Getting your ducks in a row: the acquisition of cardinals and ordinals in Dutch

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A recurring finding in developmental psychology is that children slowly discover the exact meanings of cardinals *one* through *four* in a tiered fashion before they become fully competent counters (e.g. Le Corre & Carey 2007). Linguistic knowledge has been argued to play an important role in this process, both in the initial stages, as well as in helping children overcome the limitations of innate nonverbal systems of number (e.g. Carey 2009, Izard et al. 2008). In other words, a full grasp on number entails partly innate, partly conceptual and partly language-specific knowledge. Interestingly, though, most of these developmental studies focus on English-speaking children; whether (the timing of) this acquisition pattern holds for children acquiring other languages (such as Dutch) remains largely uncharted territory, spare a few studies on other languages (e.g. Sarnecka et al. 2007, Li et al. 2003, Almoammer et al. 2013). This leaves much to be discovered about the exact role language plays in developing numerical concepts.

The relationship between numerical and linguistic knowledge is even more intricate in the case of ordinal numerals, but as of yet, such studies are actually quite limited and Dutch ordinal acquisition has not been studied at all (Fischer & Beckey 1990, Miller et al 2000, Colomé & Noël 2012 and Koch et al. 2015). Ordinals, formed in Dutch by adding *–de* or *–ste* to a cardinal (*vier–de* 'fourth', *acht–ste* 'eighth'), are obviously built on and related to cardinals, but what makes them especially interesting is how they compare to superlative adjectives. Hurford (1987) and Veselinova (1998) make cognitive-historical and typological claims in that respect. Barbiers (2007) argues Dutch *eerste* 'first' is, morpho-syntactically speaking, a superlative rather than an ordinal. His tests would put indefinite ordinals *middelste* 'middle–th/–est' and *laatste* 'last' somewhere between definite ordinals and superlatives.

This study compares how cardinals, ordinals and the degrees of comparison are acquired in Dutch, focusing specifically on the patterns and timing of comprehension. To test this, we used a so-called "Give-X" task (or e.g. 'Give-a-number', cf. most notably Wynn 1992, but also Colomé & Noël 2012; Condry & Spelke, 2008; Huang et al. 2010; Le Corre et al. 2006; Li et al. 2003; Sarnecka & Gelman 2004; Sarnecka et al. 2007) in which we asked 77 Dutch monolinguals aged 2;11–6;4 to take certain objects out of a row, for example *eight banana's*, *the third car*, *a ball that's bigger*, *the most blocks*, and *the last truck*. This was done for cardinals *one* through *four*, *eight* and *nine*, as well as their ordinal counterparts. The indefinite ordinals *middel–ste* 'middle–est' and *laat–ste* 'last', and the degrees of comparison for five adjectives were also tested. This makes the present study the most comprehensive study on ordinal acquisition to date, and offers Dutch data to the existing literature on cardinal development.

The results paint a picture in which both conceptual and linguistic knowledge play important and intricate roles. On the one hand, our data suggest that the discontinuous acquisition of cardinals found in e.g. English also holds for Dutch. This is to be expected if patterns in number development are universal. However, this same piecemeal pattern does not appear in ordinal acquisition. Instead, it seems that *eerste*, *tweede*, and *vierde* ('first', 'second' and 'fourth') are acquired (almost) at once, when children progress through the final knower-levels. Irregular *derde* 'third' and higher ordinals follow somewhat later. We argue that morphology plays an important, but not the only, role, as supported by evidence from indefinite ordinals and the degrees of comparison. While children's performance on the former category varies with respect to definite ordinals (though *laatste* 'last' generally precedes *middelste* 'middle-est'), all children responded at ceiling on the degrees of comparison. This suggests that children have a basic understanding of superlatives before they have exact representations of ordinals (and, in fact, cardinals), and that indefinite ordinals are indeed somewhere in between.

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