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The role of accuracy in children’s judgments of experts’ knowledge.

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THE ROLE OF ACCURACY IN CHILDREN'S JUDGMENTS OF EXPERTS' KNOWLEDGE

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DEDICATION

This dissertation is dedicated to my parents, Gregg and Mary Williams, whose continued support along my academic journey, from pre-k to graduate school, is credited for all that I have achieved. And to my fiancé, Joseph Gant, who's love and patience has provided me with the support needed to achieve my goals.

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ABSTRACT

THE ROLE OF ACCURACY IN CHILDREN'S JUDGMENTS OF EXPERTS' KNOWLEDGE

Allison J. Williams

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Children prefer to trust people with expertise and people who are accurate. Because experts make mistakes and give incorrect information (e.g., predictions and diagnoses), this dissertation explores children's judgments of knowledge for experts who provide inaccurate information. Across two studies, 6- to 9-years-olds (N = 160) were introduced to two experts in different domains (doctor and mechanic) and rated how much each expert knows about their relevant domain. Then, over four consecutive trials, participants heard one expert give inaccurate answers to easy questions in their domain. After each trial, children explained why they believed the expert gave inaccurate answers and rated both experts' level of knowledge. Finally, children chose which expert knew more about the two relevant domains of expertise. Study 2 included an additional measure of how children rely on accuracy and expertise when given a task that required expertise (i.e., assigning questions to be answered by the experts or themselves about bodies and cars).

Across both studies, children decreased their knowledge ratings for the inaccurate expert as they heard more inaccurate answers. In Study 1, children's explanations predicted their knowledge ratings, such that children who described the expert as having

a negative trait (e.g., not being smart) gave lower knowledge ratings and children who endorsed the expert's inaccurate statements gave higher knowledge ratings. In the additional question delegation measure in Study 2, children assigned relevant questions in the inaccurate expert's domain to the inaccurate expert and relevant questions in the control expert's domain to the control expert, and rarely assigned questions to themselves. When justifying why they delegated questions to the inaccurate expert, children referred to the inaccurate expert's relevant expertise. Also, they indicated that the other expert and/or they did not have relevant knowledge.

Together, these studies demonstrate that children weigh accuracy and expertise differently depending on the task at hand. They also provide evidence for individual differences in whether children prioritize an informant's accuracy or expertise. These findings suggest that caregivers should discuss circumstances where experts could be inaccurate and encourage children to listen and think critically about the answers people provide.

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CHAPTER I

INTRODUCTION AND REVIEW OF LITERATURE

Experts are individuals who have specialized knowledge or mastery in a particular domain or task. However, that does not make them all knowing, and sometimes they make mistakes. In the United States, doctors misdiagnose about 5% of their cases each year when treating adults for outpatient care (Singh et al., 2014). When political experts were asked to make hundreds of predictions for future political outcomes, the experts made predictions above chance, however, they were not 100% accurate (Tetlock, 2006). Also, when expert gamers were asked to recall features of new gaming consoles, the experts did not accurately recall all of the features (Mehta et al., 2011). Although many research studies have investigated children's understanding of expertise (as will be discussed below), none have investigated children's judgments of an expert's knowledge once the expert provides inaccurate information. The studies in this dissertation will address this gap in the literature and investigate potential developmental differences in children's judgments and reasoning across early elementary school.

By 3-years-old, children show an understanding of expertise when seeking out information, and this understanding increases with age. In Lutz and Keil's (2002) study, 3- to 5-year-olds were introduced to two experts (i.e., a doctor and a car mechanic) and asked questions about who would know more about a specific topic. The questions were separated into three categories: 1) stereotypical roles (i.e., knowledge that a person can observe a doctor or car mechanic using), 2) normal functioning (i.e., knowledge referring to the domain of expertise, such as a doctor knowing about people's bodies) and 3) underlying principles (i.e., knowledge of scientific principles that are involved within each domain of expertise, such as a doctor knowing about other living kinds beyond just people). Three-year-old children were able to correctly match the expert to questions about stereotypical roles more often than chance. However, it was not until 4-years-old that children also began to correctly match the expert with questions about normal functioning and underlying principles, and not until 5-years-old that children correctly matched the expert with questions about normal functioning and underlying principles. These findings suggests that children's ability to match an expert with questions about the expert's domain of knowledge improves with age.

Further research has also demonstrated that, by 4-years-old, children begin to show an understanding of the structure of domain-specific knowledge that underlies expertise. In a study with 4- and 5-year-olds, children were introduced to three experts (i.e., doctor, firefighter, and farmer) and were asked which expert could answer questions involving three corresponding domains (i.e., medicine, firefighting, and farming; Aguiar et al., 2012). Four-year-olds selected the expert more often than chance for each domain. However, 5-year-olds were significantly better than the younger participants, suggesting that as children get older, they are better able to understand that experts have knowledge involving specific topics relevant to their domain.

Not only do children match experts with their specific domains of knowledge, but they also trust experts when seeking and endorsing information (Koenig & Jaswal, 2011; Kushnir et al., 2013; Nguyen, 2012; Sobel & Corriveau, 2010). In the epistemic trust literature, trust has been measured in two ways: endorsement and preference (see Tong et al., 2020 for review). Endorsement is typically measured by having two informants give conflicting information and asking the participant to pick which informant gave the correct information. To measure preference for an informant, the participant is asked which informant they would direct a question to in the future or which informant would know more about a topic. Although Lutz and Keil (2002) and Aguiar et al. (2012) measured preference for each informant, these studies did not include measurements of how children evaluated the information provided by the informants (i.e., endorsements).

The inclusion of endorsement items in selective trust studies allows for a better understanding of children's beliefs about experts and how children trust experts. For example, when two experts (i.e., an eagle expert and bicycle expert) gave conflicting labels to novel objects in 3 different domains (i.e., birds, vehicles, and neutral items), 4- and 5-year-olds endorsed labels given by the eagle expert in the bird domain and the bicycle expert in the vehicle domain more often than chance (Landrum et al., 2013; Experiment 1). Four- and 5-year-olds also did not endorse one expert over the other in the neutral domain. These results demonstrate that children can monitor the relevance of informants' expertise and use expertise as an indicator of whom to trust.

Children also rely on an informant's expertise when revising their judgments. In a study with 3- to 6-year-olds, participants were introduced to two informants who could both correctly name familiar animals, but only one could name an unfamiliar animal while the other was ignorant (Rakoczy et al., 2015; Experiment 1). Children were then asked to judge how much food (i.e., piles of hay) was needed to feed the animal. Children made initial judgments (e.g., 2 piles) and then one of the informants gave a different judgment (e.g., 4 piles). Children were then asked to provide a final answer. In this study, children were more likely to revise their judgment to match that of the knowledgeable informant than the ignorant informant. Also, children's ratings of the informant's competence mediated the revisions, such that children who judged the informant as competent were more likely to revise their judgments than children who did not judge the informant as competent.

Although children as young as 3-years-old can use expertise to help guide their trust, learning, and judgments, expertise is not the only characteristic children monitor when deciding from whom they want to seek out information. They also use characteristics such as familiarity (e.g., Corriveau et al., 2009; Danovitch & Mills, 2014), benevolence (e.g., Landrum et al., 2013; Lane et al., 2013; Mascaro & Sperber, 2009), and accuracy (e.g., Birch et al., 2008; Harris & Corriveau, 2011; Pasquini et al., 2007; Vanderbilt et al., 2014). Landrum et al. (2013) demonstrated that when expertise conflicts with benevolence, children's trust in experts begins to change and children may rely on benevolent characteristics more than expertise when deciding who to trust. For example, when an expert was perceived as mean (i.e., crossing his arms and talking in a grumpy voice), children were less likely to endorse information provided by the expert. Instead, they preferred to endorse information from a nice informant who did not have relevant expertise. Similarly, Boseovski and Thurman (2014) found that 3- to 5-year-olds endorsed an expert's (i.e., zookeeper's) testimony more often than a maternal figure's testimony, regardless of whether the testimony was positive (e.g., an animal described as friendly) or negative (e.g., an animal described as dangerous). However, 6- to 7-year-olds were less likely to endorse an expert's claim when the expert provided negative testimony about an unknown animal. These studies suggest that children do not always endorse information provided by experts. Instead, children evaluate other characteristics of the expert and also evaluate the type of statements the experts make.

An informant’s perceived competence can not only be manipulated by labeling an informant as an expert or not, but it can also be manipulated by changing the history of accuracy of the informant. In these studies, one informant gives correct labels to familiar objects over a few trials and the other informant either gives incorrect labels or is ignorant about the objects’ labels (Clément et al., 2004; Jaswal & Neely, 2006; Koenig et al., 2004; Koenig & Harris, 2005; Pasquini et al., 2007). Children as young as 3-years-old can track the accuracy of these informants and endorse and prefer novel information from the previously accurate informants more often than the inaccurate or ignorant informants. Additional selective trust studies found that children displayed this preference even a week after observing an informant’s inaccuracy (Corriveau & Harris, 2009b) and that the amount of inaccurate information provided by an informant also influences children’s preferences (Pasquini et al., 2007). Specifically, by age 7, children only need a single encounter with an inaccurate informant to use this information to make their trust decisions (Fitneva & Dunfield, 2010).

Although previous research has not directly studied the interaction of accuracy and expertise, some research has looked at the interaction between accuracy and other characteristics, such as familiarity (e.g., Corriveau & Harris, 2009a; Danovitch & Mills, 2014). Corriveau and Harris (2009a) found that when familiarity was crossed with accuracy, 3-, 4-, and 5-year-olds tracked accuracy beyond the influence of familiarity. When there was no history of accuracy/inaccuracy provided, children preferred to ask for and endorse information provided by their familiar teacher. However, once the participants were shown that the familiar teacher was inaccurate, 4- and 5-year-olds preferred to ask for and endorse information from an unfamiliar teacher who was accurate. This study suggests that accuracy plays a strong role in children's trust in informants. It is important to note that in early childhood education, teachers are key figures of epistemic authority for children (Olson & Bruner, 1996). Because children might perceive their teachers to be knowledgeable and have expertise, it is possible that when weighing both inaccuracy and expertise, inaccuracy plays a larger role in children's judgments. However, because a teacher's expertise is often in an ambiguous domain (i.e., pedagogy), children might not recognize the teacher's specific expertise and believe their knowledge is more broad. The current study aims to measure the relation between expertise and accuracy directly by including familiar experts that children as young as 5-years-old can recognize and to whom they attribute domain specific knowledge (Lutz & Keil, 2002).

