Animate intruders

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CUNY2020, UMass, 3/19-3/21
Filler-gap dependency w/ complexity of some sort

?? a topic I’m surprised there’s even more to say about _

A topic I’m surprised there’s even more to say about it

Resumptive pronoun (RP)
Why do speakers use resumptive pronouns (RPs)?

**Part 1.** What do we know about intrusive RPs in English? Are languages really inherently different?

- A surprising generalization and some new hypotheses about a connection between RPs and Animacy

**Part 2.** Testing the comprehension of RPs in Santiago Laxopa Zapotec (SLZ), a VSO language with 4 levels of grammatical animacy
Part 1: RP Landscape

• St. Louis has a zoo that, the first time I went to it, there’s like an otter exhibit.
  (Host of a radio show; cit. Chacón, 2019)

• We have these things called aircraft carriers where planes land on them.
  (B. Obama, Oct. 12, 2012)

• The sale of uranium that nobody knows what it means.
Part 1: RP Landscape

• na daoine ar dhíbir Cromail ó thalamh na hÉireann iad
  the people C.RP expell.past Cromwell from land the.gen Ireland.gen them
  ‘the people who Cromwell expelled them from the land of Ireland’
  (Modified from Tomás Ó Criomhthain; cit. McCloskey, 2019)

• ha-xaver Se-racit lifgoS oto yoSev ba-xacer
  the-friend that-you.wanted to meet him sitting in.the-yard
  ‘the friend that you wanted to meet him is sitting in the yard’
  (Ivy Sichel, p.c.)

• xhile’ ts-ja-naw bi byu leb
  sheep cont-and-follow CL male 3.AN
  ‘the sheep that the boy is following it’
  (FSR; cit. Maziar Toosarvandani, fieldwork)
English RPs: never judged to be highly acceptable

- Recurring finding #1: the **low acceptability** of English RPs
English RPs: sometimes better than gaps

- Recurring finding #2: **RPs > gaps** in some contexts (islands)

  - ... but no evidence that they are ever absolutely acceptable

Figure 4: Experiment 2: Mean ratings per clause type
English RPs: a production problem?

- Broadly shared idea: producing complex filler-gap dependencies can fail in various ways
- And when it does, an RP is produced: as a “rescue strategy”, the (emergent?) preservation of local-well formedness; or simply the surfacing of an otherwise lowly-ranked alternative


- They are INTRUSIVE (Sells, 1984)
English RPs: a production problem?

- **Broadly shared idea**: producing complex filler-gap dependencies can fail in various ways
- And when it does, an RP is produced: as a “rescue strategy”, the (emergent?) preservation of local-well formedness; or simply the surfacing of an otherwise lowly-ranked alternative


- They are **INTRUSIVE** (Sells, 1984)

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### Figure 1: Paradigm to Elicit Island + Resumptive Sentences

<table>
<thead>
<tr>
<th>1st Question</th>
<th>2nd Question</th>
<th>3rd Question (response analyzed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- What is This?</td>
<td>- What is this?</td>
<td>- What is this?</td>
</tr>
<tr>
<td>- lives in Brazil</td>
<td>- I don't know</td>
<td>- I don't know</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

Target sentence: “This is a donkey that lives in California.”
Target sentence: “This is a donkey that lives in Brazil.”
Target sentence: “This is a donkey that I don’t know where it lives.”

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### Figure 2: Durations of Island + Resumptive Sentences and Controls, in Regions

**No Deadline**

**Deadline**

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Spoken production
F. Ferreira & Swets (2005)
English RPs: a comprehension boon?

- Another very broadly shared idea: RPs improve the parsing of FGDs (cf. Keenan, 1975).
- Some reading time studies show a facilitation in RT (Dickey, 1996, Hofmeister & Norcliffe, 2013)
- Improved comprehensibility ratings (Beltrama & Xiang, 2016)

How acceptable was that sentence? How comprehensible was it?

Figure 2: Comprehensibility judgments for Experiment 2. Error bars indicate standard errors.

Figure 3: Acceptability judgments for Experiment 3. Error bars indicate standard errors.

Beltrama & Xiang, 2016
English RPs: a comprehension boondoggle?

- **Reasons for skepticism.** Are sentences with RPs actually comprehended accurately? Pronouns, like gaps, can proliferate ambiguity.

