

REU Site Grant SMA# 1659607



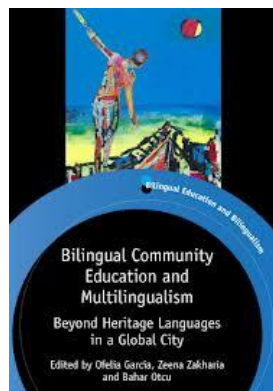
Response Time Differences in Word recognition Across Spanish-English Bilinguals

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Spanish-English Prominence

1. **Spanish**
2. Chinese
3. Russian
4. Haitian (Creole)
5. Italian
6. French
7. Yiddish
8. Korean
9. African Languages
10. Polish
11. Tagalog
12. Greek



13. Arabic
14. Hebrew
15. Bengali
16. Urdu
17. Hindi
18. German
19. Japanese
20. Serbo-Croatian
21. Portuguese
22. Persian
23. Vietnamese
24. Hungarian
25. Gujarati

Languages Other Than English (LOTE) spoken by New Yorkers over 5 years of age, US Census Bureau (2009) American Community Survey Table B160001 in Garcia, Zakharia & Otcu, 2013, p13.

Spanish-English Bilingualism Prominence

- ▶ Understanding how bilinguals process language
 - ▶ Educational purposes
 - ▶ Teaching literacy, vocabulary, etc.
 - ▶ Maintaining and expanding abilities in both languages (dual language learning)
 - ▶ Clinical purposes
 - ▶ Treating bilinguals with language disorders such as aphasia

Background on Lexical Access Among Bilinguals

- ▶ Lexical access is the activation of words in the mental lexicon
 - ▶ Are multiple languages activated for bilinguals when listening/reading regardless of the language presented?
- ▶ 2 hypotheses have been proposed (Hell & Groot, 2008)
 - ▶ Language-selective hypothesis
 - ▶ Only one language is active
 - ▶ Language non-selective hypothesis
 - ▶ Multiple languages are active

Cognate Words

▶ Cognates

- ▶ Words in a language with similar form and meaning to words in another language
- ▶ May share phonological and orthographical form
- ▶ Examples
 - ▶ English *dental* - Spanish *dental*
 - ▶ English *piano* - Spanish *piano*

Cognate Facilitation Effect

▶ Cognate facilitation effect

- ▶ Advantage cognate words have over non-cognate words in recognition speed
- ▶ Supports the language non-selective hypothesis (Rosselli & et al., 2014).
 - ▶ Rosselli et al. (2014) found that Spanish-English bilinguals responded quicker to words appearing in both languages.
 - ▶ For words appearing in only a single language, RTs were slower.

Effects of Context on Lexical Access

- ▶ Hell and Groot (2008) found that the cognate facilitation effect disappeared when words were presented after a sentence with **high-context**.
 - ▶ **High-context sentence:** Context of sentence relates to target word
 - ▶ Dutch: De mooiste hut op het schip is van de **kapitein**.
 - ▶ English: The best cabin of the ship belongs to the **captain**.
 - ▶ **Low-context sentence:** Context of sentence does not relate to target word
 - ▶ Dutch: De knappe man in het witte pak is de **kapitein**.
 - ▶ English: The handsome man in the white suit is the **captain**.
- ▶ Participants instructed to determine if target word was a real word of English or not.
- ▶ RTs decreased when target words followed **high-context sentences**, mitigating the cognate facilitation effect.
- ▶ **High-context sentences** permit an individual to process language quicker without needing to access the lexicon in both languages.

This Study: Language Dominance Effects

- ▶ Topic
 - ▶ This study investigates lexical access among Spanish-English bilinguals, with varying degrees of dominance between both languages, while observing the effects of cognitive facilitation and context.
- ▶ Questions
 - ▶ Will language dominance affect the cognate facilitation effect?
 - ▶ Will language dominance affect the relationship between lexical access and context
- ▶ Rosselli et al. (2014) found that RTs of cognates were shorter when Spanish-English bilinguals responded to picture stimuli in their non-dominant language.
 - ▶ Individuals can use their dominant language to access cognates when responding to pictures.
 - ▶ This supports the language non-selective hypothesis.

Methodology: Participants

- ▶ $n = 12$ bilingual Spanish-English participants
- ▶ Ages 18-30, $M = 23.33$, $SD = 3.08$
- ▶ College students

Methodology: Materials

- ▶ Northwestern University's The Language Experience and Proficiency Questionnaire (LEAP-Q)
 - ▶ Language dominance survey consisting of culture/language-based questions.
 - ▶ Used scores to determine language dominance
 - ▶ Added response values for Spanish and English questions and subtracted latter from the former.
 - ▶ Positive value = Spanish-dominant
 - ▶ Negative value = English-dominant
 - ▶ 0 = Balanced

Methodology: Lexical Decision Task

- ▶ Sentences were presented one word at a time, for .5 s, until the final target word appeared (in red font).
 - ▶ Participants were tasked to
 - ▶ Press the “yes” key if target is a real word of Spanish
 - ▶ Press the “no*” key if target is not a real word of Spanish
- ▶ Word/Sentence conditions
 - ▶ Cognate or non-cognate
 - ▶ High-context or low-context
- ▶ 80 sentences total, only in Spanish.
- ▶ Response times were recorded.