Further research on selective trust including experts has looked at other characteristics of the expert's statements such as counter-intuitiveness (Lane & Harris, 2015) and conflicting with a consensus (Boseovski et al., 2017). Replicating previous work, children ages 3 to 8 trusted a relevant expert more often than an irrelevant expert when endorsing claims about novel entities (Lane & Harris, 2015). Interestingly, when the relevant experts made a claim that was counterintuitive (e.g., an animal expert claiming that an animal can see through things or never has to eat anything), children 5- to 8-years-old were less accepting of the expert's claims compared to younger children. The children may have believed the counterintuitive claims were inaccurate and therefore trusted the relevant expert less than the irrelevant expert who provided the intuitive claims. This finding suggests that older children may be more sensitive to what an expert says than to whether their expertise is relevant to the domain of knowledge in question. In another study, children 4- to 8-years-old heard claims from an expert and three laypersons who disagreed with the expert's claims (Boseovski et al., 2017). Although it was possible that children could have judged the expert's claims as inaccurate because a consensus of three non-experts disagreed with the claim, children endorsed the expert's claims and preferred to seek out information from him in the future regardless of the consensus' conflicting claim. This finding suggests that children may continue to believe an expert is knowledgeable about their domain of expertise even after hearing multiple conflicting claims. The limitations of the studies described above are that the characteristics of experts they define as counter-intuitive (i.e., contrary to common-sense) and anti-consensus (i.e., against the general agreement) could be understood by children as inaccuracy. Children are skeptical of counter-intuitive claims (Lane & Harris, 2014) and therefore might believe the expert's claims to be inaccurate. Also, children are more likely to believe information provided by multiple people rather than a single person and therefore they might also believe the expert to be inaccurate. The current study aims to directly measure children's understanding of experts who are inaccurate.

Current Studies

The current studies used a mixed factorial study design to explore the influence of an informant's history of inaccuracy on children's preference for the expert and their judgments of the informant's knowledge. The methods and analyses were preregistered with the Open Science Framework (Study 1:

https://osf.io/u2g3w/?view_only=7ed2be2b56d34f7097381c260a477c21; Study 2: https://osf.io/8rqgj/?view_only=7c68ddd2994145389275a14fe6d778bb).

Participants were ages 6 to 9 for several reasons. First, although research has shown that, by 3-years-old, children have an understanding of expertise, this understanding improves with age (Landrum et al., 2013). These studies rely on children having a strong understanding of expertise and belief in experts having high levels of knowledge. Second, in order to use the numerical rating scale described later in the methods, children needed to have good number sense. Children usually receive their first formal instruction in arithmetic in kindergarten. To make sure that children in my study would not only be able to label the values on the number line, but also have the number sense to know the quantities each number holds and their relation as more or less to one another, participants were 6-years-old or older. Third, previous research on children's trust in inaccurate informants has shown no difference between 4- and 7-year-olds' responses (Ronfard & Lane, 2019); however, adults show a different pattern of results than 4- to 7-year-olds, such that adults' gradually grew more distrusting while children quickly distrusted a repeatedly inaccurate informant. It is possible that including a slightly older age group (8- and 9-year-olds) could reveal a significant difference in children's judgments of inaccurate experts between age groups. Thus, the current studies included 2 age-groups, 6- through 7-year-olds and 8- through 9-year-olds.

Recent research using the selective trust paradigm has found individual differences in children's preferences (e.g., Cossette et al., 2020; Juteau et al., 2019). Therefore, researchers suggest using alternative methods of measuring children's preference and beliefs about individuals who provide testimony and have different epistemic characteristics (Hermes et al., 2018; Guerrero et al., 2020; Juteau et al., 2019). The current studies include some methods from the selective trust literature (i.e., asking children “who knows more about X?”), but also integrate a new measure of knowledgeability (i.e., asking children to rate how much the expert knows about a topic). Children in both studies were asked which expert (i.e., a doctor and a mechanic) knew more about each domain of expertise (i.e., bodies and cars) and also rated how much they believed the two experts knew about their relative domains of expertise. Then, across 4 consecutive trials, children heard one expert provide an inaccurate answer to an experimenter’s question. After each inaccurate answer, children were asked why they believed the expert said the specific statement and again rated how much each expert knew about their relative domain of expertise. After the 4 inaccurate trials, children were asked again which expert knew more about each domain of expertise.

Based on the existing selective trust research (e.g., Aguiar et al., 2012; Lutz & Keil, 2002), I predicted that children would rate the expert as having a high level of knowledge in that domain before hearing any inaccurate answers. However, because children are sensitive to an informant’s history of inaccuracy (e.g., Corriveau & Harris, 2009b; Pasquini et al., 2007), across the 4 trials, children were expected to decrease their knowledge rating of the inaccurate expert. Overall, older children were expected to rate the inaccurate expert as having a lower amount of knowledge in their relevant domain than younger children. However, participants were expected to judge the control expert (i.e., the expert who does not provide any information) as having knowledge in both the related and unrelated domains after observing the inaccurate expert give incorrect answers over multiple trials. A recent review by Marble and Boseovski (2020) argues that a limitation in research on children’s selective social learning is that much of the literature claims to include a “neutral informant.” However, sometimes this informant provides other testimony (instead of providing useful information e.g., “this is a dog”, the informant provides random information e.g., “this is nice”) that although intended to be neutral, gives children some information about that informant (e.g., they say positive things; Koenig & Jaswal, 2011). To better understand inaccuracy specifically, the control expert was a neutral control, such that he did not provide any information that could influence children’s perceptions of him other than being described as an expert in his domain.

Along with judging the expert’s amount of knowledge after hearing each incorrect answer, children were prompted to explain why the expert gave inaccurate answers. In Study 1, children gave an open-ended explanation and, in Study 2, children chose between two explanations. Some studies have asked children to explain why they preferred to direct their question to one expert over another (e.g., Butler et al., 2020; Williams & Danovitch, 2019), why they believe one informant to be correct (e.g., Guerrero et al., 2017), or given children a choice between two explanations for why an informant gave an inaccurate answer (e.g., Corriveau & Harris, 2009a; Hermansen et al., 2021, Exp. 2; Ronfard & Lane, 2019). However, I am unaware of any studies that ask children to give open-ended explanations for why the informant said what they did. Ronfard and Lane (2019) offered a forced-choice explanation for why the informant gave an inaccurate answer and asked 4- to 7-year-olds if an informant provided an inaccurate answer because of a mistake or on purpose. The results showed that older children (5.5- to 7-year-olds) were more likely to say the inaccurate information was intentional (i.e., on purpose) than younger children (4 to 5.5-year-olds). Because Study 1 uses an open-ended format, it was unclear whether the children in this study (i.e., older than 5.5 years) would attribute intent without being prompted with a forced-choice. Guerrero et al. (2017) did ask children an open-ended question; however, it was to explain why they believed the expert was right, not why the expert said a specific answer. They found that children's responses fell into three categories: 1) knowledge attributed to the informant (e.g., saying the informant knows about the topic), 2) commenting on the object referred to in the testimony (e.g., seeing a picture of the object and describing a physical quality of it), and 3) circular or undifferentiated responses with no additional reasons (e.g., simply repeating the testimony of the informant). Because the informants in the current studies would be giving obviously wrong answers, I predicted that children would produce opposite explanations of the first and third categories used in Guerrero et al. (2017) when asked why the expert said the answer (e.g., *not* attributing knowledge to the informant and saying the testimony is wrong rather than simply repeating it).

Across two studies, children rated an expert's knowledge across multiple trials. I predicted there to be an influence of the positivity bias on children's judgments of the expert's knowledge. The positivity bias is the idea that children pay attention to and process information selectively to have a positive view of themselves and/or others. Previous research suggests that a positivity bias in social judgments (e.g., judging if a person is mean or nice) emerges as early as 3-years-old, peaks in middle childhood, and decreases by ages 10 to 11 (see Boseovski, 2010, for a review). Also, previous research has shown that when given positive information about an individual (i.e., they are nice), 3- to 6-year-olds only need one piece of evidence to judge that individual as having a positive trait. However, when given negative information about an individual (i.e., they are mean) children need multiple pieces of evidence before they label that individual with a negative trait (Boseovski & Lee, 2006). Because the current studies included negatively valenced judgments (i.e., rating that the individual has low knowledge), I expected children to decrease their knowledge ratings most significantly after they received multiple examples of inaccuracy. Specifically, because the positivity bias is the strongest in middle childhood, I hypothesized that 6- and 7-year-olds would show the largest decrease in their knowledge rating of the expert after hearing 3 or 4 inaccurate answers, while 8- and 9-year-olds would only need to hear 1 or 2 inaccurate answers before decreasing their knowledge rating significantly. The positivity bias would also relate to children's explanations for why the expert said the inaccurate information. I predicted older children would make more negative explanations (e.g., the expert does not know anything) than younger children and that children who made more negative explanations would rate the expert as having less knowledge than children who did not give negative explanations or gave fewer negative explanations.

Study 2 replicates the results of Study 1 and examined how children's opinions about the inaccurate expert relate to their behavior when they need to rely on expertise to win a game. Children were provided the same information as in Study 1, and then played a game that required the expertise of both experts (inaccurate and control). As mentioned previously, Study 2 also further examined children's explanations for the inaccurate answers provided by the expert by making children choose from the two most frequently produced explanations from Study 1.

Theoretical and Practical Significance

Children are social learners and much of the previous literature has suggested that children not only understand expertise, but they also rely on an individual's expertise to help learn about certain topics. However, in real life, experts do not always provide the correct answer. It is important to further understand what children think about experts who provide inaccurate information. These studies will demonstrate how an informant's accuracy and expertise influence children's judgments of the informant's knowledge. The current studies will add to the large literature on children's social learning and expertise (see Marble & Boseovski, 2020 for a review). Marble and Boseovski (2020) suggest that when children make social learning judgments (e.g., endorsement of information), children consider cues of knowledge (e.g., expertise, accuracy, consensus) as well as evaluate information at both the person level (e.g., traits such as in-group status) and content level (e.g., valence of information provided). The current studies further investigated this theory of social learning by examining children's judgments of the expert overall (knowledge attribution) and at the content level (explaining why the expert said the inaccurate answer).

CHAPTER II

STUDY 1

Methods

Participants

The minimum number of participants required was determined by an ANOVA: Repeated Measures, within-between interaction power analysis using G*Power (Faul et al., 2007). The analysis indicated that a sample size of 80 would have adequate power to detect a significant interaction with a small to moderate effect size of effect size of .15 (with power of .8, and an alpha error probability of .05). Participants included 40 6- to 7-year-olds (20 males, 20 females; M_{age} = 7.04, *SD* = .09) and 40 8- to 9-year-olds (22 males, 18 females; M_{age} = 8.98, *SD* = .09). Four additional participants were excluded from analysis. Two 6-year-olds failed the scale training questions and were unable to maintain attention on the task, and one 7-year-old and one 8-year-old were receiving input from siblings. Seventy-nine percent of parents identified their child as White/Caucasian, 10% identified as Asian, 1% identified as Black/African-American, and the other 10% identified as belonging to 2 or more races. Ninety-five percent of parents identified their child as Not Hispanic or Latino, 2.5% participants identified as Hispanic or Latino, and the other 2.5% of participants did not answer.

Participants were recruited using social media accounts (e.g., Facebook and Instagram) or from http://childrenhelpingscience.org. Children received a certificate and a $5 Amazon gift card for their participation.

