The Roles of Overconfidence, Overclaiming, Cognitive Reflection, and Age in Children's Belief in Myths

Candice Ma

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Department of Psychology, The University of Texas at Austin

Faculty Advisor: Jacqueline Woolley, Ph.D.

Graduate Student Mentor: Jenny Nissel, M.A.

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Abstract

People who are least knowledgeable are most likely to overestimate their own knowledge. Relatedly, those who are most confident in their knowledgeability are most likely to claim knowledge they cannot possibly possess. Those who are low in cognitive reflection, the tendency to think analytically and reflect on one's own reasoning, often overestimate their performance. Low cognitive reflection is also associated with poor accuracy judgement of scientific ideas and news headlines. Most of the research on cognitive reflection and the lack of insight into one's own ignorance has been done in adults, and little is known about these effects in children. This study investigated the roles of overconfidence, overclaiming, cognitive reflection, and age in predicting children's belief in scientific myths. We measured endorsement of scientific animal myths, self-reported knowledge of animals, the tendency to overclaim animal knowledge, and cognitive reflection in children ages 7 to 10 (N = 61). No variables were found to be predictors of myth endorsement; however, secondary analyses revealed that interest in animals had a negative relationship with familiar myth endorsement and that familiarity and parent endorsement of myths were also associated with myth endorsement. These findings suggest that children have higher accuracy in discerning truth from myth if they are interested in that topic, and that children are accepting of information that has already been introduced to them, particularly by a parent, but are generally skeptical of unfamiliar information.

Children believe all sorts of myths: that if you swallow a watermelon seed, a watermelon plant will grow in your stomach; that chocolate milk comes from brown cows; or that a mouse's favorite food is cheese (Guerrero et al., 2019). Unexpectedly, so do adults. Many adults believe that goldfish have short memories, for instance, or that vaccines are linked to autism (Motta et al., 2018). So why does belief in untruths persist so strongly across ages? The existing literature suggests that overestimation of knowledge, overclaiming of knowledge, and cognitive reflection may be involved. The goal of the present study was to understand the roles of self-perceived knowledge, overclaiming, cognitive reflection, and age in children's tendency to believe in myths. I predicted that children who are younger and have high confidence in their knowledge, high tendency to overclaim, and low cognitive reflection would be more likely to endorse scientific myths.

Learning From Others

People begin to learn myths from childhood, from many different sources—peers, parents, teachers, TV shows, or, increasingly, the internet—but these beliefs all arise from testimony, or verbal or nonverbal communications that convey information (Harris et al., 2018; Lackey 2008). Empirical research into testimonial learning is still very new, but the past two decades have seen a dramatic increase in testimony research, which has shed light on a wealth of factors involved in testimony endorsement. Past research suggests that children and adults find consensus testimony—testimony given and agreed upon by a group—much more trustworthy than testimony given by a lone dissenter (Asch, 1956; Bernard et al., 2015; Corriveau & Harris, 2010). Generally, children prefer testimony from speakers with more expertise and who have a history of accuracy, while they reject claims made by inaccurate speakers (Kushnir & Koenig, 2017; Li & Yow, 2018). Children also prefer testimony from speakers of their own social group: ingroup members (Chen et al., 2013; Elashi & Mills, 2014; McDonald & Ma, 2016).

