often undergo a dominance switch, in which their first-learned language becomes their non-dominant language and their second-learned language (the majority language) becomes their dominant language
  - may have limited literacy skills in the heritage language

The goal of this study is to examine the factors that contribute to heritage speakers' fluency

- We conducted a large-scale analysis of verbal fluency data and self-reported language questionnaire data from bilinguals in Southern California, most of whom were heritage speakers. In addition to global language proficiency, we examined verbal and literacy proficiency separately in order to understand how individual differences in literacy contribute to production fluency.

Elsewhere 8.2% | School 16.3% | Childhood Home 75.5%
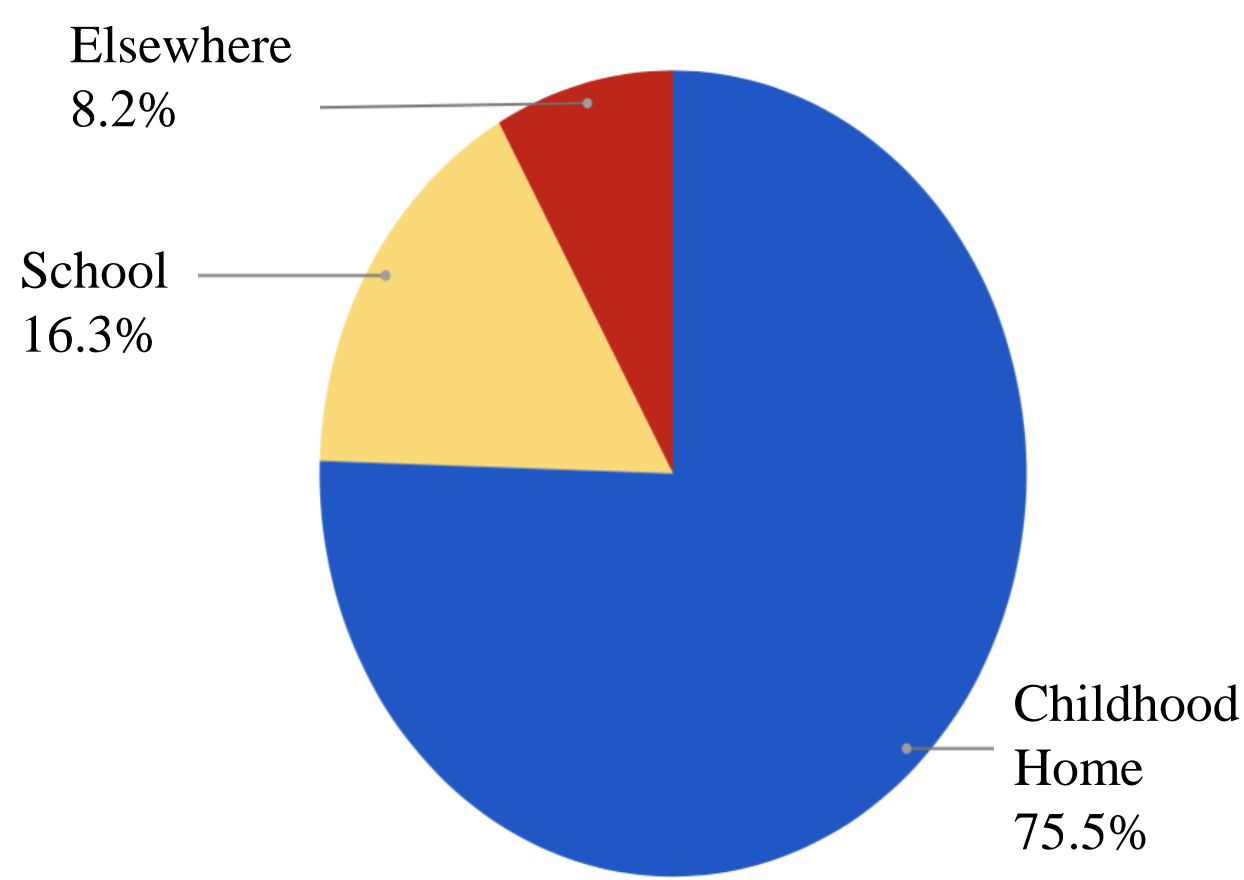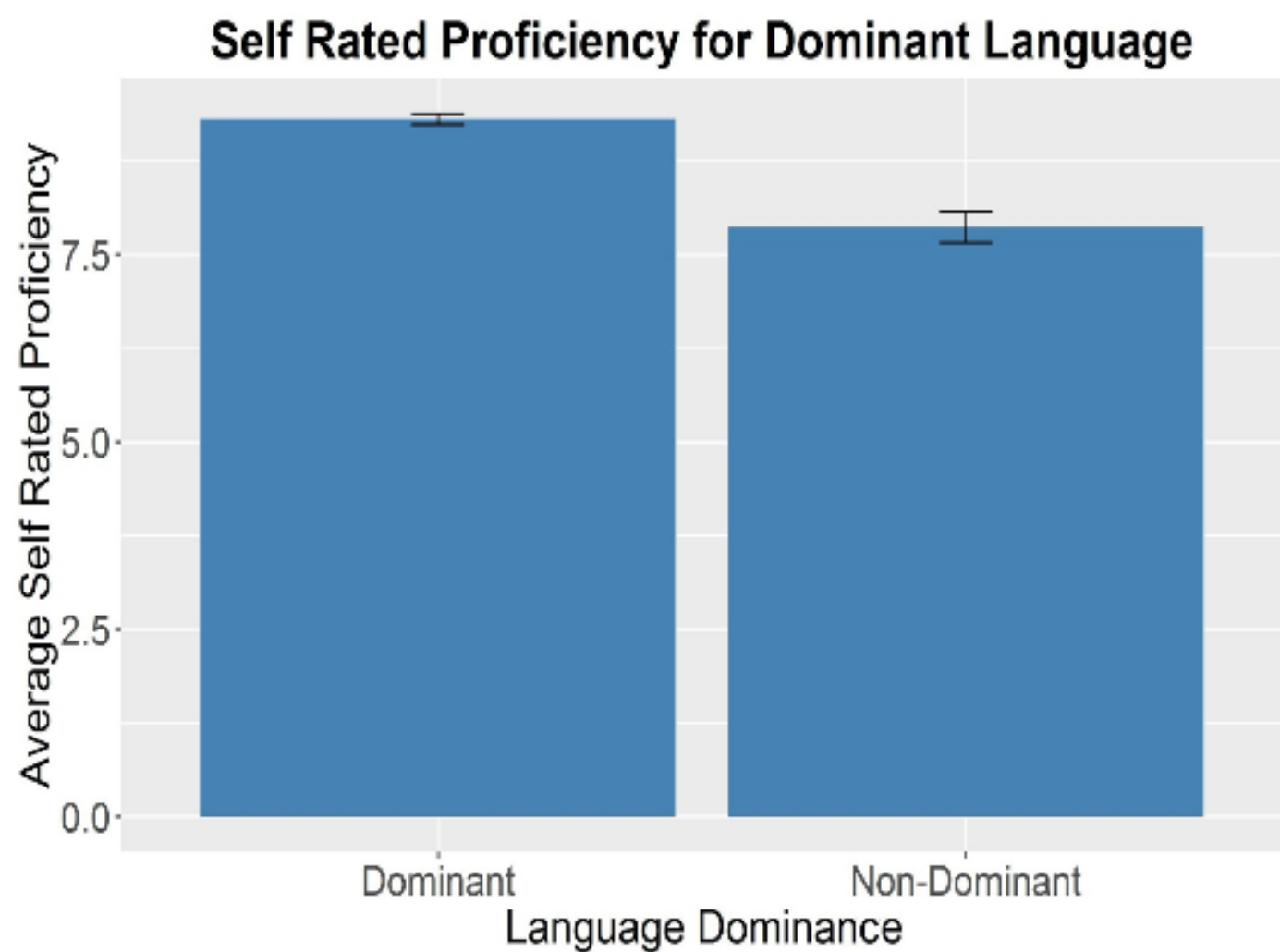
Research Questions

