Social Effects on Code-Switching

Stephanie Calo¹, Souad Kheder¹, Ann Kreidler², Jorge Valdés Kroff³ and Edith Kaan¹

¹Dept. of Linguistics; ²Dept. of Speech, Language and Hearing Sciences; ³Dept. of Spanish & Portuguese Studies

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What are we investigating?

• Code-switching
  • The use of more than one language in the same conversation/sentence.

  “The boy was playing con sus amigos.”

• Code-switching only socially permitted if the conversation partner is known to be fluent in both languages as well.
Investigation Code-switching ...

- Syntax/structure
- Sociolinguistics
- Psycholinguistics
- Neurolinguistics
Investigating code-switching using brain waves

• Non-invasive methods –
  • Event-related potentials (ERPs)
ERP Components:

John ate **broccoli** at dinner (plausible)

John ate **democracy** at dinner (anomalous)

Sensitive to semantic/conceptual anomalies

Negative polarity / Peak at around 400 ms

Calo et al.
ERP Components:

Syntactic anomalies / integration difficulty / unexpected language events that are non-semantic in nature

Positive deflection, Peak at around 600 ms

The plane brought **us** to paradise and back.
The plane brought **we** to paradise and back.

Gram
Ungr

Calo et al.
Each night the campers built a _______.

- Will code switches be treated as an unexpected change in meaning? \textbf{N400}
- Will code switches be treated as an unexpected change in form? \textbf{Late positivity/ P600}

\begin{itemize}
  \item \textit{Expected English word:} \textbf{fire}
  \item \textit{Spanish translations (code switch):} \textbf{fuego}
  \item \textit{English synonym (lexical switch):} \textbf{blaze}
\end{itemize}
Moreno et al. (2002)

Each night the campers built a **fuego**.

Spanish code switch

- **Small N400**: a negativity over left fronto-central sites

- **Large P600**: a posterior positivity response associated with the processing of an *unexpected or improbable event*

Each night the campers built a **blaze**.

English synonym (lexical switch)

- **N400 response**: harder to integrate in the previous context
According to literature on joint action, processing depends on ....

- who you are with
- knowledge you have / share with
Rueschemeyer et al. (2014)

• How participants process sentence stimuli they attend in the presence of another individual (a confederate).

How the N400 (associated with semantic integration) is modulated by a participant’s perception of a confederate’s ability to grasp sentence content.

A confederate is a trained person who plays the role of a participant, without the knowledge of the actual participant.
In the boy’s dream, he could breathe under water.
a robust N400- effect

- knowledge of the confederate not having the context affects the listener’s comprehension.

In the boy’s dream, he could breathe under water.

Calo et al.
Exp 2

- **NO N400- effect**

Exp 1

- **Robust N400- effect**

- Knowledge of the confederate not having the context affects the listener’s comprehension.
The Social N400

- Language users process semantic anomalies differently if they can assume the sentence is strange for another person in the room.
Code-switching

- Code-switching only socially permitted if the conversation partner is known to be fluent in both languages as well.
Current study

To what extent is comprehension of code switches sensitive to the language knowledge of others present?
Methods: Participants

- Spanish-English bilinguals
- n=5 pilot study; n=3 study with confederates
- Undergraduate students recruited from UF campus
  - Spanish/English learned before age 12
### Methods: Stimuli

<table>
<thead>
<tr>
<th>Confederate</th>
<th>Type</th>
<th>Example sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monolingual/Bilingual</td>
<td>No Switch</td>
<td>The soccer player scored the winning goal in the last minute of the game.</td>
</tr>
<tr>
<td>Monolingual/Bilingual</td>
<td>Switch</td>
<td>The soccer player scored the winning goal en el último minuto del partido.</td>
</tr>
</tbody>
</table>

- All sentences followed with meta-prompt: “Do you think your partner understood the sentence?”
- 25% followed by a comprehension question: e.g., “Did the soccer team win by a landslide?”
Methods: Procedure

- Two sessions
  - Session 1: **Behavioral**
    - Language background questionnaire
    - Language proficiency tasks in Spanish (DELE, naming task) and English (MELICET, naming task)
Methods: Procedure

- Session 2: **ERPs**
  
a. A monolingual confederate
   - Map task
   - Sentence reading task

b. A bilingual confederate
   - Map task
   - Sentence reading task

c. Debriefing
Map Task
Results

Figure 1: ERP results at the critical word for CPz for the control study (left) and study with confederates (right)

The soccer player scored the winning goal in the last minute of the game.

The soccer player scored the winning goal en el último minuto del partido.
Results

To what extent is comprehension of code switches sensitive to the language knowledge of others present?

• Data collection is ongoing, but processing code switches in the presence of a monolingual appears to elicit a larger posterior positivity.

• This modulation of the positivity was absent in a control study presenting the same materials, but without confederates present.

• Should these results hold with more participants, this would suggest that comprehension of code-switches is sensitive to the language knowledge of others present.
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Stephanie Calo: scalo@ufl.edu
Souad Kheder: skheder@ufl.edu
Ann Kreidler: a.kreidler@ufl.edu
Jorge Valdés Kroff: jvaldeskroff@ufl.edu
Edith Kaan: kaan@ufl.edu