In addition to testimony and informant variables, individual characteristics of a child, such as attachment style, culture, intuition, or prior knowledge, can also influence the belief in incoming information (Chan & Tardif, 2013; Corriveau et al., 2009; Lane & Harris, 2015). The role of prior knowledge in belief has been studied relatively extensively. It is a tool that children begin to use even in infancy to make judgments: infants will stare in disbelief at a speaker who makes obviously false claims, like mislabeling a cup as a shoe, while toddlers begin to protest verbally (Harris et al., 2018; Koenig & Echols, 2003; Pea, 1982). When relevant prior knowledge is weak, however, children are more willing to believe other people's claims. When two-year-olds have weak prior knowledge, they are more likely to endorse experimenter-provided labels for a labeling task even when it conflicts with their perceptual knowledge (Jaswal & Markman, 2007). Three-year-olds are likely to trust statements made by others, even when they come from ill-intentioned strangers, when they do not have any relevant prior knowledge (Jaswal et al., 2010). Five- to eight-year-olds are observed to be more likely to endorse testimony that conflicts with their prior knowledge when that prior knowledge is weak than when it is strong (Chan & Tardiff, 2013). Sometimes, however, the exact breadth of our own knowledge eludes us.

Overconfidence

People are prone to overestimating or underestimating their knowledge or abilities. Kruger and Dunning (2000) asked college students who participated in different assessments, including evaluations of humor, logical reasoning, and grammar, to rate their perceived performance relative to their peers. Those whose actual performance on the assessments fell in the top quartile tended to underestimate their abilities relative their peers, while all other participants consistently overestimated themselves. Those who fell in the bottom quartile overestimated themselves to a greater degree than peers in any other quartile, and they were also

least accurate in assessing other people's competence. This illustrates what was coined the Dunning-Kruger effect: people with the least expertise in a subject tend to misjudge their knowledge or performance the most (Dunning, 2011). People have a hard time knowing what they do not know, and ignorance is underestimated because people cannot even conceive of the knowledge that they lack in a topic that they know very little about. Additionally, their ignorance can be masked by their belief in misinformation, which they mistake for accurate information, leading to overconfidence in their knowledge in a potentially circular way. Consequently, they have very limited insight into their own ignorance (Dunning, 2011).

Limited awareness of ignorance can have significant implications. Motta et al. (2018) found that overconfidence in one's own knowledge about autism is positively correlated with trust in non-experts, which may be what leads to increased belief in misinformation and anti-vaccine myths. Additionally, those who are less knowledgeable and more misinformed about autism tend to believe they know more than scientific and medical experts. Currently, there is very little research on the Dunning-Kruger effect in children, but this is a direction that merits investigation. It may be enlightening to explore children's confidence in their own knowledge and how it relates to belief in misinformation and myths. It seems plausible that, like adults, children experience a lack of insight into their own ignorance and overestimate their own knowledge as a result. This might consequently make them more likely to endorse epistemically unsupported claims, like myths.

Overclaiming

The unawareness of ignorance has also manifested itself in the way that people have been observed to claim to know things they cannot possibly know (Atir et al., 2015; Paulhus et al., 2003). When asked about their knowledge in 150 topics, 120 of which were real (e.g.,

behaviorism) and 30 of which were made-up foils (e.g., "choramine"), people claimed to know about 44% of the real terms and 25% of the foils (Paulhus et al., 2003; Dunning, 2011). This is known as overclaiming, and it correlates with narcissism, self-deceptive enhancement, and self-perceived knowledge (Atir et al., 2015; Paulhus et al., 2003).

Atir et al. (2015) found that people who rated themselves as highly knowledgeable in finance were more likely to claim knowledge of nonexistent financial concepts. More than 90% of participants claimed to know about at least one nonexistent term. Participants were even more likely to overclaim when they were asked to rate their knowledgeability before participating in the overclaiming task. Participants' genuine knowledge, assessed by another questionnaire, was also found to positively predict overclaiming, but self-perceived knowledge still strongly predicted overclaiming after controlling for genuine knowledge. Furthermore, when participants were explicitly warned about the presence of foils, they were less likely to overclaim, but the predictive relationship between high self-perceived knowledge and overclaiming remained unaffected (Atir et al., 2015; Paulhus et al., 2003). Adults who are confident in their knowledge are consistently more likely to overclaim. Furthermore, Atir et al. (2015) suggested that self-perceived knowledge predicts overclaiming, completely regardless of genuine knowledge. Participants who were induced to rate themselves as more knowledgeable in a domain by being given an easy quiz prior to the evaluation, as opposed to a hard quiz, were more likely to claim knowledge of made-up items pertaining to that domain.