Do self-rated proficiency and amount of language use predict word generation in English and Spanish?

Method

Data were aggregated across five studies conducted at UCR from 2016-2018.

Language History Questionnaire (LHQ): Information about the frequency of language use and self-reported proficiency in each language on a scale of 0 (none) to 10 (perfect)

Verbal Fluency Task: Participants were instructed to name as many words as possible within 30 seconds in different semantic categories (e.g., Animals, Family Members, Fruits). They completed the task once in each language with a different set of categories.
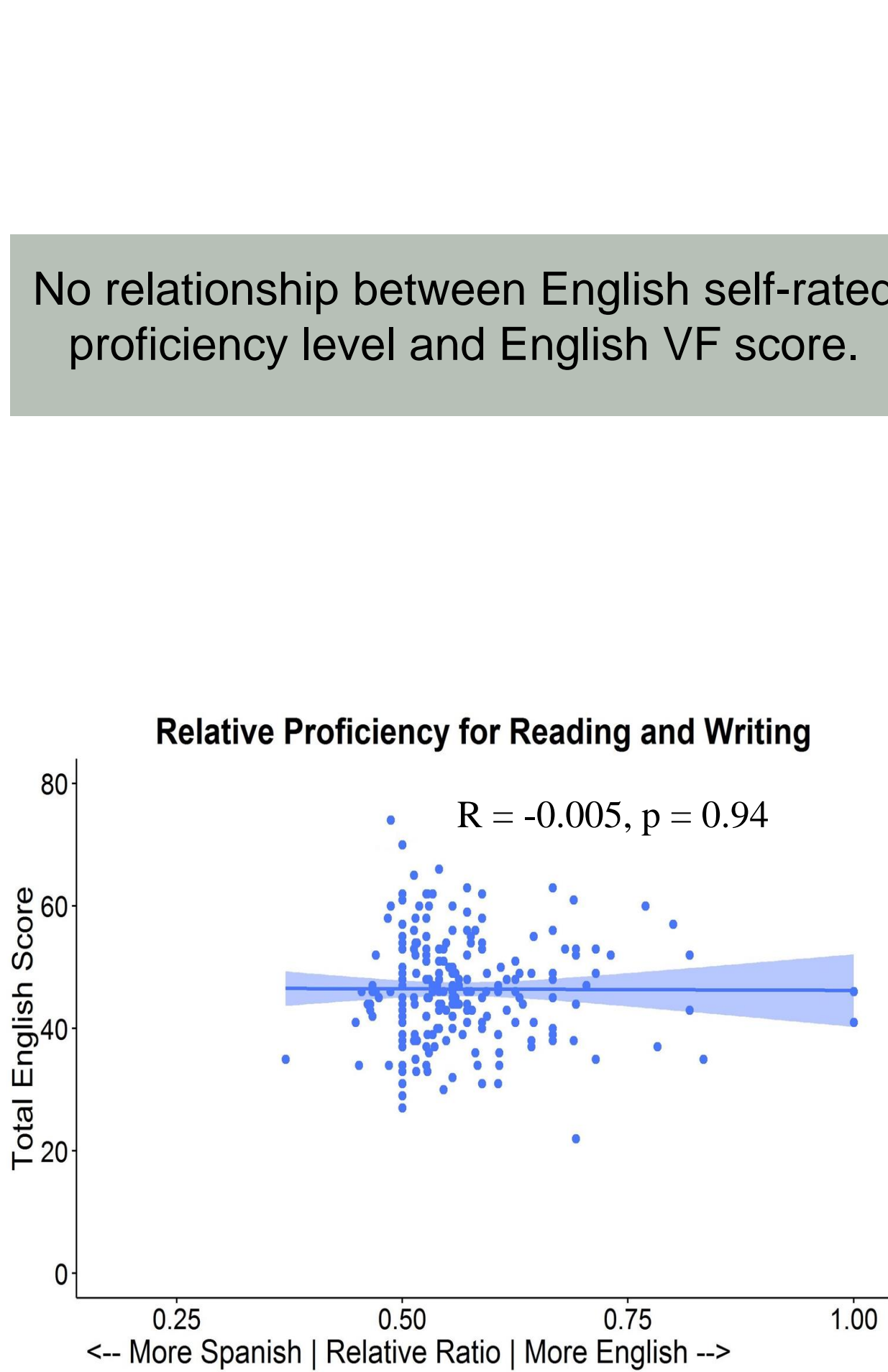
Number of Participants	228
Male	38
Female	190
Age	17-31
Dominant Language (English)	185
Dominant Language (Spanish)	43
Average Age of 2nd Language Acquisition	5.2 years

