When a fishing rod becomes a tyre: on gesture comprehension in 2-to-3 years old transition in children

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Between the ages of 2 and 3, we observe a rapid growth in the spoken vocabulary of toddlers (Ganger & Brent 2004).However, the trajectory of co-speech or silent gesture production, as shown by Namy at al. (2004), is not characterised by constant growth. Language acquisition in the considered period can be characterised by a "trial-and-error" approach children adopt in everyday communication (Gentner & Namy, 2006; Benson, 2020). The trial-and error method used by toddlers is commonly described based on the mistakes they make in speech: (1) overgeneralisation, related to the use of improper syntactic structures (Baker, 1979; Onnis et al., 2002; Parke & Gauvain, 2009); (2) overextension, related to the use of a single word as a label for various objects (Rescorla, 1980; Clark, 2015; Barrett, 2017); and (3) underextension, when a child uses a word for a single item and does not see that the item belongs to a broader category (White, 1982; López- Couso et al., 2017; Barrett, 2017). In our presentation, we address the mistake of overextension in a gesture task. In the research, however, we did not look at speech. All of the errors occurred during a silent gesture comprehension.

The main experiment focused on children's ability to comprehend signs presented to them in the form of iconic gestures in three groups of children: 24-monthers, 30-monthers, and 36-monthers (total n=30). Each child was presented with a 36-pages-long book that contained 4 images per page. In 3 consecutive rounds, 12 pages per round, each child was asked to match the gestures of the experimenter with one image designated to the gesture. The task was challenging, because the children were shown two types of iconic gestures: enacting and representing ones. While statistical analysis revealed that children score higher with age, and that there is a change in preference for gesture comprehension: from representing gestures to enacting gestures, the qualitative viewing of the video material resulted in additional observations. In the post-experimental analysis, described here, we observed 66 examples of

overextension mistake in gesture comprehension from 16 children. We observed that children made similar mistakes within their age groups---they extended one characteristic of a gesture presented to them by the experimenter (e.g. the spinning reel of the fishing rod in an enacting gesture) onto another---and in their answer pointed to the wheel present on the same page (ignoring the rest of the observed gesture indicating the fishing rod). The mistakes seem to be related to their experience with and knowledge about different kinds of objects and operations done to or with these objects.

In our analysis, we provide each pair (the expected and incorrect answer), describe the overextended manual characteristic of a given gesture, and try to the account for these mistakes using cognitive representation and prototype theory (Rosch 1975) from the perspective of gesture use. Intertwining these with Piaget's understanding of intellectual growth (adaptation and adjustment of knowledge), as well as the notion of schema (1952: 7; Inhelder & Piaget, 1958), we describe how the mistakes we observe provides us with insight into children's information processing in a comprehension task. Overextension is not only a mistake children make in speech---insights from silent gesture comprehension can help us understand how human thinking and conscious perception of characteristic features of actions and objects change and mature over time.

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