The Impact of Lexical Co-activation through Cognates on L2 Rule Learning

Kepa Erdozia & Noèlia Sanahauja
Summary

Language Acquisition (L1) vs. Language Learning (L2)
RQ: How could second language learning be eased?
Hyp: Cross-linguistic activation of the lexicon of the L1 facilitates the learning of an L2 grammatical rule.
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Expe: Two groups of Spanish native speakers learning two artificial minilanguages based on Basque. Same grammatical rule for both languages and different vocabulary:

   Cognate (Spanish-Basque) - Non-cognate (only Basque)
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- Cognate (Spanish-Basque) - Non-cognate (only Basque)

Results: Accuracy and Reaction Times showed that rule **learning was greater using cognates than using non-cognates.**
Cognate Facilitation Effect

**Cognates** are words which share both form and meaning across two or more languages:

Guitar (En) - Guitarra (Sp) - Kitarra (Bq)
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*Cognate Facilitation Effect* (Dijkstra et al., 1999): Cognates are processed faster and more accurately than non-cognates.

Cognate:
Lion = León (Sp)

Non-Cognate:
Sheep = Oveja (Sp)

Costa, Caramazza, Sebastián-Gallés, 2000
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Cog. Fac. Eff. observed in sentence context (van Hell & de Groot, 2008)
Less tip-of-the-tongue states (Gollan & Acenas, 2004)
Faster to learn and harder to forget (de Groot & Keijer, 2000)
More sensitive to cross-linguistic priming (de Groot & Nas, 1991)
More resistant in patients with aphasia (Costa et al., 2012)
Knowledge of lexicon in rule learning

Segmented words allow rule learning (Peña et al., 2004)
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Spanish-Basque cognates to learn number agreement in Basque NPs.
Hiru dado berdea\textsuperscript{k} vs. Los tres dados berdes

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However, any study has not investigate the facilitatory power of known vocabulary as compared to an unknown vocabulary in L2 rule learning.
Two artificial languages have been created based on Euskera. Both languages have a reduced vocabulary and a grammatical rule based on Basque language. The difference between the two being the cognate (Spanish-Basque) or non-cognate status of their lexical items.

- **Vocabularies**
  1. 30 Cognate words (Spanish-Basque)
  2. 30 Non-Cognate words (only Basque)

- **Gramatical Rule:**
  - Subjects must take *-ak* and objects *-a*. S and O can appear at first or second position.
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4 PHASES

1. Pre-test (only Basque Vocabulary)
2. Vocabulary Learning Phase (Cognate and Non-Cognate)
3. Test (Cognate and Non-Cognate)
4. Post-test (New Cognate Vocabulary)
**MATERIALS: VOCABULARIES**

30 cognate and 30 non-cognate words: 20 nouns and 10 verbs

<table>
<thead>
<tr>
<th>Vocabularies</th>
<th>BASQUE</th>
<th>COGANTE</th>
<th>SPANISH</th>
<th>ENGLISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>idazkari</td>
<td>sekretari</td>
<td>secretaria</td>
<td>secretary</td>
<td></td>
</tr>
<tr>
<td>gidari</td>
<td>pilotu</td>
<td>piolo</td>
<td>pilot</td>
<td></td>
</tr>
<tr>
<td>gozogile</td>
<td>pastelero</td>
<td>pastelero</td>
<td>pastry chef</td>
<td></td>
</tr>
<tr>
<td>suhiltzaile</td>
<td>bonbero</td>
<td>bonbero</td>
<td>firefighter</td>
<td></td>
</tr>
<tr>
<td>erizain</td>
<td>enfermera</td>
<td>enfermera</td>
<td>nurse</td>
<td></td>
</tr>
<tr>
<td>Sorosle</td>
<td>sokorrista</td>
<td>socorrista</td>
<td>lifeguard</td>
<td></td>
</tr>
<tr>
<td>zelatatu</td>
<td>espiatu</td>
<td>espiar</td>
<td>to spy</td>
<td></td>
</tr>
<tr>
<td>margotu</td>
<td>pintatu</td>
<td>pintar</td>
<td>to paint</td>
<td></td>
</tr>
<tr>
<td>gainditu</td>
<td>superatu</td>
<td>superar</td>
<td>to overtake</td>
<td></td>
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<td>...</td>
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*Length* of words was controlled for both vocabularies ($p > .05$).

*Levenshtein phonological distance* was almost inexistent (nouns=.35; verbs=.1).