Self Rated Proficiency for Dominant Language

Measures

- **Language proficiency:** A ratio of English to Spanish self-rated proficiency was calculated, in which English proficiency was divided by the total proficiency. Separate proficiency ratios were calculated for **verbal proficiency** (speaking and oral comprehension skills) and **literacy proficiency** (reading and writing skills).

- **Language use**: A ratio of English to Spanish language use was calculated, in which English use was divided by the total proficiency. The activity that measured **language use** varied from speaking at home to socializing with friends.

- **Z-score**: Standardized Z-scores were calculated for language use to enable us to combine multiple datasets that used different scales for measuring language use.
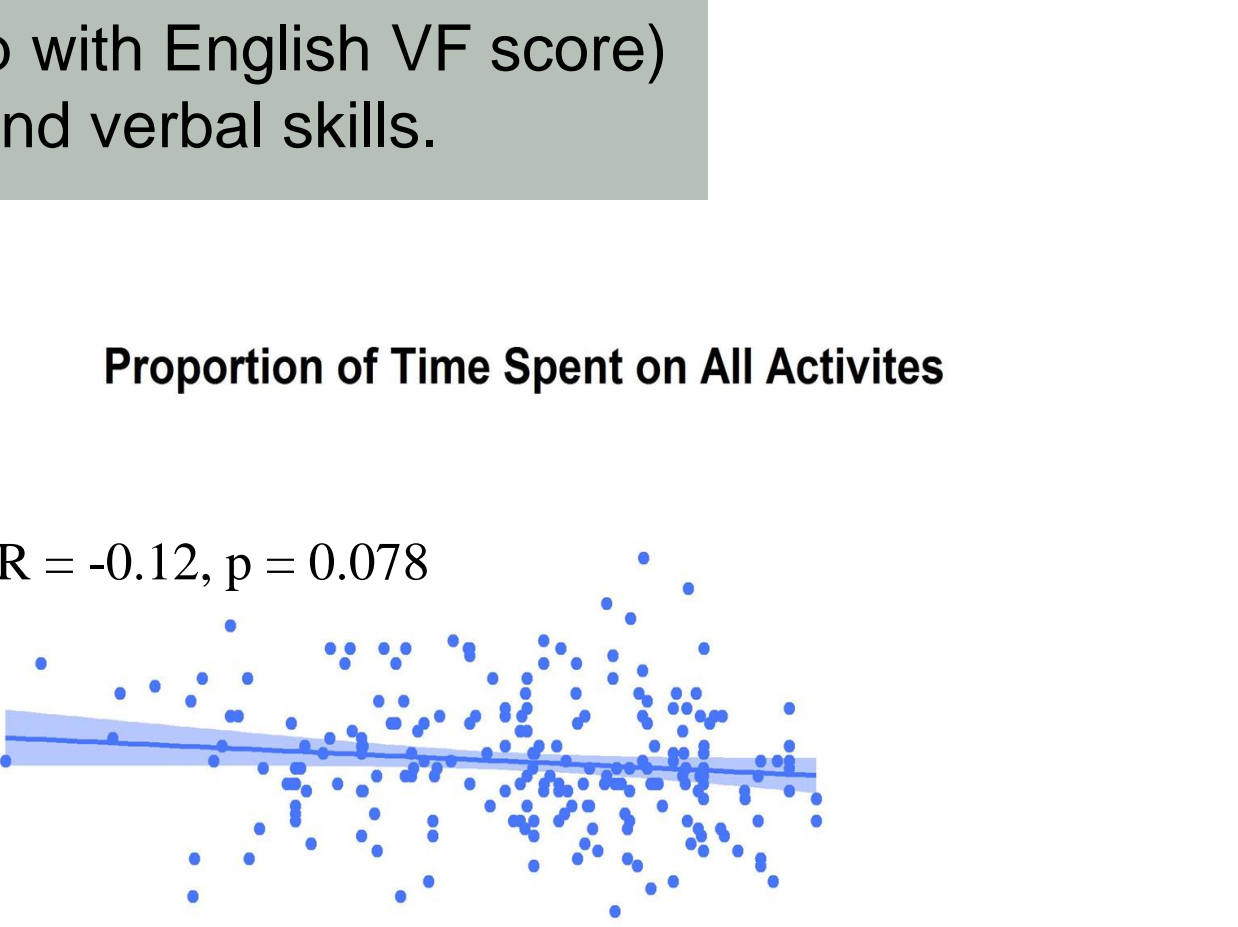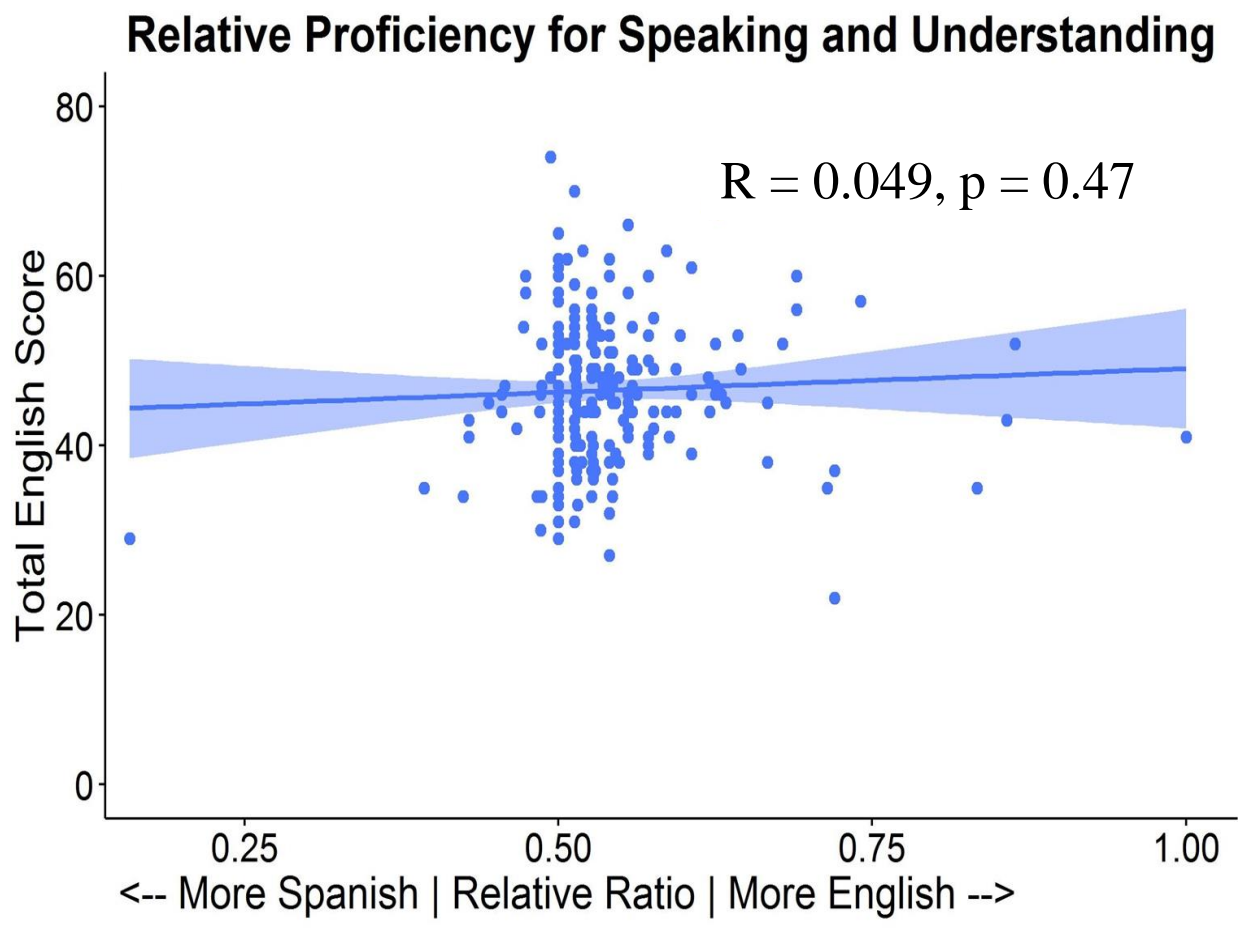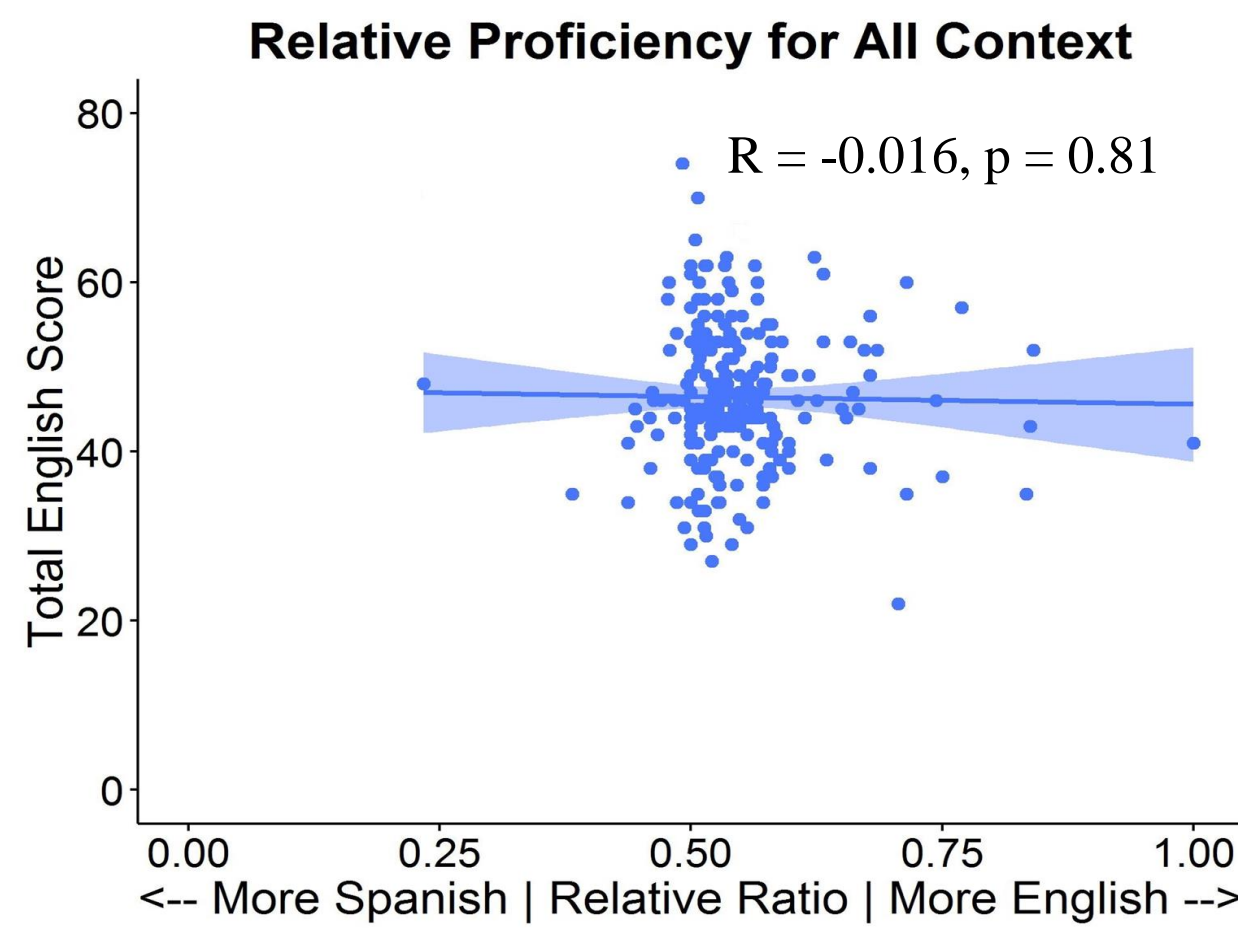
Results

