Resolving pronouns with multiple cues: Children use pragmatics before morphology

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Introduction

Pronoun meaning is influenced by many factors, but some are stronger than others. Thus, learners must not only extract information from individual cues but also *integrate* them together.

In Spanish, null subject pronouns **probabilistically** favor the preceding subject, relative to the overt form (Alonso-Ovalle et al. 2002, Carvalho et al. 2015, Keating et al. 2016, a.o.)

(1) *La maestra saluda a la niña y* { *ø / ella* } *sale*.
    The teacher waves to the girl and {*pro*/she} leaves.

Discourse connectives signal coherence relations (Kehler 2002), which can **probabilistically** favor different antecedents.

(2) *La maestra saluda a la niña* { *y después/porque* } *ø sale.*
    The teacher waves to the girl {and then/because} *pro* leaves.

Verbal agreement can **categorically disambiguate** between singular and plural antecedents, even when the pronoun is null.

(3) *La maestra saluda a las niñas y ø* { *sale / salen* }.
    The teacher waves to the girls and *pro* {leave-3S/leave-3P}.

Research Questions

I. When do kids learn to use these cues in pronoun resolution?
II. How do children integrate conflicting cue information?

Hypothesis & predictions

Hypothesis: *Learners should prioritize statistically reliable cues.*

Prediction 1: *Children start using agreement morphology **first**.*

Prediction 2: *Agreement influences interpretation **most strongly**.*

Methods & Results

Forced-choice pronoun resolution task crossing **form**, **connective**, and **agreement morphology**. Plural /s/ on overt pronouns was masked by the following segment (as in Johnson et al. 2005).

(4) *La maestra saluda a las niñas … y después ella s ں s alen al recreo.*
    The teacher waves to the girls … and then they leave to the yard

Subject antecedent   Object antecedent
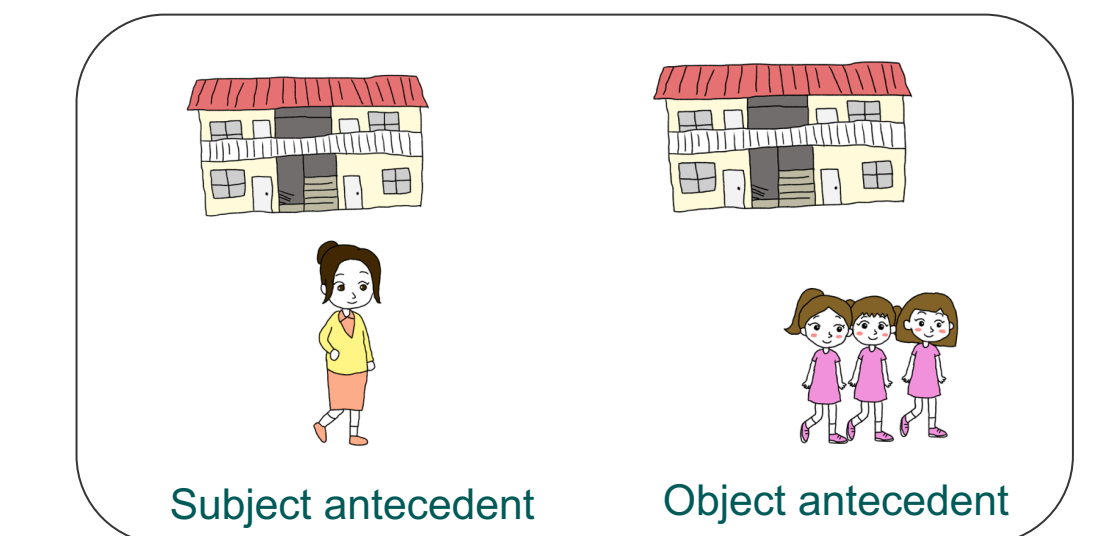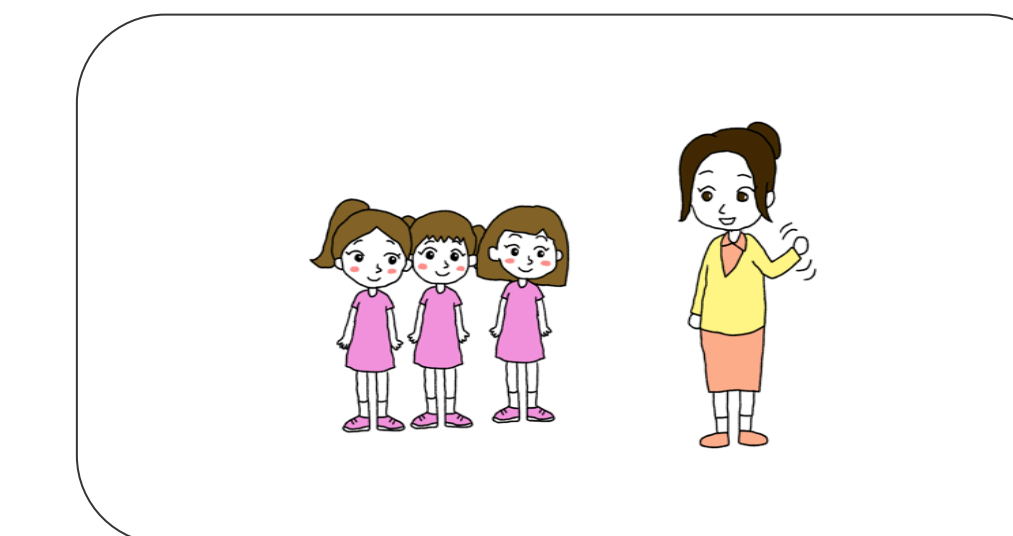
Q1: *When do children use each pronominal cue?*

