



Animate intruders

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filler-gap dependency w/ complexity of some sort



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

↑
filler

↑
gap

a topic I'm surprised there's even more to say about **it**

↑
resumptive pronoun (RP)

Today

- 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

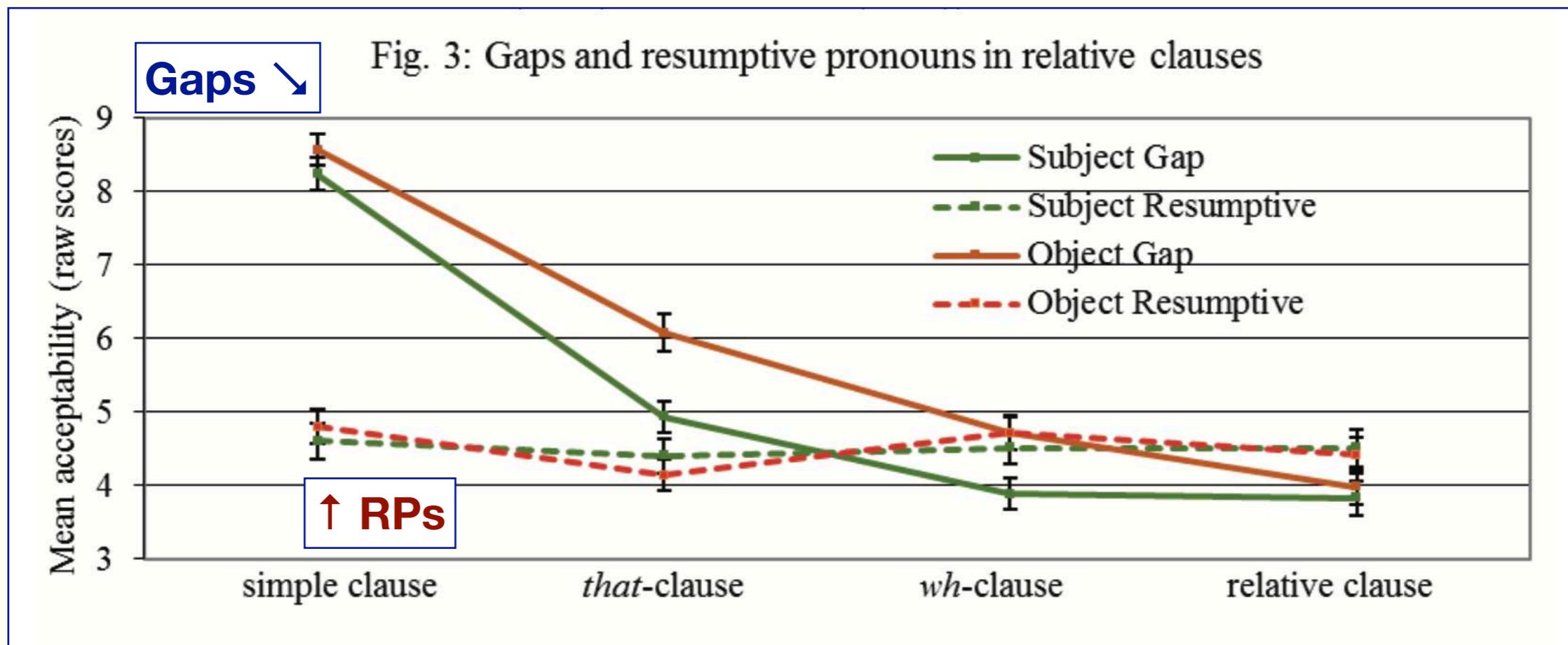
- St. Louis has a zoo that, the first time I went to **it**, there's like an otter exhibit.
(Host of a radio show; cit. Chacón, 2019)
- We have these things called aircraft carriers where planes land on **them**.
(B. Obama, Oct. 12, 2012)
- The sale of uranium that nobody knows what **it** means.
(D. Trump, Oct. 28, 2016; cit. Morgan & Wagers, 2018)

Part 1: RP Landscape

- na daoine ar dhíbir Cromail ó thalamh na hÉireann **iad** **Irish**
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 **Hebrew**
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** **Zapotec**
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

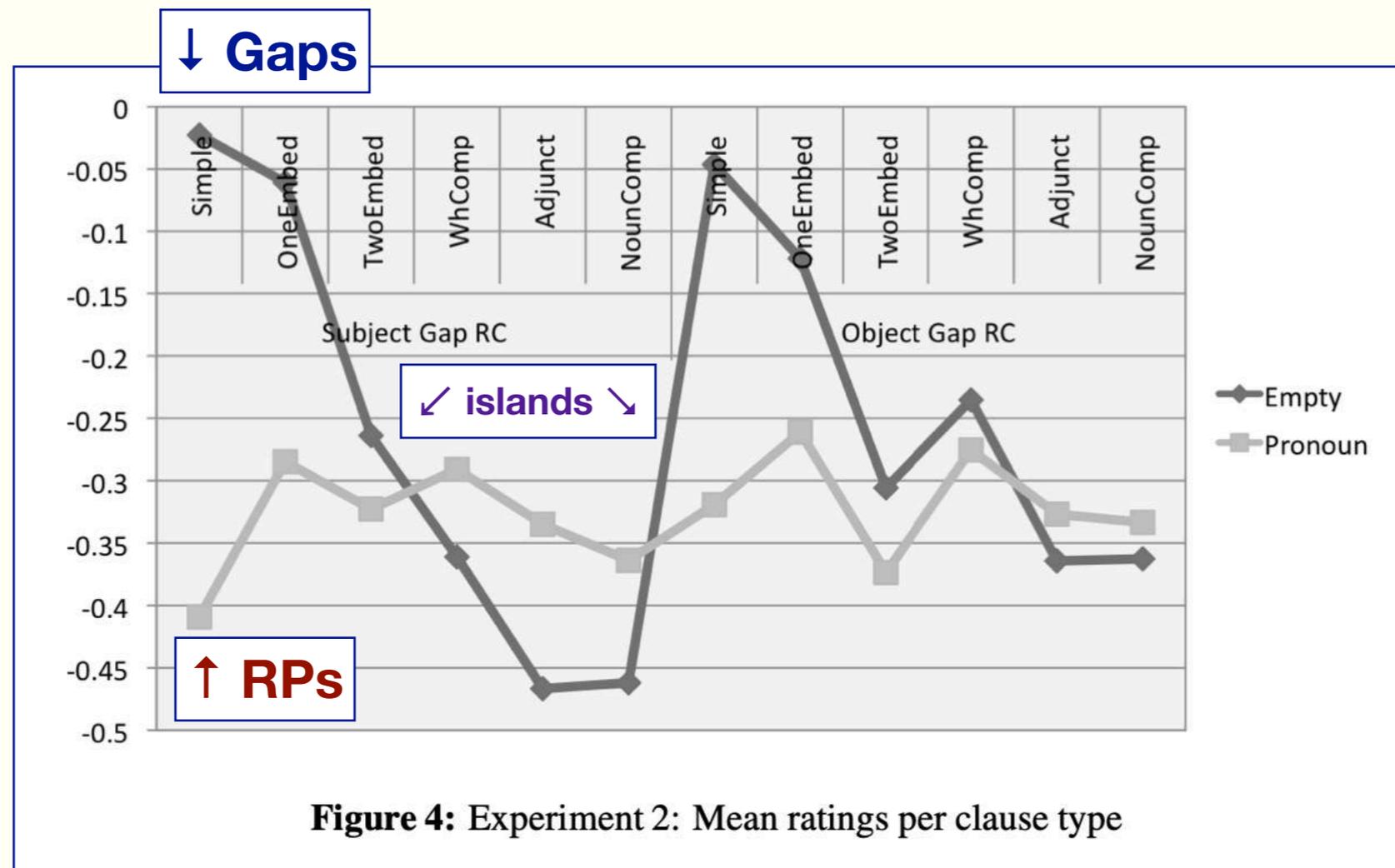
- Recurring finding #1: the **low acceptability** of English RPs
 - Alexopoulou & Keller (2007), Heestand, Xiang & Polinsky (2011), Han et al. (2012), Keffala & Goodall (2011), Morgan (2013), Chacón (2019), inter alia.