Materials

Expert Images

Based on previous research showing that children can recognize familiar experts' domains of knowledge (e.g., Lutz & Keil, 2002), a doctor and a car mechanic were selected as the experts for this study. Two different images of White middle-aged, grey-haired, smiling men with similar features represented the experts (see Appendix A). The first image showed a doctor wearing a lab coat over a blue shirt and tie with a stethoscope around his neck. The second image showed a mechanic wearing a blue jumpsuit with a wrench in the breast pocket.

Question and Answer Pairs

Thirteen pairs of questions and incorrect answers were initially developed about the body (i.e., doctor questions) and 13 pairs were developed about cars (i.e., mechanic questions). Some questions were inspired by previous research on children's understanding of expertise (Lutz & Keil, 2002) and some answers were inspired by previous research on children's explanation evaluation (Johnston et al., 2019). Five adults read each question and answer pair and rated how wrong each answer was using a 5 point scale (1 = *not wrong at all* and 5 = *extremely wrong*). Mean scores for each of the 13 questions and answer pairs per domain ranged from 3.6 to 5.0. Four question and answer pairs were selected for each expert because they could be matched for question type (i.e., for each domain, there was 1 "what" question, 1 "how many" question, and 2 "which part" questions; see Appendix B). Adults' mean ratings did not differ by more than .2 for each matched question (M = 4.90 for doctor questions, M = 4.75 for mechanic questions).

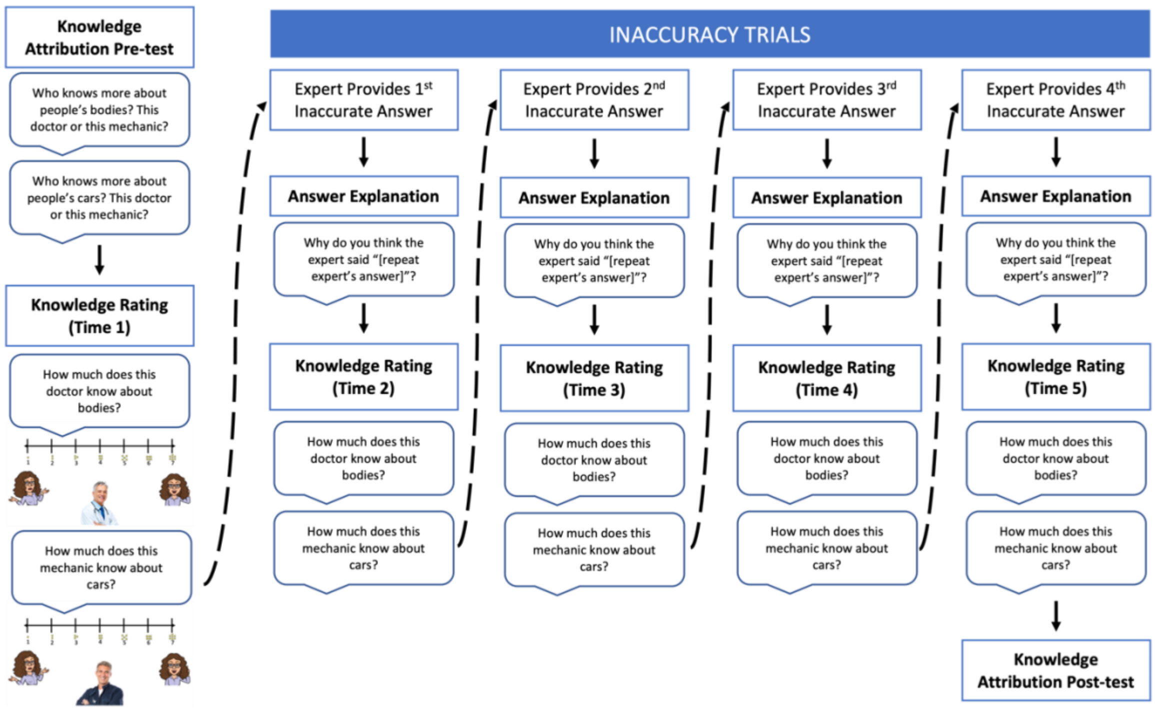
The answers for both experts were audio recorded by a native English-speaking middle-aged male.

Procedure

Children were tested individually by a female experimenter. The study took place over Zoom, an online video conferencing application. All participants completed the study from their own computer or tablet. Families were instructed to not use Zoom on a smartphone. Some parents were present in the room during the session and were instructed to keep a neutral expression and return the child's attention to the experimenter/screen if necessary. See Figure 1 for order of presentation of the study procedure.

Figure 1

Schematic of Procedure for Study 1 with Titles in Bold Font Indicating Dependent Measures



Counting Check

Before the study began, participants were asked to count to 7 in order to ensure that they could use the 7-point scale. All study participants were able to count to 7 without help.

Scale Training

Participants were told that the experimenter was going to talk about people and the participants would be asked how much a person knows about something. They were trained to show how much a person knows using a 7-point knowledge scale, where 1 meant that a person does not know anything and 7 meant that a person knows more than anybody else. Children were shown the 7-point scale on the screen and told what each point meant (see Appendix C). Below each mark on the number line scale were clusters of stars corresponding to each number. Previous research examining children's knowledge ratings has used varying amounts of stars to represent amounts of knowledge (e.g., Boseovski & Thurman, 2014; Mills & Keil, 2004). Participants then completed 3 practice questions. For the three practice questions, children were introduced to three individuals consecutively: 1) A person (Bobby) who knows more about dinosaurs than anybody else, 2) A person (Sarah) who does not know anything about spaceships, and 3) A person (Larry) who knows some things about trees. After each person was introduced, children were asked to use the scale to show how much that person knew about each topic (e.g., "How many stars show that Bobby knows more about dinosaurs than anybody else?"). If a participant answered a practice question incorrectly, they were informed of the correct answer and asked to select their answer again (e.g., "Remember, 7 stars means a person knows more than anybody else. So how many stars means that Bobby knows more about dinosaurs than anybody else?"). Participants were excluded from analysis if they incorrectly answered any of the practice questions after being informed of the correct answer.

Expert Introduction

After children were trained on how to use the scale, they were introduced to the experts. Children were told that "a doctor is a person who helps people when they are sick or hurt and makes sure that people are healthy" and "a car mechanic is a person who fixes cars when there is something wrong with them and makes sure cars run well" (based on Lutz & Keil, 2002). While the experimenter said each introduction, the expert's image was displayed on the computer screen.

Knowledge Attribution Pre-test

To check that children could match the expert with their domain of knowledge, children were asked, “who knows more about people’s bodies, this doctor or this mechanic?” and “who knows more about people’s cars, this doctor or this mechanic?” Previous research has shown that children as young as 5-years-old can correctly attribute knowledge to experts more than 90% of the time (Landrum et al., 2013; Lutz & Keil, 2002). If children answered either knowledge attribution question incorrectly, they were corrected.

Pre-test Knowledge Rating

Using the 7-point knowledge scale, participants rated how much each expert knew about their domain of knowledge (i.e., “How much does the doctor know about bodies?” and “How much does the mechanic know about cars?”).

Inaccuracy Trials with Answer Explanation and Knowledge Ratings

Participants were randomized into one of two conditions (i.e., inaccurate doctor or inaccurate mechanic). Participants then heard 4 question and inaccurate answer pairs. Participants in the inaccurate doctor condition only heard the experimenter ask doctor questions and the doctor produced all the inaccurate answers. Participants in the inaccurate mechanic condition only heard the experimenter ask mechanic questions and the mechanic produced all the inaccurate answers. The experimenter said they wanted to know some things about people’s bodies or cars, so they asked the doctor or mechanic (depending on condition). The experimenter said, “Let’s hear what the doctor/mechanic said” and asked the question aloud (e.g., “How many bones are in a person’s hand?”). The participant then heard an audio recording of the expert’s response (e.g., “People don’t have any bones in their hands”) while viewing the expert’s image, along with a speech bubble with the written transcription of the audio, on the screen. To counterbalance the order of questions, a 4x4 Latin square was used to create 4 orders of questions for both conditions.

After each inaccurate answer, the experimenter asked the participant why they thought the expert said that answer (e.g., “Why do you think the doctor said people don’t have any bones in their hands?”). If the participant said, “I don’t know” or did not give an answer, the experimenter prompted the child “to take their best guess.” If the child said, “I don’t know” again or did not give an answer after 4 seconds of silence, their response was recorded as an “I don’t know/no answer.” All other explanations were transcribed and coded. After giving their explanation, participants rated how much the inaccurate expert knew and how much the control expert knew about their relevant domain of expertise using the 7-point knowledge scale. In both conditions, the other expert was used as a neutral control.

Knowledge Attribution Post-Test

After the 4 Inaccuracy trials with explanations and knowledge ratings, participants were asked again “who knows more about people’s bodies, this doctor or this mechanic?” and “who knows more about people’s cars, this doctor or this mechanic?”.

Explanation Coding

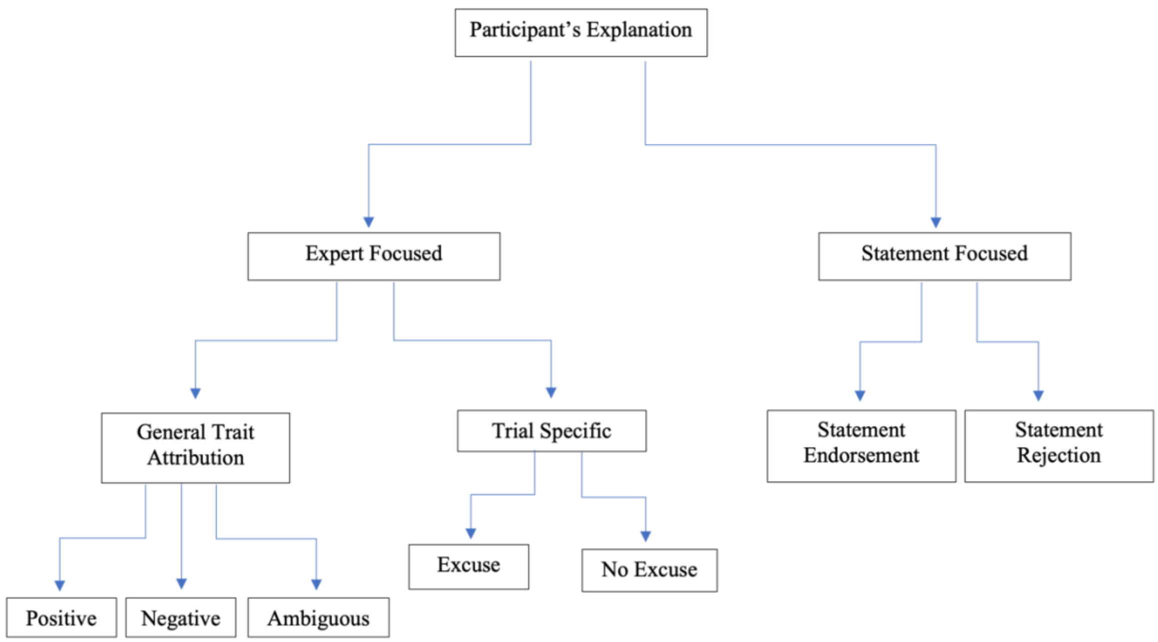
Children’s responses to the Answer Explanation questions were transcribed and coded by two independent coders blind to participant’s age. Explanations were coded into two general non-exclusive categories: Expert Focused and Statement Focused (see Figure 2).

