

# Three experiments on early parsing of subject-verb agreement in Catalan

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Agree is one of the basic operations that constitutes UG, and subject-verb agreement is one of its many manifestations. The literature provides some surprising results on subject-verb agreement in acquisition, vis à vis what we know about production, which is early. First, Johnson et al. (2005) tested the processing of subject-verb agreement in English in contexts in which number marking in the noun had been shadowed and thus only verb agreement was a cue to number; their results showed poor identification of number features even at age 4. Pérez-Leroux's (2005) study on Spanish led to the same result, despite richer verbal inflection in Romance than in English. Later research led to the idea that the delay in number identification had its source in the methods used in experimentation (Brandt-Kobele & Höhle 2010, Gonzalez-Gomez 2017), while others maintained that delay was subject to crosslinguistic variation (Legendre et al. 2014). Here we present new results from three experiments on Catalan, conducted under different methods. The conclusions we draw allow us to resolve the conflict that the results of Johnson et al. and Pérez-Leroux raise between late comprehension and early production of agreement (extensively attested in Romance).

Experiments 1 and 2 were two sentence-picture matching tasks, conducted with 111 Catalan-speaking children between the ages of 3 and 6; experiment 1 followed that of Pérez-Leroux for Spanish, testing comprehension of sentences with null and overt, singular, and plural, subjects, plus unrelated distractors. Experiment 2 was identical to experiment 1 except for the presence of distractors with numerals (*Tres ànecs volen* 'Three ducks are flying'). While both experiments granted better results than those of Pérez-Leroux for Spanish, the younger group was above chance in all conditions only in experiment 2, showing a clear effect of the presence of a numeral in the experiment, drawing the children's attention to numerosities (see Table 1). The older group's performance was above-chance in all conditions. These results point, therefore, to the effect of experimental confounds in some results obtained in this experimental paradigm. Crosslinguistic variation is not supported, given that performance in the same languages depends on method.

Table 1. Mean estimation, percentage of adult-like answers, Experiments 1 and 2

Exp1	Distractor	Overt subject		Null subject	
Age group		Singular	Plural	Singular	Plural
3–4	96.7%	77.2%	76.9%	45.5%	66.5%
5–6	97.3%	91.7%	89.5%	72.4%	88.5%

Exp2	Numeral	Overt subject		Null subject	
Age group		Singular	Plural	Singular	Plural
3–4	88.2%	76.5%	73.1%	59.8%	69.6%
5–6	96.1%	87.6%	85.1%	72.8%	89.3%

Turning to a younger age range, experiment 3 targeted infants using the preferential looking paradigm. We measured the gaze duration to number-matching vs. mismatching videos (with both videos played simultaneously) when the infants heard a sentence with an overt or null subject, singular or plural, produced three times after a baseline window. By hypothesis, if an infant can parse subject-verb agreement, she will look longer at the matching event than at

the mismatching event. Similar to those in experiments 1 and 2, the conditions in this experiment are exemplified in (1), with an overt subject, and (2), with a null subject. 20 children were tested in Catalonia.

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|--------|---|----|--|
| (1) a. | L'animal balla.<br>the animal dance.3sg<br>'The animal is dancing.' | b. | Els animals ballen.<br>the animals dance.3pl<br>'The animals are dancing.' |
| (2) a. | Ballà.<br>dance.3sg<br>'(He) is dancing.'                           | b. | Ballen.<br>dance.3pl<br>'(They) are dancing.'                              |

Infants were divided into two groups, younger (Mean age = 19 months) and older (Mean age = 32 months). We performed the Wilcoxon signed rank test – for condition (overt and null), time window (S1, S2, and S3), and group (19 months and 32 months). Parsing of number agreement can only be truly measured with null subjects; we only report results for that condition (see Figure 1). For 32 month-olds, we found significant differences in gazing performance to matching and mismatching videos during exposure to S1 and S3 in the singular condition and S2 in the plural condition, with longer looks at the matching video. For 19 month-olds, we found significant differences during exposure to S2 and S3 in the singular condition. No other significant differences were found in the other windows, i.e. the younger infants showed no identification of plural items. Analyses against chance showed that statistical significance, if detected in the matching condition, corresponded to above chance performance. Statistical significance, if detected in the mismatching condition, corresponded to looks away from the matching condition.

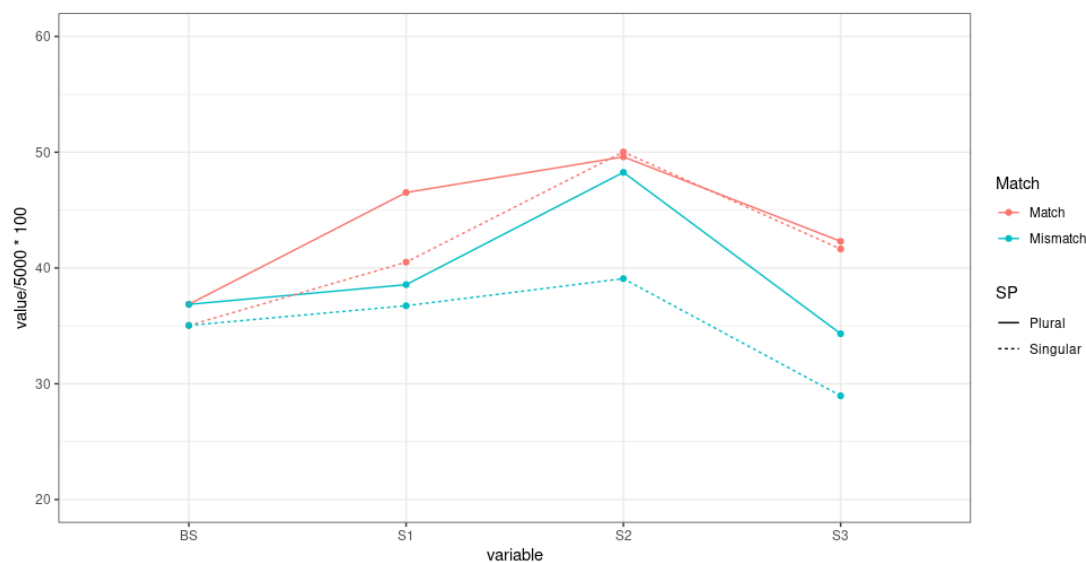


Figure 1: Gazing towards the matching (red) and non-matching (blue) scene by 19 month-olds.

Taken together, the results indicate the impact of the experimental method (cf. the results of experiment 1 and experiment 2) and the infants' sensitivity to number marking from 19 months (experiment 3), in line with a growing body of evidence on the acquisition of the syntax at the preverbal stage (see Franck et al. 2013 on word order parameters and Perkins & Lidz 2021 on long-distance dependencies).

- Gonzalez-Gomez, N., L. Hsin, I. Barrière, T. Nazzi & G. Legendre (2017) Agarra, agarran: Evidence of early comprehension of subject–verb agreement in Spanish. *Journal of Experimental Child Psychology* 160, 33–49.
- Pérez-Leroux, A. T. (2005). Number problems in children. *Proceedings of the 2005 Canadian Linguistics Association Annual Conference*, 1–12.