Subject antecedent interpretations of null and overt subject pronouns

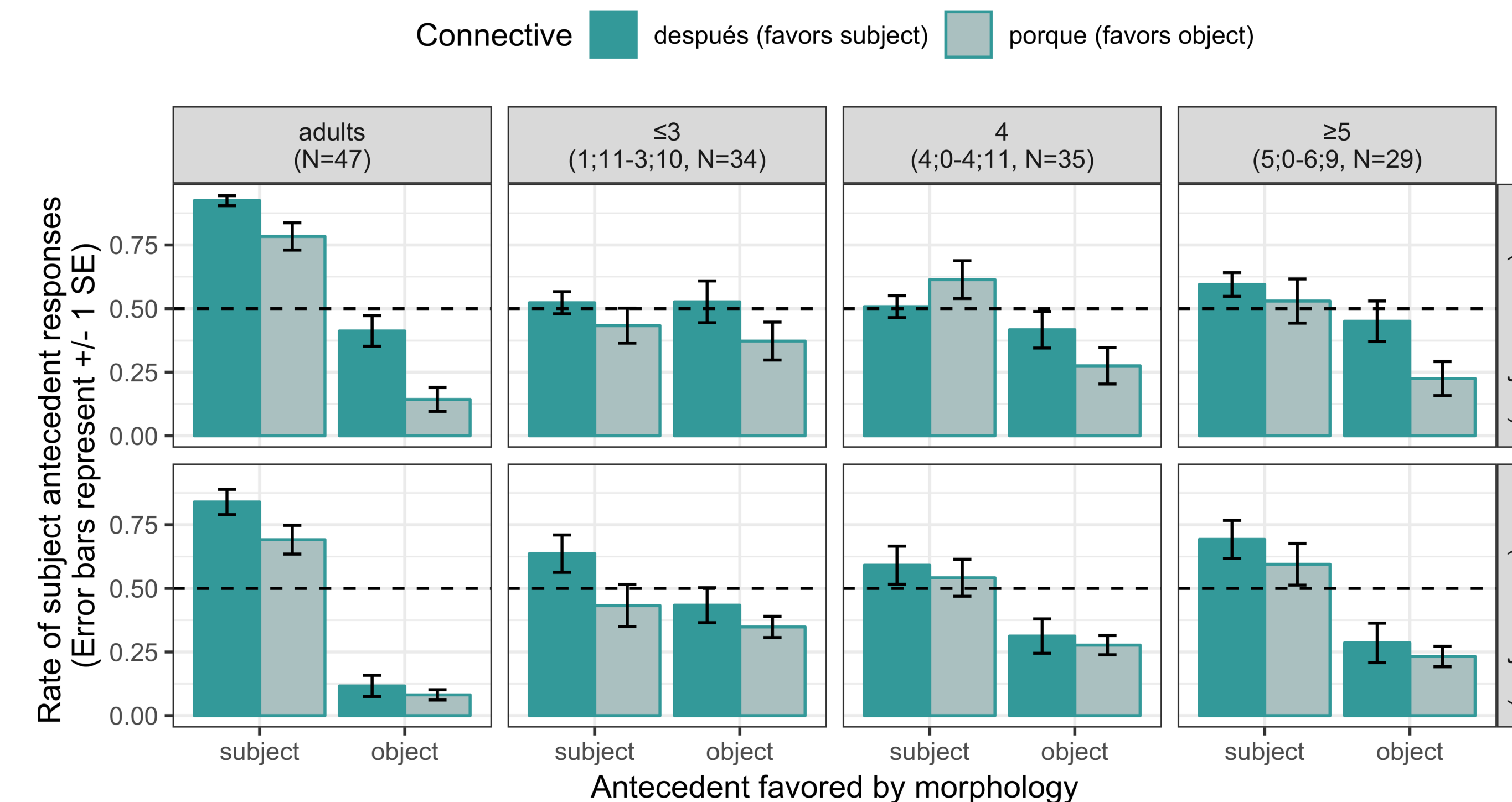Connective ▮ después (favors subject) ▮ porque (favors object)