Expert Focused explanations included a reference to the expert. Within this code, there were 2 subcategories: 1) General Trait Attribution, and 2) Trial Specific explanations. General Trait Attributions referred to the expert's general characteristics (e.g., "He is crazy" or "He doesn't know about anything"). General Trait Attributions had 3 sub-subcategories: Positive (e.g., "He is smart"), Negative (e.g., "He is not smart"), and Ambiguous (e.g., "He is silly"). Trial Specific explanations referred to the expert and his statements on each trial (e.g., "Maybe he can't see the bones" or "He is wrong"). There were also two sub-categories of Trial Specific explanations: Excuse (e.g., "maybe he can't see the bones", "he forgot the right answer", or "he doesn't know about bones") and No Excuse (e.g., "he is wrong" or "he is lying").

Statement Focused explanations were any explanations that did not include a reference to the expert and that solely focused on the statement. Statement Focused explanations differed from Trial Specific explanations because Statement Focused explanations disregarded the expert entirely and simply focused on the statement alone with no connection to who said the statement. Statement Focused explanations had 2 subcategories: 1) Statement Endorsement and 2) Statement Rejection. Statement Endorsement explanations claimed that the expert's answer was correct without reference to the expert himself (e.g., "That is right") or repeated the inaccurate answer (e.g., "People don't have bones in their hands") and Statement Rejection explanations claimed that the expert's answer was incorrect without reference to the expert himself (e.g., "That's not true") or the participant providing a different answer than the expert gave (e.g., "People do have bones in their hands").

Figure 2

Flowchart of Coding Scheme for Explanations in Study 1



Results

Knowledge Attribution Pre-Test

All participants attributed biological knowledge to the doctor. All but one 6-year-old and two 9-year-olds attributed mechanical knowledge to the mechanic[1].

Change in Knowledge Rating

Preliminary analyses revealed no effects of gender or trial order, so these variables were excluded from further analyses.

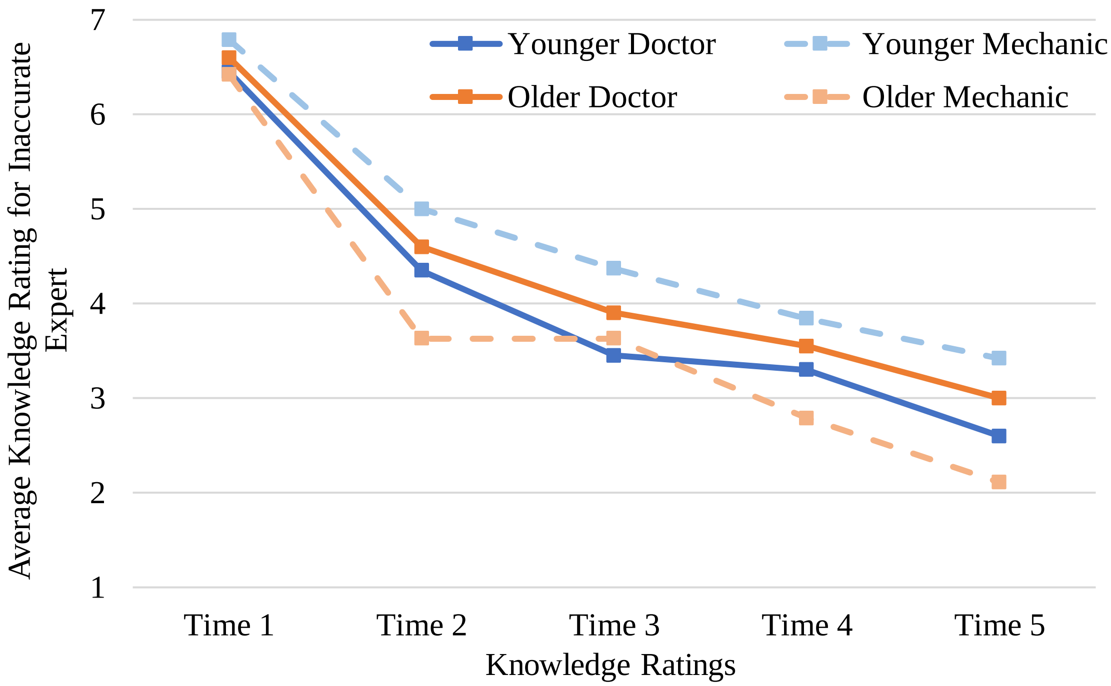
A 2 (age group: younger or older) x 2 (condition: doctor or mechanic) x 5 (time: 1, 2, 3, 4, 5) mixed-factorial ANOVA examining change in knowledge ratings for the inaccurate expert resulted in a significant value for Mauchly's Test of Sphericity,

[1] Removing these participants does not change the results of the following analyses; therefore, they were included for all analyses.

therefore Greenhouse - Geiser corrections are reported for the following results. There was a significant main effect of time, $F(2.71, 256.59) = 88.21$, $p < .001$, $\eta^2 = .537$. Post-hoc pairwise comparisons with Bonferroni correction (critical $p = .005$ for 10 comparisons) for each time point resulted in all significant differences, ps < .002, suggesting that participants decreased their knowledge ratings at each time point. There was no significant main effect of age or condition, Fs < .79, ps > .37. There were also no significant interactions, Fs < 2.63, ps > .11. The linear trend contrast for knowledge ratings was significant, $F(2.71, 256.59) = 189.58$, $p < .001$, $\eta^2 = .714$, such that children decreased their knowledge ratings for the inaccurate expert as he provided more inaccurate information over time (see Figure 3). These results suggest that regardless of age and whether the inaccurate expert was a doctor or a mechanic, participants decreased their knowledge rating of the inaccurate expert across all time points.

Figure 3

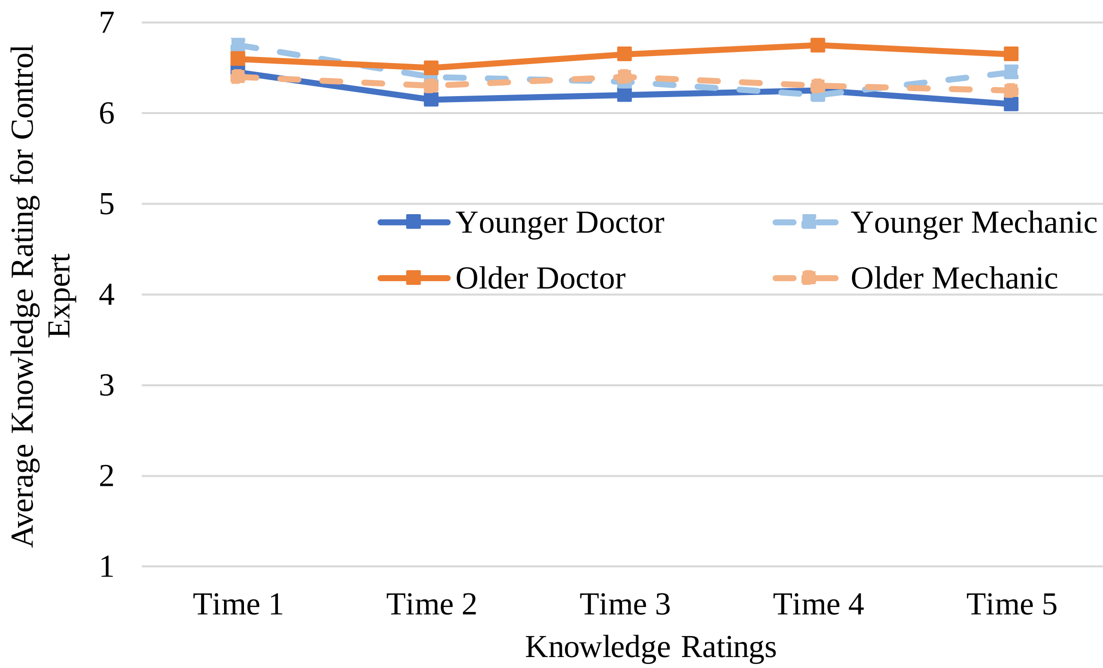
Children's Average Knowledge Ratings for the Inaccurate Expert Over 5 Time Points by Age Group and Condition for Study 1



A second mixed-factorial ANOVA using the knowledge ratings for the control expert resulted in no significant main effects or interactions, Fs < 2.78, ps > .10. This suggests that participants did not change their knowledge rating for the control expert over time (see Figure 4).

Figure 4

Children's Average Knowledge Ratings for the Control Expert Over 5 Time Points by Age Group and Condition for Study 1



Explanations

Two independent coders, blind to the participant's age, coded 40% of the explanations. Overall percent agreement was 96.18% and there was high interrater reliability (Cohen's κ = .87). Disagreements were resolved through discussion. Each coder then coded 30% of the sample on their own. Table 1 displays the frequency of each explanation type across all 4 trials (*N*=318; 1 trial for 1 6-year-old and 1 8-year-old were not codable due to audio recording error).

Table 1

Frequency of Explanation Codes in Study 1 Combined Across All Trials

Explanation code	Age Group	
	6- & 7-year-olds (*n*=159 trials)	**8- & 9-year-olds (*n*=159 trials)**
Expert Focused Total	58 (36%)	85 (53%)
General Trait Positive	1 (1%)	1 (1%)
General Trait Negative	21 (13%)	29 (18%)
General Trait Ambiguous	7 (4%)	9 (6%)
Trial Specific Excuse	25 (16%)	38 (24%)
Trial Specific No Excuse	4 (3%)	8 (5%)
Statement Focused Total	78 (49%)	49 (31%)
Statement Endorsement	41 (26%)	33 (21%)
Statement Rejection	37 (23%)	16 (10%)
I Don't Know/No Answer	27 (17%)	21 (13%)
Not Codable	3 (2%)	8 (5%)

Note. Expert Focused and Statement Focused explanations were not mutually exclusive; therefore, totals are more than 100%.

Table 2 displays the means and standard deviations for the total production for each explanation by age group. There was no significant difference between age groups for the production of Expert Focused explanations, $t(78) = -1.91$, $p = .059$. However, there was a significant difference between age groups for the production of Statement Focused explanations, $t(78) = 2.87$, $p = .025$, suggesting that younger children were more likely than older children to produce Statement Focused explanations.

Table 2

Average Total Production of Explanation Codes in Study 1 by Age Group with Mean and Standard Deviation

Explanation code	Age Group: 6- & 7-year-olds (*n*=40)	Age Group: 8- & 9-year-olds (*n*=40)
Expert Focused Total	1.45 (1.55)	2.13 (1.60)
General Trait Positive	.03 (.16)	.03 (.16)
General Trait Negative	.52 (1.15)	.73 (1.15)
General Trait Ambiguous	.18 (.68)	.23 (.80)
Trial Specific Excuse	.63 (1.08)	.95 (1.22)
Trial Specific No Excuse	.10 (.38)	.20 (.69)
Statement Focused Total	1.95 (1.47)	1.23 (1.37)
Statement Endorsement	1.03 (1.29)	.83 (1.20)
Statement Rejection	.93 (1.29)	.40 (.93)
I Don't Know/No Answer	.68 (1.14)	.53 (1.09)
Not Codable	.08 (.27)	.20 (.72)

Note. Expert Focused and Statement Focused explanations were not mutually exclusive.

