



Conceptual Representations of Plurals: A Production Study on the Acquisition of Distributivity and Collectivity

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19th Workshop on Syntax, Semantics and Phonology
September 29, 2023 - Nantes Université

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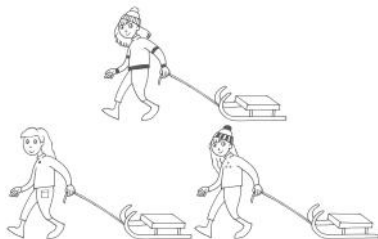
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Distributive interpretation: the predicate refers to each atomic member of the plurality:



Background: Formal semantics

Most formal theories of language suggest that, to get the distributive reading of a mixed predicate, an additional semantic operator D needs to be present at the logical level (Brisson, 1998; Link, 1983):

$$D = \lambda P \lambda x \forall y [y \subseteq x \wedge \text{Atom}(y) \longrightarrow P(y)]$$

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Landman’s theory (1989):

The collective and distributive readings have two separate derivations:

- $\text{carry}(\uparrow(\mathbf{j}+\mathbf{b}))$ - Coll
- $*\text{carry}(\mathbf{j}+\mathbf{b})$ - Distr

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However, **children accept the distributive reading** of an ambiguous sentence more often than adults do (Bosnić and Spenader, 2019; Musolino, 2009; Pagliarini et al., 2012; Syrett and Musolino, 2013).

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- Children from 4 to 13 years of age
- Crosslinguistic research: English, Italian, Serbian, Dutch
- Comprehension tasks with explicit measures (picture verification tasks, picture selection tasks, act-out tasks)

These results cast doubts on the greater difficulties which are claimed to be associated with the distributive representation.

Research question: Why?

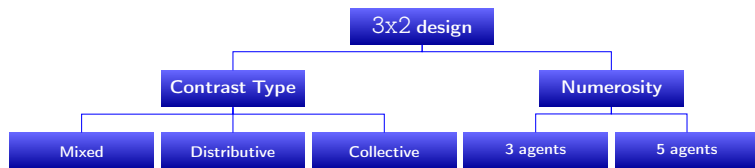
Why do children not behave as adults do and, if they show any preference, they opt for the most difficult interpretation?



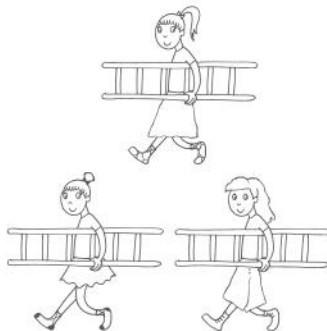
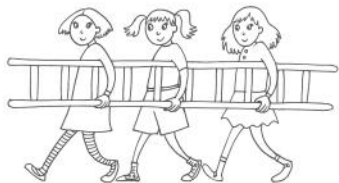
Since what children say can be a mirror of what they think, their spontaneous production, not previously investigated, may help us answer this question (Guasti et al., 2023; Sauerland and Alexiadou, 2020).

Methodology

- Task: Production experiment
- Participants: 51 children (age \sim 5) and 51 adults, monolingual Italian native-speakers
- Stimuli: 12 experimental trials; 12 filler trials
- Procedure: Participants saw two images side by side and were asked to describe them freely, one by one (elicitation question: “What does happen here?”; “And here?”).

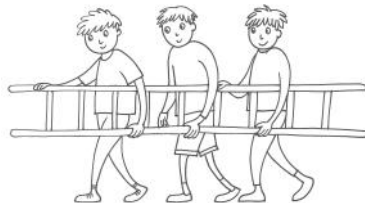
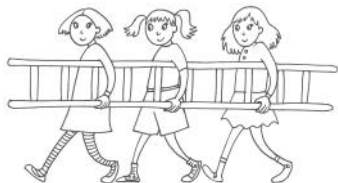


