Delayed ambiguity resolution in L2

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Euskal Herriko Unibertsitatea (UPV/EHU)
The man saw the woman with binoculars.
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RESOLVING AMBIGUITIES

Most of the time, ambiguities are solved by using default mechanisms like
Subject-First strategy (Bever, 1970),
Attachment Preferences (Frazier & Fodor 1978),
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... always favouring the simplest structure.
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Subject-*BEFORE* Object \quad \quad Object-*BEFORE* Subject

Manipulations of Gender and/or Number can change interpretations towards non-preferred (default) RC structures.
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World knowledge may also affect structure to meaning mapping.
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Subject-\textit{BEFORE}-Object \quad Object-\textit{BEFORE}-Subject

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World knowledge may also affect structure to meaning mapping.

When ambiguity is solved towards a non-preferred structure, the incrementally built structure has to be reanalysed.
PROCESSING STRUCTURAL DISSIMILARITIES IN L2

L2 speakers never achieve Native-like processing.
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**BASQUE**
Canonical SOV (OV)
ERGATIVE-ABSOLUTIVE
Neskak (A) mutila (P) ikusi du.
Mutila (S) etorri da.

**SPANISH**
Canonical SVO (VO)
NOMINATIVE-ACCUSATIVE
La chica (A) ha visto al chico (P).
La chica (S) ha venido.

*The girl (A) has seen the boy (P).*
*The girl (S) has arrived.*
PROCESSING DISSIMILARITIES IN BASQUE

**ERGATIVE PROCESSING** Diaz et al., 2011, 2016
Non-natives: no-P600

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**Ergative case condition**

- Mikelen arrebek egunkaria
- Mikelen arrebek *egunkariak

---

**Ergative case violation**
PROCESSING DISSIMILARITIES IN BASQUE

**ERGATIVE PROCESSING**  
Diaz et al., 2011, 2016  
Non-natives: no-P600

**VO-OV PROCESSING**  
Erdocia & Laka, 2018  
Natives: Negativity  
Non-Natives: Positivity

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**ERGATIVE CASE VIOLATION**

Native speakers

- Verb position
- DP2 position

Non-native speakers

- Verb position
- DP2 position

---

Ergative case condition

- F3
- F4
- P3
- P4

Mikelen arrebek egunkaria
Mikelen arrebek *egunkariek

![Graphs and diagrams showing ERP waveforms and scalp maps for native and non-native speakers.](image-url)
PROCESSING AMBIGUITIES IN BASQUE

-AK is homophonous for singular ergative and plural absolutive.

<table>
<thead>
<tr>
<th>AMB</th>
<th>Gizonak emakumeak ikusi ditu.</th>
<th>Man (?) woman (?) has seen.</th>
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<td>The men the women have seen.</td>
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# RESOLVING AMBIGUITIES IN BASQUE

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## NATIVES

![EEG Brain Wave Diagram](image)

Legend:
- **AMB-soV**
- **AMB-osV**

- 0 - 1600 ms
- 500-600 ms
- 800-900 ms

- **POS**
- **NEG**

- 4.0 µV
RESOLVING AMBIGUITIES IN BASQUE

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### NATIVES

![Natives EEG Graphs]

### NON-NATIVE

![Non-Natives EEG Graphs]
EXPERIMENT

Basque speakers interpret ambiguous sentences like canonical ones. But, is that biased by a singular preference?
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- to disentangle the singular-plural ambiguity for the first argument. For that purpose, we tested whether the Agent-first preference remains when both ambiguous arguments are plural.
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Plural demonstratives are syncretic for Ergatives and Absolutives in Basque.

Plural Demonstratives

HAUEK → those
HORIEK → those/these
HAIEK → these
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(1) *Neska hauek Mikel ikusi dute.*

’These girls have seen Mikel’

(2) *Neska hauek Mikelek ikusi ditu.*

’Mikel has seen these girls’
EXPERIMENT: Materials

2 Conditions. 32 sentences per condition.

'St老虎 have eaten those sheep'
EXPERIMENT: Materials

2 Conditions. 32 sentences per condition.

SOV
Otso hauek ardi haiek jan dituzte
Wolf these sheep those eaten have

OSV
Ardi hauek otso haiek jan dituzte
Sheep these wolf those eaten have

'These wolves have eaten those sheep'
EXPERIMENT: Methods

Participants
19 Basque native speakers (6 males, age = 19.6 ± 2.7)
19 Non-native speakers highly proficient in Basque (4 males, age = 19.5 ± 2.7; AoA ≈ 3).

Procedure
ACTICAP: 32 electrodes
64 experimental sentences + 416 fillers
Visually presented word by word.
RSVP: 350ms. + 250ms. ISI.
Duration: 1h 15m

Task
Acceptability Judgements
RESULTS: Behavioural

<table>
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<tr>
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<td>NATIVES</td>
<td>93.6% (±1.1)</td>
<td>90.6% (±1.8)</td>
<td>567.4 (±46.6)</td>
<td>670.9 (±84.4)</td>
</tr>
<tr>
<td>NON-NATIVES</td>
<td>92.1% (±1.5)</td>
<td>89.8% (±2.2)</td>
<td>634.9 (±40.9)</td>
<td>693.1 (±44.7)</td>
</tr>
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**Accuracy**: Both groups performed equally well on both experimental conditions.

**Reaction Time**: Both groups performed faster the task for canonical sentences than for non-canonical ones.
RESULTS: ERPs

VERB POSITION

NATIVES

VERB: Neg. 350-400 ms
Neg. 500-700 ms

NON-NATIVES

VERB: NS

AUXILIARY POSITION

NATIVES

AUXILIARY: NS

NON-NATIVES

VERB: NS

AUXILIARY: Neg. 400-450 ms
Neg. 500-700 ms
RESULTS: ERPs

GROUP COMPARISON:

VERB: 350-400 (ORDERxAxGROUP, F(2,72)=4.185; P(HF)=0.040)

700-800 (ORDERxAxGROUP, F(2,72)=4.185; P(HF)=0.048)

AUXILIARY: 800-850 (Midline, ORDERxAxGROUP, F(1,36)=6.001; P(HF)=0.019)

Natives

sov ———

osv ————

Non-natives

sov ———

osv ————
RESULTS: ERPs

GROUP COMPARISON:

VERB: 350-400 (ORDERxAPxGROUP, F(2,72)=4.185; P(HF)=0.040)

700-800 (ORDERxHxGROUP, F(1,36)=4.199; P(HF)=0.048)

AUXILIARY: 800-850 (Midline, ORDERxGROUP, F(1,36)=6.001; P(HF)=0.019)
CONCLUSIONS

Non-native bilinguals of Basque who acquired the L2 early (≈3y.o.) and whose proficiency is high do not process temporary ambiguous sentences disambiguated towards a non-preferred word order as native speakers do. This can be due to the typological differences between L1 (Sp.) and L2 (Bq.) regarding argument alignment (Case System) and word order (VO vs. OV).

The question whether natives and non-natives make use of the same or different neural mechanisms when reanalysing syntactically complex sentences remains unsolved. If our results are interpreted as a delay on disambiguation and reanalysis, we can conclude that non-native processing differs quantitatively, not qualitatively, from that of natives. Thus, world knowledge modulates the syntactic processing of non-natives who become more native-like. Further research on other types of language pairs is needed to support this conclusion.
Moltes Gràcies
Eskerrik Asko