Interaction between sentence complexity and resumption: Experimental evidence from Spanish.

Laura Stigliano & Ming Xiang
The University of Chicago

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Main goals

▶ Examine the interaction between island repair and resumption with respect to the difference between intrusive and grammatical resumptive pronouns (RPs) in the same language—Spanish.

▶ Test whether the availability of RPs in the baseline, non-island contexts plays any role in whether more complex contexts (i.e. islands or more levels of embeddings) can be ameliorated/repaired (and to which extent).
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- **H1**: speakers make use of these mechanisms in a **broad sense**.
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- **H1**: speakers make use of these mechanisms in a **broad sense**.
  - Prediction: complexity of islands will be **always** reduced by RPs (i.e. clitics) in Spanish.

- **H2**: speakers make use of these mechanisms in a **narrow sense**.
  - Prediction: reduction of complexity will only be attested for extractions that **optionally** allow resumptive clitics in the base-line, non-island cases (i.e. indirect object clitics in Sp.).
Roadmap

1. Background
   - Grammatical and Intrusive Resumption
   - Resumption in Spanish
   - Previous experimental findings

2. Experiment

3. Discussion & Conclusions
1. Background
Resumption

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  - **Grammatical** resumption is licensed by the grammar
  - **Intrusive** resumption is not licensed by the grammar
Grammatical Resumption – Three types of languages

▶ Obligatory gaps (e.g. English) – i.e. no grammatical resumption:
  (1) the girl that I met
      (*her)
      at the party

▶ Obligatory resumption (e.g. Arabic, Shlonsky 1992):
  (2) l-bint
      the-girl
      ?illi
      comp
      ˘ sufti-
      *(ha)
      saw-
      2sg-fem
      -*(her)
      Lit.: 'the girl that you saw
      her
      '

▶ Optional resumption (e.g. Irish, McCloskey 2002):
  (3) a. an
      the
      ghireach
      girl
      a
      aL
      ghoind
      stole
      na
      the
      s´ıoga´ı
      fairies
      Lit.: 'the girl that the fairies stole away'
  
  b. an
      the
      ghireach
      girl
      a-r
      aN-[past]
      ghoind
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      her
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    Lit.: ‘the girl that you saw her’

▶ Optional resumption (e.g. Irish, McCloskey 2002):

(3) a. an ghirseach a ghood na síogaí
    the girl aL stole the fairies
    Lit.: ‘the girl that the fairies stole away’

b. an ghirseach a-r ghood na síogaí í
    the girl aN-[past] stole the fairies her
    Lit. ‘the girl that the fairies stole her away’
Intrusive Resumption

- **Intrusive Resumption** is not licensed by the grammar. It arises as a ‘last resort’ strategy where a pronominal appears in place of an illicit gap.

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  (4) I’d like to meet the linguist that Peter knows a psychologist that works for *(her)*.
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- It has been suggested that intrusive resumptives can **facilitate** the processing of long-distance dependencies when the parser is overloaded due to complexity (Kroch, 1981; Prince, 1990; Erteschik-Shir, 1992, a. o.)
Spanish

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- Spanish has Clitic Doubling: a clitic co-occurs with a full DP.

- Baseline: acceptability judgment task that tested the optionality of Clitic Doubling for Direct Objects (5) and Indirect Objects (6):

  (5) Ana habló con la enfermera que (lo) ayudó a Bruno la semana pasada...
      Ana talked with the nurse that (him) help DOM Bruno the week before
      ‘Ana talked with the nurse that helped Bruno last week...’

  (6) Ana habló con el estudiante que (les) regaló un libro a sus profesores...
      Ana talked with the student that (them) gave a book to his professors
      ‘Ana talked with the student that gave a book to his professors on Friday...’
Results:
- Clitic Doubling is **optional**
  - DO: no main effect of Clitic/Gap (p > 0.05)
  - IO: no main effect of Clitic/Gap (p > 0.05)
Resumption in Spanish

- Pre-verbal clitics can serve as resumptive elements.

- Introspective judgments suggest that there is structure-dependent variability in the acceptability of RPs: resumed DOs relatives are degraded (7a) but resumed IOs relatives are optionally allowed (7b):

\[(7)\]
\[\begin{align*}
\text{a. } & \textbf{El chico} \text{ que la mujer \textit{(*lo)} vio.} \\
& \text{The kid that the woman \textit{(*him)} saw} \\
& \text{‘The kid that the woman saw \textit{(*him).}’} \\
\text{b. } & \textbf{El chico} \text{ que la mujer \textit{(le)} dio un libro.} \\
& \text{The kid that the woman \textit{(him)} gave a book} \\
& \text{‘The kid that the woman gave \textit{(him)} a book.’}
\end{align*}\]
Resumption in Spanish

- Previous literature have suggested that Spanish RPs can rescue islands:

(8) **Qué libro** me dijiste que no recordás dónde *(lo)* pusiste?
Which book to.me told that no remember where it put
’Which book did you tell me that you don’t remember where you put *(it)*?’
(adapted from Suñer 1998)