Proficiency Level

English (Blue)

Relative Proficiency for All Context — R = -0.016, p = 0.81

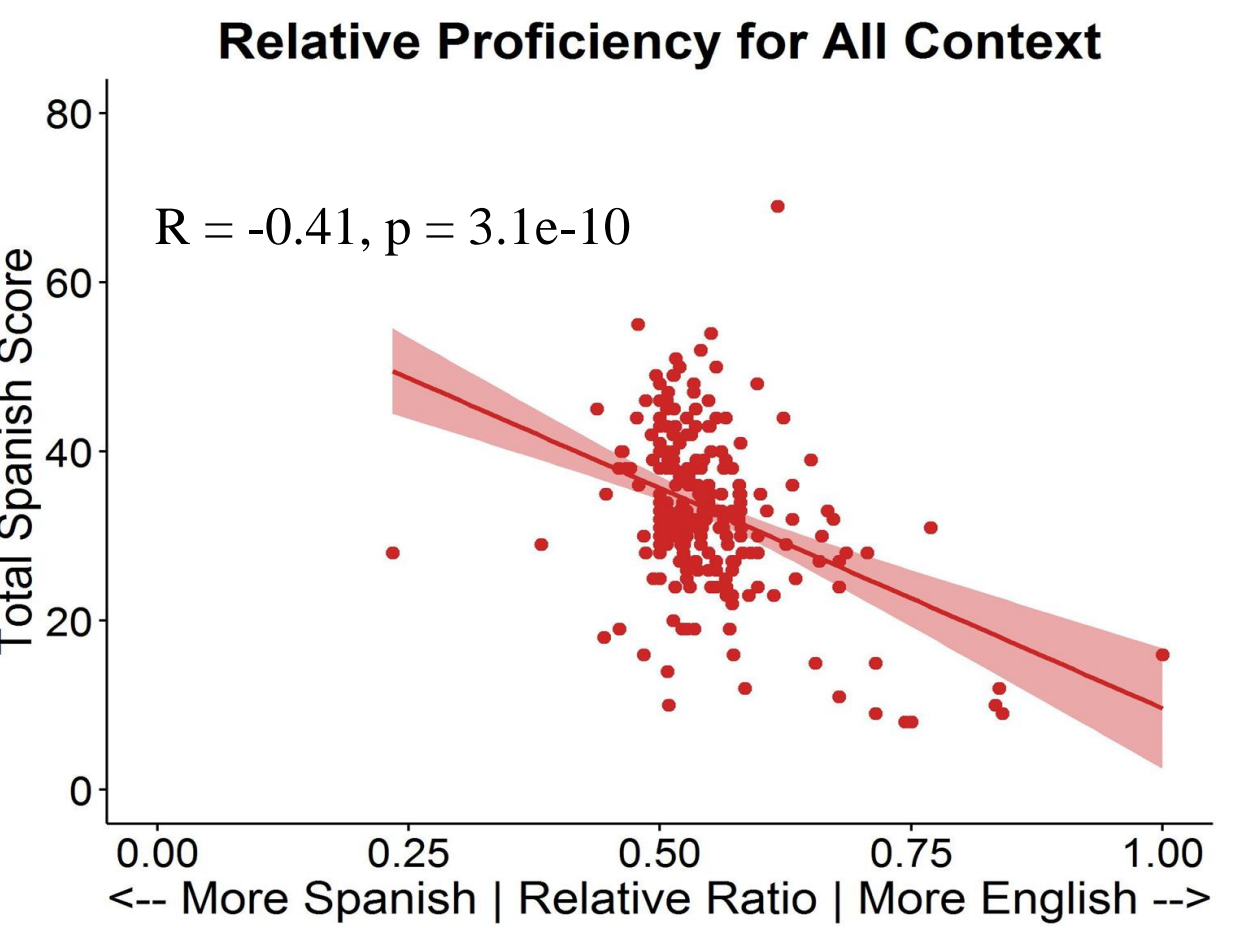No relationship between English self-rated proficiency level and English VF score.

