Development of Mechanistic Support Language in Spanish Speakers in Colombia

Background Beyond basic spatial relations (e.g., teddy on table), we know little about how children learn to talk about mechanical support events (e.g., objects attached/hung from a surface via glue, magnet, etc.), and map them onto linguistic structures. Moreso, the majority of the research that has been done focuses on children learning English - a language that has several verbs that lexicalize support via a specific mechanism (e.g., glue, tape, clip, etc.)[1]. The broad goal of the current study is to deepen our understanding of spatial language acquisition by diversifying the populations that have been studied. Specifically, we explore how 4- to 6-year-old monolingual Spanish-speaking children and adults in Colombia, encode mechanical support events.

Figure 1. Examples of stimuli

Note. Images depict the static result state; stimuli are *dynamic* events of a hand attaching the figure object to the ground object. There are also examples of visible mechanisms; in hidden mechanism events the fastener is obscured by the figure and never shown to the participant.

Consider the mechanical support event depicted in Figure 1; *different* verbs can be used to encode the *same* spatial configuration (e.g., 'la niña pusó/ colgó/ pegó el papel al arbol' '*the girl put/ hung/ stuck/ taped the paper to the tree).* Typically in Spanish, the Basic Locative Construction (estar = *be on*), encodes a static state (e.g., 'la foto esta en la pared' = '*the picture is on the wall*'), whereas Put verbs (poner = *put*, colocar = *place*), act similarly semantically for dynamic events[1]. Moreover, rooted in Levin's English classification of verbs (1993), Verbs of Putting in a Spatial Configuration (e.g., colgar = *hang*, lean = *inclinar)* encode the spatial orientation of the figure object to the ground object without indicating the causal mechanism used in the support relation (i.e., 'Ella cuelga la foto de la puerta' = '*She hangs the picture from the door*' specifies that the picture is oriented in a downward orientation from the door, but the mechanism of support remains unclear).

Verbs of Attaching however, can either encode the specific mechanism in the lexical verb (often as a denominal) (e.g., enganchar = *hook)* or they can refer to a specific descriptor of the mechanism (e.g., sticky), without specifying the mechanism (e.g., pegar = *stick).* Since Verbs of Attachment encode the mechanism or provide a descriptor of the mechanism in the verb, we refer to these as Mechanism Verbs. General Verbs of Putting (poner = *put)* or Verbs of Putting in a Spatial Configuration (colgar = *hang)* are considered Non-Mechanism Verbs.

Recent findings show Spanish, contrary to English, has relatively fewer lexical verbs that encode the specific mechanism used (e.g., pegar = *stick)*. Several Specific Verbs of Attaching, commonly denominals in English, may be less available in Spanish than in English (e.g., 'tape' and 'pin.'). Thus, at least in terms of describing dynamic support relations, Spanish descriptions may compensate for the lack of lexical verbs that encode the mechanism (denominals) by using a separate adverbial clause to encode the mechanism (e.g., 'pegar con cinta' = '*stick with tape').* In terms of development, we consider how the limited availability of Mechanism Verbs may make learning easier (thus predicting little, if any, significant developmental change) or harder, because the mechanism is encoded outside of the main verb as an adverbial clause (thus predicting developmental change). We ask, 1) How do monolingual Spanish speakers encode dynamic mechanical support events? And 2) How may these descriptions change over development in monolingual Spanish speakers?

Procedure Spanish monolinguals, four to six-year-olds (*N* = 28), and adults (*N* = 25) were tested in Manizales, Colombia. Participants viewed videos of dynamic events where an agent attached a figure (paper) to a ground (tree or door) with a mechanism (clip, tape, pin), and were asked to describe the event (Fig. 1). Participant utterances (N = 304) were transcribed and coded for the type of verb; Mechanism Verb (e.g., pegar = *stick*), Non-Mechanism Verb (e.g.,

Simple verb: poner = *put* or Orientation verb: colgar = *hang*). We also coded whether the mechanism was encoded as the main verb, an adverbial phrase ('lo colgó con un gancho' = '*she hung it with a clip'*), or an individual clause "le pusó un clip y lo pusó ahí' = '*she put a clip on it and put it there'*).

Results Spanish-speaking adults were equally likely to use Non-Mechanism and Mechanism verbs (Figure 2). Further, when they did encode the mechanism (which was less than 60% of the time; Figure 3), they encoded it in a variety of linguistic structures, not only the main verb, thus motivating future cross-linguistic research on the encoding of spatial relations across languages and over development. Spanish-speaking children showed a similar pattern to their adult counterparts; binary logistic regressions showed no difference between children and adults for use of Mechanism or Non-Mechanism verbs (*p*s > .10). However, within the class of Non-Mechanism verbs (e.g. colgar, poner), children use more simple verbs (poner) compared to adults (*p* =.026).

Our findings suggest that both child and adult monolingual Spanish speakers encode the mechanism in a clause outside the main verb. In addition, children use more simple verbs (e.g. poner) than adults, whereas adults use more orientation verbs (e.g., colgar), suggesting developmental change in the acquisition of orientation verbs from childhood to adulthood. Implications for linguistic theory and spatial language acquisition will be discussed, including consideration of whether and how this pattern observed for Spanish in the domain of mechanical support compares to the encoding of path and manner in the domain of manner of motion[2].

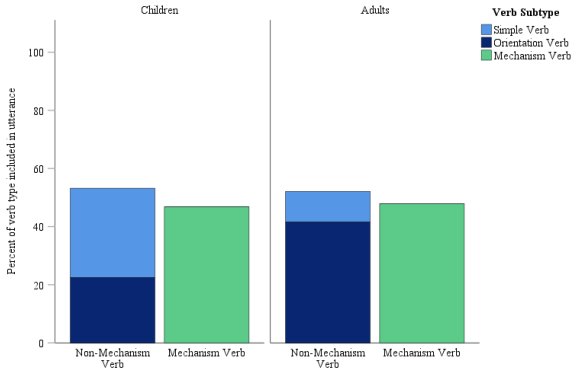

Figure 2. Percentage of verb types; Mechanism and Non-Mechanism verbs (i.e., Simple and orientation verbs) used in monolingual Spanish-speaking children and adults' mechanistic support descriptions

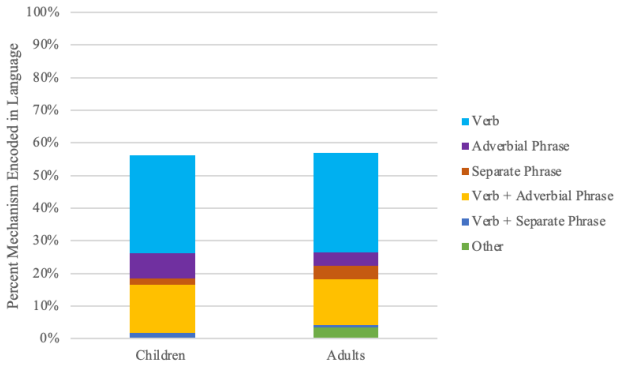

Figure 3. Percentage of trials that encoded the mechanism (and how it was encoded) in Spanish-speaking children's and adults' dynamic event descriptions

References

[1]Levin, B. (1993). *English Verb Classes and Alternations A Preliminary Investigation*. University of Chicago Press.

[2]Talmy, L. (1985). Lexicalization patterns: Semantic structure in lexical forms. In T. Shopen (Ed.), *Language typology and syntactic description* (pp. 36-149). Cambridge: Cambridge University Press.