(9) A **María** escuché el rumor de que *(la)* desaprobaron.
Dom María heard the rumor of that her failed
‘As for María, I heard the rumor that they failed *(her)*.’
(adapted from Saab and Zdrojewski 2012)
(Some) previous experimental findings

- RPs in islands were **not accepted** (e.g. Heestand, 2011), even by the same speakers who produced them (Ferreira & Swets, 2005)

- When gaps and RPs are compared in languages with grammatical resumption and in languages without it, in all tested environments, RPs were **not more acceptable than gaps** (Alexopoulou & Keller, 2007)

- RPs were more preferred than gaps when **task was manipulated**; i.e. forced choice task (Ackerman et al., 2018) or comprehensibility judgment (Beltrama & Xiang, 2016)

- Comparison within the same language (Hebrew) in two structures: one that allows RPs (CNP islands) and one that doesn’t (CS islands). Results show that this grammatical difference is **reflected in the online processing** (Keshev & Meltzer-Asscher 2017).
2. Experiment
The goals and motivation for this research are as follows:

- There have not been controlled experimental studies on the effect of resumption in Spanish.
- Theoretical literature on this language claims that there are amelioration effects, but this hasn’t been found for other languages.
- The pre-existing variability in the acceptability of resumptive elements in non-island contexts (DO vs. IO) should be taken into account when evaluating their effects on islands.
- Testing the role of the availability of resumption in the base-line condition for more complex contexts.
Experiment

- Self-Paced Reading task + Acceptability Judgment on IbexFarm
- 48 Native speakers of Rioplatense Spanish, recruited on social media

**Experimental design:**
- 2 sets (DO and IO)
- $2 \times 2 \times 2$ for each set
  - **resolution type:** clitic vs gap
  - **construction type:** non-island vs RC isl.
  - **depth of embedding:** zero vs one
- 24 lexical items for each set
- both grammatical and ungrammatical fillers were included

**Analysis:**
- Each dependency type analyzed separately with linear mixed-effects regressions
- Random effects included by-subject and by-item intercepts
- For reading times (RTs), we analyzed the log transformed RTs on the critical region (i.e. $(cl)$ verb in the plots) and the next spill-over region.
(10) Ana llamó al doctor al que...
Ana called the doctor that
‘Ana called the doctor that...’

a. ...los enfermeros lo/__ vieron el sábado en el hospital. NON-ISLAND – ZERO EMBEDDING
...the nurses cl/gap saw the Saturday in the hospital.
‘...the nurses saw on Saturday at the hospital.’

b. ...[Sonia cree que] los enfermeros lo/__ vieron el sábado en el hospital. NI – ONE EMBEDDING
...Sonia thinks that the nurses cl/gap saw the Saturday in the hospital.
‘...[Sonia thinks that] the nurses saw (him) on Saturday at the hospital.’

c. ...los enfermeros que lo/__ vieron el sábado en el hospital ganaron un premio. ISL. – ZERO
...the nurses that cl/gap saw the Saturday in the hospital won a prize.
‘...the nurses that saw (him) on Saturday at the hospital won a prize.’

d. ...[Sonia cree que] los enfermeros que lo/__ vieron (...) ganaron un premio. ISL. – ONE EMBED.
...Sonia thinks that the nurses that cl/gap saw (...) won a prize.
‘...Sonia thinks that the nurses that saw (him) on Saturday at the hospital won a prize.’
Sample Stimuli - IO extractions

(11) Ana vio a los fiscales a los que...
Ana saw DOM the prosecutors DOM.that
‘Ana saw the prosecutors that...’

a. ...la jueza les/ _ entregó la evidencia en un sobre después de la reunión.
...the judge cl/gap gave the evidence in an envelope after of the meeting
‘...the judge gave (them) the evidence in an envelope after the meeting.’

b. ...[Sonia cree que] la jueza les/ _ entregó la evidencia en un sobre después de la reunión.
...Sonia thinks that the judge cl/gap gave the evidence in an envelope after of the meeting
‘...[Sonia thinks that] the judge gave (them) the evidence in an envelope after the meeting.’

c. ...la jueza que les/ _ entregó la evidencia en un sobre después de la reunión declaró...
...the judge that cl/gap gave the evidence in an envelope after of the meeting testified
‘...the judge that gave (them) the evidence in an envelope after the meeting testified yesterday.’

d. ...[Sonia cree que] la jueza que les/ _ entregó la evidencia (...) declaró ayer.
...Sonia thinks that the judge that cl/gap gave the evidence (...) testified yesterday
‘...[Sonia thinks that] the judge that gave (them) the evidence (...) testified yesterday.’
Results – Acceptability Judgment

▶ Direct Objects - Non Islands:
- main effect of resolution type (p<0.001): gaps rated higher than clitics.
- main effect of depth of embedding (p<0.001): zero emb. rated higher than one.
- no significant interaction between resolution and depth embedding (p<0.001).