Spanish (Red)

Relative Proficiency for All Context — R = -0.41, p = 3.1e-10
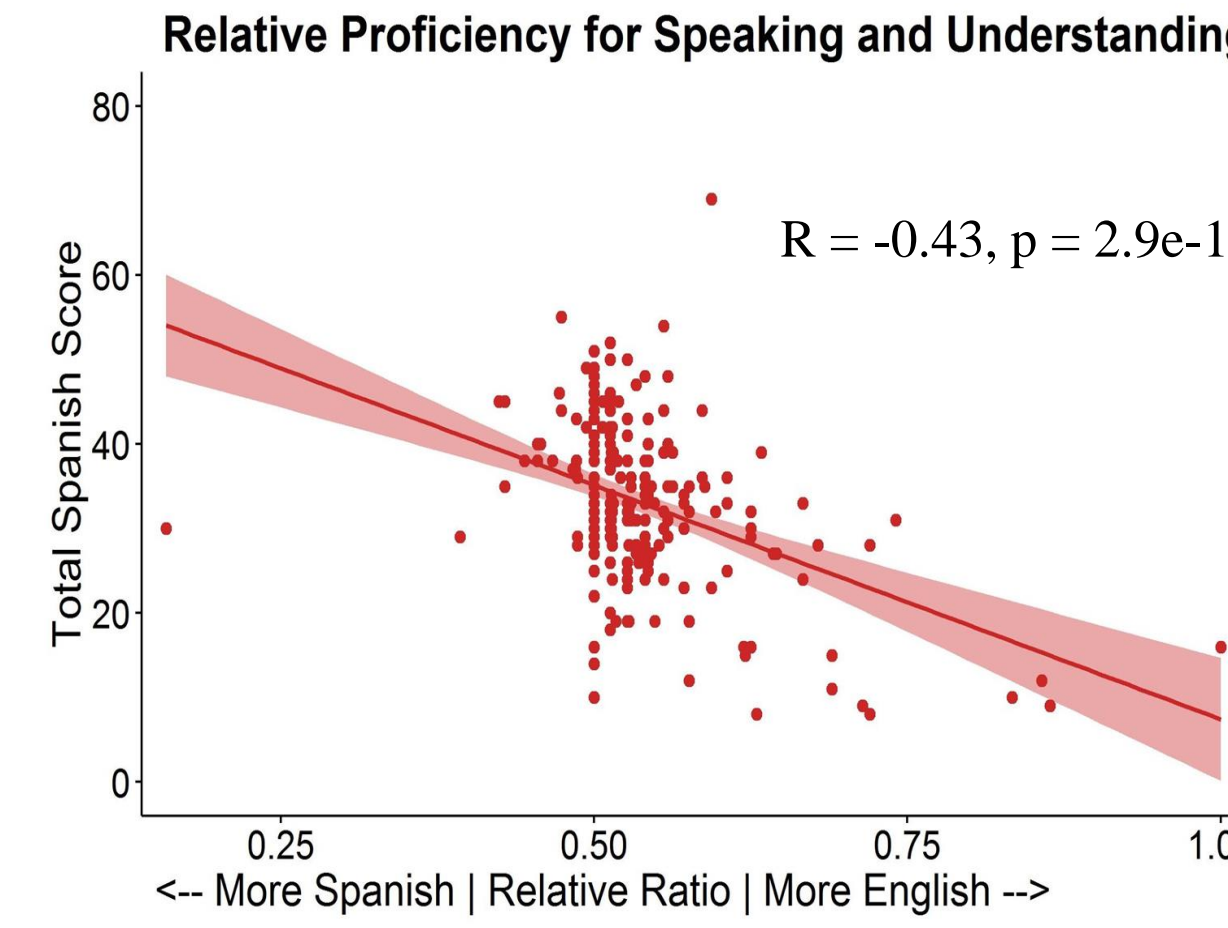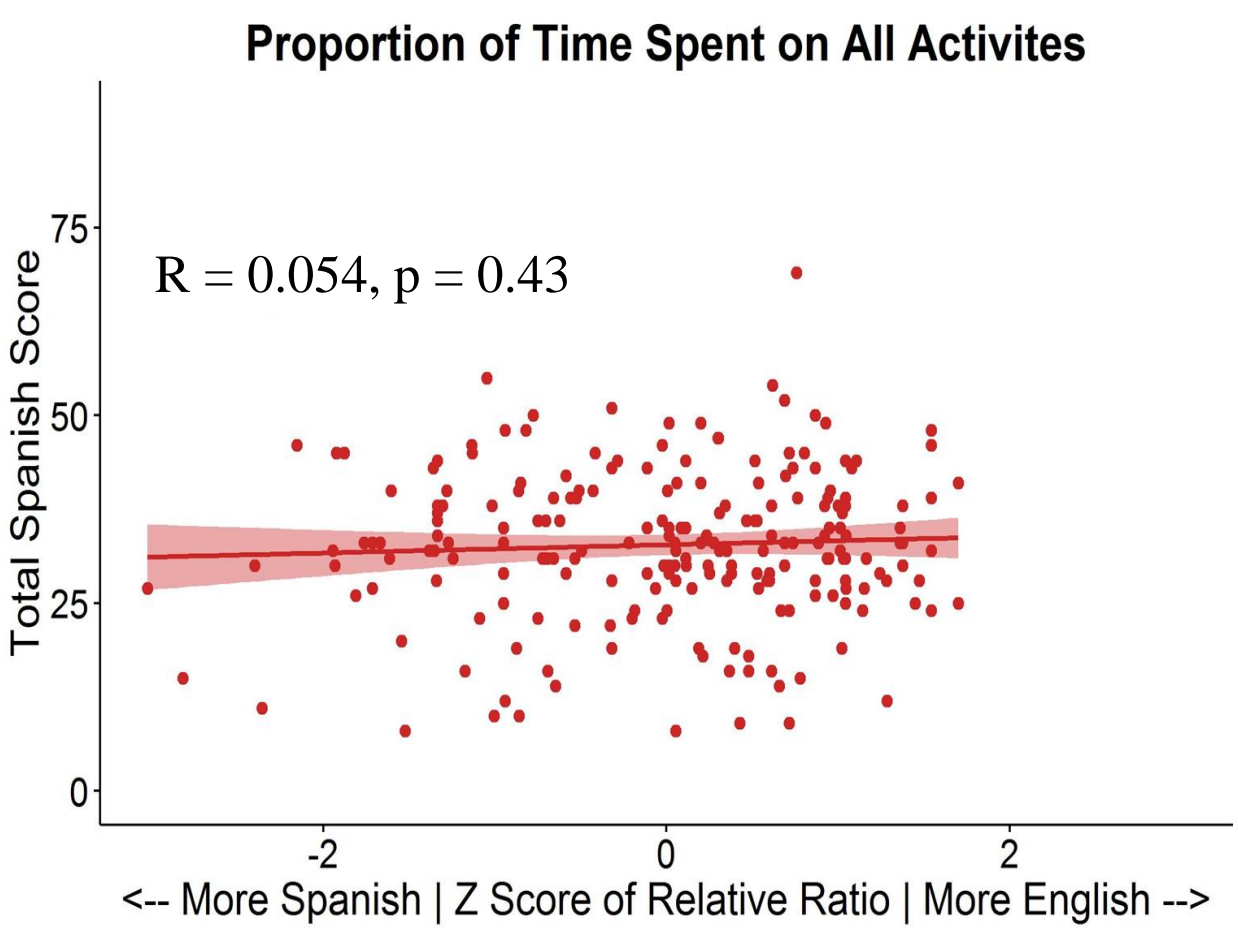