Effects of Mutual Intelligibility on Code-Switching

by Jeff Lu, Seth Vigil, and Angela Yang

Introduction

RESEARCH QUESTION

Does the mutual intelligibility of two languages impact the time it takes to code-switch between them?

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There is a positive correlation between the mutual intelligibility of two languages and the ease of code-switching between them.

Methodology

EXPERIMENT DESIGN
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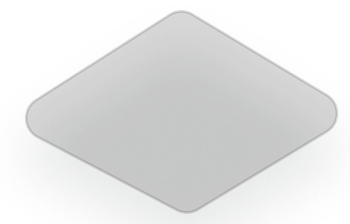EXPERIMENT DESIGN
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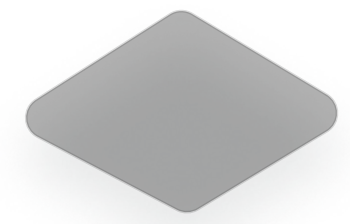EXPERIMENT DESIGN
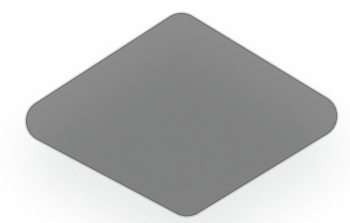EXPERIMENT DESIGN

Who are we looking for?

Age
Adults (age 18+)

Language Background
Simultaneously bilingual in English and target language
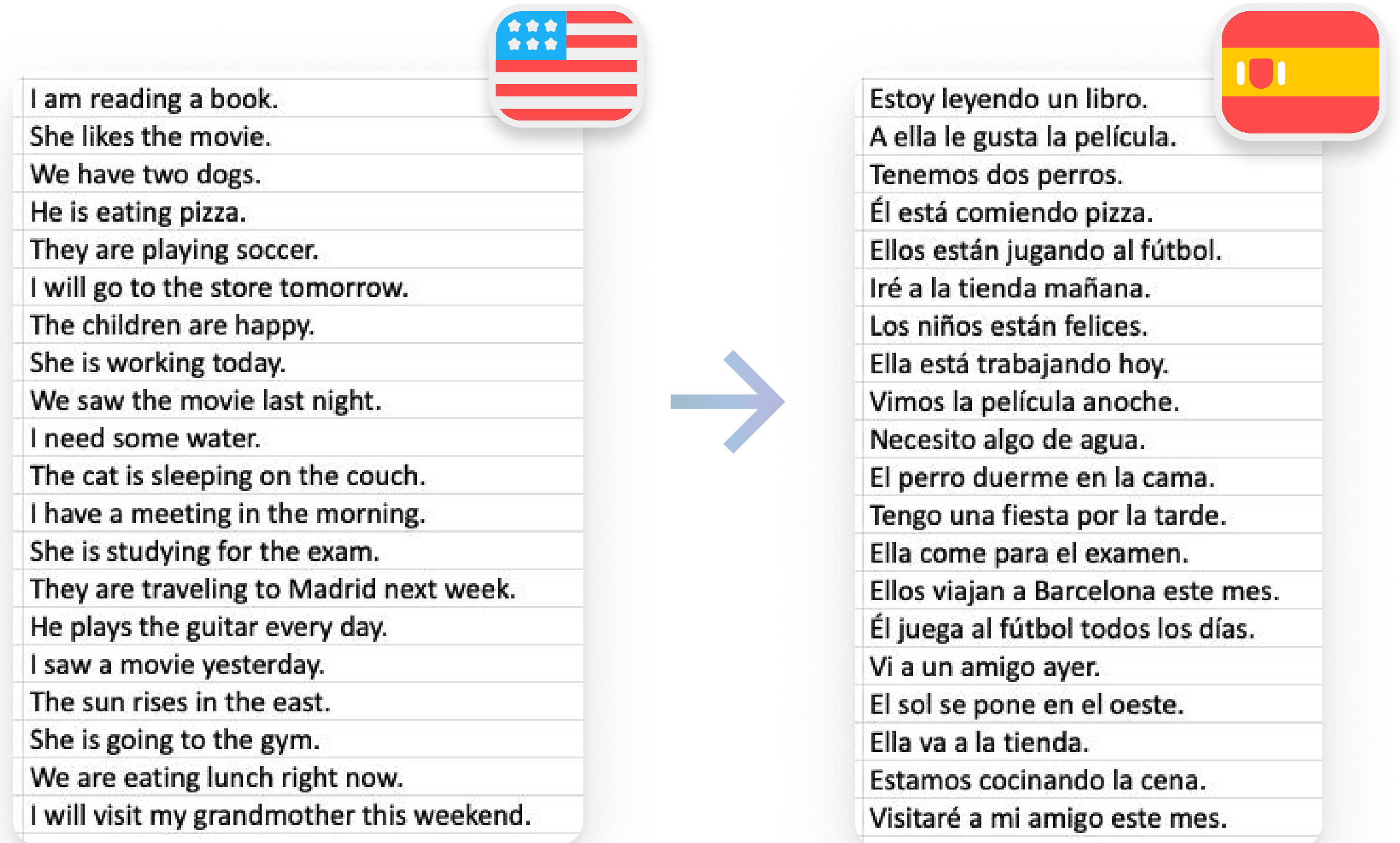
Structure
Between-subjects design