▶ Indirect Objects - Non Islands:
- no main effect of resol. type (p>0.1)
- main effect of depth of embedding (p<0.001): zero emb. rated higher than one.
- significant interaction between resolution and embedding (p<0.05).

▶ DOs and IOs - RC Islands:
- no main effects; no significant interactions
Dependency types (DO vs. IO) display different patterns for the baseline, non-island conditions (although both allow clitic doubling to the same extent):
Results – Acceptability Judgment

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- relativization of DOs resolves the dependency with a gap

There is no island repair by resumption in the sense of making grammatical an ungrammatical sentence (contra previous claims, e.g. Suñer 1998).

DOs: resumption improves for one embedding compared to zero embedding (p > 0.1).

IOs: clitic doesn’t ameliorate the effect of deeper embedding (p > 0.05).
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- relativization of DOs resolves the dependency with a gap
- relativization of IOs shows optionality between clitics and gaps (p>0.1).

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Results – Self Paced Reading: DO/IO Non-islands

Figure 2. DO − Non islands. log transformed RTs by Region

Figure 4. IO − Non islands. Log transformed RTs by Region

• DO – Critical and 1st spill-over region: main effect of resolution type (ps < .001), and of embedding (ps < .05).

• DO – Marginal interaction on the spill-over region (p=.07), driven by the fact that clitics in one-embedding were read faster than zero-embedding (p < .05).

No difference between gap conditions (p > .9).

• IO – clitic vs. gap difference non-significant on any region (ps > 0.5), consistent with acceptability judgments.

• IO – Main effect of embedding on the spill-over region, but no significant interaction.
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- IO – clitic vs. gap difference non-significant on any region (ps > 0.5), consistent with acceptability judgments.
- IO – Main effect of embedding on the spill-over region, but no significant interaction.
Results – Self Paced Reading: DO/IO, RC-islands

Figure 3. DO − RC islands. log transformed RTs by Region

Figure 5. IO − RC islands. Log transformed RTs by Region

• DO – Critical region: interaction between resolution type and embedding (p < .01), with clitics in one-embedding read much faster than the clitics in zero-embedding (p < .001). No difference between the two gap conditions (p > .6).

• IO - Similar trend of interaction on the critical region for the IO structure, but it is not significant.
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- **IO** - Similar trend of interaction on the critical region for the IO structure, but it is not significant.
3. Discussion & Conclusions
Discussion

- No amelioration effect of resumption on islands at all, even with the IOs, for which grammatical resumption is available in non-islands.

- For DO clitics, an improvement is seen for one embedding compared to zero embedding. This could mean that resumption is better in grammatical more complex structures, but not islands.

- The lack of island-rescuing effect is manifested in acceptability judgments (clitic conditions were never judged more acceptable than gap conditions), and RTs (clitic conditions were never read faster than gap conditions).

- More nuanced finding: between the clitic conditions, for both non-islands and islands, clitics can facilitate the processing of more complex one-embedding dependency relative to the zero-embedding.
Conclusions

▶ We aimed to test the claim that speakers make use of the mechanisms available in their language when processing islands.

▶ We found a structure-dependent variability of the acceptability of resumptive elements. This may suggest even within the same language there could be a distinction between grammatical vs. intrusive resumption.

▶ The difference in the baseline cases allowed us to test any correlations between the availability of clitics in the non-island conditions, and their effects in different types of islands and depths of embedding.

▶ It seems to be the case that whether clitics are allowed in the baseline case doesn’t play a role in the effects obtained for RC islands.

▶ Neither grammatical nor intrusive resumption can rescue islands per se, extending previous findings, but it can facilitate processing in a very constrained way.
Thank you!

laurastigliano@uchicago.edu
voices.uchicago.edu/stigliano
In Spanish we can see an interesting contrast between dependency types (see, e.g. Fadlon et al. 2019): while DOs allow passivization (12a), IOs don’t allow it (12b). A possible explanation for the patterns we find in the baseline case is that resumptive clitics are allowed/preferred in those contexts in which other strategies are not possible.

(12)  

a. el médico que fue visto por el enfermero
the doctor that was seen by the nurse
‘the doctor that was seen by the nurse’

b. *el médico que fue dado los informes
the doctor that was given the reports
Int: ‘the doctors that was given the reports’
Experiment Weak vs. Strong Islands

- **Direct Objects:**
  - main effect of resolution type (p<0.001): gaps rated higher than clitics.
  - main effect of construction type (p<0.001): non-islands rated higher than weak isl., and weak rated higher than strong.
  - significant interaction between resolution and construction type (p<0.001).

- **Indirect Objects:**
  - main effect of resolution type (p<0.001): clitics rated higher than gaps.
  - main effect of construction type (p<0.001): non-islands rated higher than weak isl., and weak rated higher than strong.
  - no significant interaction between resolution and construction type (p>0.05).