Overclaiming is thought to be a form of self-enhancement, as overclaiming scores correspond with established self-enhancement traits (Paulhus et al., 2003). Graeff (2003) proposed another possible explanation: when people have general knowledge that they feel is relevant to a topic, they may activate a schema for that category of knowledge and mistake that sense of knowledgeability as familiarity with more specific terms or concepts within that

category, but which are in fact foils created by experimenters. Dunning (2011) described this phenomenon as a reaching around to more general knowledge. As with overconfidence, however, there is very little research into overclaiming in children. While adult overclaiming is often attributed to self-enhancement, new findings indicate that self-enhancement may have very little to do with children's tendency to overclaim, since neither children's self-perceived knowledge nor their liking of a certain topic predict overclaiming (Butler & Nelson, 2021). Further research is necessary for understanding the mechanisms driving children's overclaiming tendencies.

Cognitive Reflection

Cognitive reflection relates to the ability to think analytically. The Cognitive Reflection Test (CRT) measures cognitive reflection using questions that are designed to elicit an incorrect intuitive response to its questions and thus requiring respondents to reflect on their own reasoning in order to arrive at the correct answer, (Frederick, 2005). CRT performance is predictive of performance on other rational thinking tests, religiosity, and paranormal beliefs, among other traits (Pennycook & Rand, 2019). Baron et al. (2015) found that longer response time and higher accuracy on the test both predicted similar outcomes and suggested that poor performance on the CRT is indicative of reflective impulsivity, the unwillingness to think analytically. People who are reflectively impulsive tend not to reflect on new information and instead accept their intuitive, reflexive response to it. As a result, they are highly accepting of new information.

People who think more reflexively, as opposed to reflectively, also tend to be susceptible to the Dunning-Kruger effect (Pennycook et al., 2017). Pennycook and Rand (2019) found that adults who were more likely to judge fake news articles to be true were also more likely to

overclaim, and that these factors were both negatively correlated with CRT performance. This suggests that lower cognitive reflection may be linked to gullibility or acceptance of myths and misinformation. Similarly, Young and Shtulman (2020) found that reflective children (children who performed better on the developmental version of the CRT) were more accurate in judging scientific statements as true or false, and reflective children improved more in accuracy than reflexive children after being shown a tutorial on scientific concepts.

Conclusions

There are a number of different factors that predict how people evaluate the validity of new information. One of them may be overconfidence, which is correlated with greater trust in non-experts, less knowledge, and more misinformation (Motta et al., 2018). Another may be overclaiming, which is associated with high self-perceived knowledge (Atir et al., 2015). However, while overconfidence in and overclaiming of one's own knowledge has been observed robustly in adults, we do not know much about these phenomena in children (Atir et al., 2015; Dunning, 2011). A third variable may be cognitive reflection, which has only recently begun to be understood. Strong performance on a measure of cognitive reflection is strongly correlated with accuracy of knowledge in children, and CRT performance is correlated with inaccurate truth evaluation in adults (Pennycook & Rand, 2019; Young & Shtulman, 2020). This hints at the possibility that those who are low in cognitive reflection may be more receptive to scientific myths.

Empirical research into the awareness of ignorance and cognitive reflection is still relatively new, especially in developmental contexts, and the question remains whether they predict children's belief in myths. Here we sought to answer this question, which may offer valuable insight into the way children learn and decide what to trust.