Keffala & Goodall, 2011
(Fig. From Goodall, 2017)

English RPs: sometimes better than gaps

- Recurring finding #2: **RPs > gaps** in some contexts (islands)
 - Esp. McDaniel & Cowart (1999), Keffala & Goodall (2011), Han et al. (2012), Ackerman, Frazier & Yoshida (2018)
 - ... but no evidence that they are **ever absolutely acceptable**

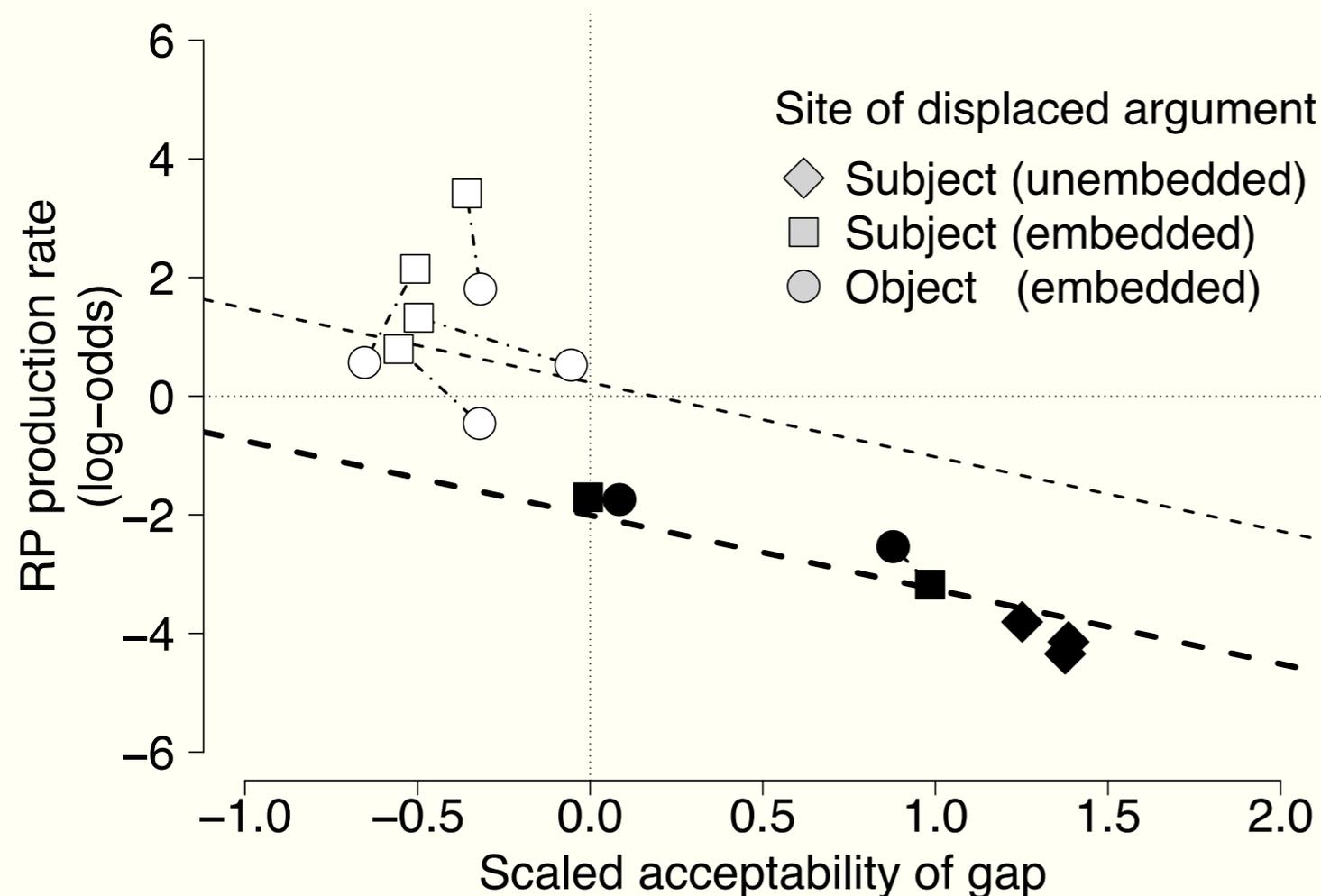


English RPs: a production problem?

- **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

Kroch (1981), Chao & Sells (1983), Asudeh (2004, 2012), Alexopoulou (2006), Heestand et al. (2011), Polinsky et al. (2013); Shlonsky (1992), Hawkins (2004), Goodall (2017), among many others

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



RP's produced more often →

← gaps are less acceptable

Written production
Morgan & Wagers (2018)

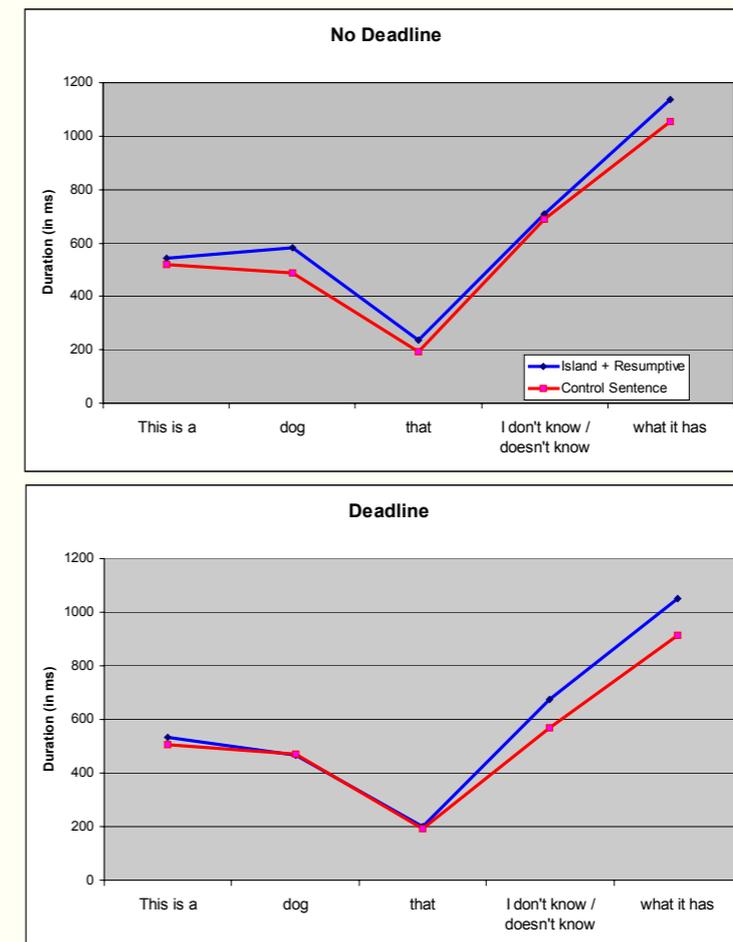
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Figure 1: Paradigm to Elicit Island + Resumptive Sentences

1 st Question	2 nd Question	3 rd Question (response analyzed)
 ←What is This?  -lives in Brazil  -I don't know	 ←What is this?  ←What is this?  -I don't know	   ←What is this?
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.”

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



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?

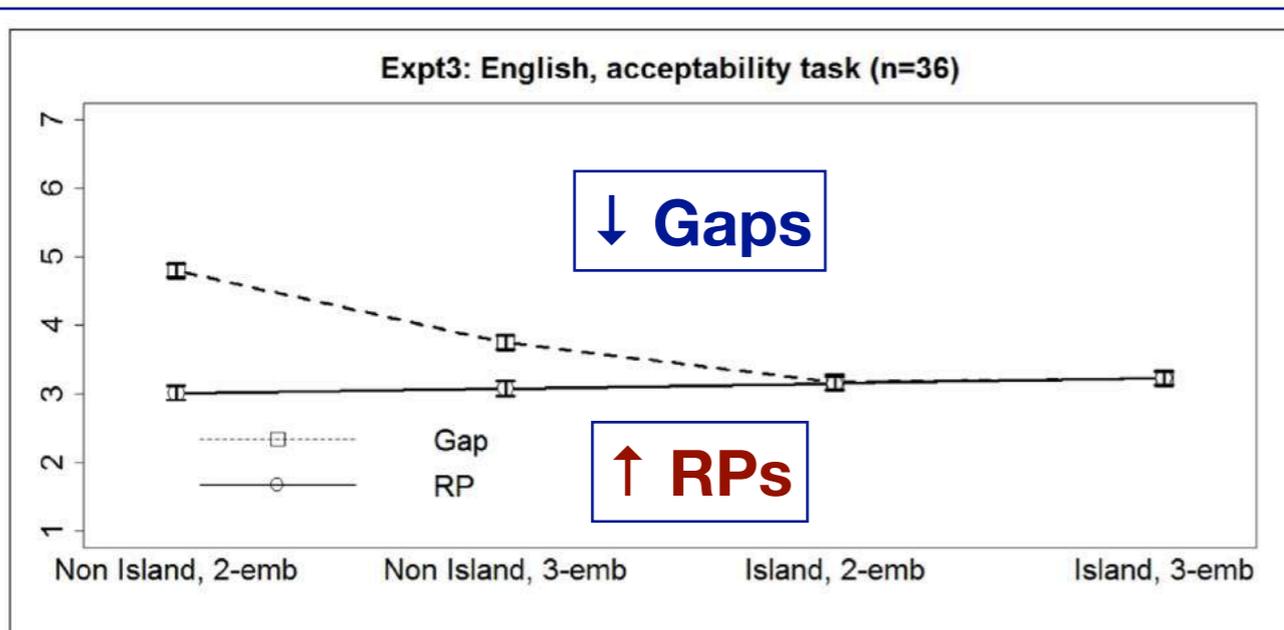


Figure 3: Acceptability judgments for Experiment 3. Error bars indicate standard errors.

How comprehensible was it?