Contrast Type levels



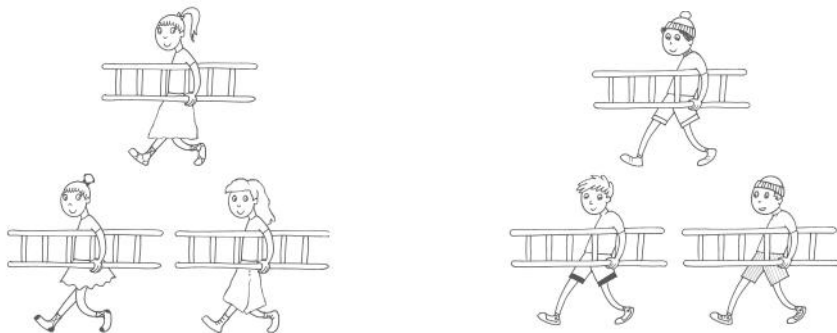
Mixed condition

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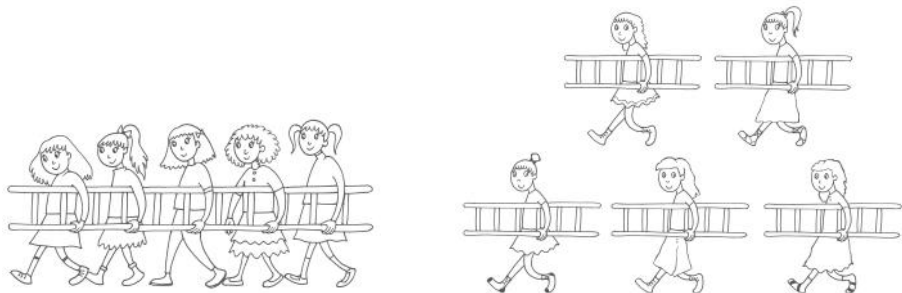
Collective condition

Contrast Type levels



Distributive condition

Numerosity factor: Example trial



Mixed condition: 5 agents

Data analysis

Data coding (0/1/2):

Distributive markers*	Collective markers*
“ciascuno”, “ogni” (<i>each, every</i>)	“insieme”, “assieme” (<i>together</i>)
“ognuno” (<i>each one</i>)	“unico”, “solo” (<i>single</i>) + obj
“diverso” (<i>different</i>) + obj	“stesso” (<i>same</i>) + obj
“uno per uno” (<i>one by one</i>)	c. predicates: (“collaborare a”, <i>to collaborate to</i> , e.g.)
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Analysis:

- DV: linguistic marking (0/1)
- Mixed effect logistic regression with Contrast Type and Numerosity as fixed effects (separate models for adults and children)

Predictions

Adults:

- More linguistic markers overall (pragmatic reasons)
- More marking in the mixed condition
- More **distributive markers**, both across conditions and within the mixed condition

Children:

- More linguistic marking in the mixed condition, if they realized that the context required explicit disambiguation
- Exploratory question on the other two conditions

Results

- 51 adult participants (25 females); age $M = 27.96$ (11.4)
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marking \sim contrastType*numerosity + (1|trial) + (1|participant)

Fixed effects	chisq	df	p-value
contrastType	93.40	2	< 0.001 ***
numerosity	0.35	1	0.55
interaction	5.14	2	0.07

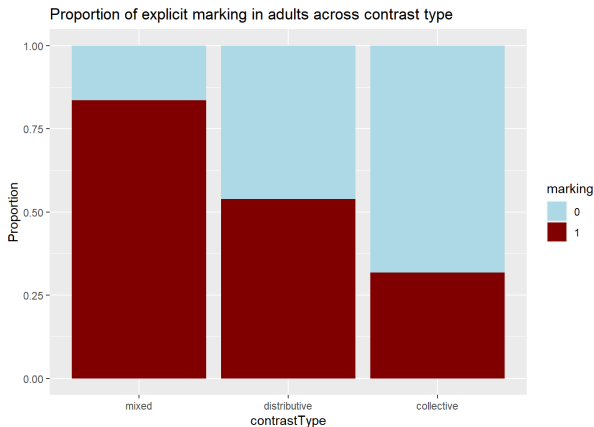
Adults

Fixed effects	chisq	df	p-value
contrastType	7.29	2	< 0.05 *
numerosity	0.19	1	0.66
interaction	1.05	2	0.59

Children

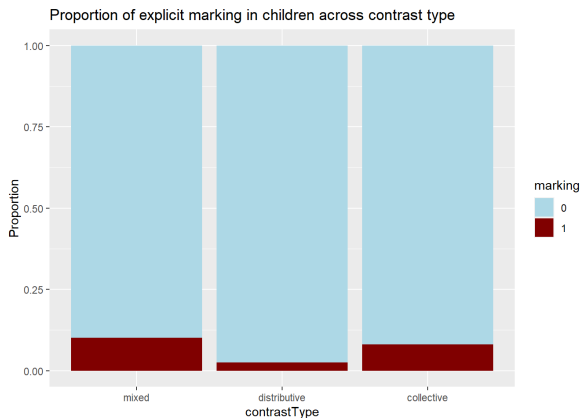
Results

Adults expressed more marking in the mixed condition ($M=84\%$), followed by the distributive ($M=54\%$) and the collective one ($M=32\%$).