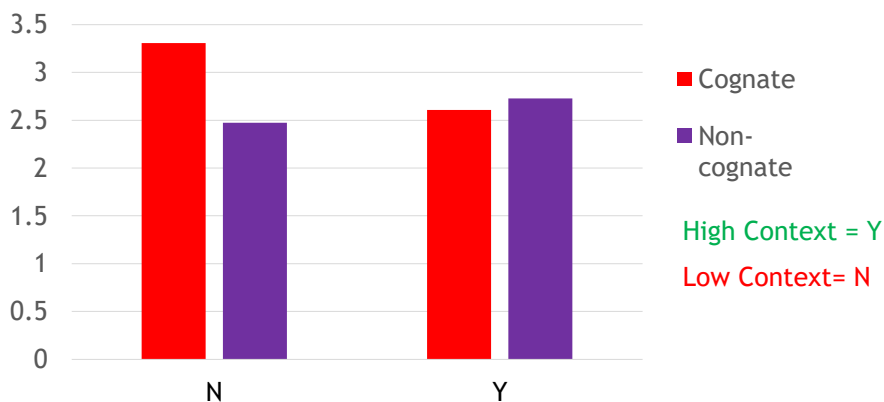
Methodology: Lexical Decision Task

Vulgar (real word)	Cognate	Non-cognate
High-context sentence	Felipe le insulto de una manera muy vulgar <i>Felipe insulted him in a way that is very vulgar</i>	Felipe le insulto de una manera muy fuerte <i>Felipe insulted him in a way that is very strong</i>
Low-context sentence	Felipe le pregunto algo de una manera muy vulgar <i>Felipe asked him in a way that is very vulgar</i>	Felipe le pregunto algo de una manera muy fuerte <i>Felipe asked him in a way that is very strong</i>

Methodology: Procedure

- ▶ Participants were given a consent form to read over and sign.
- ▶ Participants were instructed to fill out the LEAP-Q form.
- ▶ Participants were then instructed to complete the lexical decision task.
- ▶ Participants were thanked for their time.

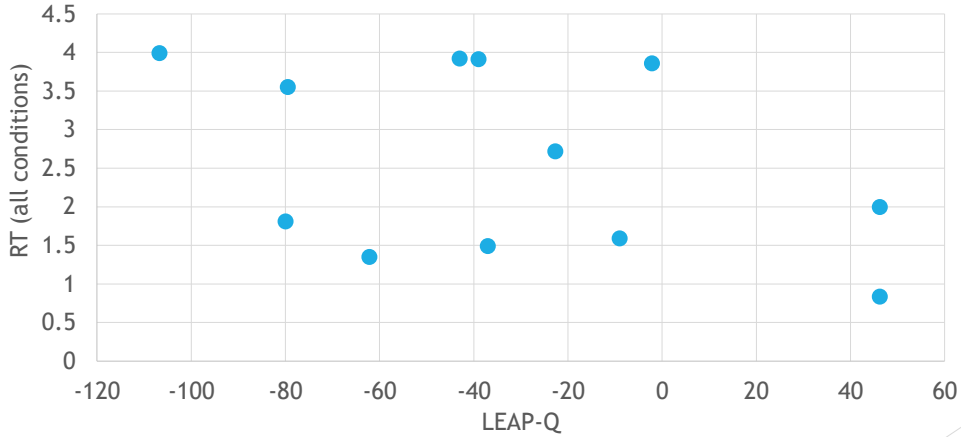
Results I



- ▶ When sentences were low-context, average response rates were fairly similar for both cognates/non-cognates.
- ▶ When sentences were high-context, average response rates were lower for non-cognates compared to cognates.

Results II

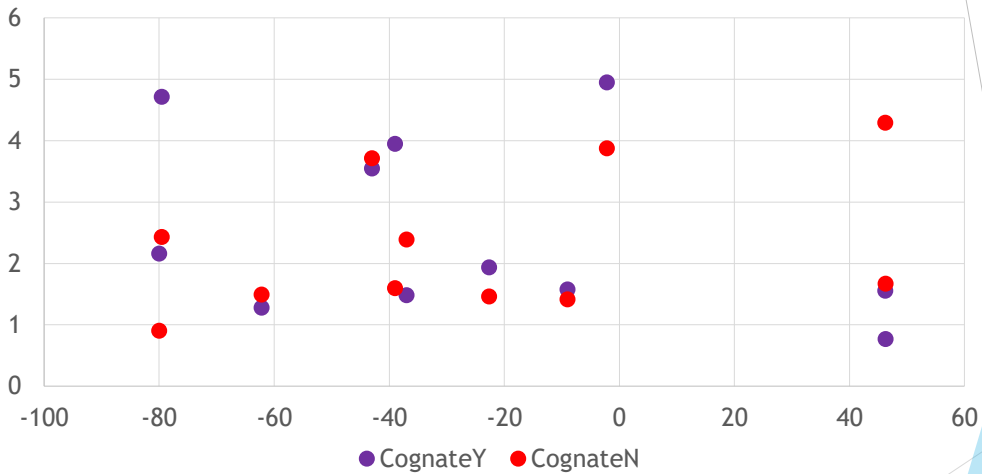
Scatterplot: LEAP-Q and RT (all conditions)