Methods

Design Overview

The study hypothesis was that children who overestimate their knowledge, overclaim their knowledge, and perform poorly on cognitive reflection tests are more likely to believe in scientific myths about animals. The primary independent variables were confidence in knowledge, overclaiming of knowledge, cognitive reflection, and age. The primary dependent variable was belief in scientific myths. Participants were evaluated on their endorsement of myths, self-perceived knowledgeability, tendency to overclaim, and cognitive reflection, as measured by the Myth Questionnaire, Confidence Questionnaire, Child Overclaiming Questionnaire, and the developmental version of the Cognitive Reflection Test, respectively. All questionnaires except for the Cognitive Reflection Test included items related to animals in order to remain domain-specific and avoid confounding variables.

Participants

Sixty-two child participants, ages 7 to 10, were recruited at random from the University of Texas at Austin Children's Research Center database. One participant, whose data was collected in the piloting stage before the Myth Questionnaire and Child Overclaiming Questionnaire were modified to better capture myth endorsement and overclaiming, was excluded. The remaining 61 participants passed the attention checks during the Myth Questionnaire, as explained below. Of these 61 participants, 30 were female, and 31 were male. Parents were compensated with a $10 gift card and children were presented a small toy upon completion of the study. Parents signed a consent form and children signed an assent form before they could participate.

Materials and Measures

Myth Questionnaire

Participants were asked to rate eight scientific myths about animals as true or false. As an attention check, this task also included two obviously false scientific statements that participants were expected to evaluate as false and two obviously true scientific statements that participants were expected to evaluate as true. Items were presented in randomized order. A ratio of the number of myths endorsed (rated true) to the total number of myths a participant responded to served as their myth belief score.

We piloted an initial selection of ten myths and six attention check statements, as shown in Table 1, with children ages 7 to 9 to gauge general endorsement of each item. The first three items in the table were borrowed from Guerrero et al. (2019). The items marked with an asterisk were removed from the study after piloting; the remaining eight myths and four attention checks made up the Myth Questionnaire. Item 2 was removed because its wording might be interpreted ambiguously, while Item 9 was removed to avoid floor or ceiling effects, as 92% of participants in piloting endorsed it. By contrast, all other myths received between 25% and 75% endorsement. Item 13 was removed because 42% of participants stated that it was true, and item 14 was removed because 75% of participants stated that it was false, which meant they failed to serve as attention checks that elicited *false* and *true* as their unanimous responses, respectively. After a second round of piloting, in which ten children ages 8 and 9 completed the full survey, Item 8, "Dogs are colorblind," was changed to "Dogs can only see in black and white" because the former version of the statement could not be said to be definitively false.

Table 1

Animal Myths and Attention Checks Piloted

Item #	Item	Status
1	Goldfish have really short memories.	Myth
*2	Cheese is a mouse's favorite food.	Myth
3	Camels store water in their humps.	Myth
4	Ostriches bury their heads in the sand when they're scared.	Myth
5	Mom birds will abandon their babies if the babies have been touched by humans.	Myth
6	Touching a toad will give you warts.	Myth
7	Bats are blind.	Myth
8	Dogs are colorblind.	Myth
*9	Chameleons change color to blend into their surroundings.	Myth
10	Chocolate milk comes from brown cows.	Myth
11	Penguins can fly.	Attention check (False)
12	Cats have three legs.	Attention check (False)
*13	Alligators live in the forest.	Attention check (False)
*14	Rattlesnakes are venomous.	Attention check (True)
15	Baby birds hatch from eggs.	Attention check (True)
16	Turtles live in shells.	Attention check (True)

Note: *Removed from the task after piloting.

Following presentation of the items in Table 1, participants were asked if they had ever heard, seen, or read about each myth before ("Before today, have you ever heard somebody say that…"; "Have you ever seen it on TV or read it in a book?"). These data were collected purely for exploratory purposes. The ratio of myths that they had heard of before and endorsed to the total number of myths that they had heard of before yielded a familiar myth belief score.

