

Adults find rejecting propositions harder than affirming them—they misremember statements that they are told are false as true more often than confirmed statements as false (Gilbert et al., 1990). This is argued to support an asymmetric, 'Spinozan' view of belief formation, on which propositions are accepted implicitly and automatically, but rejecting them requires voluntary effort. This is in contrast to a 'Cartesian' view of belief formation, on which both acceptance and rejection take the same amount of effort (Gilbert, 1991; Pion et al., 2025).

The developmental roots of this phenomena are unclear. When learning from testimony, children sometimes seem quite Cartesian, rationally evaluating who the experts are, and choosing to believe their testimony over a novice's (Shafto et al., 2012). Other times, however, children seem to have a strong bias to believe and act on others' testimony, even when this testimony contradicts their beliefs (e.g., Jaswal et al., 2010). Importantly, poorer EF predicts whether children are likely to believe conflicting testimony—consistent with the idea that rejecting propositions requires effortful control (Jaswal et al., 2014).

To more directly test these different mechanisms of belief formation in childhood, we presented 3- to 8-year-old children (N=117) with a memory task based on Gilbert et al. (1990). Children were introduced to two characters, a novice and an expert, who were learning about 'modis'—a new kind of animal. In the "learning" phase, the novice made statements about modis (e.g., "Modis are friendly"), which the expert either confirmed or denied ("Yes, that's right!", or "No, that's wrong!"). Children heard 12 such statements in the learning phase, half of which were denied. After they heard these 12 statements, children were asked 12 questions about the statements they heard earlier (e.g., "Are modis friendly?"). Each of these was a forced-choice yes/no question. Two months later, children repeated the memory test from Session 1 (without any additional reminders or learning phase), and completed a measure of EF (Lagattuta et al., 2011).

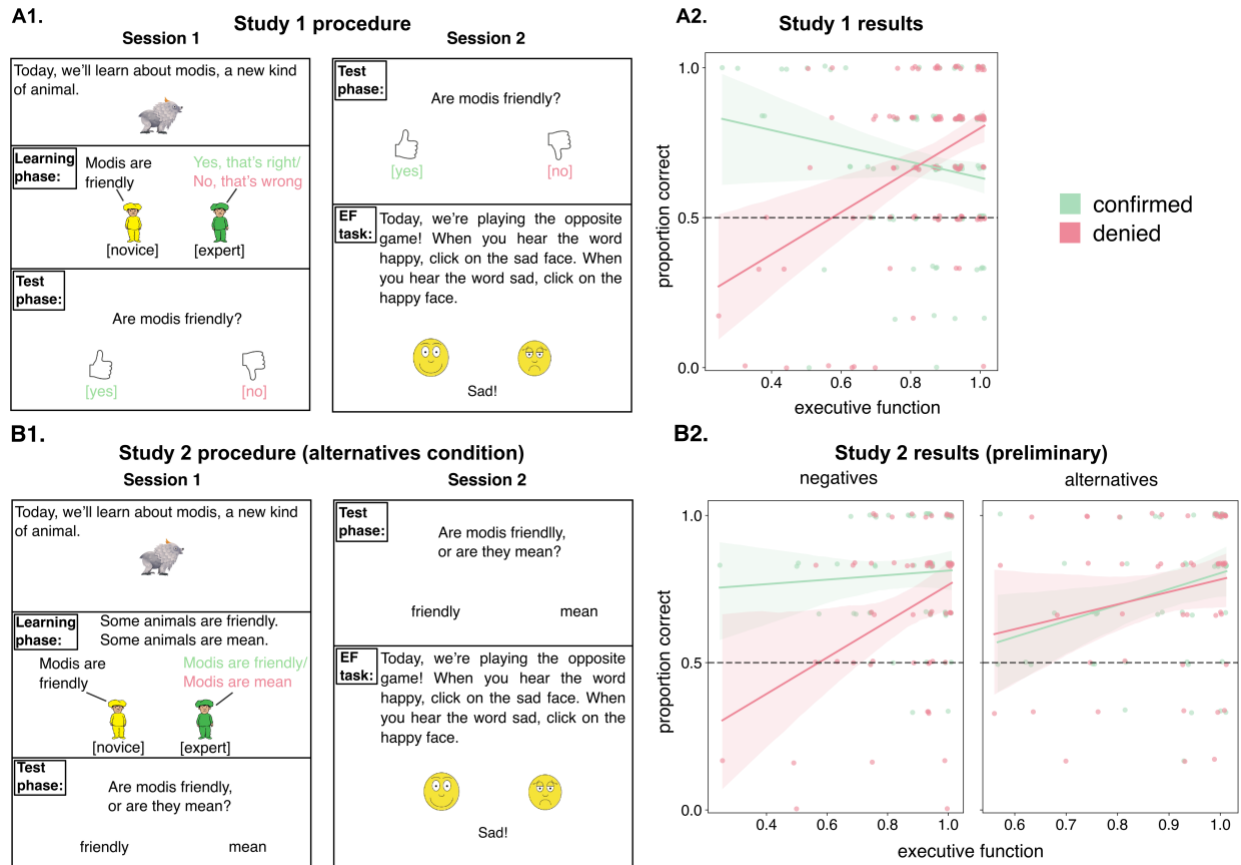
We analyzed our data using mixed-effects binomial regression models predicting how likely children were to remember each statement. Children's EF predicted how accurately they remembered denied statements—but not affirmed ones—in the test phase of session 1, even after controlling for age (interaction between denial and EF,  $\beta = 4.59$ ,  $p < .001$ ). Children who remembered statements correctly during the first session, but misremembered them in the second session were more likely to make these errors for denied statements than confirmed ones (.564,  $p = .02$ ). In sum, children with poorer EF struggle especially at processing and remembering rejected statements correctly. This is compatible with a Spinozan theory of belief, on which accepting propositions is automatic but rejection is effortful.

