

The “Exact” Interpretation of Number Words

This study pursues the meaning of number words by examining how they interact with deontic modals. We argue that number words have the “exactly *n*” interpretation through considerations of learnability and acquisition data.

Sentences containing number words may receive non-exact (‘at least *n*’ or ‘at most *n*’) interpretations. According to sentence (1), a person who has *at least three* children will receive the benefit; according to (2), missing *at most three* quizzes is acceptable. One possible analysis is that number words are polysemous; *three* may mean ‘at least three’ or ‘at most three’ depending on the context (Geurts 2006). A second analysis relates non-exact readings to modals (Kennedy 2012).

The first analysis predicts that by the time children understand sentences with non-exact readings, they should have received relevant input on the polysemy of number words. Musolino’s (2004) experiments show that by 5, children can correctly interpret sentences with ‘non-exact’ readings. However, he finds little relevant input in CHILDES data. We carried out a similar corpus study on more number words. We selected 18 files (7,722 utterances) from Sachs (1983) (1;1 to 4;9). 505 utterances containing either a modal or a number word were extracted (see (3)) and hand-coded as “deontic”, “non-deontic”, or “at least *n*”, “at most *n*”, “exactly *n*”. We found that sentences compatible with ‘at least *n*’ interpretations are all related to partitive *one* (see (4)); there is no input on ‘at most *n*’ readings; most of the utterances with number words have the ‘exactly *n*’ reading. This confirms the learnability issue raised by Musolino (2004): if the non-exact readings depend on number words, children could not have learned the knowledge by age 5. Thus, number words are monosemous.

As to modality, deontic modals are most closely related to non-exact interpretations (Kennedy 2012, Scharfen 1997). We observed that the child in Sachs (1983) started using deontic modals as early as two and that by age 4, 20% of the modals were deontic. If non-exact interpretations rely on deontic modals, children can acquire the knowledge by age 5. It indicates that Kennedy’s (2012) proposal is empirically possible.

An experimental study will be carried out this Fall to further verify our proposal. In the experiment, a child observes an animal throwing hoops onto a pole. The animal gets 2 (or 3, or 4) hoops on the pole. It is announced that the animal *has to get three* hoops on the pole to win a prize. The child judges if the animal wins. This is a modification of Musolino’s (2004) Experiment 1, where the rule of winning is announced before the animal throws any hoops. In the original design, it is infelicitous that the animal continues to throw a fourth hoop, for he has already won by succeeding with three hoops. In our modified version, the rule is announced

after the animal finishes; so it is natural that the animal tries as many hoops as possible. This is the design for testing the ‘at least n’ interpretation. For the ‘at most n’ interpretation, the rule is “the animal *can* miss *three* hoops and still win a prize.” We aim to find out how children interpret number words in the improved felicitous context.

In sum, we argue that number words have the “exactly n” interpretation and that the non-exact readings are due to modals (and the context). Our study contributes to the debate on the semantics of number words (e.g., Horn 1972, Huang et al. 2009, Syrett et al. 2012) and calls for more attention on the acquisition of deontic modals.

Data

- (1) You need to have three children to receive the benefit.
- (2) You can miss three quizzes.
- (3) Modals and number words included in our corpus study:
can, may, must, need, have to; one, two, three
- (4) Want one of these?

References

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