Confidence Questionnaire

In the Confidence Questionnaire that was created for this study, participants self-reported their level of knowledge of animals relative to other children their age ("How much do you know about animals compared to other kids your age?"). Participant responses were measured on a 5-point Likert scale (0 = *know nothing at all* to 4 = *know everything*). The response value ranging

from 0 to 4 was used for their self-perceived knowledge score. Participants then reported their level of interest in animals ("How interested are you in animals?"). This was also measured on a 5-point Likert scale (0 = *not at all* to 4 = *totally*), and the response value ranging from 0 to 4 was used for their interest score.

Child Overclaiming Questionnaire – Animal Topic

To measure overclaiming of animal knowledge, the present study borrowed the animal topic items from the Child Overclaiming Questionnaire (OCQ) developed by Butler and Nelson (2021), which has convergent validity in evaluating traits measured by the established adult Overclaiming Questionnaire. Items from this questionnaire can be found in Table 2. Participants were asked to rate how familiar they were with the nine items in randomized order, three of which were foils—nonexistent animals—though experimenters did not inform participants of the presence of foils. Responses were measured on a 5-point scale (0 = *never heard of it* to 4 = *very familiar*) and categorized by signal detection analysis for scoring. Real animals that participants claimed knowledge of (by giving a response ranging from 1 to 4) counted as hits. Foils that participants claimed knowledge of counted as false alarms. The number of false alarms yielded a pure false alarm score ranging from 0 to 3, which served as a measure of overclaiming.

Table 2

Animal Topic Items on the Child OCQ

Item	Status
Platypus	Real
Kangaroo	Real
Bilby	Real
Spider	Real
Rabbit	Real
Zebra	Real
Ploling	Foil (Nonexistent)
Crosoda	Foil (Nonexistent)

Donbura	Foil (Nonexistent)

Cognitive Reflection Test – Developmental Version

Cognitive reflection was measured by the developmental version of the Cognitive Reflection Test (see Table 3), adapted by Young et al. (2018) from the adult Cognitive Reflection Test developed by Frederick (2005). The developmental CRT has acceptable reliability (Young et al., 2018). A participant's total number of correct responses to the developmental CRT became their cognitive reflection score.

Table 3

Items on the Developmental CRT

Item	Correct Answer	Intuitive Answer
If you're running a race and you pass the person in second place, what place are you in?	Second	First
Emily's father has three daughters. The first two are named Monday and Tuesday. What is the third daughter's name?	Emily	Wednesday
A farmer has 5 sheep, all but 3 run away. How many are left?	Three	Two
If there are 3 apples and you take away 2, how many do you have?	Two	One
What do cows drink?	Water	Milk
What weighs more, a pound of rocks or a pound of feathers?	Same	A pound of rocks
What hatches from a butterfly egg?	Caterpillar	Butterfly
Who makes Christmas presents at the North Pole?	Elves	Santa
Anna is playing foursquare with her three friends: Eeny, Meeny, and Miny. Who is the fourth player?	Anna	Mo

Parent Questionnaire

A parent of each participant was asked if they had ever told their child that each of the eight items on the Myth Questionnaire was true. These responses let us know if the participants

were ever exposed to these myths at home, and the questionnaire was purely for exploratory purposes.

Procedures

After participants and their parents provided informed consent, experimenters invited families to participate in the study virtually over the video platform Zoom. In Zoom meetings, an experimenter shared their screen, which displayed all questionnaires on an online Qualtrics survey, and led the participant and their parent through each questionnaire in the survey. First, parents answered several demographic questions. They were then told that they could either leave or stay, given they did not interfere with their child's answers, for the upcoming tasks. Next, participants evaluated whether a series of scientific myths were true or false in the Myth Questionnaire. During this questionnaire, they were also asked if they had heard of each myth before. Participants then completed the Confidence Questionnaire to determine how confident they were in their animal knowledge. This questionnaire also measured their interest in animals, as children have sometimes been found to overclaim more for topics they liked (Butler & Nelson, 2021). Participants then completed the Child Overclaiming Questionnaire. Finally, they took the developmental Cognitive Reflection Test. After their child completed all tasks, parents were called back to complete the Parent Questionnaire and be debriefed. Families were compensated afterwards.