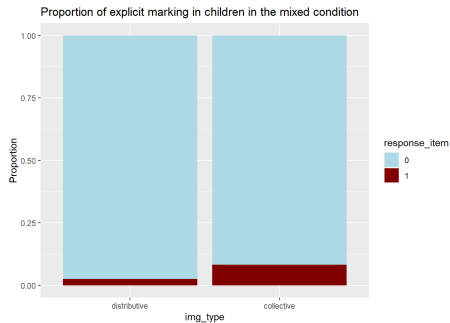
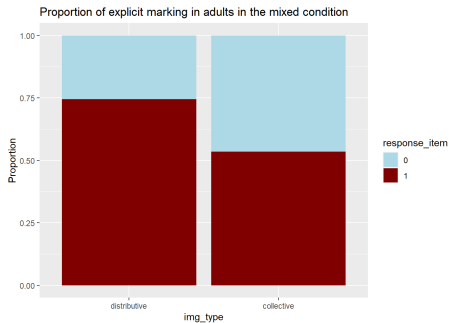
Results

Children produced very few linguistic markers. They expressed more markers in the mixed condition ($M=10\%$), BUT more in the collective ($M=8\%$) than in the distributive one ($M=2\%$).



Results

Within the mixed condition, adults marked the distributive description ($M=74\%$ vs. $M=54\%$; $p<.05$), while children the collective one ($M=8\%$ vs. $M=3\%$; $p<.05$).



Interim discussion

In previous studies, **adults** accepted the collective interpretation as the default one for a sentence unmarked;

↔ and here they considered an unmarked sentence sufficient to describe a collective image, but added **linguistic markers to the distributive one**.

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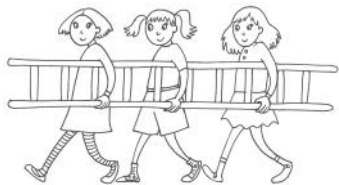
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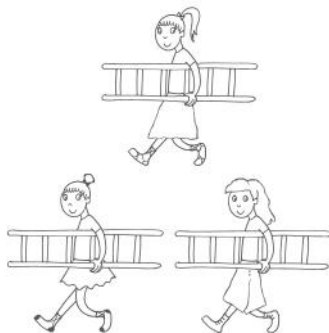
Children were not fully sensitive to the need to express linguistic markers. When they recognised the difference between images, they produced **more collective markers, differently from adults**.

- 1 Children have yet to acquire the distributive markers, while the collective representation is already acquired;
- 2 Children consider the distributive interpretation more basic, and they try to linguistically mark the collective one.

Qualitative analysis

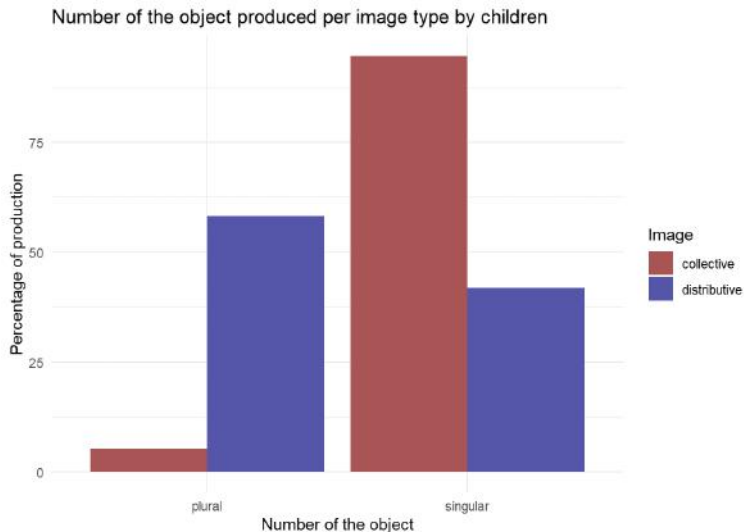


“The girls are carrying **a ladder**”



“The girls are carrying **the ladders**”

Qualitative analysis: Singular vs. plural forms



Conclusion

Children might have tried to disambiguate the two readings, even though they relied on strategies we did not expect.

If this were the case, we might suggest cautiously that the distributive interpretation is not derived from the collective one, but they represent two distinct semantic derivations.

|Recall background

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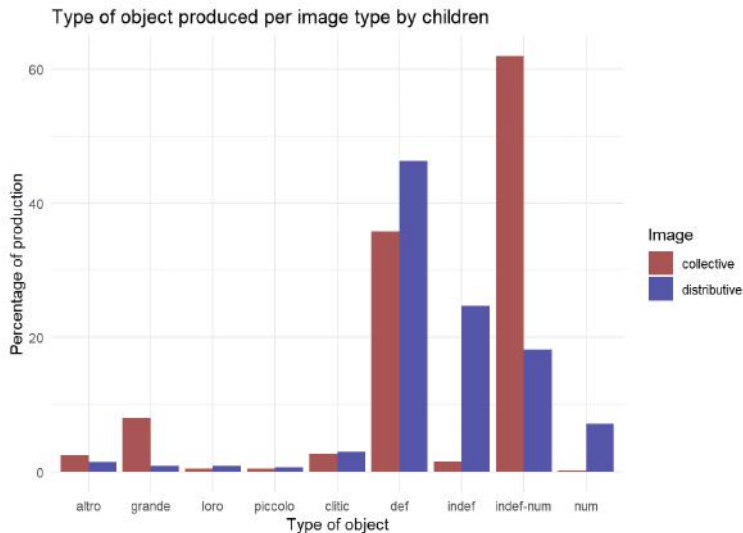
- Children produced few markers and did not display pragmatic behaviour (the context did not help them) \leftrightarrow **task that induces more collaborative performance**
- We cannot exclude that our collective images were easier to describe literally \leftrightarrow **task with the same number of objects between the images**