Prediction of Change in Knowledge Rating

Hierarchical linear regression was used to assess the contribution of each predictor to children's knowledge ratings for the inaccurate expert at each time point (see Table 3). Actual scores at each time point were used rather than difference scores because some children gave a rating of 7 across all 5 time points while others dropped to a 1 rating after 1 time point and continued to stay at a 1 for the following 4 time points. If the analysis included difference scores, those who gave a rating of 7 with no change or those who gave a 1 with no change would be considered to have the same ratings. Actual scores were also included to account for the variations between participants.

Because they were produced less than 10% of the time, explanations coded as General Trait Positive, General Trait Ambiguous, Trial Specific No Excuse and

Nonsense were excluded from analyses[2]. Because data was analyzed across all 4 trials, the assumption of independence was violated when age and condition were included in the analysis. Therefore, a "Participant" variable was created such that each participant was randomly assigned a number to control for the variance of each individual participant across the 4 trials.

Participant, Age (measured continuously), and Condition were entered into Block 1 yielding a significant model, $F(3, 314) = 3.30$, $p = .021$, that explained 3.1% of the variance in knowledge ratings. Age ($B = -.37$, $p = .002$) was the only significant predictor in Block 1. Production of Expert Focused explanations, specifically General Trait Negative & Trial Specific Excuse, was added in Block 2 and the total amount of variance accounted for significantly increased to 12.3%, $\Delta R^2 = .09$, F change $(2, 312) = 16.40$, $p < .001$, and the overall model was significant, $F(5, 312) = 8.73$, $p < .001$. Age ($B = -.31$, $p = .007$) and General Trait Negative explanations ($B = -2.17$, $p < .001$) were the only significant predictors in Block 2. Production of Statement Focused explanations, specifically Statement Focused Endorsement and Statement Focused Rejection, were entered in Block 3 and the amount of variance accounted for significantly increased to 16.7%, $\Delta R^2 = .04$, F change $(2, 310) = 8.23$, $p < .001$, and the overall model was again significant, $F(7, 310) = 8.88$, $p < .001$. Age ($B = -.31$, $p = .008$). General Trait Negative ($B = -1.63$, $p < .001$) and Statement Focused Endorsement ($B = 1.32$, $p < .001$) were the only significant predictors in Block 3. Finally, I Don't Know/No Answer was entered in Block 4 and the amount of variance accounted for (17.5%) did not significantly increase, $\Delta R^2 = .01$, F change $(1, 309) = 3.08$, $p = .080$, but the overall model was still significant,

[2] Adding these four types of explanations back into the analysis does not significantly change the overall model, F change $(4, 305) = 1.64$, $p = .164$.

F(8, 309) = 8.20 , $p < .001$. Age ($B = -.29$, $p = .012$). General Trait Negative ($B = -1.28$, $p = .003$), and Statement Focused Endorsement ($B = 1.70$, $p < .001$) continued to be the only significant predictors in Block 4. Thus, the final model showed that older children gave lower ratings to the inaccurate expert than younger children. Also, children who produced General Trait Negative explanations were more likely to give lower ratings to the inaccurate expert than those who did not produce this explanation. Finally, children who produced Statement Focused Endorsement explanations were more likely to give higher ratings to the inaccurate expert than those who did not produce this explanation.

Table 3

Hierarchical Regression Results Predicting Children's Knowledge Ratings for the Inaccurate Expert in Study 1 (N = 318)

	Block 1			Block 2			Block 3			Block 4		
Predictors	*B*	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*β*
Participant	.00	.00	.01	-.00	.01	-.01	-.00	.01	.00	.00	.01	.00
Age	-.37**	.12	-.17	-.31**	.12	-.15	-.31**	.12	-.14	-.29*	.12	-.14
Condition	-.07	.27	-.01	-.04	.26	-.01	-.16	.26	-.03	-.09	.26	-.02
General Trait Negative				-2.04***	.36	-.31	-1.63***	.38	-.25	-1.28**	.43	-.19
Trial Specific Excuse				-.13	.33	-.02	.33	.36	.05	.70	.42	.12
Statement Focused Endorsement							1.32***	.34	.23	1.70***	.41	.30
Statement Focused Rejection							.11	.39	.02	.49	.44	.08
I Don't Know/ No Answer										.81	.46	.12
R^2		.03*			.12***			.17***			.18***	
ΔR^2					.09***			.04***			.01	

* $p < .05$, ** = $p < .01$, *** = $p < .001$

Exploratory Analysis of Knowledge Rating

Due to the knowledge ratings having a bi-modal (i.e., non-normal) distribution, an exploratory analysis was conducted such that children were categorized into 1 of 3 groups of responders: children in the “Never Drop” category never rated the expert below a 4, children in the “Fast Drop” category dropped their rating by at least 2 points after hearing only 1 inaccurate answer, and children in the “Slow Drop” category dropped their rating by at least 2 points after more than 1 inaccurate answer or only dropped their rating by 1 across all trials (see Table 4 for breakdown by age group).

Table 4

Frequency of Participant in Each Type of Rater Response by Age Group

	Category of Rater Response		
Age Group	Never Drop	Fast Drop	Slow Drop
Younger	11	22	7
Older	12	16	12

A post-hoc goodness-of-fit power analysis in G*Power (Faul et al., 2007) using a sample size of 80, $\alpha = .05$, and effect size of .30 resulted in power = .48. Because of this low power and to be consistent with the previous analyses, the multinomial logistic regression was analyzed based on children’s responses to individual trials ($N = 318$). A multinomial logistic regression was conducted with Category of Rater Response as the dependent variable with 3 levels (i.e., Never Drop, Fast Drop, and Slow Drop) and the same variables as the previous analysis for the independent variables (i.e., Participant, Age (continuous), Condition, and production of General Trait Negative, Trial Specific Excuse, Statement Focused Endorsement, and Statement Focused Rejection explanations; see Table 5 for breakdown of independent variables by category).

Table 5

Characteristics of The Independent Variables by Categories of Rater Response (N = 318)

Independent Variable	Category of Rater Response				
	Never Drop	Fast Drop	Slow Drop		
	M (SD)	M (SD)	M (SD)	$F_{(2, 315)}$	*p*
Participant	38.53 (24.19)	39.87 (23.51)	44.16 (20.53)	1.36	.259
Age (continuous)	7.64 (1.11)	8.23 (1.06)	8.04 (1.13)	7.48	< .001
	N	N	N	χ^2 *(df)*	*p*
Condition				2.69 (2)	.260
Doctor	43	71	44		
Mechanic	48	80	32		
General Trait Negative				16.94 (2)	< .001
Produced	3	35	12		
Not Produced	88	116	64		
Trial Specific Excuse				7.48 (2)	.024
Produced	23	33	7		
Not Produced	68	118	69		
Statement Focused Endorsement				14.39 (2)	< .001
Produced	34	28	12		
Not Produced	57	123	64		
Statement Focused Rejection				20.46 (2)	< .001
Produced	14	14	25		
Not Produced	77	137	51		

Pearson's goodness-of-fit statistics (χ^2 = 633.59, df = 144, *N* = 302, *p* < 0.001) and the omnibus test for the final model were both significant (LR χ^2 = 75.26, df = 14, *N* = 318, *p* < 0.001), indicating that the independent variables were collectively and significantly associated with each child's response category. The Nagelkerke pseudo R^2 = 0.240, meaning that the model accounted for 24% of the overall variance. Table 6 displays the estimated multinomial logistic regression coefficients that predicted category of rater response for each independent variable included in the model. Note that explanations in the model are analyzed for "Not Produced" such that positive coefficients indicate the explanation was not produced, and negative coefficients indicate that it was produced. As shown in Table 6, children were more likely to never drop their rating of the inaccurate expert relative to children who slowly dropped their rating if they were younger, did not produce a general trait negative explanation, and if they produced a trial specific excuse and statement focused endorsement explanation. Children were more likely to quickly drop their rating of the inaccurate expert relative to children who slowly dropped their rating if they did not produce a statement focused rejection explanation. Lastly, children were more likely to quickly drop their rating of the inaccurate expert relative to children who never dropped their rating, if they were older, produced a general trait negative explanation, and if they did not produce a statement focused endorsements.

Table 6

Independent Variables Associated with Category of Rater Response in the Final Multinomial Logistic Regression Model

Variable	*B*	*SE*	Wald	*p*	OR	95% CI
Never Drop Relative to Slow Drop						
Intercept	4.50	1.75	6.61	.010		
Participant	-.02	.01	4.48	.034	.99	.97-1.00
Age (continuous)	-.47	.16	8.38	.004	.63	.46-.86
Condition	-.44	.35	1.58	.209	.64	.32-1.28
General Trait Negative	1.43	.71	4.06	.044	4.16	1.04-16.62
Trial Specific Excuse	-1.26	.54	5.49	.019	.28	.10-.81
Statement Focused Endorsement	-1.06	.46	5.34	.021	.35	.14-.85
Statement Focused Rejection	.95	.49	3.83	.050	2.59	1.00-6.73
Fast Drop Relative to Slow Drop						
Intercept	1.01	1.45	.48	.487		
Participant	-.01	.01	2.31	.129	.99	.98-1.00
Age (continuous)	-.00	.14	.00	.990	1.00	.76-1.31
Condition	-.58	.31	3.46	.063	.56	.31-1.03
General Trait Negative	-.26	.42	.38	.538	.77	.34-1.75
Trial Specific Excuse	-.73	.49	2.18	.140	.48	.19-1.27
Statement Focused Endorsement	.00	.43	.00	.993	1.00	.43-2.33
Statement Focused Rejection	1.53	.44	12.17	< .001	4.61	1.95-10.88
Fast Drop Relative to Never Drop						
Intercept	-3.50	1.51	5.39	.020		
Participant	.01	.01	.82	.367	1.01	.99-1.02
Age (continuous)	.46	.14	11.54	< .001	1.59	1.22-2.08
Condition	-.14	.30	.21	.646	.87	.49-1.53
General Trait Negative	-1.68	.65	6.70	.010	.186	.05-.67
Trial Specific Excuse	.53	.39	1.84	.175	1.71	.79-3.69
Statement Focused Endorsement	1.06	.38	8.03	.005	2.90	1.39-6.05
Statement Focused Rejection	.58	.48	1.42	.233	1.78	.69-4.58

Note. OR, odds ratio; CI, confidence interval.