Sample Size
n≥30 for each IV level

What are testing them with?

- Materials consist on 20 basic English sentences and their corresponding translations into the target language.

- 10 sentences are translated correctly, while the other 10 are translated incorrectly.

- The incorrect translations differ from their English counterparts in a variety of ways, but are still similar semantically and syntactically.

- Participants are instructed to **respond as quickly and accurately as possible**.

I am reading a book.
She likes the movie.
We have two dogs.
He is eating pizza.
They are playing soccer.
I will go to the store tomorrow.
The children are happy.
She is working today.
We saw the movie last night.
I need some water.
The cat is sleeping on the couch.
I have a meeting in the morning.
She is studying for the exam.
They are traveling to Madrid next week.
He plays the guitar every day.
I saw a movie yesterday.
The sun rises in the east.
She is going to the gym.
We are eating lunch right now.
I will visit my grandmother this weekend.

→

Estoy leyendo un libro.
A ella le gusta la película.
Tenemos dos perros.
Él está comiendo pizza.
Ellos están jugando al fútbol.
Iré a la tienda mañana.
Los niños están felices.
Ella está trabajando hoy.
Vimos la película anoche.
Necesito algo de agua.
El perro duerme en la cama.
Tengo una fiesta por la tarde.
Ella come para el examen.
Ellos viajan a Barcelona este mes.
Él juega al fútbol todos los días.
Vi a un amigo ayer.
El sol se pone en el oeste.
Ella va a la tienda.
Estamos cocinando la cena.
Visitaré a mi amigo este mes.

Semantic processing task

- Participants will read an English sentence at their own pace, followed by a sentence in the IV language.

- The participant's task is to **determine whether that sentence has the same meaning** as the English word that was shown immediately before.

- Participants **indicate their response with a key press**: either the J key (same meaning) or K key (different meaning).

- Participants are instructed to **respond as quickly and accurately as possible**.

- Reaction time will be collected and analyzed.

Welcome to the experiment!
To begin, please select the language other than English that you are most familiar with.

Select an option from the following list

[▼]

[Next ➜]

INDEPENDENT VARIABLE (IV)

Mutual intelligibility

- Mutual intelligibility is defined as "a relationship between different but related language varieties in which speakers of the different varieties can **readily understand each other without prior familiarity or special effort**."

- To capture degrees of mutual intelligibility, I chose languages with **varying levels of similarity to English** (based on the DLI categories) for my experiment.

4 IV LEVELS

Spanish   Indonesian

Hebrew   Chinese

Ease of code-switching

- **Reaction time** is measured, being the most intuitive way to capture how easy it is to code-switch between two languages.

- **Accuracy** is taken into account as far as *which* reaction times we measure.