Thank you for listening!

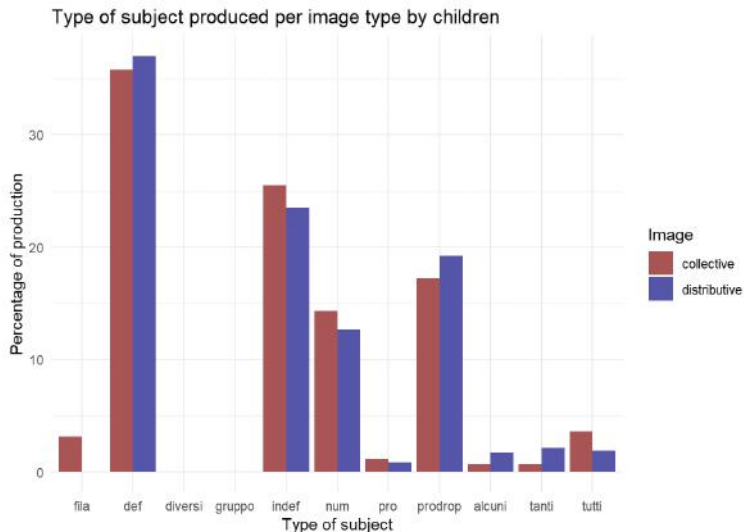
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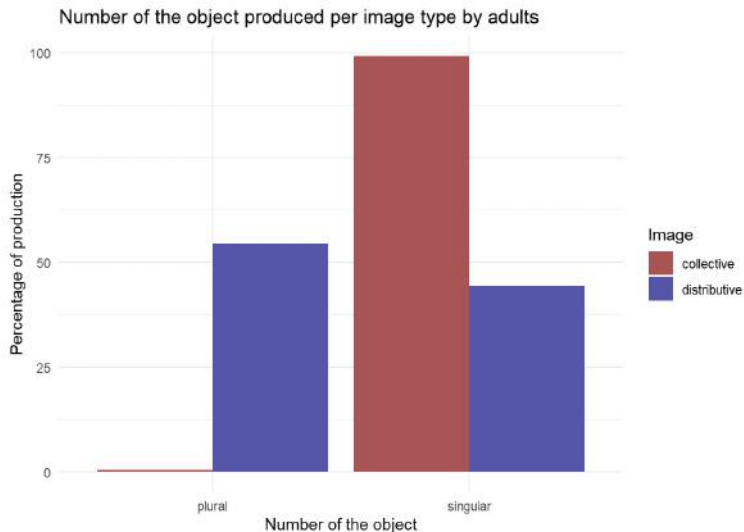
Additional slides I



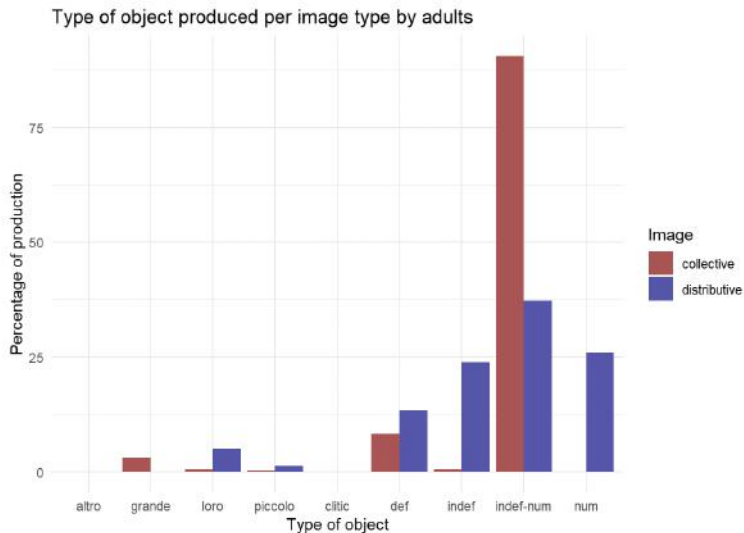
Additional slides II



Additional slides III



Additional slides IV



Additional slides V