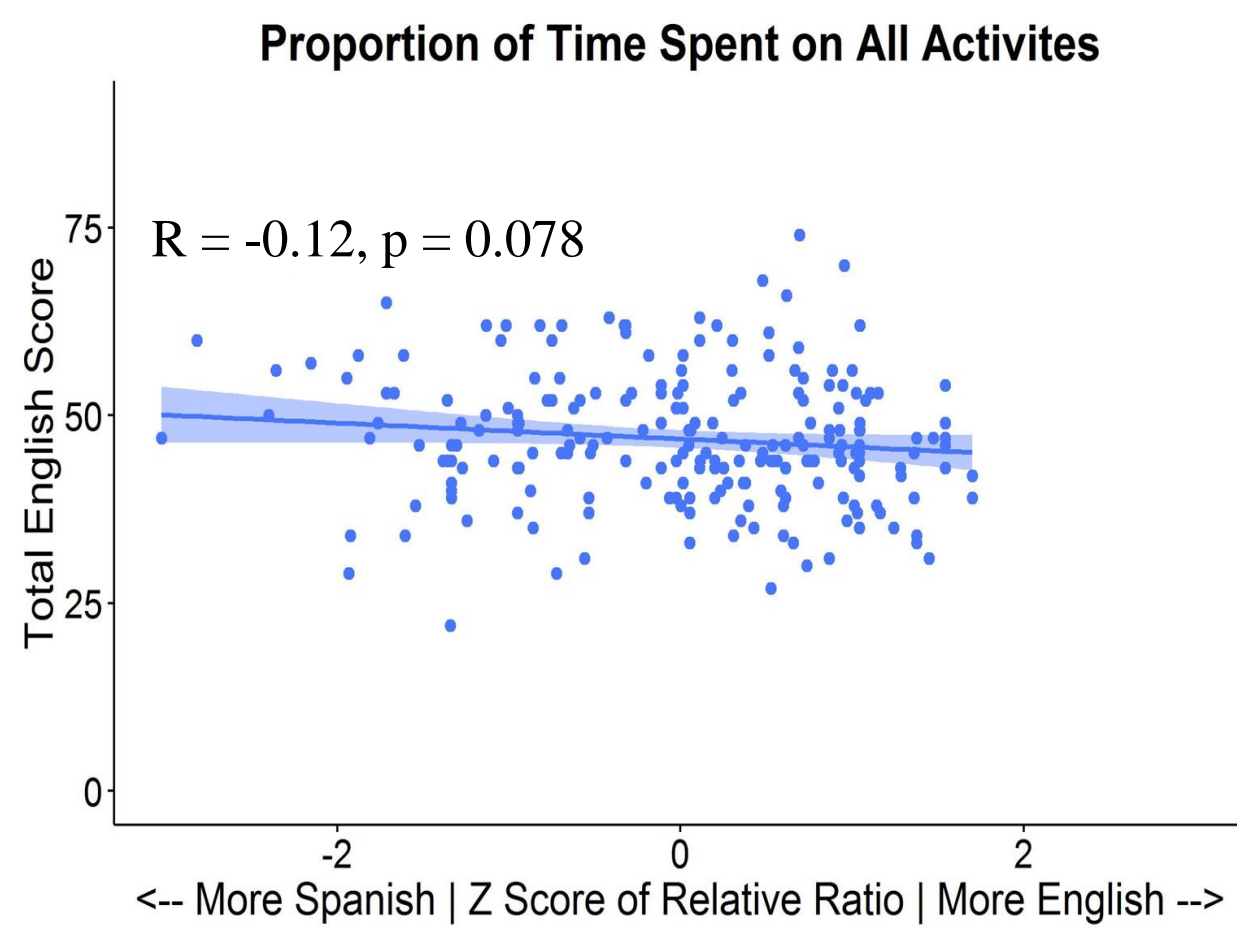
English-dominant bilinguals with greater imbalance in their English and Spanish proficiency scored lower on Spanish VF.