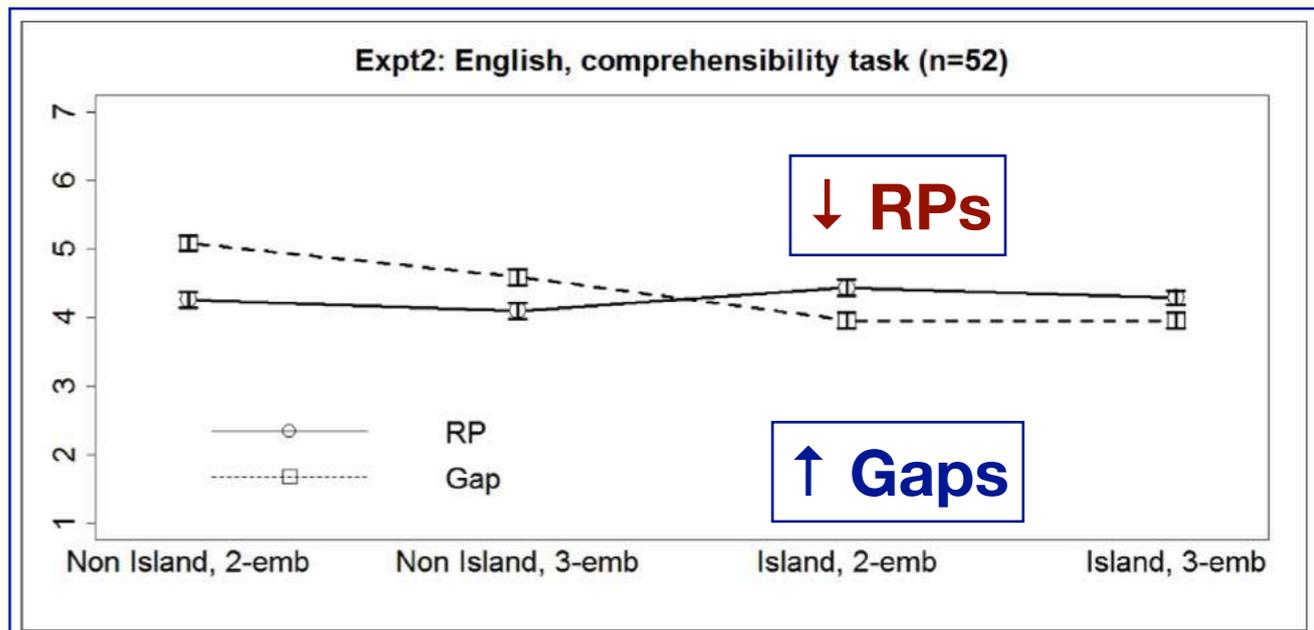
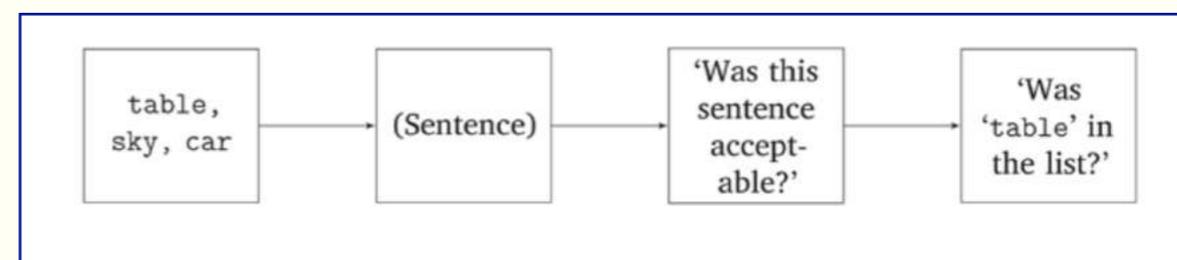
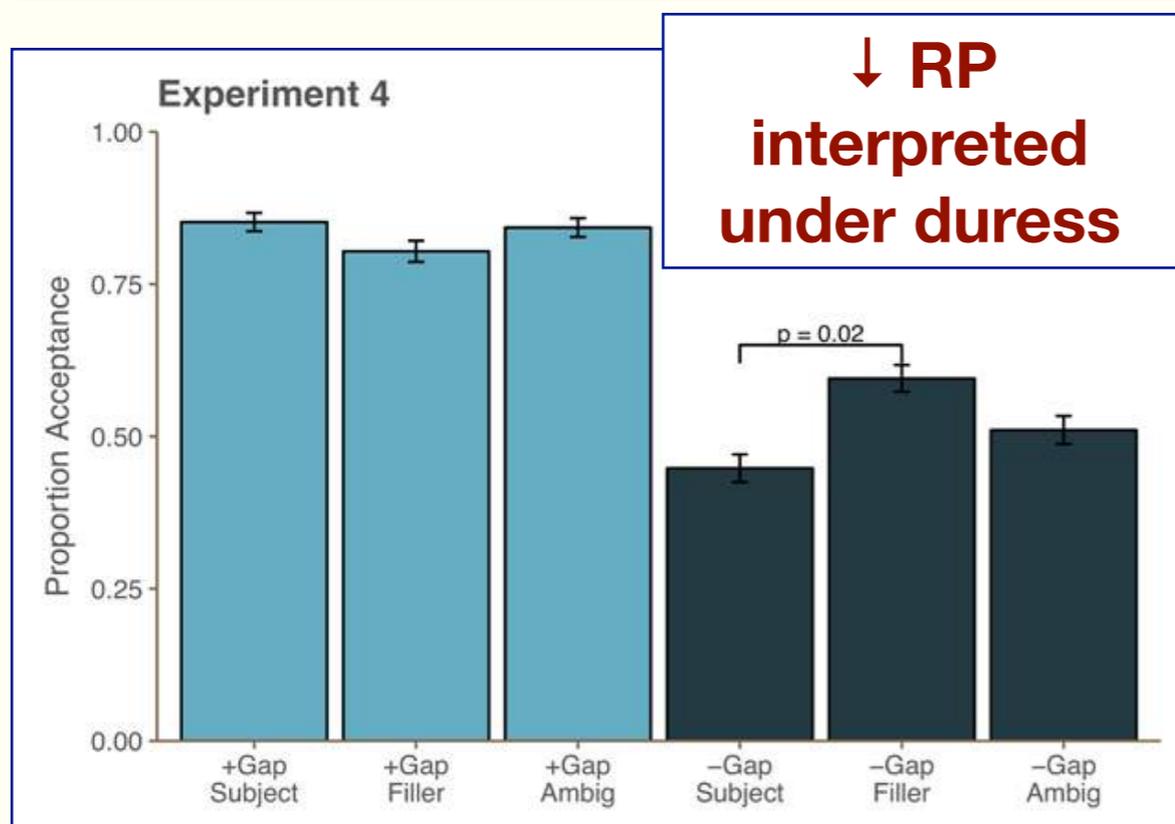


Figure 2: Comprehensibility judgments for Experiment 2. Error bars indicate standard errors.

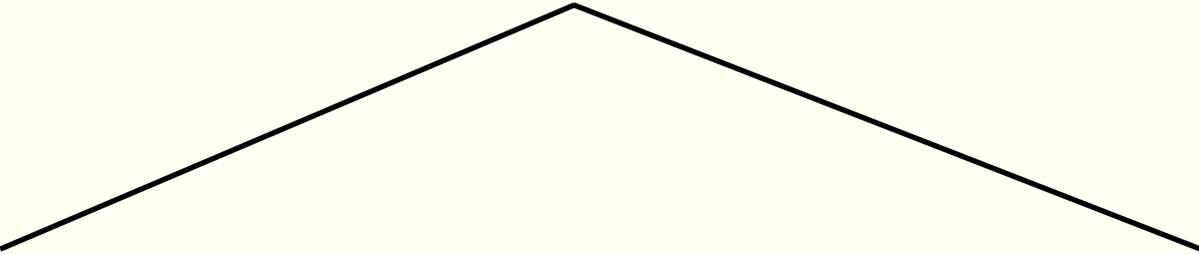
English RPs: a comprehension boondoggle?

- **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



Concurrent memory load task
Chacón (2019)

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?**
 - Maybe Palauan. Yes: Georgopoulos, 1985, 1991; No: Chung & Wagers 2020.
- **Do all languages have intrusive RPs?**

How true RPs are distributed

A standard view, from Irish & Hebrew

Obligatory RPs
islands, prepositional
objects, etc.

c. Chuartaigh sé uaigh a raibh sé ag déanamh nach raibh sé i bhfad ó
 sought he grave C.RP was he PROG think C.NEG.FIN was it long since
 cuireadh corp inti
 put.PAST.IMPERS body in-it
 ‘He sought out a grave that he was thinking that it wasn’t long since a body had been put in it.’

CR 86

Obligatory gaps
highest subject
position

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

↓ Gap

Optionality

↑
??