- **Very little evidence here.** Morgan, von der Malsburg, V. Ferreira, Wittenberg (2018): RPs are often *miscomprehended* (VWP).

- **Chacón (2019):** it’s possible, but it might take a lot to derail the comprehension of filler-gap dependencies.
Moving beyond English

intrusive RPs (Sells, 1984)
  • English
  • German
  • Greek
  • …

true RPs (true, grammatical, …)
  • Irish (McCloskey, 1990)
  • Hebrew (Sichel, 2014, i.a.)
  • Swedish (Engdahl, 1982)
  • Vata (Koopman, 1982)
  • Tongan (Hendrick, 2005)
  • Cantonese (Francis et al. 2015)
  • Zapotec (?; this talk)
  …

Why don’t all languages just use RPs? (McCloskey, 2017, 2019)
Do any languages have only RPs?
Do all languages have intrusive RPs?
How true RPs are distributed
A standard view, from Irish & Hebrew

Obligatory RPs
islands, prepositional objects, etc.

Obligatory gaps
highest subject position

Optionality

(4)a. *an fear a raibh sé breoite
the man c.RP be.PAST he sick
‘the man that (he) was sick’

(2)a. an bheirt a bhí siad ag iarraidh – a shábháil
the two c.PG be.PAST they PROG try.vn save.NON–FIN
‘the two that they were trying to save’

Interrogating the standard view
"Optional" RPs are actually pretty rare
McCloskey (2017, 2019)

- 24.5M word corpus of Irish, 15.6K hand-annotated sentences
  - 333 published texts, audio sources
  - L. 19th C - today; 150 idiolects

\[
\begin{array}{llll}
\text{Dependency length} & \rightarrow & \text{One clause} & \text{2 clauses} & \text{3+ clauses} \\
\downarrow \text{Dependency tail} & & & & \\
\text{Gaps} & \sim 64,000^* & 439 & 3 \\
\text{Islands} & - & 165 & \\
\text{Optional RPs} & \boxed{66} & (5) & \\
\end{array}
\]
“Optional” RPs are less acceptable

- Hebrew, whose RP distribution is similar to Irish, presents a similar picture:
  - Optional direct object RPs are rare (Ariel, 1999; <10% of DOs), gaps are preferred (cf. Friedmann & Costa, 2011)
  - In acceptability judgment studies, direct object RPs receive lower ratings than direct object gaps (Meltzer-Asscher, Fadlon, Goldstein & Holan (2015), Farby et al. 2010)

Meltzer-Asscher et al. (2015)
When are “optional RPs” used?
McCloskey (2017, 2019)

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<td>—</td>
<td>165</td>
<td></td>
</tr>
<tr>
<td>※ Optional RPs</td>
<td>66</td>
<td></td>
<td></td>
</tr>
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</table>

50 (76%) involve *animate head nouns*

as gaps, only 10 would be ambiguous

![Bar chart showing RC Subj: ANIM vs RC Subj: INANIM with Inanimate Filler/RP and Animate Filler/RP categories]
Animacy and RPs

- Head noun animacy
  - has the strongest association with optional object RPs in Irish
  - Animacy also a major determinant of difficulty with object relative clauses in non-RP languages
  - In English, we can avoid linking animates to object position by using a passive; not (as) possible for the Irish, or Hebrew speaker …

50/66 (76%) involve animate head nouns

The overall picture suggests a more nuanced view of what the difference is between “intrusive resumption” and “true resumption.”… The deepest mystery in all of this … is why there should be an anti-pronominal prejudice and why it should have such force. McCloskey (2019)
Animacy and RPs
Fadlon, Morgan, Meltzer-Asscher & V. Ferreira (2019)

• ... reach a strikingly similar conclusion in a Hebrew RC production study, modeled on Gennari & MacDonald (2008)

• Object RPs are still rare, but much less rare when the head is animate

Fig. 5. Experiment 3, distribution of relative clause type by condition.
Animate intruders

- Even in “true resumption” languages like Hebrew or Irish, direct object RPs — standardly considered in free variation with gaps — actually appear to be produced under pressure. A (somewhat?) intrusive RP.