Event Index	UTC Timestamp	UTC Date and Ti	Local Timestamp	Local Timezone	Local Date and T	Experiment ID	Experiment Vers	Tree Node Key	Repeat
1	1732742623233	27/11/2024 21:2	1732742623054	-8	27/11/2024 13:2	201625	4	task-yyac	
2	1732742630797	27/11/2024 21:2	1732742630236	-8	27/11/2024 13:2	201625	4	task-yyac	
3	1732742636581	27/11/2024 21:2	1732742636032	-8	27/11/2024 13:2	201625	4	task-yyac	
4	1732742636854	27/11/2024 21:2	1732742636721	-8	27/11/2024 13:2	201625	4	task-yyac	
5	1732742638981	27/11/2024 21:2	1732742638849	-8	27/11/2024 13:2	201625	4	task-yyac	
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8	1732742641660	27/11/2024 21:2	1732742641537	-8	27/11/2024 13:2	201625	4	task-yyac	
9	1732742645660	27/11/2024 21:2	1732742645525	-8	27/11/2024 13:2	201625	4	task-yyac	
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12	1732742646807	27/11/2024 21:2	1732742646671	-8	27/11/2024 13:2	201625	4	task-yyac	
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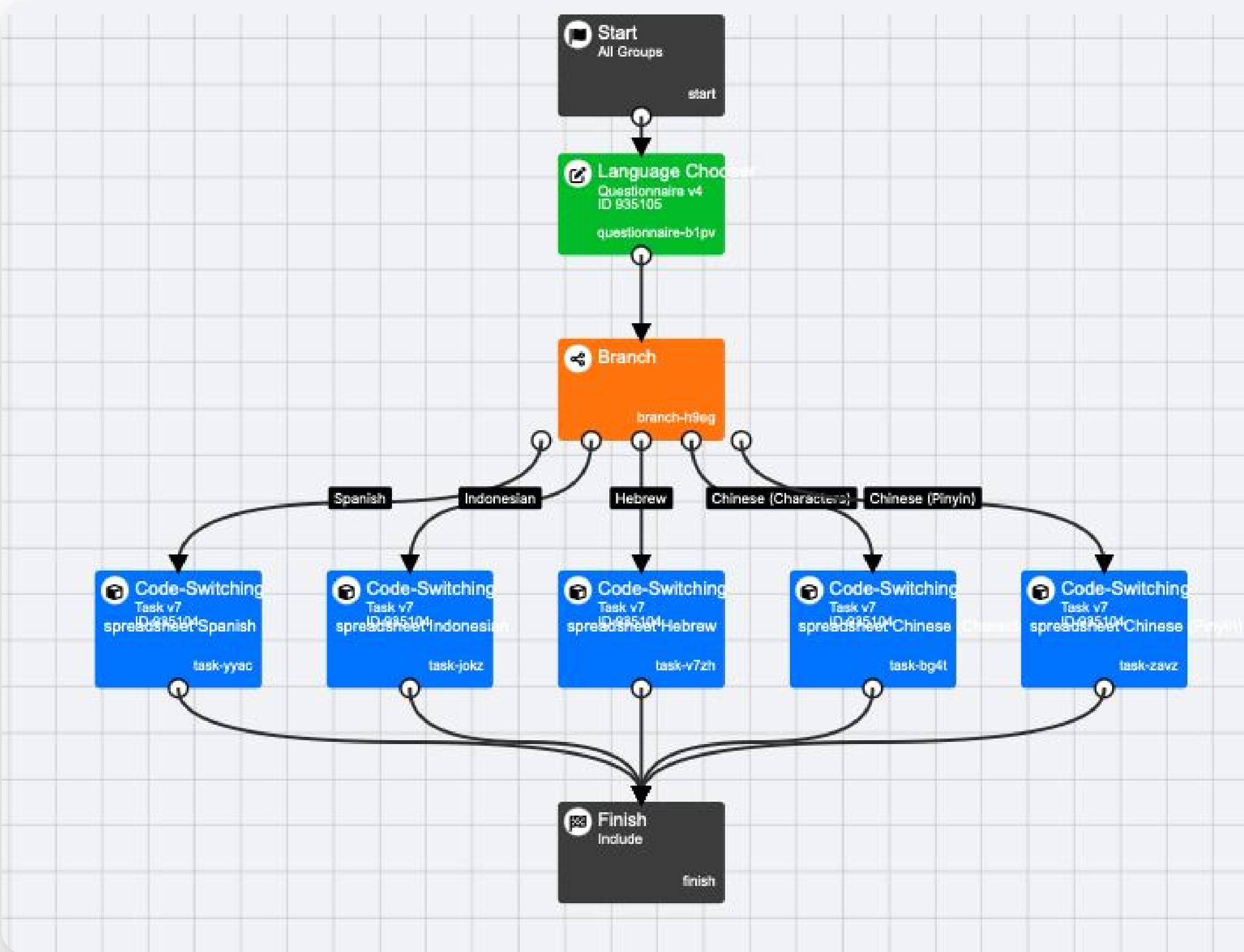# Eliminating confounding variables

- **Keep study materials constant** across IV levels (same sentences and respective translations).

- **Minimize order effects** by randomizing the order in which stimuli are presented.

- **Counterbalance variations in individuals** by recruiting participants from a variety of ages, genders, locations, and cultural/linguistic backgrounds (only simultaneous bilinguals).