(2) a. an bheirt a bhí siad ag iarraidh – a shábháil
 the two C.FG be.PAST they PROG try.VN save.NON-FIN
 ‘the two that they were trying to save’ RADIO REPORT

b. an bheirt a raibh siad ag iarraidh iad a shábháil
 the two C.RP be.PAST they PROG try.VN them save.NON-FIN
 ‘the two that they were trying to save them’ RADIO REPORT

↑ RP

Interrogating the standard view

“Optional” RPs are actually pretty rare

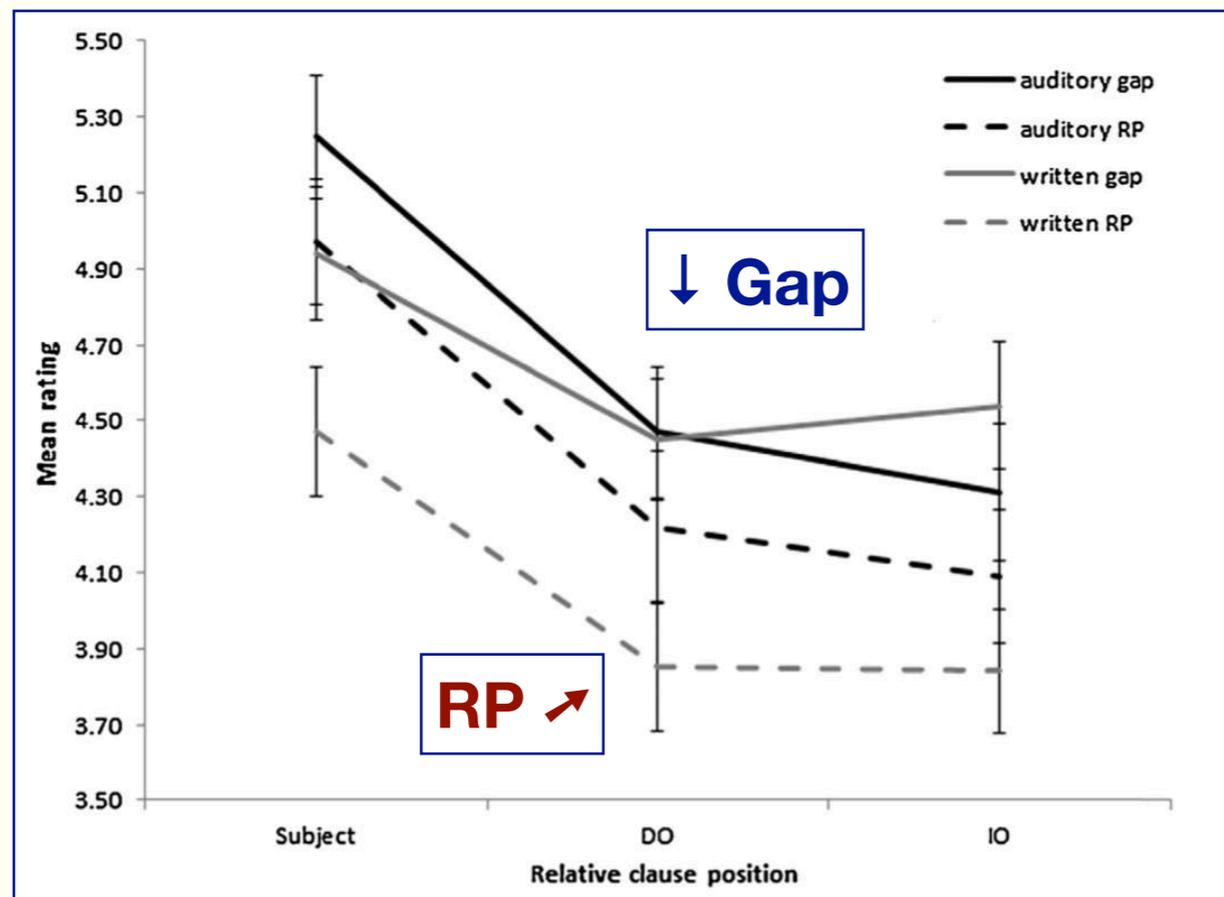
McCloskey (2017, 2019)

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

<i>Dependency length</i> →	<i>One clause</i>	<i>2 clauses</i>	<i>3+ clauses</i>
↓ Dependency tail			
Gaps	~ 64,000*	439	3
Islands	—	165	
✱ Optional RPs	66	(5)	

“Optional” RPs are less acceptable

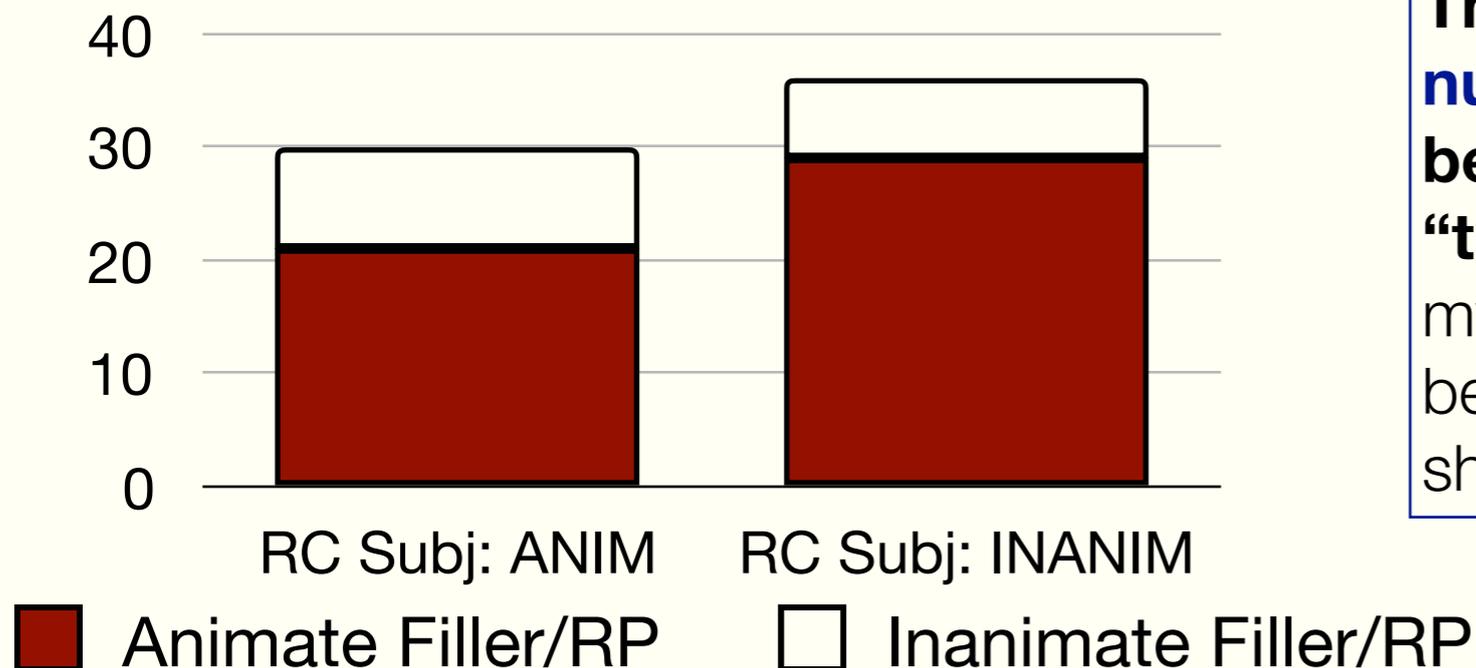
- Hebrew, whose RP distribution is similar to Irish, presents a similar picture:
 - Optional direct object RPs are rare (Ariel, 1999; <10% of DOs), gaps are preferred (cf. Friedmann & Costa, 2011)
 - In acceptability judgment studies, direct object RPs receive lower ratings than direct object gaps (Meltzer-Asscher,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



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
Traxler et al. 2002, Mak et al. 2002, 2006, Gennari & MacDonald, 2008, 2009, Lowder & Gordon 2014, Wagers & Pendleton 2016
- 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*

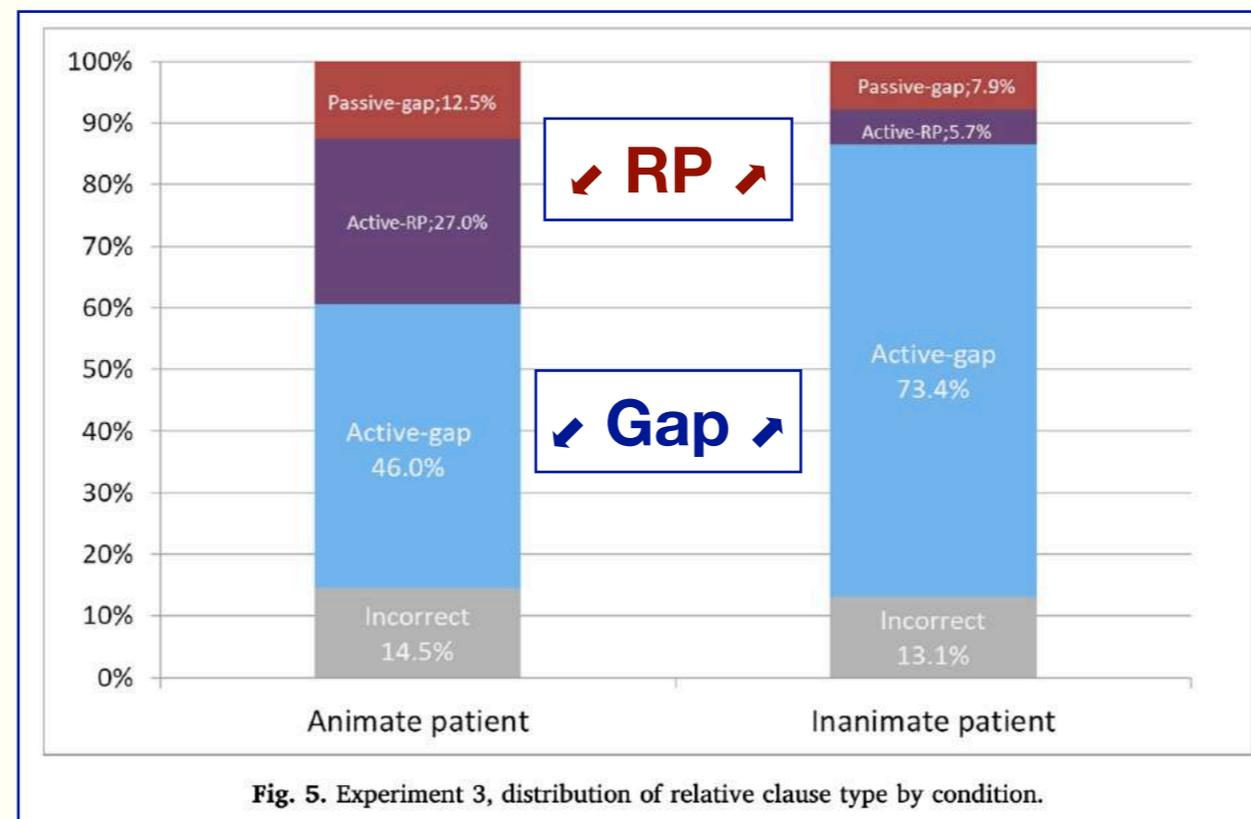


The overall picture suggests a **more nuanced view** of what the difference is between “intrusive resumption” and “**true resumption.**”... The deepest mystery in all of this ... is why there should be an anti-pronominal prejudice and why it should have such force. McCloskey (2019)