However, these results were also compatible with an alternative account on which children with lower EF are more likely to answer "yes" as a heuristic to yes/no questions. To rule out this alternative explanation, we are conducting a follow-up study with another sample of 3- to 8-year-

old children. Participants will follow the same general procedure as our previous study, except for two changes. First, half of our participants will see the expert respond to the novice's statement (e.g., "Modis are friendly") without using linguistic negation, by asserting an alternative, contradictory statement ("Modis are mean"). The other participants will hear statements affirmed or negated just as in the first study ("No, that's wrong!"). Second, to rule out the possibility that the "yes" bias uniquely explains why children struggle on denied statements, we will ask children to endorse of two alternative statements on test trials ("Do modis have prickly fur, or do they have smooth fur?"). We are currently collecting data (N = 111; target N = 181).

Preliminary results suggest that when hearing the expert assert a statement that contradicts the novice's statement (instead of simply negating the novice's statement), children with poor EF do not struggle to endorse the correct property for denied statements. This replicates previous work showing that children accept experts' testimony over novices'. But when the speaker rejects a novice's statement by simply negating it, as in Study 1, children with lower EF struggle to remember denied statements more than confirmed ones. This replicates and validates our finding from Study 1 and suggests that a simple "yes" bias cannot explain why children struggle to remember denied statements as false.

Together, our findings are consistent with a Spinozan model on which rejection is effortful, particularly in the absence of alternative propositions.



**Figure 1. A1.** The study design and procedure for Study 1. **A2.** Results from Study 1. Children’s EF, measured two months after Session 1, predicted how well they remembered denied statements in particular (denial  $\times$  EF interaction). **B1.** Study design and procedure for the “alternatives” condition in Study 2. The “negatives” condition was identical to the “alternatives” condition except that the expert confirmed or denied the novice’s statement by saying either “Yes, that’s right!” or “No, that’s wrong!”, just as in Study 1. **B2.** Preliminary results for Study 2 for the negatives and alternatives conditions. Children with low EF misremembered rejected statements as true more often than confirmed statements as false in the negatives condition, but not the alternatives condition. Statements denied by the expert are represented in red; statements confirmed by the expert are represented in green.