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# The role of frequency effects and cognitive development in language acquisition. A study on countability.

Literature suggests a bias for countability in language acquisition: children likely assume a new word to refer to a whole-object, not to the substance of the object (Bloom & Kelemen, 1995; Markman, 1990) and prefer the count morpho-syntax over the mass morpho-syntax (Barner & Snedeker, 2005; Gathercole, 1985).

Why is count interpretation favored? Is this bias due to a linguistic difference between mass and count nouns? In our study on Italian, we selected by means of corpus queries: 10 "mass"nouns, i.e. nouns appearing more frequently in a mass context (*sand*); 10 "count"nouns, i.e. nouns appearing more frequently in a count context (*ring*); and 20 "neutral"nouns that appear in both contexts with similar frequency (*pizza*). For each noun, two identical sentences were created: in one the noun appeared in a mass context, in the other one, in a count context. Grammaticality judgments on these 80 sentences were collected on 152 adult native speakers (age range: 19-77) and on 58 preschool children (age range: 62-76 months). Acquisition of experimental nouns were assured.

Adults judgments were collected by means of an online rating questionnaire. Scores ranged from 0 (totally unacceptable) to 4 (totally acceptable). Only count nouns in mass context (mean= 0.37) and mass nouns in count context (mean= 0.48) were rejected; sentences in the other conditions were scored above 2.50, that had been fixed as the acceptability threshold.

Children gave a yes/no answer about the acceptability of the sentences. They partially replicated the pattern of the adults, however they rejected more count nouns in mass context (80.0%) than mass nouns in count context (51.2%, $p < .0001$). Moreover, neutral nouns were mostly rejected in mass context (63.96%).
Additional analyses showed that children's performance with mass ($r= .27$; $p< .05$) -but not count ($r= .12$; $p= .36$)- context positively correlated with their performance in the Logical Operations and Conservation test on abstraction abilities (Vianello & Marin, 1997).

In sum, countability in the language is modulated by frequency effects. However, frequency alone is not explicative for what concerns children's performance on neutral nouns and on mass nouns in count context, which are better explained by hypothesizing that the processing of uncountability relates with extra-linguistic cognitive abilities. Overall, these findings suggest that language acquisition models that rely on statistical learning may also take into consideration the role played in the development by extra-linguistic cognitive abilities which provide salient information encoded into language.

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