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**



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**
mapping animate referents to object position is a highly-marked misalignment of canonical roles (Aissen, 2003, F. Ferreira, 1994, Christianson & F. Ferreira, 2005; cf. Sichel, 2014, Landau, 2009)
 - **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

Jed

Steven Foley

Pizarro-Guevara

Kelsey Sasaki



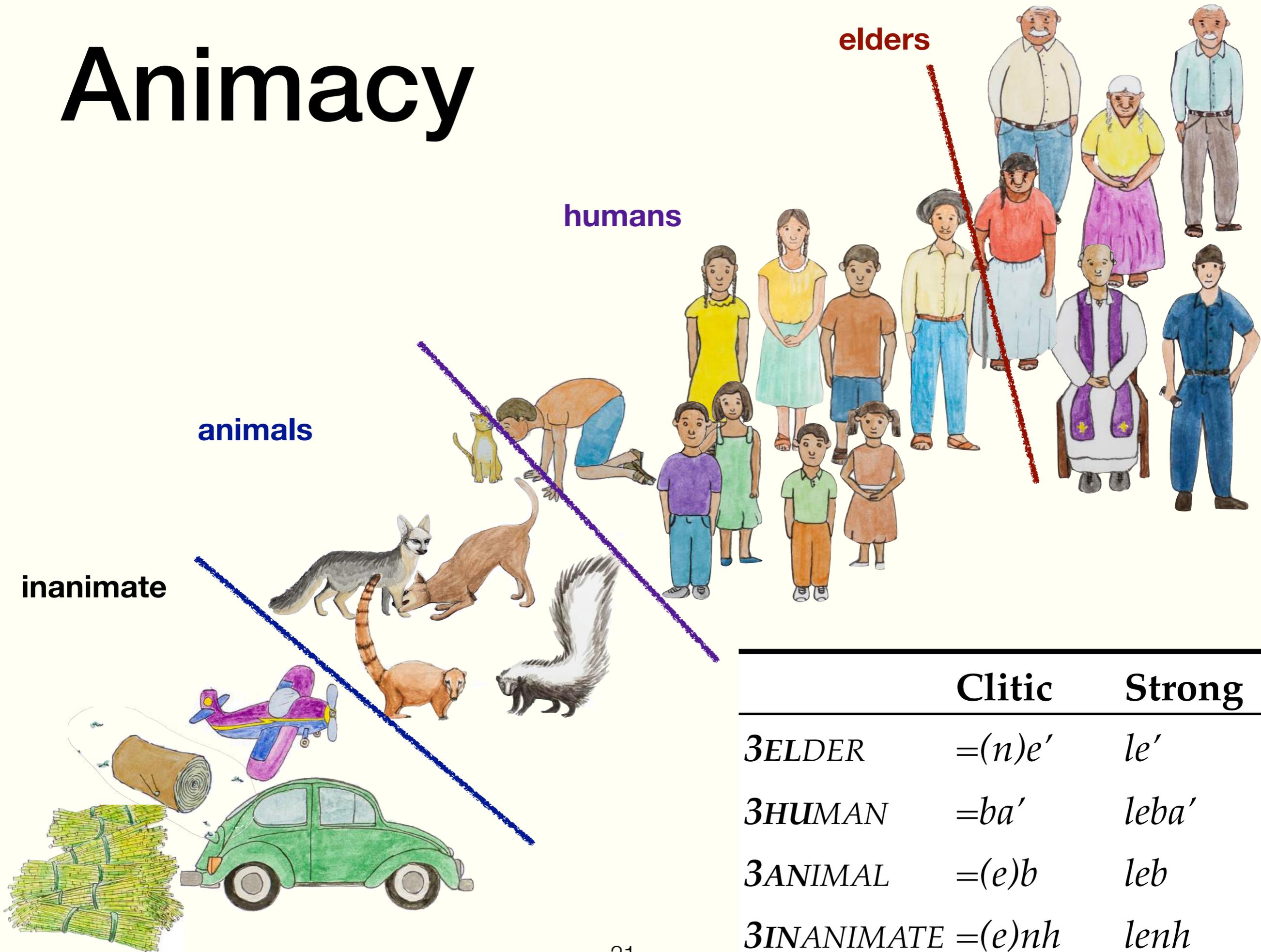
Azusena
Orozco

Maziar
Toosarvandani

Brianda
Caldera

Fe Silva Robles
Senderos

Animacy



	Clitic	Strong
<i>3ELDER</i>	<i>=(n)e'</i>	<i>le'</i>
<i>3HUMAN</i>	<i>=ba'</i>	<i>leba'</i>
<i>3ANIMAL</i>	<i>=(e)b</i>	<i>leb</i>
<i>3INANIMATE</i>	<i>=(e)nh</i>	<i>lenh</i>

Zapotec in a nutshell

1. **Rigidly VSO:**

V-N-N is unambiguous

2. **Movement creates ambiguity:**

N-V-N: gap in SUBJ or OBJ position

3. There are **resumptive pronouns** (RPs)

- which look like regular pronouns:
- ... SUBJ pronouns obligatorily cliticize on verb
- ... OBJ pronouns cannot cliticize across NP subject
- therefore, **can potentially disambiguate**

① Rigid VSO word order

	Verb	Subject	Object
(1)	<i>Tsyill</i> <i>pinch.CONT</i>	<i>bene' nu'ulhe=nh</i> <i>CL woman=DEF</i>	<i>bene' xyage'=nh.</i> <i>CL man=DEF</i>

'The woman is pinching the man.'

NOT 'The man is pinching the woman.'

② Movement creates ambiguity

(3) Shlhe'eyd=a' bene' nu'ulhe=nh tsyill bene' xyage'=nh.

see.CONT=1SG CL woman=DEF pinch.CONT CL man=DEF

'I see the woman that __ is pinching the man.'

OR 'I see the woman that the man is pinching __.'

N	V	—	NP	SRC
N	V	NP	—	ORC

③ Pronouns

Resumptive pronouns (RPs) can eliminate ambiguity.

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

see.CONT=1SG CL woman=DEF pinch.CONT=3EL CL man=DEF

'I see the woman that she is pinching the man.'

~~'I see the woman that the man is pinching her.'~~

N V=*pro* NP ✓ **SRC**
✗ **ORC**

③ Pronouns

RPs can eliminate ambiguity.

(5) Shlhe'eyd=a' bene' nu'ulhe=nh tsyill bene' xyage'=nh le'.

see.CONT=1SG CL woman=DEF pinch.CONT CL man=DEF 3EL

~~'I see the woman that she is pinching the man.'~~

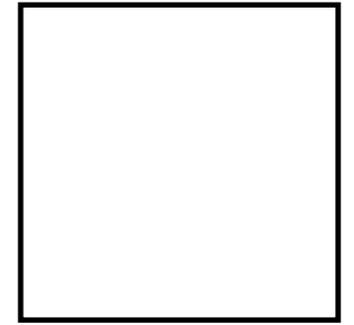
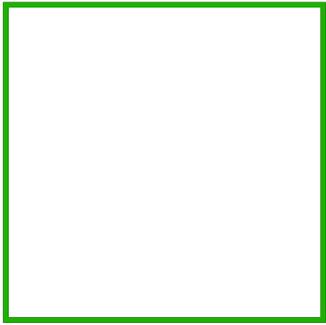
'I see the woman that the man is pinching her.'

N V NP *pro* ✗ **SRC**
✓ **ORC**

Do SLZ comprehenders accurately parse these RPs?