Statistical Analysis

A hierarchical linear regression was conducted with age in months, CRT scores, self-perceived knowledge scores, and overclaiming scores entered in that order as predictors of myth belief, each in a different block. Multicollinearity between independent variables was checked for by inspecting a correlation matrix as well as VIF and tolerance statistics. No collinearity was

detected. In a secondary analysis, a hierarchical linear regression was conducted with age in months, CRT scores, self-perceived knowledge, and overclaiming scores entered in that order as predictors of belief in familiar myths—only those myths which participants indicated they had heard, seen, or read about before—to see if results vary from overall myth belief. In exploratory analyses, interest in animals was added as a predictor in both regressions, and chi-square tests of independence were conducted on myth familiarity and myth endorsement, as well as parental endorsement and child endorsement of myths.

Results

Data analysis began with an examination of descriptive data. Descriptive information for primary independent variables is provided in Table 4.

Table 4

Descriptive Information for Primary Independent Variables

Variable	M	SD
Age in months	107	12.90
Cognitive reflection	2.98	1.62
Self-perceived animal knowledge	2.10	.85
Overclaiming of animal knowledge	.39	.80

To investigate the predictive relationship between myth endorsement and self-perceived knowledge, overclaiming, cognitive reflection, and age, a hierarchical linear regression was conducted in four stages with myth endorsement as the dependent variable. Prior to running the regression, we examined correlations between our predictor variables and discovered a strong positive correlation between age and cognitive reflection, $r(59) = .55$, $p < .001$. However,

collinearity statistics indicated that collinearity was not a concern (age, tolerance = .68, VIF = 1.46; cognitive reflection, tolerance = .70, VIF = 1.44).

At the first stage of the hierarchical linear regression, age in months was analyzed as a predictor variable to control for age. The results of the first stage revealed that age did not contribute significantly to the model, $F(1, 59) = .21$, $p = .65$. Additionally, the R^2 value of less than .01 suggests that age accounts for less than 1% of the variation in myth endorsement, which means that over 99% of the variation in myth endorsement cannot be explained by age and cognitive reflection alone. In stage two, cognitive reflection was added to the regression. The change in R^2 of less than .01 suggests that the addition of cognitive reflection to the model in stage one accounts for less than 1% of the variation in myth endorsement, which means that over 99% of the variation in myth endorsement cannot be explained by age and cognitive reflection alone. This change in R^2 was not significant, $p = .49$. In stage three, self-perceived knowledge was added to the regression. The change in R^2 of .01 suggests that the addition of self-perceived knowledge to the model accounts for an additional 1% of the variation in myth endorsement. This change in R^2 was not significant, $p = .45$. In stage four, overclaiming was added to the regression. The change in R^2 of less than .01 suggests that the addition of overclaiming to the model explains less than 1% of additional variation in myth endorsement. This change in R^2 was not significant, $p = .59$. Of age ($F(1, 56) = .03$, $p = .87$), cognitive reflection ($F(1, 56) = .58$, $p = .45$), self-perceived knowledge ($F(1, 56) = .75$, $p = .39$), and overclaiming ($F(1, 56) = .29$, $p = .59$), none were significant predictors of myth endorsement. Together, they accounted for 2.67% of variance in myth endorsement. A summary of these regression models can be found in Table 5.