Knowledge Attribution Post-Test

To determine if children changed their knowledge attribution for the inaccurate expert and the control expert, two chi-squared tests were conducted to compare changers vs non-changers against chance value (n=40). For the inaccurate expert's domain of expertise, children were categorized as changers if they selected the control expert as knowing more about the inaccurate expert's domain of expertise. For the control expert's domain of expertise, children were categorized as changers if they selected the inaccurate expert as knowing more about the control expert's domain of expertise. The chi-squared test for the inaccurate expert's domain of expertise showed that the number of children who changed and did not change did not differ from chance, $\chi^2(1) = 0.45$, $p = .502$. The chi-squared test for the control expert's domain of expertise showed that the number of children who changed and did not change differed from chance, $\chi^2(1) = 68.45$, $p < .001$ (see Table 7). These results suggest that the majority of children continued to attribute knowledge to the control expert for his domain of knowledge. However, this pattern was not the same for the inaccurate expert, such that around half of the participants (i.e., chance) said the control expert would know about the inaccurate expert's domain of knowledge.

Table 7

Children's Change in Knowledge Attribution at Post-Test by Each Expert's Relevant Domain of Expertise for Study 1

		Knowledge Attribution	
		No Change	Change
Expert's Domain	Inaccurate	43	37
	Control	77	3

Predictors of Change in Knowledge Attribution Post-Test

To understand why almost half of the participants changed their knowledge attribution at post-test, a logistic regression (see Table 8) was conducted to investigate the relation between children's knowledge attribution at post-test (i.e., changed = 1, or not changed = 0) and Age (continuous), condition, square root transformed (SQRT) final knowledge rating[3], and the total production of each explanation (i.e., General Trait Negative, Trial Specific Excuse, Statement Focused Endorsement, and Statement Focused Rejection). The model was statistically significant, χ^2 (7, N = 80[4]) = 38.24, $p <$ .001, suggesting that the model distinguished between those who had changed their knowledge attribution and those who had not. In addition, Nagelkerke R^2 was .527, suggesting that the model accounted for 52.7% of variance. The model was able to correctly identify 78.8% of the cases. Square root transformed final knowledge rating was a significant predictor of change in knowledge attribution ($p < .001$, odds ratio = .07). This finding suggests that when children gave the inaccurate expert higher knowledge ratings at Time 5, they were less likely to change their knowledge attribution at post-test. All other variables were non-significant; they did not predict children's change in knowledge attribution.

[3] Based on Kim (2013): Due to an absolute skewness z-score = 3.32 (i.e., > 3.29), final knowledge rating scores were transformed using a square-root transformation (for "moderate" positive skewness; Howell, 2013) resulting in an absolute skewness z-score = 2.53.
[4] One 6-year-old had a Cook's absolute value = 1.24. Removing that participant did not change the overall pattern of results, therefore they were included in the reported analysis.

Table 8

Logistic Regression Results Predicting Children's Knowledge Attribution of the Inaccurate Expert's Domain at Post-Test in Study 1 (N = 80)

Variable	*B*	*SE*	Wald	*p*	OR	95% CI
Model 1 (constant)	.79	2.77	.08	.774	2.21	
Age (continuous)	.37	.30	1.54	.215	1.45	.81-2.61
Condition	.05	.65	.01	.944	1.05	.30-3.71
SQRT Final Knowledge Rating	-2.72	.69	15.56	< .001	.07	.02-.25
General Trait Negative	.06	.27	.04	.837	1.06	.62-1.80
Trial Specific Excuse	-.39	.29	1.73	.189	.68	.38-1.21
Statement Focused Endorsement	.06	.29	.04	.840	1.06	.61-1.85
Statement Focused Rejection	.09	.33	.08	.778	1.10	.58-2.07

Note. OR, odds ratio; CI, confidence interval.

Discussion

Study 1 examined developmental differences in children's judgments of experts after the experts provided inaccurate information. Although children were accurate at attributing relevant knowledge to the relevant expert *before* receiving any information about the expert's inaccuracy, around half of the children changed their response regarding who knows more about the inaccurate expert's domain of knowledge to say that the control expert would know more *after* receiving information about the expert's inaccuracy. Also, children rated experts as having a high amount of knowledge in their relevant domains before observing any inaccurate information. Then, as children were given more information about an expert's inaccuracy, children decreased their knowledge rating of the inaccurate expert over time regardless of age and condition.

Although grouping the children into younger and older age groups may have made it more difficult to detect age related effects (Lazic, 2008), when age was examined continuously in the regression analyses, there was a negative relationship between age and knowledge ratings. This suggests that older children were more likely to provide lower knowledge ratings than younger children. This pattern of results is consistent with the prediction that the positivity bias may play a role in children's judgments of the inaccurate expert and that younger children are more likely to pay attention to and process information selectively to have a positive view of themselves and/or others than older children (see Boseovski, 2010, for a review). Younger children in the current study showed a positivity bias towards the inaccurate expert, such that they did not rate him as having a low amount of knowledge – a negatively valenced trait.

One potential limitation of Study 1 is that children decreased their knowledge rating of the expert because of a task demand. Developmental research suggests that when they are asked the same question multiple times, children will change their answer every time due to the nature of repeated questioning (Poole & White, 1991). However, because children decreased their knowledge rating for the inaccurate expert in a linear trend (i.e., not randomly) and children gave consistent knowledge ratings to the control expert over time, children's change in knowledge ratings for the inaccurate expert appears to have been due to the manipulation (i.e., the inaccurate information provided).

Children's explanations for why the expert provided the inaccurate information also predicted their knowledge ratings. Children across both age groups produced Expert Focused explanations at similar rates. However, younger children were more likely than older children to produce Statement Focused explanations. This is consistent with previous research that suggests younger children typically do not spontaneously describe people using traits and they rarely assume traits from behavioral evidence (e.g., Rholes & Ruble, 1984; Yuill & Pearson 1998). It is possible that the younger children in the current study were more likely to comment on the information provided rather than the person because younger children typically do not make trait labels in general.

More specifically, younger children seemed to make more Statement Focused Rejections (e.g., said the statement was wrong). It is possible that younger children were more focused on the content that was being said than the characteristics of the informant who provided them. One explanation for this result could be that children in the current study did not hear any conflicting testimony from a second informant. In a typical trust paradigm, two informants provide conflicting claims and children must choose which information or informant to endorse (see Tong et al., 2020 for review). However, children do not typically hear conflicting testimonies in their everyday life. Presenting a single informant has good ecological validity, but it may make it more difficult to discern differences in how children treat different types of informants and what informant characteristics they notice or prioritize (see Danovitch & Lane, 2020). Because children did not hear a conflicting statement by the control expert, the informant's characteristics may not have been as salient to them as the content of the inaccurate answer. Future research should examine whether children are more likely to produce the same explanations when presented with conflicting testimonies by two experts.

Children who produced a Statement Focused Endorsement explanation (e.g., said the statement was right) were more likely than children who did not produce this kind of explanation to give higher knowledge ratings to the inaccurate expert. It is possible that children who endorsed the claim also believed that the expert who produced it was knowledgeable. Prior research has shown that children who endorse statements from one expert prefer to seek out new information or ask about new information from that same expert (Jaswal et al., 2010; Landrum et al., 2013). Thus, children's endorsement of the statement may have meant that they also believed the expert still knew about information in his relevant domain.

Among children who produced Expert Focused explanations, children who produced a General Trait Negative explanation about the expert (e.g., "the expert is not smart") were more likely than children who did not produce this type of explanation to give a lower knowledge rating to the inaccurate expert. This result is consistent with some trait labeling research, such that, when an individual has shown a negative trait behavior in the past (e.g., not generous), elementary age children predict that the individual will act in a consistent way in the future (Kalish, 2002, Experiment 2). Children in this study demonstrated this pattern of thinking when they said the expert was not smart and they also rated him as not knowing anything. Also, in previous research when an expert displayed knowledge in a specific domain (e.g., dogs), children did not expect the expert to know more about an unrelated domain (e.g., artifacts) more than a neutral person (Koenig & Jaswal, 2011). However, when an expert was described as incompetent about a specific domain (e.g., dogs), children showed a preference for a neutral informant for the specific domain and the unrelated domain. Koenig and Jaswal (2011) claimed that when evaluating children's judgments of individual's knowledge, there is no "halo effect" when a person is knowledgeable (knowing about one thing does not mean you are knowledgeable about another thing). Interestingly, they found a “pitchfork effect” when an informant is incompetent (not knowing about one thing means you are not knowledgeable about another thing). Some children in the current study may have displayed this pitchfork effect such that they said the expert must not know about the topic at all or is not smart after hearing an inaccurate answer.

One assumption of regression analysis is that the dependent variable must be normally distributed (Howell, 2013). Therefore, a limitation of Study 1 is that, due to non-normal distributions and the inclusion of transformed variables, caution must be used during the interpretation of the results predicting children’s knowledge ratings for the inaccurate expert. Non-normal distributions are extremely common, especially when measuring human behavior (Field, 2018), therefore researchers have developed ways to work around this common problem. In the current study, the overall distribution of children’s knowledge ratings (i.e., the dependent variable) had a bimodal distribution, therefore an exploratory analysis was conducted where children were split into 3 categories of responders, “Never Drop”, “Fast Drop”, and “Slow Drop.” Children were more likely to be categorized as a “Never Drop” relative to a “Slow Drop” if they were younger, did not produce a general trait negative explanation, and if they did produce a trial specific excuse and statement focused endorsements. Children were more likely to be categorized as a “Fast Drop” relative to a “Slow Drop” if they did not produce a statement focused rejection explanation. Lastly, children were more likely to be categorized as a “Fast Drop” relative to a “Never Drop” if they were older, did produce a general trait negative explanation, and if they did not produce a statement focused endorsement.

One explanation for these results could come from trait labeling research, such that younger children are less likely than older children to judge someone consistently with a past behavior (Rholes and Ruble, 1984). In the current study, older children were more likely to drop their knowledge ratings than younger children. After hearing the inaccurate information (i.e., past behavior), older children made more consistent judgments about the expert (i.e., he doesn't know anything) than younger children. Also, previous research has shown that young children need multiple pieces of information to make consistent judgments about an individual (Aloise, 1993; Boseovski & Lee, 2006). It is possible that the younger children in the current study were more likely to be categorized as "Never Drop" because they needed more pieces of information than 4 inaccurate responses. Future research should consider extending the study with more inaccurate trials to examine if the amount of information children are given influences their judgments.

Lastly, children made knowledge attributions for both the inaccurate and control expert at the end of the study. Around half of the participants (46%) said the control expert knew more about the inaccurate expert's domain of knowledge. When examining what predicted this response, only children's final knowledge rating for the inaccurate expert was a significant predictor. Children who gave *lower* knowledge ratings at time 5 were *more* likely to change their knowledge attribution than children who gave higher knowledge ratings at time 5. Given that children are less likely to choose an inaccurate informant to answer a question than an accurate or neutral informant (e.g., Corriveau & Harris, 2009b; Pasquini et al., 2007), it would be expected that all children would say the control expert knows more regardless of the topic. However, there is some debate about whether children believe an expert's knowledge to be domain-general or domain-specific (e.g., Koenig & Jaswal, 2011; Taylor et. al., 1994). When evaluating the epistemic characteristics of expertise and inaccuracy, there might be individual differences that cause some children to believe the control expert would know more than the inaccurate expert in the inaccurate expert's domain of knowledge. Further research should examine children's judgments of an expert's knowledge as either domain-general or domain-specific and how that relates to how children attribute knowledge to different experts.