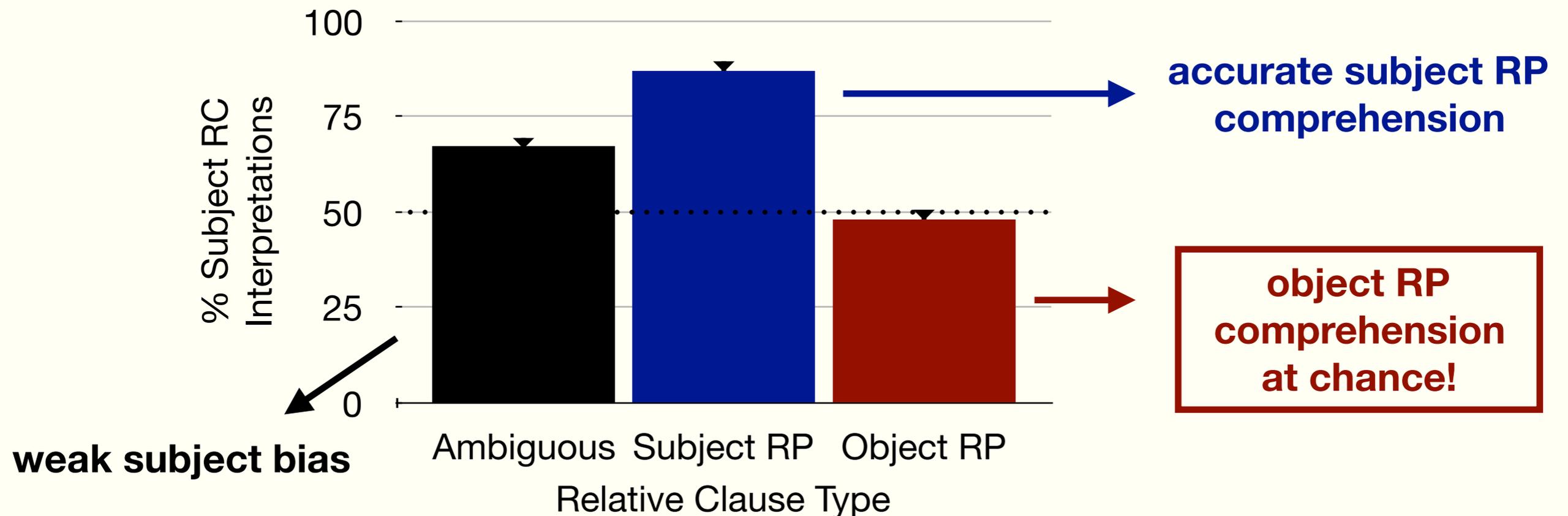
- Picture-matching experiments to probe the comprehension of RCs
- N = 105 speakers, living in Santiago Laxopa; auditory presentation
- Sentence types: **ambiguous** (gap), **subject RPs** and **object RPs**





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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

Animacy and Object RPs in SLZ

- 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 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 (Oberauer & Kliegl 2006)

- X_1 [V Y_2 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)

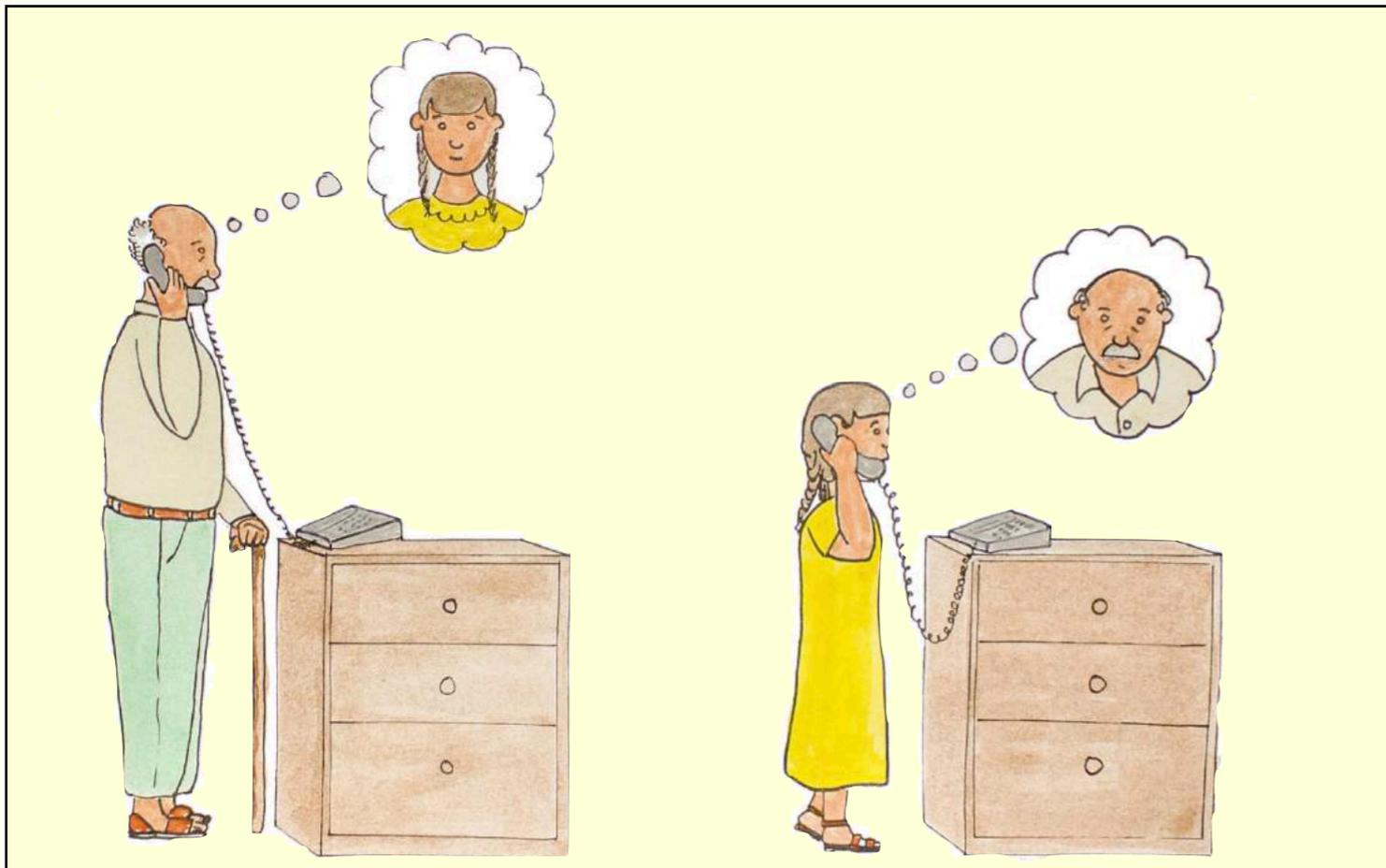
It's possible equal-animacy effects are more deleterious in non-canonical sentences (cf. Kubo et al. 2015).