Table 5

Summary of Hierarchical Regression Analysis of Predictors of Myth Endorsement

Predictor Variable	B	SE B	R^2	ΔR^2
Step 1			.00	
Age in months	7.93e-4	.00		
Step 2			.01	.01
Age in months	-2.56e-6	.00		
Cognitive reflection	.01	.02		
Step 3			.15	.01
Age in months	-1.25e-4	.00		
Cognitive reflection	.01	.02		
Self-perceived animal knowledge	.02	.03		
Step 4			.16	.01
Age in months	-3.66e-4	.00		
Cognitive reflection	.01	.02		
Self-perceived animal knowledge	.02	.03		
Overclaiming of animal knowledge	-.02	.03		
Step 5			.18	.01
Age in months	-4.51e-4	.00		
Cognitive reflection	.01	.02		
Self-perceived animal knowledge	.03	.03		
Overclaiming of animal knowledge	-.01	.03		
Interest in animals	-.01	.02		

Note. Step 5 was part of secondary analyses.

In a secondary analysis, self-reported interest in animals was added to the model as a predictor variable in a fifth stage. This addition did not significantly explain any additional variation in myth endorsement ($\Delta R^2 < .01$, $p = .59$), and with all five predictor variables in the model, there were no significant predictors of myth endorsement (see Table 5).

To see if any of these variables were predictors of endorsement of only familiar myths, another hierarchical regression was conducted with familiar myth endorsement as the dependent variable. In the first stage, age was added as a predictor variable, which accounted for less than 1% of the variation in endorsement of familiar myths. In the second stage, cognitive reflection was added, which explained an additional .04% of the variation in endorsement of familiar myths (p = .13). In the third stage, self-perceived knowledge was added, which explained an additional .02% of the variation in endorsement of familiar myths (p = .32). Overclaiming was added in the fourth stage, which explained an additional .07% of the variation in endorsement of familiar myths. At this stage, overclaiming was the only significant predictor of familiar myth endorsement, R^2 = .14, $F(1, 54) = 4.39$, p = .041. The slope of this linear relationship was negative, which meant that familiar myth endorsement decreased with increased overclaiming. Interest in animals was added in the fifth stage, which explained an additional .09% of the variation in endorsement of familiar myths. At this stage, overclaiming no longer significantly predicted familiar myth endorsement, while interest in animals became the only significant predictor, R^2 = .22, $F(1, 53) = 6.10$, p = .017. The slope of this linear relationship was also negative, which meant that familiar myth endorsement decreased with increased interest in animals. See Table 6 for a summary of these regression models.

Table 6

Summary of Hierarchical Regression Analysis of Predictors of Familiar Myth Endorsement

Predictor Variable	B	SE B	R^2	ΔR^2
Step 1			.00	
Age in months	7.93e-4	.00		
Step 2			.01	.01
Age in months	-2.56e-6	.00		

Cognitive reflection	.01	.02		
Step 3			.15	.01
Age in months	-1.25e-4	.00		
Cognitive reflection	.01	.02		
Self-perceived animal knowledge	.02	.03		
Step 4			.16	.01*
Age in months	-3.66e-4	.00		
Cognitive reflection	.01	.02		
Self-perceived animal knowledge	.02	.03		
Overclaiming of animal knowledge	-.02*	.03		
Step 5			.18	.01*
Age in months	-4.51e-4	.00		
Cognitive reflection	.01	.02		
Self-perceived animal knowledge	.03	.03		
Overclaiming of animal knowledge	-.01	.03		
Interest in animals	-.01*	.02		

Note. *$p < .05$

Further secondary analyses revealed a strong positive correlation between endorsement of all myths and endorsement of familiar myths only, $r(59) = .52$, $p < .001$. Additionally, a chi-square test of independence revealed a significant association between familiarity with a myth and endorsement of the myth, $\chi^2(1) = 95.31$, $p < .001$. This means that myths that were familiar were more likely to be endorsed, and myths that were unfamiliar were more likely to be rejected. Another chi-square test of independence revealed a significant association between a parent telling their child a myth is true and the child's endorsement of the myth, $\chi^2(1) = 22.73$, $p < .001$. This means that a child is more likely to endorse a myth that a parent told them was true.