Table 1. β-est. (SE) for regression model: subj.ant ~ morph + connective + form

	≤3	4	≥5	adults
intercept	0.66 (0.18)***	-1.02 (0.23)***	-1.29 (0.29)***	-2.87 (0.31)***
form	-0.01 (0.21)	0.00 (0.24)	-0.18 (0.27)	0.91 (0.29)**
connective	0.56 (0.20)**	0.14 (0.24)	0.60 (0.27)**	1.21 (0.29)***
morphology	0.35 (0.28)	1.13 (0.25)***	1.44 (0.35)***	3.63 (0.40)***
random effects	(1+morph|item) + (1+morph|ptcpt)	(1|item/ptcpt)	(1|item) + (1+morph|ptcpt)	(1|item) + (1+morph|ptcpt)

Q2: *How strongly do children rely on each cue?*

Effect size for each type of pronominal cue
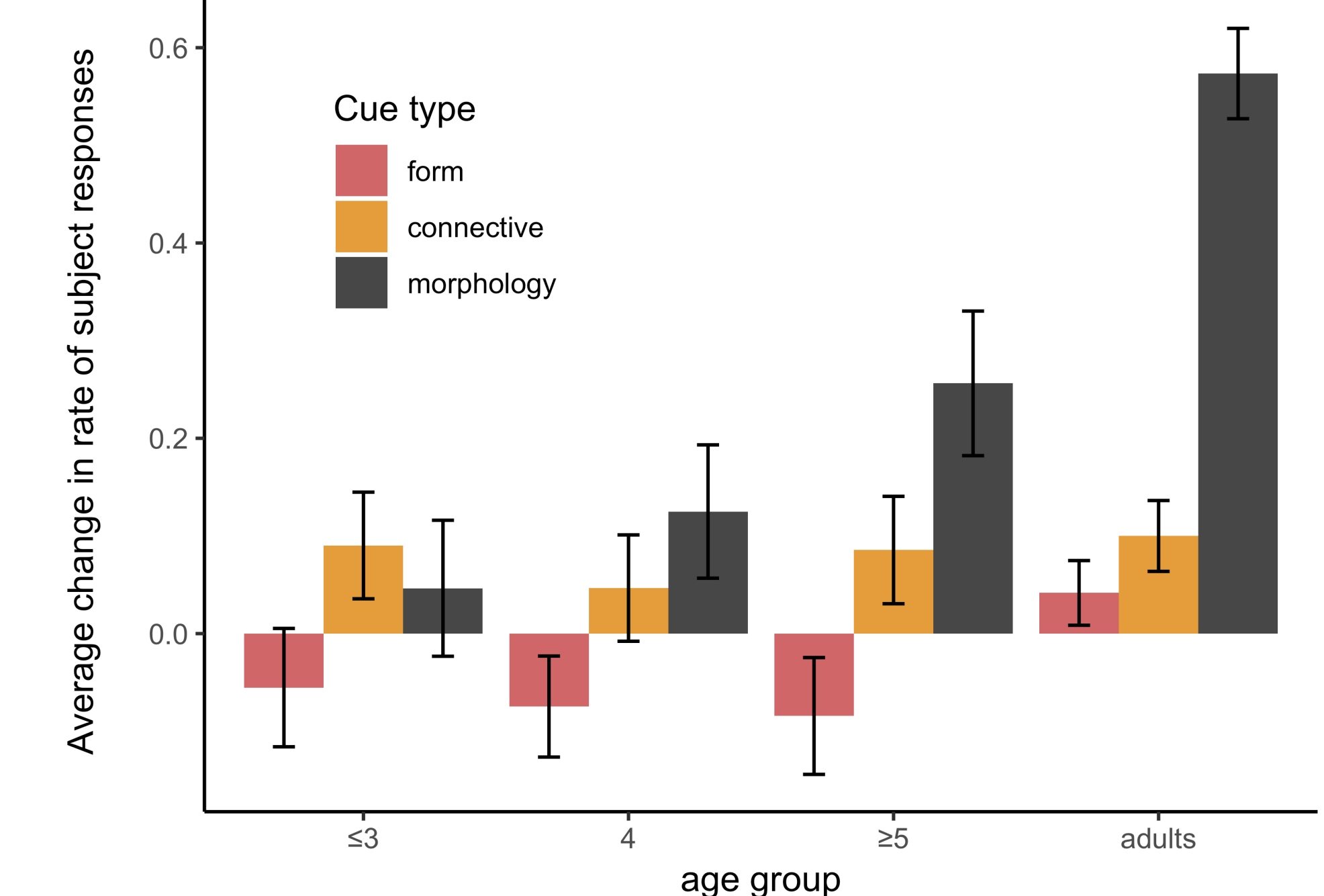Error bars represent +/- 1 SE

Cue type: ▮ form ▮ connective ▮ morphology

Table 2. β-est. (SE) for regression model: delta.subj.ant ~ cue.type

	≤3	4	≥5	adults
intercept	-0.02 (0.07)	-0.07 (0.07)	-0.08 (0.06)	-0.03 (0.06)
cue type	0.05 (0.05)	0.10 (0.05)(07)	0.17 (0.05)***	0.27 (0.04)***
random effects	(1|item) + (1|ptcpt)	(1|ptcpt)	(1|ptcpt)	(1+type|item) + (1|ptcpt)

Age ≥5 have adult-like asymmetries **morphology>form** ($t(14)$= 1.83 , p=0.04) and **morphology>connective** ($t(17)$=3.13 , p<0.01).

Discussion

- **P1 contradicted:** Children begin using **probabilistic pragmatic cues** before **categorical morphological** cues.

- **P2 partially sustained:** Children rapidly learn to prioritize agreement morphology over other available cues.

- Implications: 3Sg/3Pl agreement is **not** initially used in pronoun resolution despite its reliability and children's own target production (e.g. Clahsen et al. 2002). Since children *do* use 1Sg, 2Sg and 1Pl agreement in similar tasks (Forsythe 2015, 2017) this suggests either (i) **immature representation** of the 3rd person, (ii) **perceptual difficulties** with phonologically reduced forms (e.g. Davies et al. 2016), or (iii) **difficulty revising expectations** set up by connectives (e.g. Trueswell et al. 1999).

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