- Why animacy? Many factors potentially conspire, but two broad explanations:
  
  - **Animate switch**

  - **Animate itch**
    animates are inherently highly accessible (cf. Prat-Sala & Branigan, 2000); this may (independently of a marked alignment) induce similarity-based interference with an animate subject (Fadlon et al. 2019) or otherwise pressure the production system to act
Part 2: Zapotec

Steven Foley  Jed  Pizarro-Guevara  Kelsey Sasaki

Azusena Orozco  Maziar Toosarvandani  Brianda Caldera

Fe Silva Robles Senderos
Animacy

<table>
<thead>
<tr>
<th>Clitic</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>3ELDER</td>
<td>(n)e'</td>
</tr>
<tr>
<td>3HUMAN</td>
<td>ba'</td>
</tr>
<tr>
<td>3ANIMAL</td>
<td>(e)b</td>
</tr>
<tr>
<td>3INANIMATE</td>
<td>(e)nh</td>
</tr>
</tbody>
</table>
Zapotec in a nutshell

1. **Rigidly VSO:**
   \[ V-N-N \] is unambiguous

2. **Movement creates ambiguity:**
   \[ N-V-N \]: gap in \textsc{subj} or \textsc{obj} position

3. There are **resumptive pronouns** (RPs)
   - which look like regular pronouns:
   - … \textsc{subj} pronouns obligatorily cliticize on verb
   - … \textsc{obj} pronouns cannot cliticize across NP subject
   - therefore, **can potentially disambiguate**
① Rigid VSO word order

(1) Tsyill
    pinch.CONT

Subject

Verb

bene’  nu’ulhe=nh
CL  woman=DEF

Object

bene’  xyage’=nh.
CL  man=DEF

‘The woman is pinching the man.’
NOT  ‘The man is pinching the woman.’
Movement creates ambiguity

(3) Shlhe’eyd=a’ bene’ nu’ulhe=nh

see.CONT=1SG CL woman=DEF

tsyill bene’ xyage’=nh.

pinch.CONT CL man=DEF

‘I see the woman that __ is pinching the man.’

OR ‘I see the woman that the man is pinching __.’
Resumptive pronouns (RPs) can eliminate ambiguity.

(4) Shlhe’eyd=a’ bene’ nu’ulhe=nh
tsyill=e’ bene’ xyage’=nh.

‘I see the woman that she is pinching the man.’
‘I see the woman that the man is pinching her.’
Pronouns can eliminate ambiguity.

(5) Shlhe’eyd=a’ bene’ nu’ulhe=nh
see.CONT=1SG CL woman=DEF

tsyill bene’ xyage’=nh le’.
pinch.CONT CL man=DEF 3EL

‘I see the woman that she is pinching the man.’
‘I see the woman that the man is pinching her.’

N V NP pro ✗SRC ✓ORC
Do SLZ comprehenders accurately parse these RPs?

- Picture-matching experiments to probe the comprehension of RCs
- N = 105 speakers, living in Santiago Laxopa; auditory presentation
- Sentence types: ambiguous (gap), subject RPs and object RPs
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accuracy of subject RP comprehension

weak subject bias

subject RP comprehension at chance!
Are Object RPs actually grammatical in SLZ?

- **Foreman & Munro (2007):**
  Object RPs – and only object RPs – are unacceptable in Macuiltianguis Zapotec (MacZ)
  (this is a typologically remarkable claim; cf. Keenan & Comrie, 1977)

- A parsing constraint is proposed to account for this: immediately post-verbal NPs are parsed as subjects, if they satisfy the verb’s selectional requirements.
  Thus, in MacZ:

  - ... NP-only RCs receive a default ORC interpretation
  - ... and subject RPs are frequently used to achieve SRCs
Our recent fieldwork suggests: any difficulty with object RPs disappears when RC arguments are of unequal animacy.

i.e., an **object RP** in (5) is as good or **better** than a **gap**.

Is there a connection to Irish & Hebrew, where animacy influences whether optional RPs are used?