CHAPTER III

STUDY 2

In recent psychological research, there has been a push for evidence of replication (Duncan et al., 2014). Therefore, Study 2 was designed to replicate and extend the findings of Study 1. Study 2 included the same methods as Study 1, with the addition of a new question delegation task and an update to the previously used Explanation prompts.

The first aim of Study 2 was to better understand children's explanations based on the results collected in Study 1. In Study 2, children completed the same task as in Study 1; however, instead of receiving an open-ended question about why they believed the expert said the inaccurate information, children were given a forced-choice between the top 2 most frequently produced explanations across subcategories. This forced-choice format allowed for a more precise measure of children's explanations and avoided "I don't know" and no answer responses.

The second aim of Study 2 was to build on the results of Study 1 to better understand children's beliefs about the inaccurate informant. Although children in Study 1 gave a lower knowledge rating for the inaccurate expert after the 4 inaccuracy trials and some children believed the control expert had more knowledge in the inaccurate expert's domain of expertise, it is unclear how children would interact further with both informants when given a task to complete that requires expert help. In a series of control experiments used to further understand the results of conformity from the popular Ashe test, it was proposed that individuals were simply changing their *public pronouncements* but not their beliefs (Deutsch & Gerard, 1955). Rakoczy et al. (2015) further examined this idea when measuring children's selective advice taking. In this study, the researchers were interested in looking beyond children's preferences and understanding if children would update their beliefs when receiving advice from a knowledgeable or ignorant informant. The results showed that 3- to 6-year-olds preferred the knowledgeable informant more often than the ignorant one, and children were more likely to take advice and update their beliefs from the knowledgeable informant. However, when comparing children's belief updating to chance, children seemed to take advice from both informants above chance levels. Similar results were shown in Hermansen et. al. (2021) such that children as young as 4- and 5-years-old detected an expert's inaccuracy and then transferred this belief about the informant's reliability from one task to another. However, the rates at which children rejected the expert's claim for children who interacted with an inaccurate expert did not differ from chance. This finding suggests that there may be variability in children's belief updating when making judgments about an inaccurate expert's claims. It is possible that although children pronounce a preference for one expert over the other, they might not drastically change their beliefs when completing a task that requires domain specific expertise.

Study 2 included a Question Delegation task, similar to the one used in Danovitch et al. (2019; modelled after Lutz & Keil, 2002 and Aguiar et al., 2012). Although children may say that they prefer the control expert over the inaccurate expert on the Knowledge Attribution post-test for both domains of knowledge, it is possible that when tasked with winning a question game, children would still want to seek out answers from the expert in the relevant domain. In Rakoczy et al.'s (2015) study, age significantly predicted advice taking, suggesting older children were more likely to take advice than younger children. Also, children were asked to rate their own competence as well as the knowledgeable and ignorant informant's competence. Results showed that children did not rate themselves as more or less competent than the knowledgeable informant; however, children did rate themselves as more competent than the ignorant informant.

In the Question Delegation task, children had the opportunity to assign questions about bodies and cars to the doctor and mechanic expert or choose to answer the question themselves. The results of Study 2 reveal how children think about themselves as sources of information compared to an inaccurate expert and an expert with irrelevant expertise. Children as young as 5-years-old have difficulty judging their own knowledge and assume they have more knowledge than they do (Mills & Keil, 2004). However, by second grade, children are more aware of the limitations of their knowledge. Also, in a recent study by Baer and Odic (2022), children ages 4- to 9 had to delegate questions to either a peer that was "better" or "not as good" (Exp 1) or "younger" or "older" (Exp 2) than them on a set of number problems. Results showed that children's delegations were consistent with the law of comparative advantage (i.e., assigning questions to self and another based on the other's and self's ability). In this study, children were more likely to delegate the harder question to their partner when their partner was more skilled or older than them than when their partner was not as good or younger than them (Baer & Odic, 2022). Importantly, this effect was moderated by age such that older children (i.e., 9-year-olds in Exp 1 and 7-year-olds and older in Exp 2) were more likely to demonstrate this strategy than younger children. Younger children were more likely to demonstrate a self-serving bias, such that they delegated easier questions to themselves more often than older children.

Previous research using the Question Delegation task has found that children ages 6-8 assign more questions to experts than themselves (Danovitch et al., 2019). However, in previous work, there was no history of inaccuracy for either expert. Because children in Danovitch et al. (2019) preferred to assign questions to experts rather than themselves, I predicted that children would assign most questions to the control expert, regardless of question domain. Also, previous research has shown that children will not assign questions to a relevant expert when doing so comes at a cost (e.g., time and effort; Rowles & Mills, 2019). In my study, because the inaccurate expert has demonstrated that they answer questions incorrectly, choosing him to answer questions might cause children to lose the game. Therefore I predicted children would assign questions to the other expert. Lastly, because younger children struggle to understand their own knowledge levels when asked about difficult or complex questions (see Mills & Keil, 2004), I expected younger children to select themselves to answer questions in the inaccurate expert's domain more often than older children.

Methods

Participants

Because one of the aims of Study 2 was to replicate the findings from Study 1, 80 participants were included. Children were recruited using the same methods as Study 1 and the same exclusion criteria was applied. Participants included 40 6- to 7-year-olds (19 males, 21 females; M_{age} = 7.05, *SD* = .10) and 40 8- to 9-year-olds (21 males,19 females; M_{age} = 9.06, *SD* = .10). Four additional participants were excluded from analyses. Two 6-year-olds failed the practice questions, one 7-year-old had completed Study 1, and one 9-year-old had a faulty audio connection and was unable to answer the questions.

Of the 80 participants, 71% of parents identified their child as White/Caucasian, 11% identified as Asian, 5% participant identified as Black/African-American, and 11% identified as belonging to 2 or more races, and 1% did not provide race information. Eighty-six percent of parents identified their child as Not Hispanic or Latino, 11% participants identified as Hispanic or Latino, and the other 3% participants did not answer.

Materials and Procedures

Counting Check

Same as Study 1.

Scale Training

Same as Study 1.

Expert Introduction

Same as Study 1.

Knowledge Attribution Pre-test

Same as Study 1.

Pre-test Knowledge Judgment

Same as Study 1.

Inaccuracy Trial with Answer Explanations and Knowledge Ratings

Same as Study 1 except that instead of asking an open-ended question, children were presented with a forced-choice option between two explanations. The two most frequently produced explanations from Study 1 that also significantly predicted children's knowledge ratings were General Trait Negative and Statement Focused Endorse. These two explanations were used in the forced-choice explanation questions in Study 2. After each inaccurate answer, the experimenter asked the participant why they thought the expert said that answer and provided a choice between generic examples of the two explanation types (i.e., "because he does not know about bodies/cars" or "because [repeat inaccurate expert's answer]").

Knowledge Attribution Post-Test

Same as Study 1.

Question Delegation Task

The Question Delegation Task consisted of 10 questions (5 biological and 5 mechanical). The 10 questions were selected based on their mean difficulty based on adult ratings. Eight adults read 19 biological and 11 mechanical questions and rated how difficult each question would be for them to correctly answer using a 5-point scale (1 = *easy* and 5 = *hard*). Mean scores for each of the 30 questions ranged from 1 to 5, and the 10 questions included for this study all scored above a 3.8 (see Appendix D for questions with means and standard deviations). Harder questions were selected rather than easy ones because previous research has found that children ages 5- to 9-years-old generally choose to answer easier questions themselves if they believe they will answer correctly (Baer et al., 2021; Baer & Odic, 2019). Because one of the aims of Study 2 was to see how children delegate questions that require expertise to answer, the Question Delegation Task was developed to include questions that would be hard for children to answer. The ten questions were also piloted with 9 children (6 males, 3 females; M_{age} = 7.10, SD =

1.02) to check that they could correctly assign the appropriate expert to each question. Overall, in the pilot study, children assigned 96% of the questions to the correct relevant expert (i.e., the doctor to biology questions and the mechanic to mechanical questions).

For this task, the experimenter instructed participants that they were going to play a question game and the game was to see how many questions their team could get right. The experimenter revealed images of the same doctor and mechanic as in the earlier tasks with the words “Your Team” written at the top of the slide. To make sure children understood that the men on the screen were the same doctor and mechanic, the experimenter said “Do you remember these guys? This is the same doctor and the same mechanic you saw before. This is your team. Your team is this doctor, this mechanic, and yourself.” Participants were told that every time their team got a question right, they would get a point and that first they needed to decide who would answer each question during the game. They were told that they could keep some questions for themselves to answer but if they did not know the right answer, they could ask one of their teammates to answer it. The experimenter ended the introduction to the game by saying “Choose the teammate you think will get the right answer.” The introduction for the Question Delegation Task was modified from Danovitch et al. (2019).

Children heard each question as the question was displayed on the screen above the experts and were asked who could answer that question (e.g., “Which part of the body grows the fastest? Who will answer that question? This doctor, this mechanic, or you”). Questions were asked in 1 of 2 fixed random orders where the same type of question (i.e., biological or mechanical) did not occur more than twice in a row.

Recognition Check

To check that the participants remembered that the expert in the Question Delegation Task was the same inaccurate expert as before, the experimenter showed the picture of the inaccurate expert on the screen and asked: “Is this the same doctor/mechanic that you heard answer questions at the beginning of the study, and you rated how much he knew?” If the child said “No”, they were asked to explain why they said it was not the same person.

Question Delegation Justification

To understand why participants picked the inaccurate expert in the Question Delegation Task after rating him as having low or no knowledge, the experimenter asked, “I saw that you picked him [the inaccurate expert] to answer some of the questions in the question game, why did you pick him sometimes?” This question was only asked of participants who picked the inaccurate expert at least once during the Question Delegation Task.

Justification Coding

Children’s responses to the Question Delegation Justification question were transcribed and coded by two independent coders, blind to participants’ age. The coding scheme classified children’s justifications for why they picked the inaccurate expert based on 4 non-exclusive components: 1) justifications focused on the inaccurate expert as having knowledge or referring to the expertise label (e.g., “He knows about bodies” or “He's a doctor”), 2) justifications focused on the control expert not having knowledge (e.g., “I didn't think the mechanic would know”), 3) justifications focused on themselves not having knowledge (“I didn’t know [the answer]”), and 4) justifications referring to the question type (e.g., “They were doctor/body questions” or “they were mechanic/car questions"). Responses that did not include one or more of the above codes were coded as miscellaneous (e.g., "Cause he's funny").

Results

Knowledge Attribution Pre-Test

All participants attributed biological knowledge to the doctor. All but one 6-year-old attributed mechanical knowledge to the mechanic[5].

Change in Knowledge Rating

Preliminary analyses revealed no effects of gender or trial order, so these variables were excluded from further analyses.