Discussion

This study aimed to identify predictors of myth belief in children. Our findings suggest that self-perceived knowledge, overclaiming, cognitive reflection, and age are unrelated to

overall myth endorsement in children, so our hypothesis that each of these variables would predict myth endorsement was unsupported. This is not entirely consistent with previous findings, which suggest that cognitively reflective children had better accuracy at identifying true scientific statements, or that people with the most inflated self-perceived expertise possess the least expertise in a topic (Kruger & Dunning, 2000; Young & Shtulman, 2020).

When specifically examining the endorsement of myths that are familiar to children, interest in animals predicted endorsement above and beyond self-perceived knowledge, overclaiming, cognitive reflection, and age. A possible explanation is that children who are highly interested in animals are less likely to believe that animal myths they have heard before are true because they are more likely to think critically about these myths and seek out information about animals from sources beyond popular science, where these myths are most likely to occur. These alternative sources provide more detailed and accurate information about animals, which debunks these myths. By contrast, children who are less interested in animals are less likely to seek out these alternative information sources and tend to readily accept myths they are exposed to.

Familiarity with a myth and parent endorsement of a myth were both linked to children's endorsement of that myth. That children were more likely to endorse myths that they were familiar with might be related to the illusory truth effect, which is the tendency for repeated or familiar statements to be perceived as more true (Bacon, 1979). The familiarity of repeated statements provides retrieval fluency, which allows participants to retrieve these statements from their memory with more ease; when this occurs, they tend to identify these statements as true (Fazio et al., 2015). Additionally, unfamiliar statements were more likely to be rejected, which suggests that children are generally skeptical of unfamiliar information. This can change when information is presented to them by a familiar informant; children prefer to obtain information

from and are more likely to endorse information from a familiar teacher than an unfamiliar teacher (Corriveau & Harris, 2009). This is in agreement with our finding that when children are told by their parents, a familiar figure, that a myth is true, they will accept and echo that endorsement.

Although it was not a part of our main data analyses, there was a positive correlation between age and cognitive reflection. This is also in agreement with previous findings, which suggest that children become better at analytical thinking as they get older (Young et al., 2018).

One imitation of the present study was the relatively small sample size, which was a result of time constraints. It is possible that different relationships might be detected in a larger sample of participants. Another limitation of this study was that overall, it captured relatively little overclaiming of knowledge, with relatively little variability. A large majority of participants did not overclaim at all. One possible explanation is that the order of the questionnaires drove down the tendency to overclaim. The feeling of knowledgeability is associated with the tendency to overclaim (Atir et al., 2015). Because experimenters presented the Myth Questionnaire first, participants may have come across items they were unsure of, causing them to feel less knowledgeable about animals than they otherwise would have. Consequently, when they were then presented with the Overclaiming Questionnaire, the feeling of low knowledgeability made them less likely to overclaim their knowledge. Future research should counterbalance the order of tasks to avoid this order effect. By better capturing overclaiming, we might be able to draw new connections between children's tendency to overclaim knowledge, their self-perceived knowledgeability, and their belief in myths.

Finally, another limitation of this study was that the Parent Questionnaire could not accurately capture all parent endorsement of myths. Many parents struggled to remember

whether they had explicitly told their child that certain myths were true or false, and they were also unable to answer for their child's other parent or guardian, or any other familiar informants in the child's life. Our findings suggest that a more thorough investigation of parental myth endorsement in the future may yield further insights. It may also be helpful to conduct this study with adult participants to see if endorsement of myths persists throughout the lifetime.

To conclude, of age, cognitive reflection, self-perceived knowledge, and overclaiming, none were predictive of myth endorsement. However, domain interest was revealed to have a negative relationship with children's belief in myths that were familiar to them. Additionally, both familiarity with a myth and parent endorsement of a myth were associated with a child's endorsement of that myth, meaning that children tend to attribute truth to information they have heard before and to information provided by a parent. These findings provide insight regarding the ways that children learn and perceive novel or new information.

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