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## Starting at the end: the importance of goals in spatial language

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## Abstract

We explored the linguistic encoding of Paths in children between the ages of three and seven, in children with Williams syndrome, and in normal adults, focusing specifically on Source and Goal Paths. The results showed an asymmetry, with Goal Paths regularly and systematically encoded, but Source Paths often omitted. This pattern occurred among all groups and across a broad range of domains including Manner of Motion, Change of Possession, Change of State, and Attachment/Detachment events. It also occurred whether participants spontaneously described events or were asked to use a specific verb that biased them towards a Goal or Source Path (e.g. 'give' vs. 'get'). The results are discussed in terms of non-linguistic foundations of spatial language and the linguistic mapping biases that arise when we describe what we see.

Keywords: Source; Goal; Paths; Events; Spatial language; Williams syndrome; Conceptual representations; Syntax; Semantics

A fundamental aspect of human cognition is our capacity to represent events that capture our spatial, temporal, and causal interactions in the world. This capacity emerges early in development, with children regularly and easily talking about events they observe. Many theories suggest that this occurs in part because our non-linguistic representations of events embody properties that map readily to language, which in turn encode just those

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components of events that are naturally represented by the prelinguistic infant (Bloom, 1973; Bowerman, 1973; Brown, 1973; Mandler, 1992; Slobin, 1973). In short, objects, motions, paths, and spatial–causal relationships could be non-linguistically represented in such a way that they could be mapped rather directly into words and phrases that are acquired early in life. Further, learners might start with biases about how words and phrases map into syntactic units. For example, they might assume that objects map into nouns (Bloom, 1999; Grimshaw, 1981; Waxman, 1998) and that causal agents map into sentential subjects (Fisher, Hall, Rakowitz, & Gleitman, 1994; Grimshaw, 1981; Slobin, 1985). Correspondences between conceptual/semantic entities and syntactic structure form the backbone of current theories about semantic/syntactic mapping (Grimshaw, 1981; Jackendoff, 1983, 1990; Levin & Rappoport Hovav, 1991). They also play a vital role in theories of acquisition: Semantics can serve as a bootstrap into syntax, and vice versa (Fisher, Gleitman, & Gleitman, 1991; Gleitman, 1990; Landau & Gleitman, 1985; Pinker, 1989).

The purpose of this paper is to further explore such biases by examining the encoding of paths by young children learning English. We focus specifically on the contrast between paths that are Goal-oriented—moving towards or culminating in some goal or endpoint—and those that are Source-oriented—moving away from some origin or starting point. Although paths can be encoded in a variety of syntactic forms and positions, we focus on their encoding in prepositional phrases, which are the canonical format for path expression in English.

Our starting point is a finding from Landau and Zukowski (2003), who studied the language of Manner of Motion events in children with Williams syndrome (WS), a rare genetic deficit that gives rise to severe spatial impairment together with spared language. Landau and Zukowski asked whether the children's spatial impairment would result in impaired spatial language, specifically testing the children's ability to represent and talk about the main components of Motion events, as outlined by Talmy (1985). Landau and Zukowski found that WS children and normally developing 5-year-old children regularly encoded the Goal Path and Reference object of Manner of Motion events, but often omitted the Source Path and Reference object. That is, children demonstrated a bias for encoding Goal Paths and their endpoints over Source Paths and their starting points.

The children with WS tended to omit Source Paths and starting points more often than normally developing children, raising the question of whether this fragility was a consequence of abnormal development, possibly even specific to their spatial impairment. If so, then we might expect the pattern of Source omission to be confined to Manner of Motion events, which are clearly spatial, but not to extend to other kinds of events. Alternatively, ancillary evidence (which we review below) suggests that an asymmetry between Source Path and Goal Path could be a pervasive fact about the way we represent events, either linguistically or non-linguistically, or both. If so, then we would expect to see Source Path omission in a variety of different contexts: We should see it with both Manner of Motion and other kinds of events, we should see it in young normally developing children, and we might even see it among normal adults. In this paper, we ask whether this pattern occurs in the language of events across these broad circumstances, and if so, why.

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