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Syntactic Bootstrapping in the Acquisition of Attitude Verbs

We explore how preschoolers interpret the verbs *want*, *think,* and *hope*, and whether children use the syntactic distribution of these verbs to figure out their meanings. Previous research shows that children use syntactic information when hypothesizing the meaning of some verbs (e.g. transitive v. intransitive) [4]. However, previous attempts to show that children successfully use syntactic information to differentiate amongst attitude meanings have proven difficult [2]. Yet, since attitudes may be particularly hard to observe, and because attitude verbs are often used with enriched pragmatic meanings [5], syntax may be an important cue. To test the role of the syntax in children's acquisition of attitude verbs, we probe their understanding of *want*, *think* and *hope*, and show that interpretation patterns with type of syntactic complement.

In English, belief verbs take finite complements; desire verbs take non-finite complements (1-2).

(1) a. *Froggy wants the shape to be a heart.*
b. *Froggy wants to get a heart.*
c. **Froggy thinks the shape to be a heart.*
d. **Froggy thinks to get a heart.*

(2) a. *Froggy thinks that the shape is a heart.*
b. **Froggy wants that the shape is a heart.*

Hope can occur in both finite and non-finite frame types (3).

(3) a. *Froggy hopes to get a heart.*
b. *Froggy hopes that the shape is a heart.*

Hope also shares meaning components with *think* and *want*. Like *want*, it expresses a preference, but like *think*, it also has a doxastic component [1], [8], [9]. Out of 36,901 utterances in the Gleason corpus [3], [6], *hope* was used 23 times (.0006% of utterances). Thus, children likely have little exposure before age 4, making it an ideal test case to probe children's sensitivity to the syntactic frame of an attitude verb.

Previous research shows that children are lured by reality with *think* sentences, responding to the truth of the complement in false belief contexts. They never make such errors with *want* [7]. However, previous work tested *want* and *think* under different conditions. We develop a task that makes both belief and desire relevant, for a fair comparison of *want* and *think,* and to explore the role of syntax in the acquisition of *hope*. The child helps pull hearts and stars out of a box and shows them to a puppet who likes hearts but dislikes stars. Before the puppet sees what the next shape is, he sees its color. Most of the hearts are red, and most of the stars are yellow, so the distribution in the box makes color highly predictive of shape. The puppet always wants the shape to be heart, regardless of color of the clue; but thinks it is a star when the clue is yellow, and a heart when the clue is red. Thus, on every trial, he has both a desire and a belief; and talking about either mental state is relevant. Another puppet utters the test sentences (4), about the puppet's desire, belief or hope about what the shape is, and the child says whether the puppet is correct.

(4) a. *Froggy wants it to be a heart.*
b. *Froggy thinks that it's a heart.*
c. *Froggy hopes to get a heart.*
d. *Froggy hopes that it's a heart.*

In a 4x2 design, we tested sentence type as a between-subjects factor (*want* (n=24)*, think* (n=15), *hope-to* (n=24)*, hope-that* (n=24)), and mental state type (realized desire/belief v. non-realized desire/belief) as a within-subjects factor, with the child's response of *yes* or *no* as the dependent measure.

For *think* and *want*, we expect an interaction between sentence type and mental state type; showing that children make reality-based errors when interpreting *think* but not *want.* If children use *hope*'s syntactic frame to infer meaning, then we also expect an interaction between sentence type and mental state type for the *hope-to* and *hope-that* conditions, showing that they also make reality-based errors for *hope-that* but not *hope-to*. The critical condition is when the shape is a red star. In this case, the puppet has a false belief (because he *thinks* it's a heart based on its color) and an unrealized desire (because it is a star and he *wants* it to be a heart). In this case, we adults will assent to any of the test sentences in (4a-d), but if children are lured by reality in interpreting *think* and *hopes-that*, we expect reality errors in these conditions.

We find an interaction between sentence type and mental state type ($p<.0001$); children are adult-like in interpreting *want*, but influenced by reality when there is a conflict in the *think* case. Comparisons of *hope-to* and *hope-that* conditions reveal an interaction between frame type and mental state type ($p<.0001$); children in the *hope-that* condition are more likely to be influenced by reality than children in the *hope-to* condition. Figure 1 shows the red heart condition, where we see that children are influenced by reality when interpreting *think* and *hope-that* but not *want* and *hope-to.* Figure 2 shows influence of reality by condition.

Figure 1

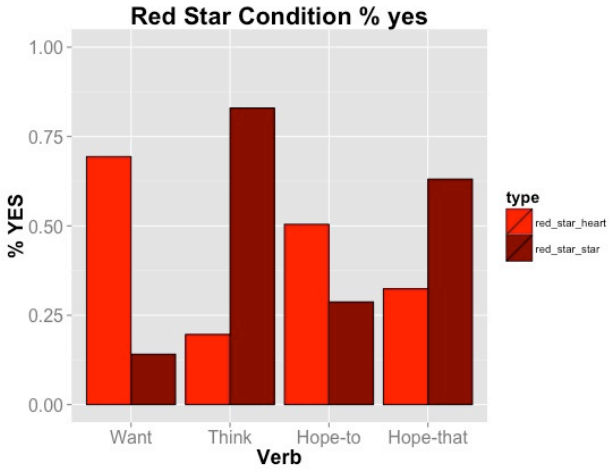
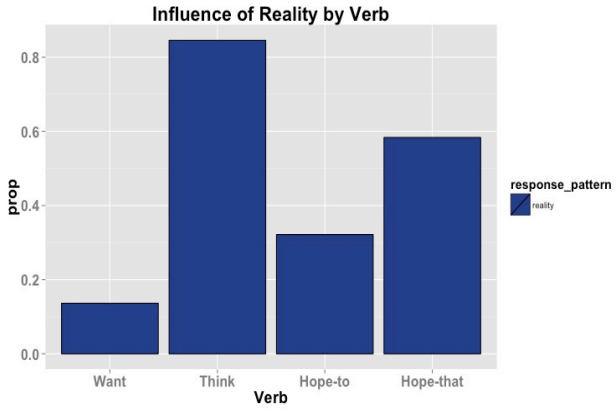


Figure 2



This study replicates asymmetries between *think* and *want*, using a single method. We also demonstrate that four-year-olds are sensitive to the frame in which they hear *hope*, showing that children use syntactic frame when interpreting attitude reports.

Selected References:

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