(5)  Ble‘eyd=a’  xhile’  tsjanaw  bi byu  (leb)
*see.comp=1sg  sheep  chase.cont  boy  3sg.an*

‘I saw the sheep that the boy is chasing.’
Animacy and Object RPs

Hypothesis:
object RPs present (independent) difficulty in equal-animacy cases as a function of encoding interference (cf. Gordon et al. 2001, Villata & Franck, 2019)

- \( X_1 [ V X_2 \text{RP} ] \)
  by hypothesis \( X_1 \) & \( X_2 \) compete for the same SUBJ position, and this simultaneous co-activation creates an opportunity for destructive feature overwriting (Oberaeur & Kliegl 2006)

- \( X_1 [ V Y_2 \text{RP} ] \)
  animacy provides a grammatically active index that can discriminate \( X_1 \) & \( Y_2 \)

More generally

It is sometimes claimed that V-initial lgs are more directly constrained by animacy hierarchies (Minkoff, 2000; cf. Clemens & Coon 2018)

It's possible equal-animacy effects are more deleterious in non-canonical sentences (cf. Kubo et al. 2015).
Take 2: Mixed animacy

- Picture-matching experiments to probe the comprehension of RCs
- N = 78 speakers, living in Santiago Laxopa; auditory presentation
- Sentence types:
  - ambiguous (gap), unambiguous VSO control and object RPs
  - arguments that mismatch in animacy; N = 39 in HU/AN group; N = 39 in EL/HU group.
  - HI > LO conditions in which higher animacy comes first; LO > HI, lower animacy first
Human > Animal

Elder > Human
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% Subject Interpretation

- Much more accurate on RPs!

<table>
<thead>
<tr>
<th></th>
<th>unambiguous VSO</th>
<th>ambiguous RC</th>
<th>object RP</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL &gt; HU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HU &gt; EL</td>
<td></td>
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< Same-animacy fillers

Diagram: Bar chart comparing subject interpretations for different sentence types in EL > HU and HU > EL conditions.
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![Graphs showing percentage of subject interpretation for different conditions.]

Much more accurate on RPs
What about alignment?

- The **animate switch**, or misalignment, hypothesis suggests that object RPs are produced more often when higher animacy arguments are mapped to object position.

- Do we see a corresponding improvement in comprehension of RPs for higher animacy heads?

  - **NO.**

**Lower animacy heads ~ (somewhat) fewer subject interpretations**

**BUT higher animacy heads don't lead to better Object RP comprehension**
Animacy and Object RPs in SLZ

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- \( X_1 [ V Y_2 \text{ RP} ] \)
  gender/animacy provides a grammatically active index that can discriminate \( X_1 \) & \( Y_2 \)

Our data support this hypothesis

Object RPs in mixed animacy RCs lead to better comprehension. The error rate is more than halved.
Animacy and Object RPs in SLZ

Animate switch
Mapping animate referents to object position is a highly-marked misalignment of canonical roles. $\sim$ more object RPs

Animate itch
Animates are highly accessible referents.

Our data speak obliquely here

When a high-ranked referent is relativized, it does lead to more subject parses

...but there does not seem to be a cumulative comprehension benefit for the RP when it’s a mis-aligned argument

We could use some production data!
Pilot eye-tracking data

N = 30
Tobii Nano Pro
OpenSesame

EL = SUBJ
HU = SUBJ
Pilot eye-tracking data

In object RP conditions, a subject interpretation can emerge before the pronoun.

But not, apparently, when the head noun is non-elder HUman.
Summing up

• **Animacy** appears to be a critical contributing factor to the production of RPs in some “true RP” languages, but also to the comprehension of RPs in Santiago Laxopa Zapotec

  • … only when co-arguments vary in grammatical animacy can object RPs be successfully parsed in SLZ

  • … true, even if the head noun provides the more low-ranked argument

• **Future directions**
  
  • Nail down the real-time time course, and evidence for potential garden-pathing

  • We’ve focused on morphosyntactic animacy, but need to gather data from speakers about its connection (or lack) to notional animacy

  • What happens in production?

  • How does animacy contribute to RP production in English?
Duxklhenu’!

- **RPs**
  - Jim McCloskey
  - Sandy Chung
  - Ivy Sichel

- **Zapotec**
  - Raul Díaz Robles, and 2 other speakers
  - Residents of Santiago Laxopa
    - Director Evaristo López Velazquez
    - Santiago Laxopa President Celestino Robles Ramirez

- **z/lab**: Fe Silva Robles, Maziar Toosarvandani, Kelsey Sasaki, Jed Pizarro-Guevara, Steven Foley, Brianda Caldera, Azusena Orozco

- UCSC Academic Senate Committee on Research and Vice Chancellor for Research
- The Humanities Institute, UC Santa Cruz

- Roque Reyes Mendoza, illustrator