Predictive parsing as a source for resumptive pronoun preference in Hebrew

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Animacy and resumption at the border of cognition and grammar

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INTRODUCTION

Resumptive pronouns (RPs) are optional in Hebrew object relative clauses (ORCs) [1]. But we've found that **RPs are obligatory when arguments of an ORC are misaligned in canonical animacy** [2].

ze ha-**naar** še-ha-**nituax** alul lecalek { *_ | oto }

That's the **teenager** that the **surgery** might scar { *_ | him }

animate — inanimate

Hypothesis The RP alignment effect is grounded in incremental processing.

I. **Animate fillers generate a strong expectation for an SRC** [3,4], such that **reanalysis** is triggered by the ORC subject.

II. An inanimate ORC subject does not provide **a good cue to the dispreferred parse**, and an **RP** is required as additional support [cf. 5].

METHOD

Non-cumulative **SPR** in Hebrew (Participants = 80, Items = 40).

2×2×2 design, crossing:

Structure	*ORC*	or	*Baseline*
Subject	*Animate*	or	*Inanimate*
Object	*Animate*	or	*Inanimate*

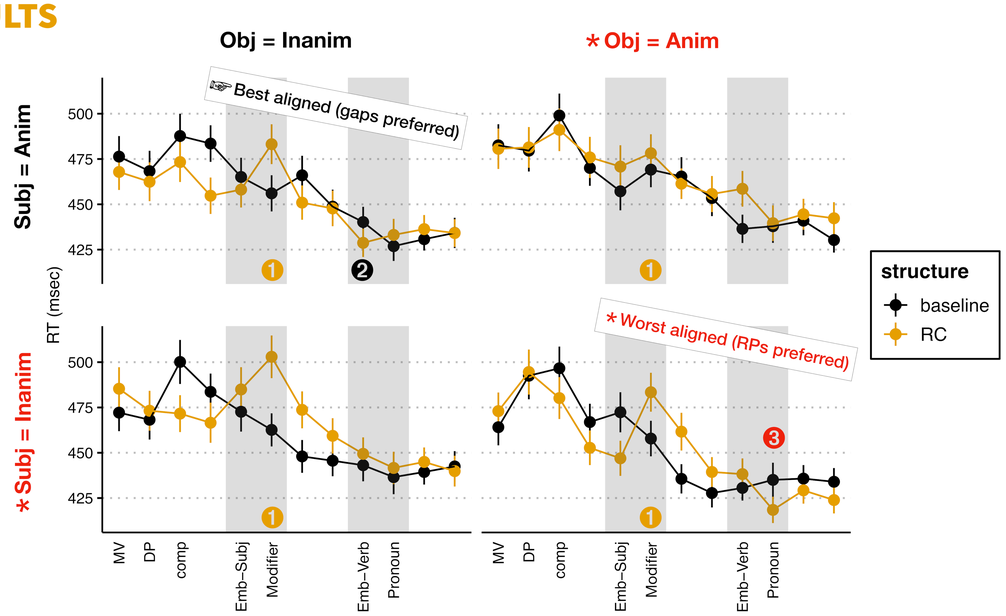
40 fillers to balance RC structure and coreference positions in adjunct clauses.

Bayesian multi-level regressions estimated in `brms` [6] at 3 regions: Embedded Subject, Verb, & Pronoun.

	Object Relative Clause (ORC)	
Subj=Anim Obj=Inanim	I.cleaned ACC the-chair that-during the-workshop **the-child** of the-teacher of-painting dirtied it in-paint oil	☞ **Best Aligned: Gap Preferred**
Subj=Anim *Obj=Anim	I.cleaned ACC the-student that-during the-workshop **the-child** of the-teacher of-painting dirtied him in-paint oil	
***Subj**=Inanim Obj=Inanim	I.cleaned ACC the-chair that-during the-workshop **the-brush** of the-teacher of-painting dirtied it in-paint oil	
***Subj**=Inanim *Obj=Anim	I.cleaned ACC the-student that-during the-workshop **the-brush** of the-teacher of-painting dirtied him in-paint oil	***Worst Aligned: RP Preferred**
	***Baseline** (Adjunct 'because' Clause)*	{ Obj=Inanim | *Obj=Anim }
Subj=Anim	I.cleaned ACC {the-chair | the-student} because during the-workshop **the-child** of the-teacher of-painting dirtied { it | him } in-paint oil	
***Subj**=Inanim	I.cleaned ACC {the-chair | the-student} because during the-workshop **the-brush** of the-teacher of-painting dirtied { it | him } in-paint oil	

*Subj, *Obj indicates the *non-canonical values*

RESULTS



❶ **Filled gap effects** at all Embedded Subjects, **not sensitive to** full **argument alignment**

- ↝ **RCs read slower** than baseline (25 ms, [12 ms, 39 ms], 95% CrI)
- ↝ maybe **even slower with Inanimate Subjects** (interaction, 8 ms, [-2 ms, 20 ms])
- ↝ … but **no interaction with Object (Filler) Animacy** (0 ms, [-8 ms, 10 ms])

❷ **Best Aligned** structures **read fastest** at the Embedded Verb

- ↝ **RCs read slower** than baseline, **except** for **Best Aligned** (interaction, 24 ms [0 ms, 47 ms])

❸ **Worst Aligned** structures **read fastest** at the Pronoun

- ↝ **RCs read slower** than baseline, **except** for **Worst Aligned** (interaction, 15 ms, [-3 ms, 32 ms])

DISCUSSION

Filled-gap effect (FGE) at the ORC subject

A. Strengthens the theory of prediction-guided filler-gap dependency resolution.

B. **Inanimate subjects induced a larger processing cost** than animate subjects: a joint product of **unmet predictions** (~ SRCs expected) and the **goodness of the alternative** analysis (*SUBJ=INANIM).

C. Failed to show that animate fillers induce a greater FGE in Hebrew [cf. 4].

Crossover pattern at the verb and pronoun

D. The **verb** was read slower in all RCs but the **Best Aligned**, reflecting ease of integration in that ORC.

E. The **pronoun** was read slower in all RCs but the **Worst Aligned**, where it was fastest, perhaps reflecting its obligatoriness. **With C., this undercuts our RP-as-reanalysis-booster hypothesis.**

Alignment in animacy was a significant predictor only in later regions

Sensitivity to argument alignment is only apparent in reading once the verb is encountered, suggesting it may be **structural** and/or related to the **interpretation of the event** rather than directly to the animacy of its co-arguments [cf. 7].

Future research: disentangle several properties of events and argument structure which are correlated with animacy, including agentivity, causation, and telicity.

[1] Meltzer-Asscher et al. 2015; [2] Cartner, Sichel, Toosarvandani & Wagers 2022; [3] Gennari & MacDonald 2008; [4] Wagers & Pendleton 2016; [5] Fadlon et al. 2019; [6] Bürkner 2017; [7] Wilson & Dillon 2023.