

Quantifying in Context:

How a discourse with two topics improves the interpretation of universal quantifier 'all' in Dutch

Quantifier spreading is a well-known, cross-linguistically robust stage in children's interpretation of universal quantifiers like *all* (a.o. Inhelder & Piaget, 1958; Philip, 1995). Several studies show that children who give spreading answers in an out-of-the-blue context, become adult-like when the quantified sentence is embedded in a discourse, specifically, when the domain of quantification relates to the discourse topic (Crain et al., 1996; Drozd & Van Loosbroek, 2006; Freeman et al., 1982; Hollebrandse, 2004; Philip & Lynch, 2000). It is unclear, however, exactly why topicality helps to determine the correct domain of quantification. In the adult grammar this domain is defined syntactically: the set denoted by *N'* adjacent to the quantifier (Partee, 1991). Why would an explicit topic help a spreader to properly restrict the domain? Hollebrandse (2004) argues that, in the child's grammar, it is not syntax, but topic structure that feeds quantification: the domain is defined as the set denoted by the discourse topic. If so, target-like behavior with quantifiers in discourse would actually mask an immature quantificational system. This raises the question: what happens when there are two topics? We investigated the effect of a discourse with two topics on Dutch children's spreading behavior.

We tested 23 children (range 4;2-6;7, mean 5;9) and 25 adults using a TVJT. The No-Discourse condition with single quantified sentences served to identify the spreaders, (1). In the Two-Topic condition, two sets of referents were explicitly introduced and described, thus setting up a discourse with two equally prominent topics, (2). If topic structure feeds quantification, we expect that either one of the two topics can define the domain of quantification.

There was an overall, significant difference between the No-Discourse Condition (48% "yes") and the Two-Topic condition (74% "yes"), ($t(22)=3.896, p<.001$). We found that this effect was caused by ten spreaders—those who said "no" 5 or 6/6 times in the No-Discourse condition; they improved significantly in the Two-Topic condition ($t(9)=-5.056, p=.001$), Figure 1. There was no effect in the non-spreaders. The spreaders were not fully adult-like though; they sometimes gave target-like "yes"-answers, but sometimes "no"-answers (still spreading).

So, a two-topic discourse helps spreaders somewhat—they no longer give exclusively spreading answers. But it is just as much a source of confusion—they use both sets as their domain of quantification. This supports Hollebrandse's topicality theory: for children in the quantifier-spreading stage, topic structure defines the domain of quantification, instead of the syntactic structure of the quantified NP (namely *N'*). When there are two discourse topics, either one defines the domain. We conclude that the target-like behavior in previous quantification studies with a discourse is illusive: it does not show that children have acquired the adult syntax-semantics mapping system. On the contrary, children need to learn to rely on syntax to interpret quantifiers. We model our conclusions in an Optimality Theory framework as a matter of re-ranking constraints: the syntactic constraint (*N'* restricts the domain of quantification) is initially ranked below a topic-alignment constraint (Topic restricts the domain of quantification).

Appendix

- (1) Sample item No-topic condition: All farmers are feeding a donkey.



- (2) Sample item Two-Topic condition (in English translation)

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| 1. Here you see some French fries that John made himself.
He is going to give the fries to his friends the elephants. | Topic 1 introduced: French fries
Topic 2 introduced: Elephants |
| 2. Here you see the elephants. They really like French fries! | Reference to Topic 1 and Topic 2 |
| 3. Oops! One bag of fries slips out of John's hands. | Reference to one item of Topic 1 set |
| 4. John gives the French fries to the elephants | Reference to Topic 1 and Topic 2 |
| 5. And now, there is no food left. | Neutral ending |

Test: "All elephants are eating French fries."

Target answer: "Yes."

Spreader: "No" (pointing to the dropped bag of fries on the floor)

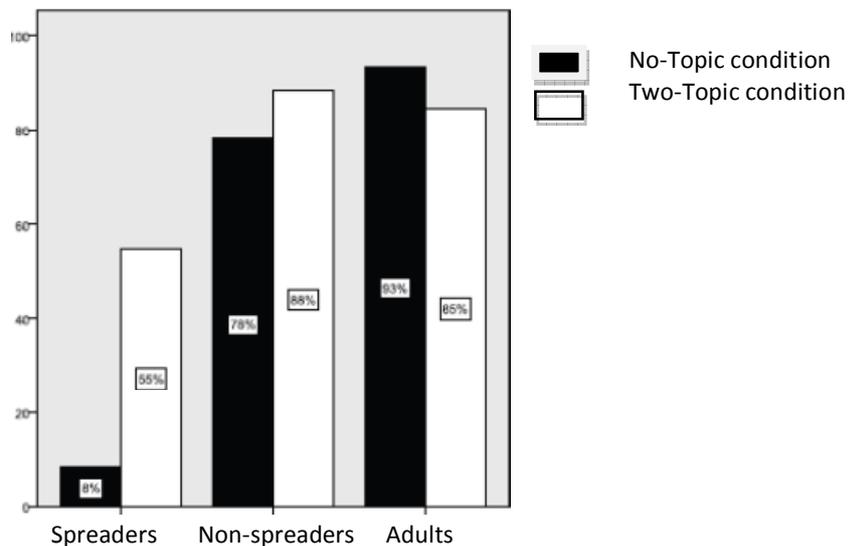


Figure 1: Percentage of acceptance for Spreaders (5 or 6/6 "no" in No-Topic condition, n=10), Non-spreaders (n=13) and Adults (n=25)

Selected References

Hollebrandse, Bart (2004). Topichood and quantification in L1 Dutch. *IRAL* 42, 203-215.

Philip, William (1995). *Event quantification in the acquisition of universal quantification*. Doctoral dissertation, University of Massachusetts, Amherst.