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**



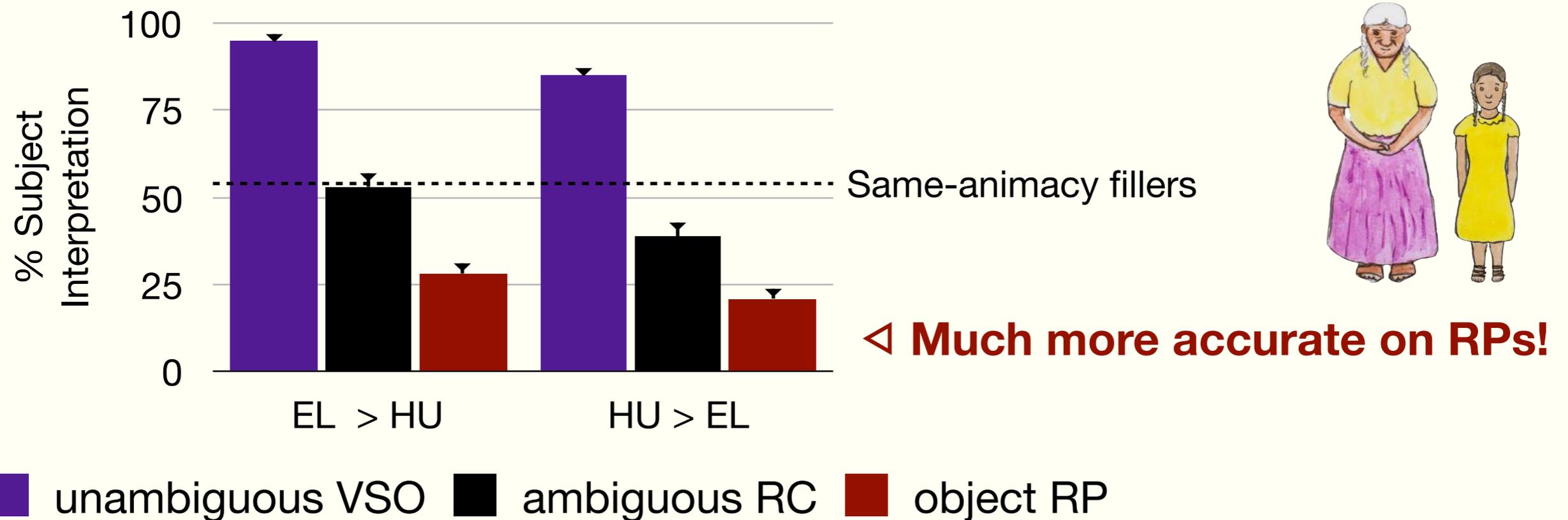
HUman > **AN**imal



ELder > **HU**man

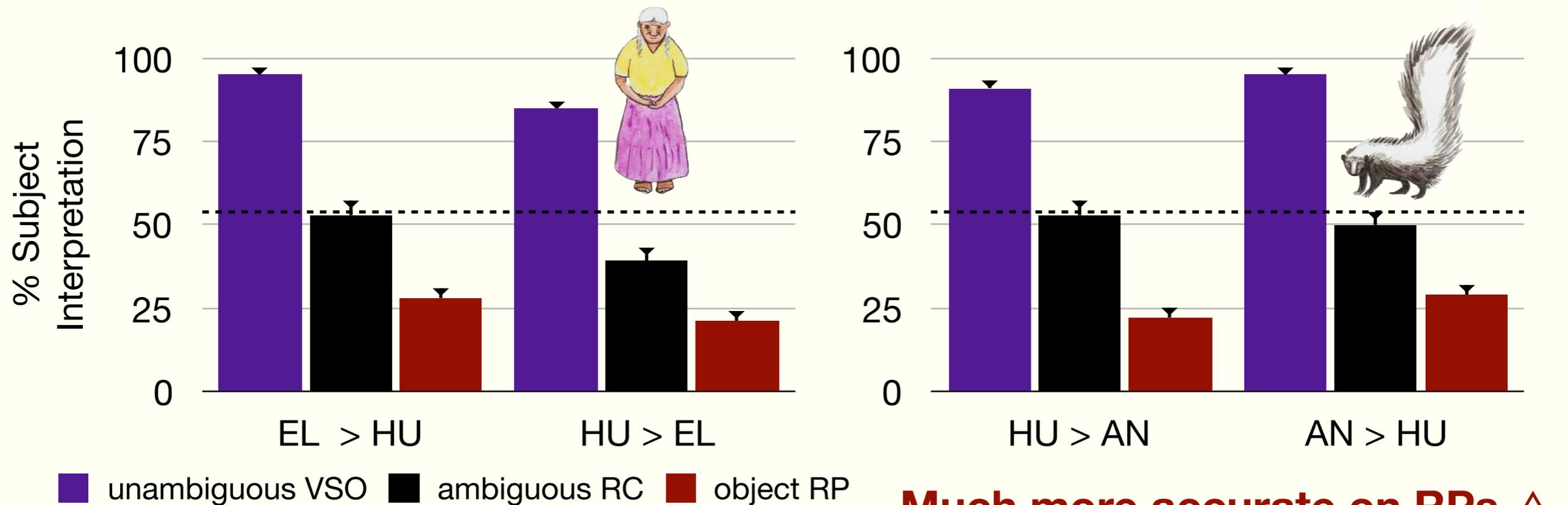
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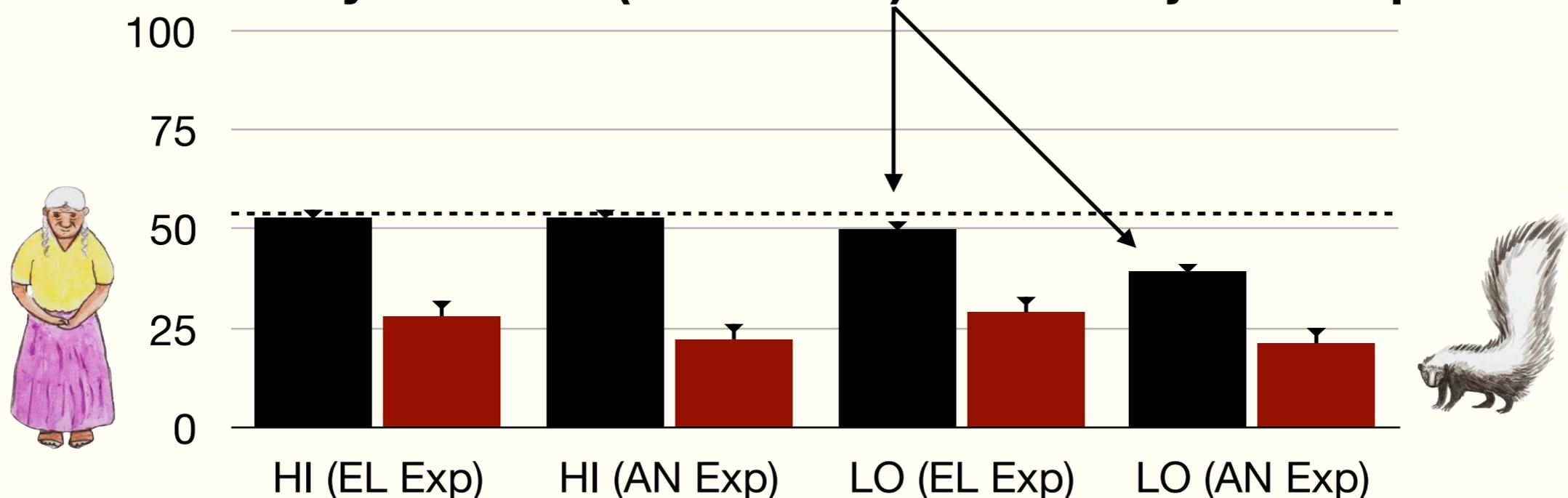


Much more accurate on RPs △

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 \leadsto (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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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 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 (Oberauer & Kliegl 2006)

- X_1 [V Y_2 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. \leadsto **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

(cf. Traxler et al. 2002, Wagers & Pendleton, 2016)

...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!