- ▶ Significant correlation between LEAP-Q and RT
- ▶ $r = -.12$; $p\text{-value} = 0.0137$

Results III

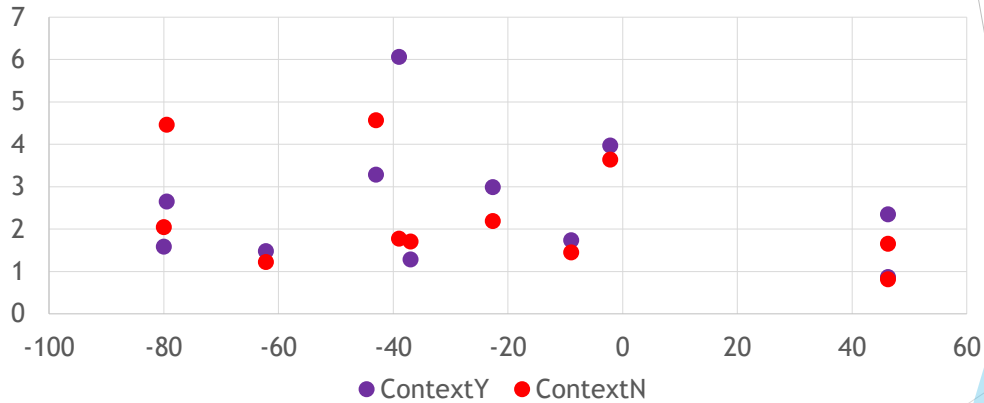
Scatterplot: LEAP-Q and RT by **Cognate** (Both Context)



- ▶ RT correlation with dominance approaching significance, when there is a cognate
- ▶ $r = -.13$; $p\text{-value} = 0.05403$

Results IV

Scatterplot: LEAP-Q and RT by Context (Both Cognate)



- ▶ The correlation between LEAP-Q and RT is significant when sentences are low-context
- ▶ $r = -.18$; $p\text{-value} = 0.007135$

Multiple Regression Analysis

- ▶ Multiple regression takes into account all variables, simultaneously
- ▶ Only LEAP-Q was found to have a significant effect
 - ▶ Models with Cognate and Context showed these were not significant predictors

	B	SE B	B	p
(Intercept)	2.189	0.253	8.64	$p < .001$
LEAPQ	-0.011	0.004	-2.475	$p = 0.01$

- ▶ While there were no effects of Cognate and Context, correlations may be suggestive
 - ▶ More data required

Conclusions

- ▶ Found that language dominance affects response time in general
 - ▶ As LEAP-Q increases (more Spanish-dominant), RT decreases
- ▶ Tentative correlational evidence suggesting that
 - ▶ **Cognate** facilitation effect occurs with higher dominance
 - ▶ Context helps less-dominant groups access words more quickly
 - ▶ Effects were not significant when all factors put into a single multiple regression analysis

Potential Implications

- ▶ Knowing how lexical access works in bilinguals may facilitate
 - ▶ Dual-language learning
 - ▶ Using cognates in teaching materials
 - ▶ Providing high context material may help students in their less-dominant language
 - ▶ Treatment for disorders like aphasia
 - ▶ aphasia can affect ability to recall words
 - ▶ using cognates in treatment might be helpful

Limitations & Concerns

- ▶ Participant count was very limited.
- ▶ Age range was limited as well.
- ▶ Frequency of use for each cognate in English and Spanish might be different

Follow-Up

- ▶ Include English sentences in addition to Spanish sentences
- ▶ Ensure a larger pool of participants is gathered
- ▶ Compare different inputs of stimuli
 - ▶ Reading vs. listening

Acknowledgement

- ▶ The author would like to thank participants for their time partaking in this study.
- ▶ The author would also like to thank Dr. Syelle Graves, Dr. Jonathan Nissenbaum, and Dr. Isabelle Barriere as well as other NSF student researchers for their continued support and feedback.
- ▶ The author would like to also greatly thank the NSF for the opportunity and funding to conduct this independent, mentor-led research study.
- ▶ Finally, the author would like to especially thank Dr. Marissa Nagano for the huge support and encouragement throughout the entire research process. Despite the difficulties encountered, Dr. Nagano was always helping and involved in several ways.