

## Quantifier Relationships in the Lexicon: Scalar Competence and Performance

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Children learning English, Mandarin, Portuguese and Spanish have been shown to be delayed in the development of distributive and collective sentence interpretations until roughly 10 years-old (e.g. Hanlon 1986, Brooks & Braine 1996, Brooks et al. 1998, Pagliarini et al. 2012, Syrett & Musolino 2013). An explanation of this gradual development is the hypothetical delayed emergence of a pragmatic scale of collectivity-distributivity. We refer to this account as the Pragmatic Scale Hypothesis, following Dotlačil (2010) and Padilla-Reyes et al. (2017). Pagliarini et al. (2012) show that children's increasingly categorical judgments of the Italian distributive quantifier *ciascun* as distributive predicts children's decreasing judgments of the plural definite article *i* as distributive, as expected on a scalar informativeness account, wherein *ciascun*'s distributive entailment anchors the scale and *i* derives its collective meaning via implicature. Padilla-Reyes et al. (2017) demonstrate a similar relationship between the distributive quantifier *cada* and the plural quantifiers *los* and *unos*. It is also plausible that this delayed trajectory in interpretations is related to the developing role of executive function in pragmatic interpretations (e.g. Kapa & Colombo 2014, though cf. Janssens et al. 2014).

Given these findings, the current study seeks to determine: 1) whether similar predictive relationships among distributive and collective quantifiers exist in child English, 2) whether general lexical development predicts the development of Dotlačil's putative pragmatic scale of distributivity-collectivity and 3) whether the development of executive function abilities (attention, inhibition and non-verbal working memory, as in Miyake et al. 2000) helps to explain this protracted development in child English and child Spanish.

To answer these questions, an SES- and age-matched sample of monolingual Spanish-speaking children in Puerto Rico ( $n=31$ , mean age=95.25 months,  $SD=7.43$ ) and English-speaking children in the Midwestern US ( $n=29$ , mean age=95.38 months,  $SD=7.65$ ) were given a video-recorded Truth Value Judgment Task (TVJT – Crain & McKee 1985). Children were asked to affirm or reject the critical final sentences of each TVJT, which included predicates that occurred with quantifiers that varied by distributivity (distributive: *each/cada*; collective: *the/los, some/unos*), crossed with distributive/collective visual video contexts. Children were independently given the EXAMINER executive function battery (Kramer et al. 2014) and the TVIP/PPVT (Dunn & Lugo 1986) tests of lexical development.

Results showed that: 1) Consistent with previous work, acceptance of distributive *each* in collective pragmatic contexts in child English predicted acceptance of both *the* ( $B=.592$ ,  $SE=.098$ ,  $p < .001$ ) and *some* ( $B=.645$ ,  $SE=.085$ ,  $p < .001$ ) in distributive pragmatic contexts (Figures 1 & 2). 2) None of the three executive function components were predictive of any of the distributive-collective quantifier/context interactions, except attention, which predicted the acceptance of distributive *cada* sentences in collective contexts, but only in Spanish ( $B=-.185$ ,  $SE=.076$ ,  $p=.021$ ). 3) TVIP and PPVT scores were predictive in both languages of acceptance of distributive/collective sentence types in incongruent contexts (Figure 3), consistent with the claim that the distributive-collective pragmatic scale, an informativeness relationship among quantifiers in the lexicon, comes to be more highly specified as the lexicon develops. Results are argued to be consistent with the Pragmatic Scale Hypothesis.

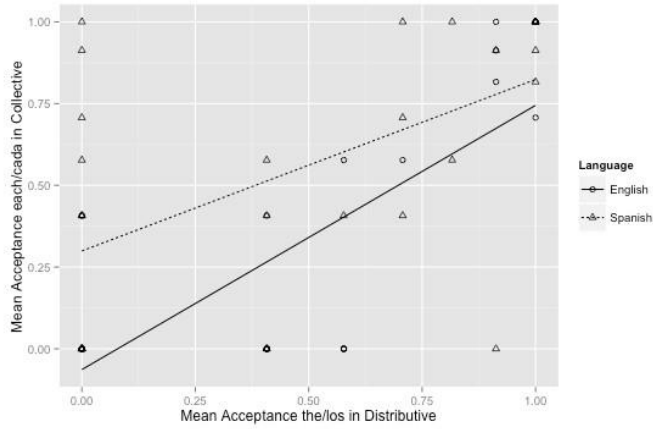


Figure 1 – Mean Acceptance of *each/cada* in Collective Contexts Predicts Acceptance of *the/los* in Distributive Contexts

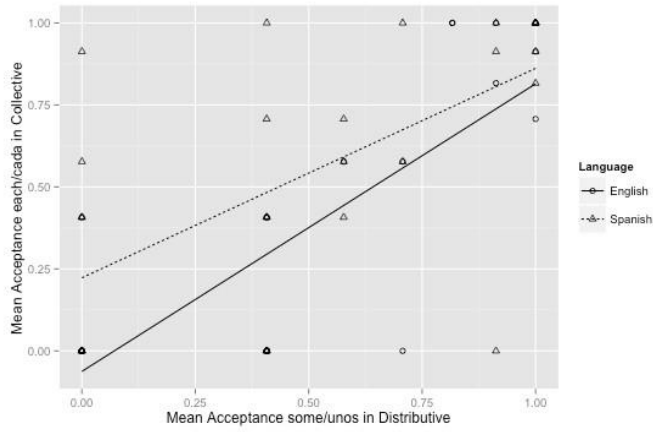


Figure 2 – Mean Acceptance of *each/cada* in Collective Contexts Predicts Acceptance of *some/unos* in Distributive Contexts

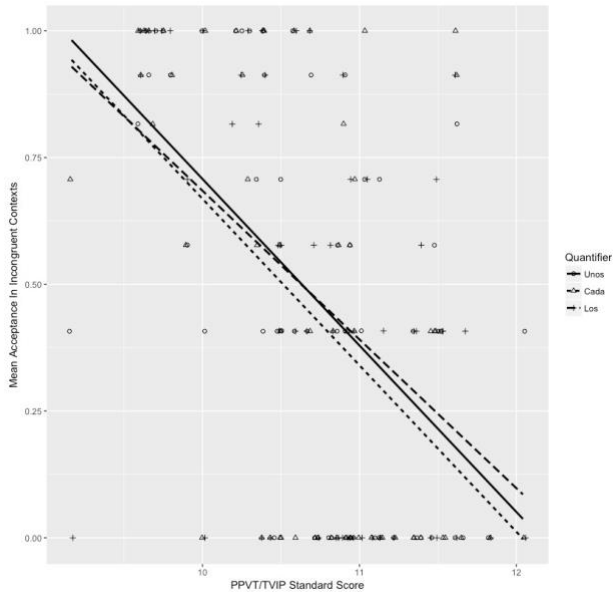


Figure 3 – Standard PPVT/TVIP Scores Predict Mean Acceptance of Distributive-Collective Quantifiers in Incongruent Contexts (English and Spanish Combined)