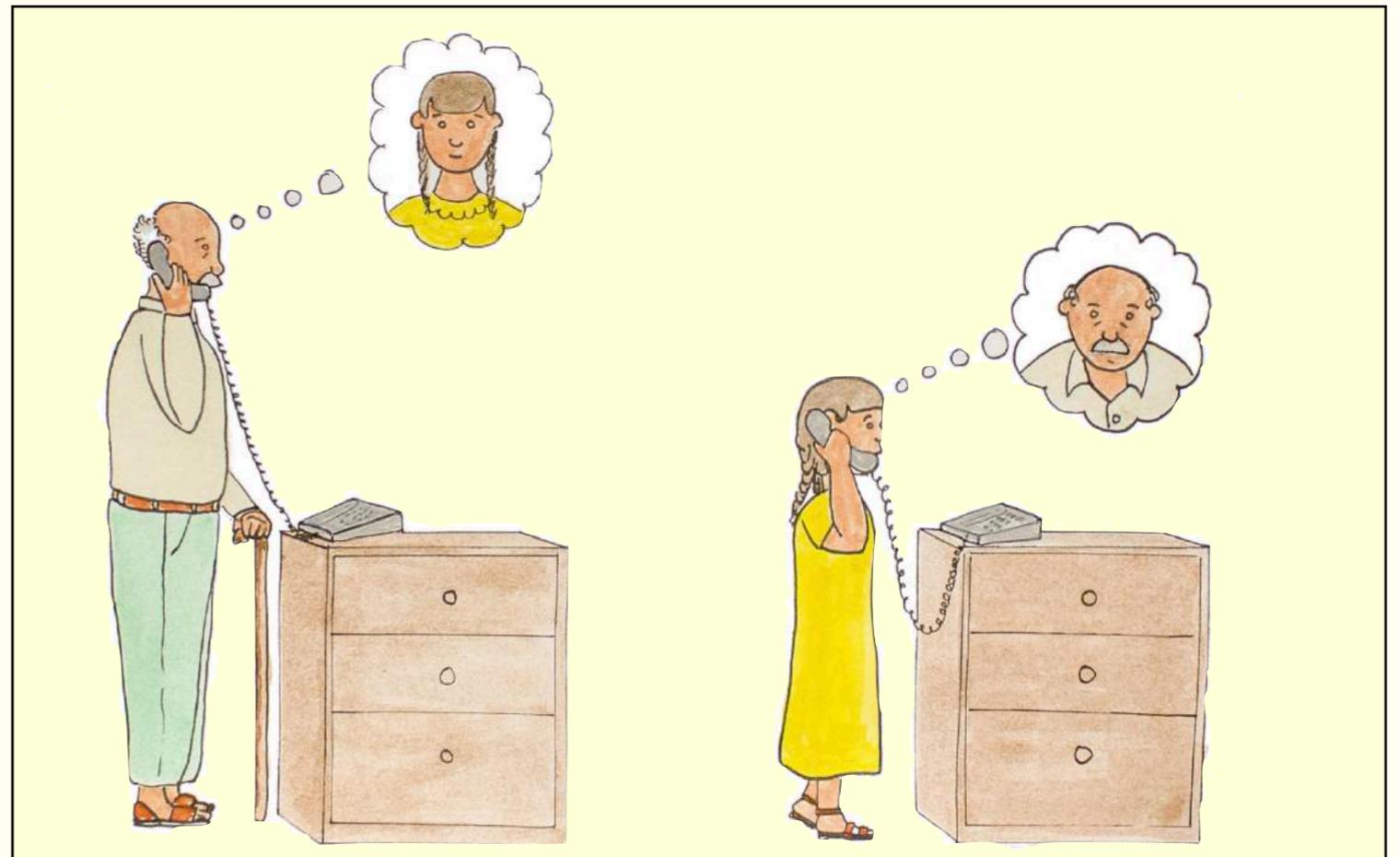
Pilot eye-tracking data



N = 30
Tobii Nano Pro
OpenSesame

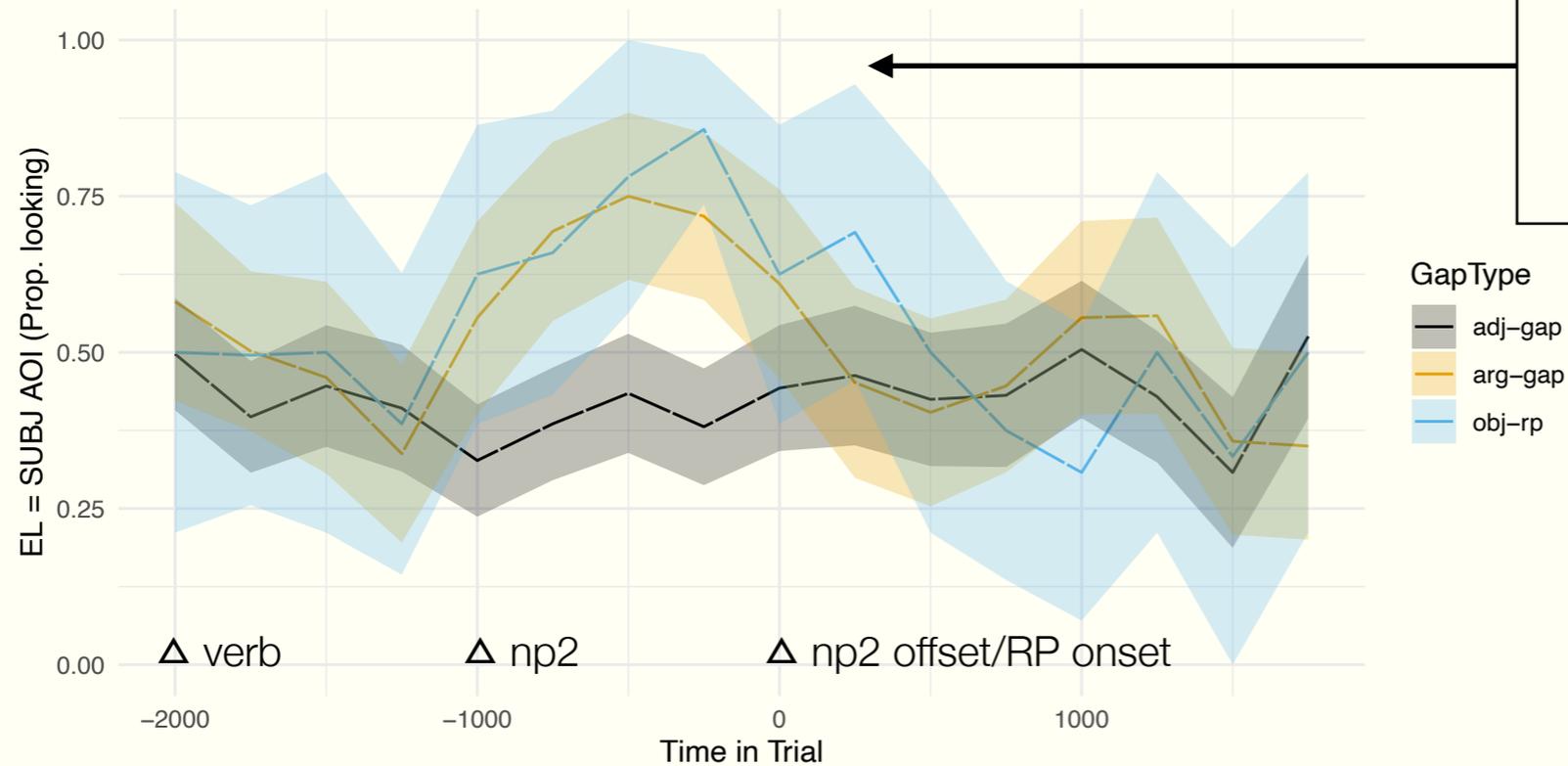
EL = SUBJ

HU = SUBJ



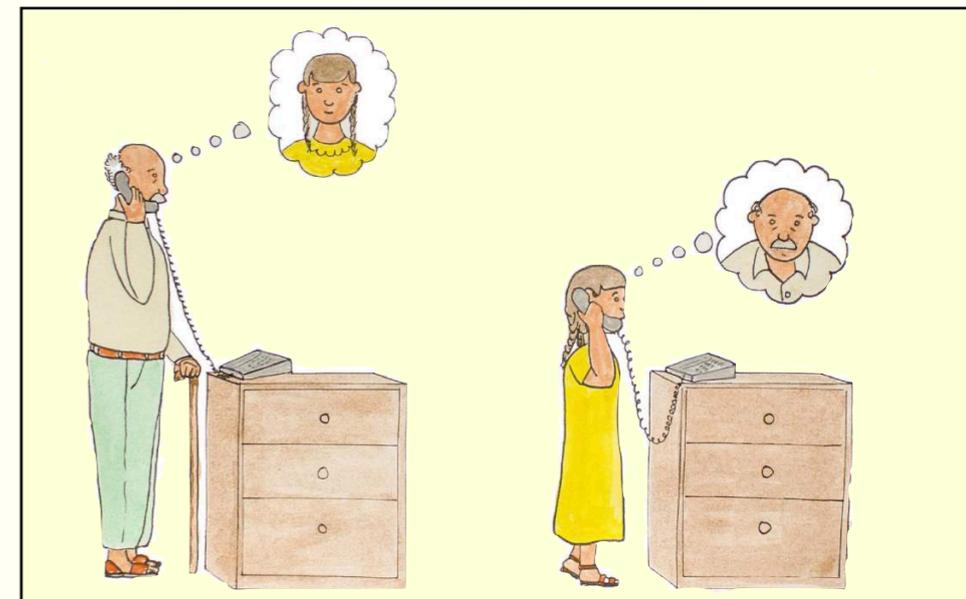
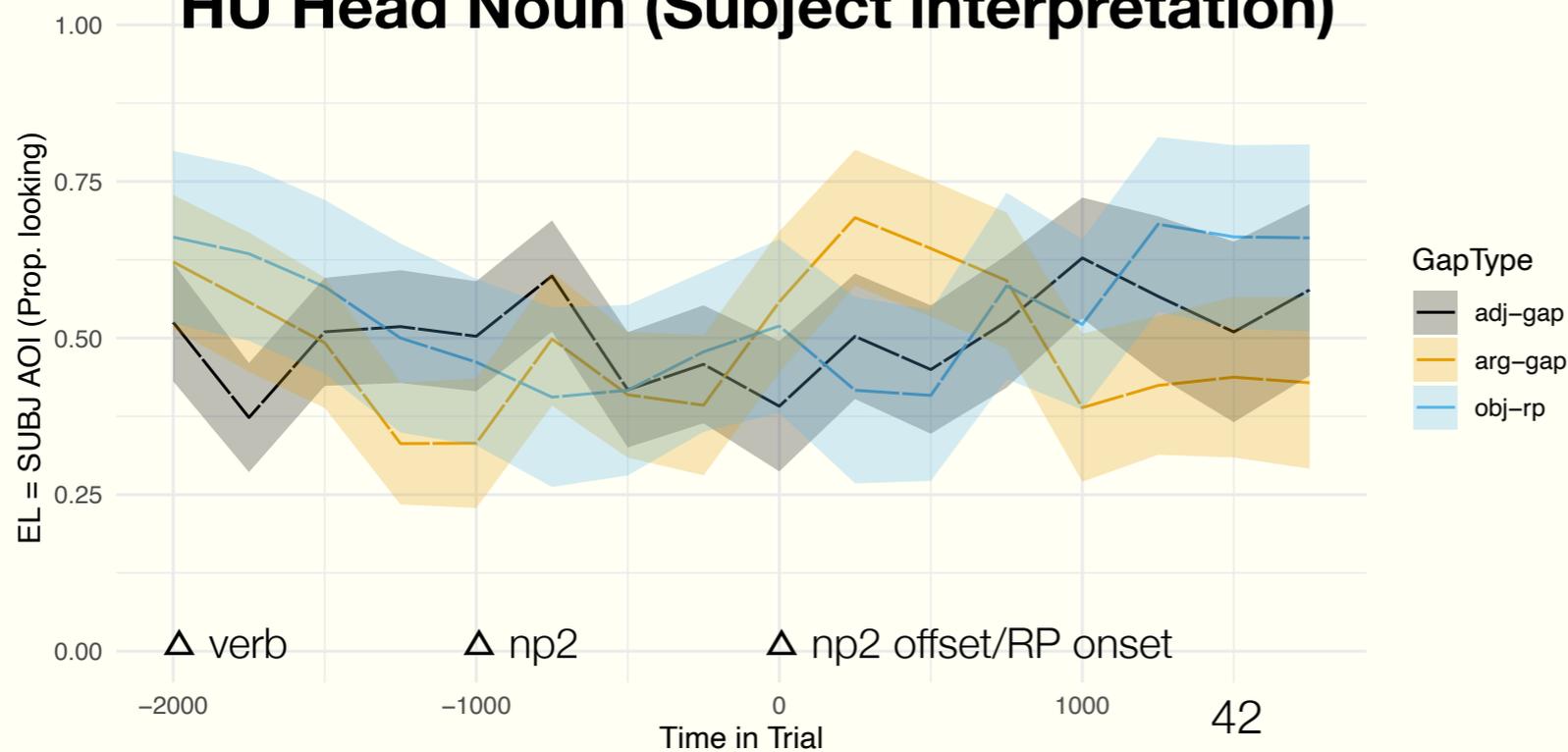
Pilot eye-tracking data

EL Head Noun (Subject interpretation)



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

HU Head Noun (Subject interpretation)



EL = SUBJ

HU = SUBJ

But not, apparently, when the head noun is non-elder **HU**man

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

