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Auditory Distraction on Visual Translation: Language Interference in Spanish-English Bilinguals

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Introduction

The study of language and the brain is called psycholinguistics. A prominent topic in psycholinguistics is the study of bilingualism. Bilingual research can help us understand how languages interact with each other and within itself. There are two ways language can interfere with brain processing: interlingual interference (between languages) and intralingual interference (within-one language). These types of interference can be shown experimentally in cross-modality set ups. Few research has been done testing this in auditory-auditory tasks (called a dichotic translation task), and very few, if any, research has been done using an auditory-visual translation task. Both of these tasks are testing selective attention, how well you can ignore the distracting stimuli.

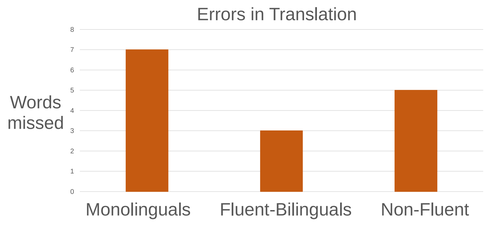
The two research papers I have found to be close to the setup I am using, both use a dichotic translation task; I have not found any that utilize an auditory-visual translation task like mine. Mägiste (1984) studied 40 German-Swedish high-school bilinguals using a dichotic translation task, always translating German into Swedish. She found the German dominant group made more errors, more when the distracting sound was in German, showing more intralingual interference than interlingual. Less experienced bilinguals also had more errors. Lawson (1967) used Dutch-English bilinguals in a simultaneous dichotic translation task. She found no significant results, due to a very small sample size (6 men). There is a general lack of research in bilingual dichotic listening, and even less in the role of auditory distraction on bilingual translation. With my research I intend on filling this literary gap.

Hypotheses

- Hypothesis 1: Bilinguals will produce less interference than monolinguals.
- Hypothesis 2: More novice bilinguals will produce more interference than fluent bilinguals.
- Hypothesis 3: More intralingual interference will be produced across all subjects.
- Hypothesis 4: Phonetically similar words will create more interference in both groups.

Expected Results

- Monolinguals have more word errors and longer latency than both bilingual groups.
- Low missed word rates across all groups.
- Relatively low average latencies (reaction times) across all groups.
- Less English fluent bilinguals have a higher amount of words missed and a longer average latency time compared to fluent bilinguals.
- All subjects have a longer latency time in presentation of phonetically similar words; expect them to miss translate the target word.
- Negative correlation between subjects that listen to music when studying and their latency/errors data.



Graph 1. Example of what data would look like.

Methods

Participants:
- 30 non-dyslexic English monolinguals
- 30 non-dyslexic English-Spanish bilinguals.
- Consenting 18+ year old adults.
- UCF students volunteering through SONA website.
  - Students register with their class and view study summary and requirements, then sign up for a time slot and show up in person.
  - After completion of the study, 1 credit point is given for participation.

Materials:
- Background survey
  - Demographics, study habits, self rated fluency questions.
- Fluency test (“Free English language tests,” n.d.).
- Audacity software to split the headphone presentation of distractor words.
- E-Prime to present target words on screen and record response latencies.
- All words are from the top 200 of the most frequently used lists (“Word frequency data,” n.d.), (“Spanish 101,” 2016).
- All words recorded in the same voice with the same intensity.

Procedure:
General procedure:
- Subjects will translate a word they see on the screen into English. If they are monolingual they are only repeating the word seen.
- They will have on a pair of headphones in which they will hear a distracting word in either the right, left, or both ears.
- If both ears, word is the same.
- During the control there will be no distracting words presented.
- All bilinguals will be translating what they see on screen into English.

Monolinguals:
- Short demographic survey.
- 9 control words with no distraction stimulus.
- 6 practice words with distractor stimulus.
- 36 test words with auditory distractor stimulus, break after 18.
- Post-test survey.