Relative Proficiency for Reading and Writing — R = -0.005, p = 0.94

Relative Proficiency for Speaking and Understanding — R = 0.049, p = 0.47

The same pattern (no relationship with English VF score) can be seen for literacy and verbal skills.

Relative Proficiency for Reading and Writing — R = -0.41, p = 4.1e-10

Relative Proficiency for Speaking and Understanding — R = -0.43, p = 2.9e-10
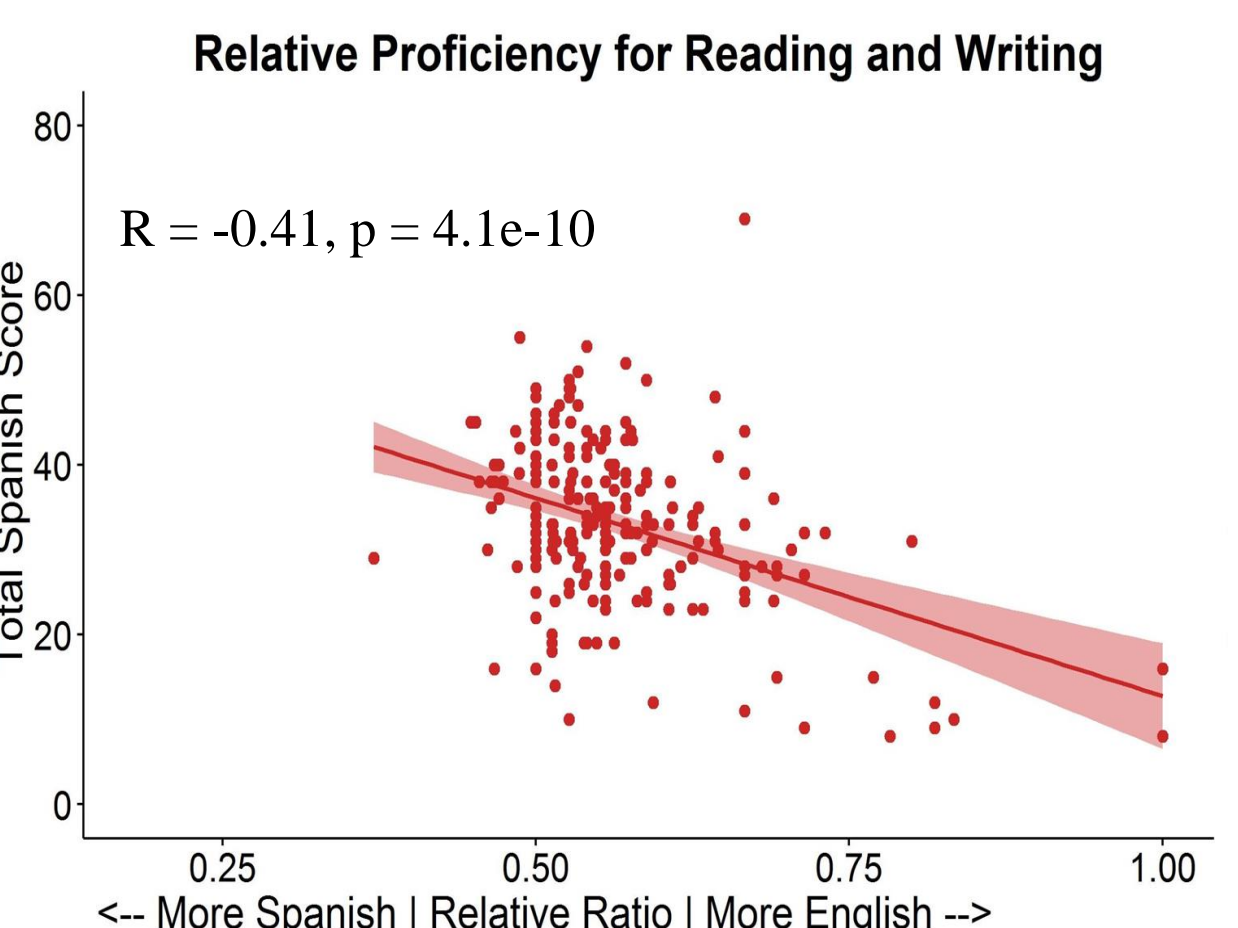
The same pattern (negative correlation with Spanish VF score) can be seen for literacy and verbal skills.

Language Use

Proportion of Time Spent on All Activites — R = -0.12, p = 0.078

Proportion of Time Spent on All Activites — R = 0.054, p = 0.43

Relative language use in English and Spanish shows no relationship with their VF score in either English and Spanish.

Discussion

- Spanish fluency is affected more by relative proficiency in English and Spanish than English fluency. This may be because the language environment tends to favor English use and most of the bilinguals were English-dominant.
- Self-rated proficiency in Spanish is more reliable for determining fluency performance in Spanish while self-rated English proficiency is not a good predictor of English fluency performance. If we assume their self-reported proficiency level for both languages is accurate, then there is a possibility that the heritage speakers may have trouble tapping into subtle differences in English, while differences in Spanish are easier to assess.
- It is still unclear whether the participants are accurate in their self-reported proficiency ratings. Their self-reported proficiency in English did not correlate well with Verbal Fluency scores, but it did for Spanish.
- Proficiency ratings were based on speaking, listening comprehension, reading, and writing, but did not assess vocabulary. If the Verbal Fluency task relies heavily on vocabulary size, people with larger vocabularies could be driving the VF scores. Bilinguals with Spanish attrition may have smaller vocabularies, which would affect their VF scores. Further research is needed to better understand the relationship between self-rated proficiency and language production to determine which is a better indicator of language ability.
- It is possible that the Verbal Fluency tasks assess executive function more than language ability. Future research can examine how well the Verbal Fluency task is an assessment for language ability or language proficiency and how much it relies on executive function abilities.

References & Acknowledgments

America's Languages: Investing in Language Education for the 21st Century. (n.d.). Retrieved May 06, 2019, from https://www.amacad.org/language
Luk, G., & Bialystok, E. (2013). Bilingualism is not a categorical variable: Interaction between language proficiency and usage. *Journal of Cognitive Psychology, 25*(5), 605-621.

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