*30 extra cognate words* (20 nouns and 10 verbs) were used in the Post-test.

Levenshtein phonological distance was almost inexistent: nouns=.6; verbs=.0
## MATERIALS: CONDITIONS

### Cognate Conditions (COG group)

<table>
<thead>
<tr>
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<th>Aktoreak</th>
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‘The actor has painted the doctor’
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PROCEDURE I: PRE-TESTING PHASE

Aim: To ensure that participants do not know Basque.
Task: Listen experimental material and choose the correct.
Materials: 16 sentences (8 SOV and 8 OSV)
Similar for all participants.
Prediction: Chance (≈ 50%).

AUDIO: Erizaina esatariak elkarrizketatu du.
PROCEDURE II: LEXICAL LEARNING PHASE

**Aim:** To learn the vocabulary.

**Materials:** Lexical items presented one by one.

**Task:** Explicit learning.

**Participants** divided in groups.

COG AUDIO: Aktore

NCOG AUDIO: Antzezle
PROCEDURE II: LEXCIAL LEARNING PHASE

Aim: To learn the vocabulary.
Materials: Lexical items presented one by one.
Task: Explicit learning.
Participants divided in groups.

Aim: Measure the learning.
Materials: 30 pairs of items.
Task: Picture matching.
Learning: Reach %80 of correct answers.

COG AUDIO: Aktore
NCOG AUDIO: Antzezle

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PROCEDURE III: TESTING PHASE

**Aim:** To measure the effect of L1 vocabulary activation while using L2 rule.

**Materials:** 40 sentences (20 SOV and 20 OSV).

**Task:** Listen experimental material and choice the correct.

**Participants** divided in groups.

**Prediction:** COG group $<$ NCOG group.

**COG AUDIO:** Aktoreak medikua pintatu du.

**NCOG AUDIO:** Antzezleak sendagilea margotu du.
PROCEDURE IV: POST-TESTING PHASE

Aim: To measure the effect of L1 vocabulary activation while using L2 rule.
Materials: 20 sentences (10 SOV and 10 OSV)
Task: Listen experimental material and choice the correct. Similar for all participants.
NEW Cognate words.
Prediction: COG group = NCOG group.

AUDIO: Pirata dentistak atropeilatu du.
Results

ACCURACY

**PRE-TEST:** by chance.
**TEST:** COG > NCOG
**POST-TEST:** COG > NCOG
Results

ACCURACY

PRE-TEST: by chance.
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REACTION TIMES

PRE-TEST: Same reaction times.
TEST: COG < NCOG
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Overall, COG group performed better across sessions.
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Pre-test to test: Accuracy increased more for COG than for NCOG.
Test to post-test: Accuracy increased more for NCOG than for COG.

REACTION TIMES

PRE-TEST: Same reaction times.
TEST: COG < NCOG
POST-TEST: Same reaction times.
Cognate Processing

Lexical retrieval: The differences observed in the performance of both groups can only be attributed to the lexical retrieval of the vocabulary items.

*Cognate Facilitation Effect*: cognates are processed more easily than non-cognates. Cross-linguistic activation in the COG group but not in the NCOG group.

Explicit Learning. 1h experiment

Explicit vocabulary learning: benefits for low-proficient L2 learners.

No-Cognate learners do not grasp a long-lasting knowledge of the lexical items.

Cognate learners do not have to memorize the words, overlapping with Spanish.

Rule Learning Through Cognates

Cross-linguistic activation of the L1 (Spanish) through cognates unburden lexical access to the vocabulary items of the L2 (mini-Basque). COG participants devoted fewer resources to lexical retrieval than NCOG participants. The resources saved up could be destined to learning the rule of the language.

By contrast, NCOG learners could not employ as many resources to learn the grammatical rule, most of those resources being destined to lexical retrieval. This explains why non-cognate learners' performance was slower and less accurate or, in other words, why they had more difficulty learning the rule of the artificial language.
DISCUSSION

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CONCLUSIONS

▶ We showed that adults can learn a set of lexical items and a grammatical rule of an artificial language explicitly.

▶ COG group easily retrieve the words, since these matched the corresponding items in their Spanish lexicon.

▶ The cognate facilitation effect attested in lexical and syntactic processing also favours rule learning.

▶ Rule learning is facilitated when the vocabulary items of the artificial language are cognates with the L1.

▶ Retrieving non-cognate vocabulary was very costly, thus non-cognate learners disposed of few resources to apply the grammatical rule.

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THANK YOU
Questions and Comments