Executive Function, General Lexical Development and the
Quantity Implicature in Child Spanish

What domains of cognition are responsible for computing scalar implicature interpretations? There is evidence that both lexical development and the executive function components of working memory and inhibition may be relevant in both adult and child implicature generation (Feeney, Scrafton, Duckworth & Handley 2004; De Neys & Schaeken 2007; Dieussaert, Verkerk, Gillar & Schaeken 2011; Marty, Chemla & Spector 2013; Janssens, Fabry & Schaeken 2014; Grinstead, Oates, Padilla-Reyes & Nieves-Rivera 2018). Pursuing these insights in child Spanish with the *algunos* ("some") existential quantifier, we investigate the specific proposal that general lexical development may serve as an index of the developing relationship among quantity features of the quantifiers on the Quantity Scale (Grice 1975) and that inhibition (as in Miyake et al. 2000) may predict the ability to suppress one of the two interpretations of the existential quantifier (e.g. the "some, but not all" implicature interpretation vs. the "some, and possibly all" logical interpretation).

To investigate this hypothesis, we tested child (n = 54, age range = 48-100 months, mean age = 78.9 months, SD = 15.4) and adult (n = 26, mean age = 319.8 months [26 years], SD = 54.9) Spanish-speakers' interpretations of the existential *algunos* quantifier, which is taken to generate a pragmatic "some, but not all" implicature (Gutiérrez-Rexach 2001, 2010; Alonso-Ovalle & Menéndez-Benito 2002, López-Palma 2007 and Martí 2007). We gave adults and children 5 video-recorded, stop-motion, Truth-Value Judgment Tasks (Crain & McKee 1985), including an explicit Question Under Discussion (following Gualmini et al. 2008), described by activity predicates (Table 1). The actions represented by the predicates were performed consecutively by either 3 of 4 protagonists in the video scenarios, or by 4 of 4 of them (Figure 1). In 4 of 4 scenarios, *algunos* should be incongruent with a "some, and possibly all" interpretation. Participants were also given measures of inhibition (Flanker), attention (Set-Shifting) and working memory (Dot Counting) and a receptive and an expressive test of lexicon.

Results were recorded as number of sentences accepted. Descriptively, adults generated the implicature in 96% of 4 of 4 contexts, while children did so in 80% of such contexts. Lexical measures significantly predicted implicature generation with an r^2 of .473 for receptive and .220 for expressive. All three executive function measures were also predictive for children, but not for adults (p > .05), perhaps because of ceiling effects.

Results may lend insight into some of the psychological processes underlying pragmatic reasoning. Descriptively, results are consistent with the existing literature on *algunos* in 5 year-olds (Miller, Schmitt, Chang & Munn 2005; Vargas-Tokuda et al. 2009), to wit, all 5 year-olds in the study categorically generated implicatures, with only some of the 4 year-olds failing to do so (4 year-olds are significantly different from 5 year-olds, 6 year-olds and adults, p < .001). The interaction of domain-specific and domain-general cognitive abilities in implicature generation is discussed.

Figure 1 – "Some (*algunos*) children went down the slide."

Stimuli Sentence	Translation
Algunos niños bajaron la resbaladilla.	Some children went down the slide.
Algunos niños subieron la escalera.	Some children went up the ladder.
Algunos niños brincaron la cerca.	Some children jumped the fence.
Algunos niños cruzaron la calle.	Some children crossed the street.
Algunos niños le dieron vuelta al autobús.	Some children went around the bus.

Table 1 – Activity Predicate Stimuli Sentences

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