#	Left ear	Right ear	Screen text
1		English	Eng
2	Both Eng	Both Eng	Eng
3	Eng		Eng
4		Eng	Span
5	Both Eng	Both Eng	Span
6	Eng		Span
7		Span	Eng
8	Both Span	Both Span	Eng
9	Span		Eng
10		Span	Span
11	Both Span	Both Span	Span
12	Span		Span

Table 1. Bilingual conditions, 12 in total. All being translated into English.

Left ear	Right ear	Screen
	Them	Time
Way	Way	Two
	Look	First
Hear		Year
Man	Man	Many

Table 2. Examples from the test condition in monolinguals.

Bilinguals:
- Short demographic survey followed by an English fluency test.
- 12 control words with no auditory distractor stimulus.
- 12 practice words with auditory distractor stimulus.
- 48 test words with auditory distractor stimulus, break after 24.
- Post-test survey.

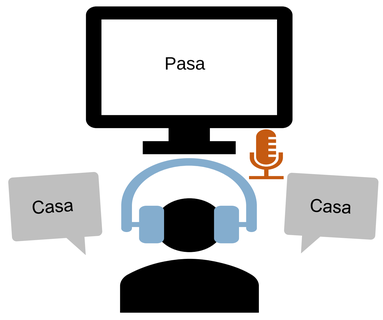


Figure 1. Graphic representation of the procedure layout from a first-person perspective.

Left ear	Right ear	Screen
Well	Well	Tell
	After	Ahora
	Quiero	Tiene
Gracias		World
Cómo	Cómo	Sólo

Table 3. Examples from the test condition in bilinguals.

Conclusion

Ears were randomized to account for any ear advantage, something that was not done in Mägiste’s experiment. A right ear advantage would mean the subject has a continually decreasing latency (faster to respond) when distractor stimuli is in the right ear. This would lead to less significant results because there would be a smaller amount of interference. If latencies are smaller (faster response) in conditions 1-3 and 10-12 in Table 1, as compared to the other conditions, this means there is more interlingual than intralingual interference. Lower missed words would also indicate more interlingual interference. If latencies are smaller in conditions 4-9, the opposite is true, there is more intralingual interference.

If monolinguals have longer latency times and more missed words, hypothesis 1 will be proven true, which also confirms the phenomenon called the bilingual advantage. If more novice bilinguals have longer latencies and more missed words than fluent bilinguals (H2), this will also confirm the bilingual advantage as they have better language attentional skills. If phonetically similar words create more interference (H4), then we know that there was a switching of attention that allowed the auditory distraction to interfere with the visual modality. If subjects that respond yes to listening to music when they study in the pre-test survey, and they have smaller latencies and less missed words overall, this may indicate that they have better attentional skills, and may be able to learn to improve these skills by training. The reason I included studying English monolinguals as well is to act as a comparison to the bilingual data, this way we can prove if there is indeed a bilingual advantage or not.

¡Mas!

Future work:

Hopefully this research will act as a catalyst for more bilingual research, specifically involving audio-visual interference. My interests lie mostly in the behavioral neuroscience realm but languages interest me so there is a high probability that I will continue to do research in psycholinguistics. Whether that be tweaking this project or an entirely new research question.

References

- Cowan, N., & Barron, A. (1987). Cross-modal, auditory-visual Stroop interference and possible implications for speech memory. *Perception & Psychophysics, 41*(5), 393.
- Free English language tests. (n.d.). Retrieved March 24, 2018, from http://www.world-english.org/tests.htm
- Lawson, E. A. (1967). ATTENTION AND SIMULTANEOUS TRANSLATION. *Language & Speech, 10*(1), 29.
- Mägiste, E. (1984). Stroop tasks and dichotic translation: The development of interference patterns in bilinguals. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 10*(2), 304-315. doi:10.1037/0278-7393.10.2.304
- Spanish 101. (2016, August 08). Retrieved March 25, 2018, from http://www.101languages.net/spanish/most-common-spanish-words/
- Word frequency data. (n.d.). Retrieved March 25, 2018, from https://www.wordfrequency.info/

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