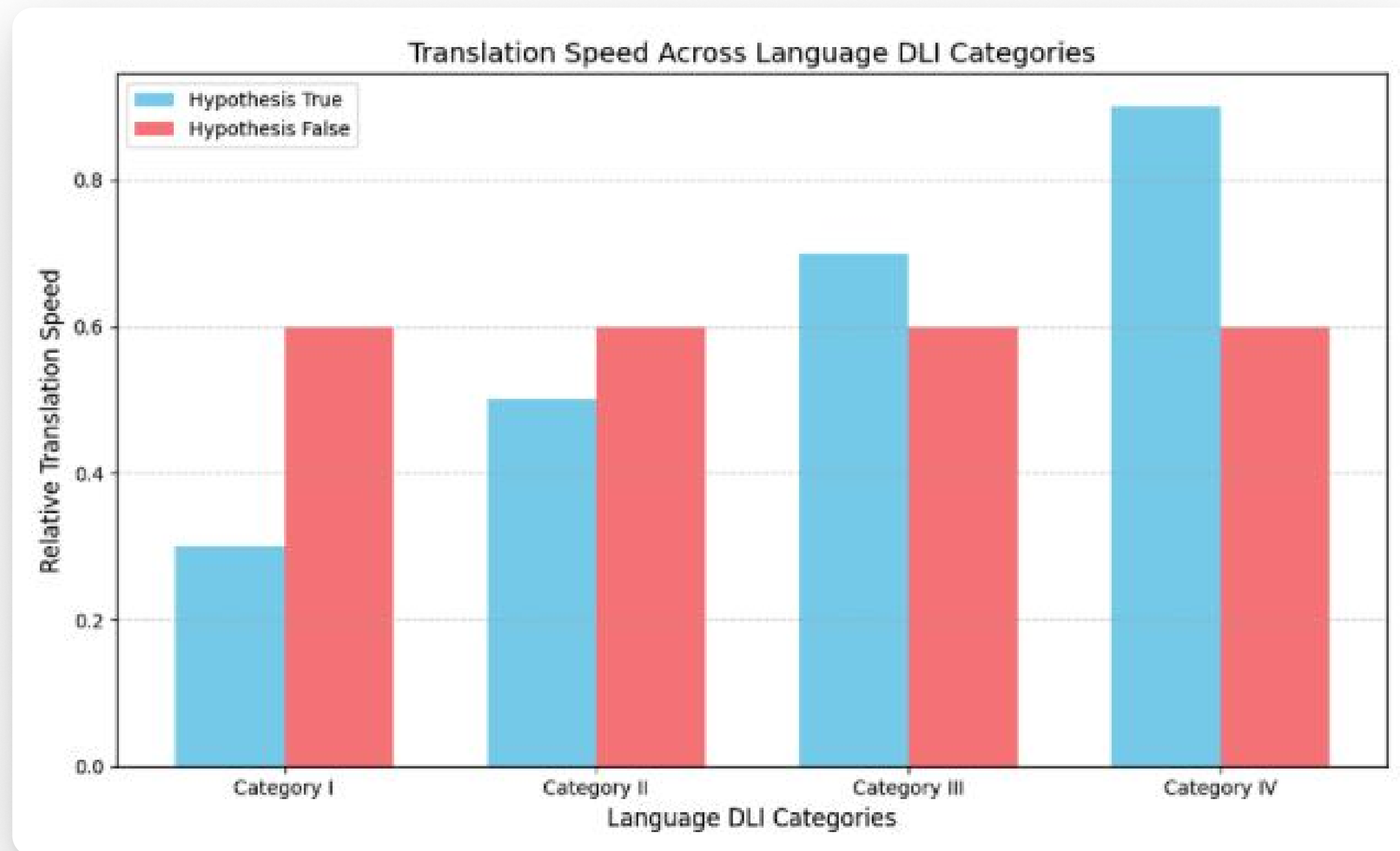| Row	randomise_blocks	randomise_trials	display	Pacing	Presentation	Location	Mask	Trigger
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2		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
3		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
4		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
5		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
6		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
7		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
8		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
9		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
10		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard
11		1	Words	Selfpaced	Isolation	Relative	Off	Keyboard

Gorilla

- Using **Gorilla** gave us a jump start for our experiment because it was covered in Mo's section, and we were able to build off a sample study.

- It also felt like a suitable choice because of the branching nature of our study (what with the different IV languages) and the collaborative nature of our project.

Demo Time!

Conclusion

PREDICTED RESULTS

Translation Speed Across Language DLI Categories

THEORETICAL IMPLICATIONS

Should our prediction hold true, this experiment would enhance our understanding of cognitive load in language switching, our models and neurological theories of code-switching, and our sociolinguistic perspectives on bilingualism.

Additional research questions might include how mutual intelligibility affects neural pathways, language learning/development, and sense of identity/cultural integration.

Variables to investigate further might include direction of switching, linguistic dimension of similarity, and social/situational context.

Thank you! :)