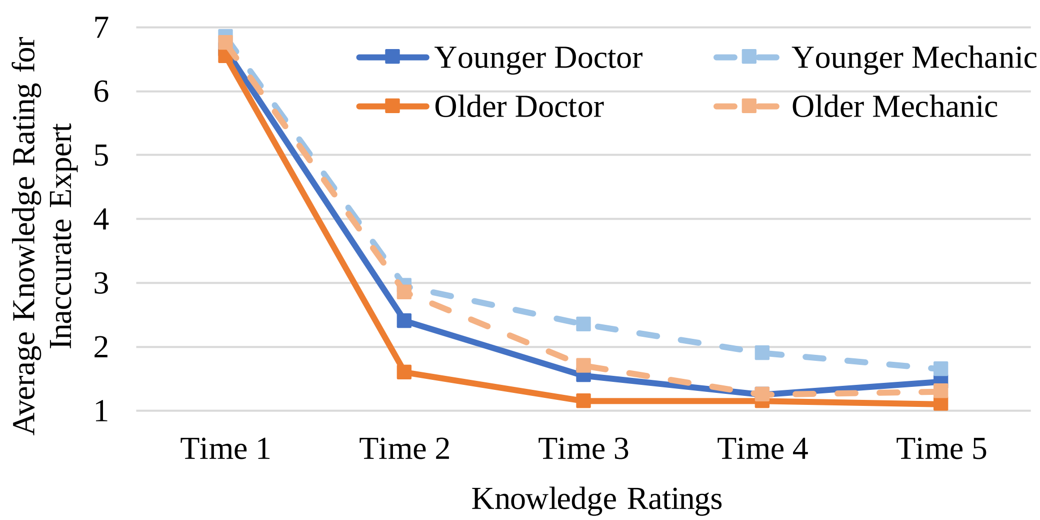
A 2 (age group: younger or older) x 2 (condition: doctor or mechanic) x 5 (time: 1, 2, 3, 4, & 5) factorial ANOVA examining change in rating for the inaccurate expert resulted in a significant value for Mauchly's Test of Sphericity, therefore Greenhouse - Geiser corrections are reported for the following results. There was a significant main effect of time, $F(2.25, 170.73) = 386.70$, $p < .001$, $\eta^2 = .836$. Post-hoc pairwise comparisons with Bonferroni correction (critical $p = .005$ for 10 comparisons) for each time point resulted in all significant differences, *p*s < .003, expect for time 3 to time 4, $p = .008$, and time 4 to time 5, $p = .874$, suggesting that participants decreased their knowledge ratings at each interval from time 1 to time 3 and then leveled off after time 3. There was also a main effect of condition, $F(1, 76) = 4.10$, $p = .046$, $\eta^2 = .051$, such that participants who heard inaccurate answers from the mechanic gave higher ratings overall than participants who heard inaccurate answers from the doctor. There was no significant

[5] To be consistent with Study 1, this participant was included in the following analyses. Removing this participant changes the results slightly, such that the main effect of condition in change in knowledge ratings is no longer significant, $F(1, 75) = 3.52$, $p = .064$. All other patterns of results do not change.

main effect of age, *F* < 2.41, *p* = .125. There were also no significant interactions, *F*s < 1.80, *p*s > .164. Although the linear trend contrast was significant, *p* < .001, when observing the shape of the data, it is more likely a logarithmic trend such that children decreased their knowledge ratings for the inaccurate expert but leveled off as he provided more inaccurate information (see Figure 5).

Figure 5

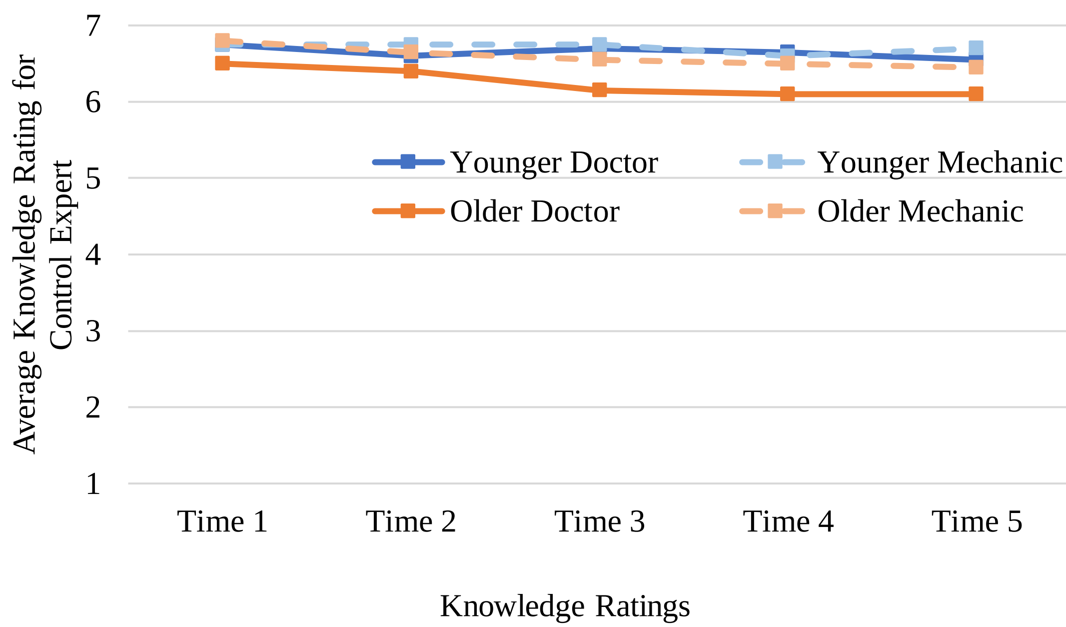
Children's Average Knowledge Ratings Over 5 Time Points for the Inaccurate Expert by Age Group and Condition for Study 2



A Mixed Repeated Measures ANOVA using the ratings for the control expert as the dependent variables resulted in a significant main effect of knowledge rating, *F*(2.38, 181.15) = 3.61, *p* = .022, η^2 = .045 (see Figure 6). However, post-hoc pairwise comparisons with Bonferroni corrections for each time point resulted in no significant differences, *p*s > .070, suggesting that participants' knowledge ratings for the control expert did not significantly differ between time points. Also, there were no other significant main effects or interactions, *F*s < 3.20, *p*s > 0.77.

Figure 6

Children's Average Knowledge Ratings Over 5 Time Points for the Control Expert by Age Group and Condition for Study 2.



Answer Explanations

Across all 4 trials, children selected the General Trait Negative explanations 93% of the time (see Table 9 for breakdown by age group and condition). Thus, when providing participants with a forced-choice option, participants indicated that the expert did not know about his domain of expertise (i.e., bodies or cars) rather than endorse the inaccurate statement.

Table 9

Frequency of Explanation Choice by Age Group and Condition for Study 2

		Explanation Type	
		General Trait Negative	Statement Focused Endorsement
Younger	Doctor	77 (96%)	3 (4%)
	Mechanic	78 (97%)	2 (3%)
Older	Doctor	68 (85%)	12 (15%)
	Mechanic	76 (95%)	4 (5%)

Prediction of Change in Knowledge Rating

Due to the non-linear distribution of the data, it was not appropriate to conduct a linear regression as in Study 1. Informal observation revealed that of the 7% of Answer Explanations that were Statement Focused, the average knowledge rating across trials was 6.14 (*SD* = 1.65). In comparison, the average knowledge rating for the trials where children chose the General Trait Negative explanations was 1.41 (*SD* = 1.05). This finding suggests that children who selected the Statement Focused explanation rated the inaccurate expert as having knowledge and children who selected the General Trait Negative explanation rated the inaccurate expert as not having knowledge.

Also, of the 21 trials in which children chose the Statement Focused Endorsement explanations, 13 occurred on the first trial, 5 occurred on the second trial, 2 occurred on the third trial, and only 1 occurred on the fourth trial (with this participant choosing the Statement Focused Endorsement explanations on every trial). Statement Focused Endorsement explanations were more likely to be selected on earlier trials than later trials, where children had less experience with the informant's inaccuracy, and they were more likely to be followed by a higher knowledge rating than a lower knowledge rating.

Participants selected the General Trait Negative explanation and gave lower knowledge ratings regardless of trial.

Exploratory Analysis of Knowledge Rating

The same categorization scheme used for the exploratory analysis in Study 1 was used for the data in Study 2 (see Table 10 for breakdown by age group). However, because 83% of children were in the "fast drop" category, and the number of children in the other categories was very small, the exploratory analysis computed in Study 1 was not appropriate for Study 2.

Table 10

Frequency of Participant in Each Type of Rater Response by Age Group in Study 2

	Category of Rater Response		
Age Group	Never Drop	Fast Drop	Slow Drop
Younger	3	32	5
Older	0	34	6

Knowledge Attribution Post-Test

To determine if children changed their knowledge attribution for the inaccurate expert and the control expert, two chi-squared tests were conducted to compare "changers" vs "non-changers" against the expected value (n=40). The chi-squared test for the inaccurate expert's domain of expertise showed that the number of children who changed and did not change did not differ from chance, $\chi^2(1) = 1.25$, $p = .264$, suggesting that around half the participants (i.e., chance) said the control expert would know about the inaccurate expert's domain of knowledge. The chi-squared test for the control expert's domain of expertise showed that the proportion of children who changed and did not change significantly differed from chance, $\chi^2(1) = 61.25$, $p < .001$ (see Table 11), demonstrating that the majority of children continued to attribute knowledge to the control expert for his domain of knowledge.

Table 11

Children's Change in Knowledge Attribution by Each Expert's Relevant Domain of Expertise for Study 2

		Knowledge Attribution	
		No Change	Change
Expert's Domain	Inaccurate	35	45
	Control	75	5

Predictions of Change in Knowledge Attribution.

To understand why almost half of the participants changed their knowledge attribution at post-test, a logistic regression (see Table 12) was conducted to investigate the relation between children's knowledge attribution at post-test (i.e., changed = 1, or not changed = 0), Age (continuous), and condition. Due to a skewness score of 13.07 for final knowledge rating, an Inverse Transformation for "severe" positive skewness was conducted and resulted in a skewness score of 8.22. Because the skewness of the new transformed variable was still above 3.29, this variable was excluded from the logistic regression. Also, due to the low frequency of Statement Focused Endorsement explanations, the selection of each type of explanation was excluded from the analysis.

The model was statistically significant, χ^2 (2, N = 80) = 17.16, p < .001, suggesting that it distinguished between participants who had changed their knowledge attribution and participants who had not. In addition, 25.9% of the variance was accounted for (Nagelkerke R^2 = .259), and the model was able to correctly identify 68.8% of the cases. Age (continuous) was a significant predictor of change in knowledge attribution (p < .001, odds ratio = 2.26), indicating that as age increases by a factor of 1 year, children's odds of changing their knowledge attribution at post-test increases by a factor of 2.26. This finding suggests that older children were more likely to change their knowledge attribution at post-test than younger children. The effect of condition was non-significant; therefore, whether the inaccurate expert was a doctor or a mechanic did not affect children's knowledge attributions at post-test.

Table 12

Logistic Regression Results Predicting Children's Knowledge Attribution of the Inaccurate Expert's Domain at Post-Test in Study 2 (N = 80)

Variable	Nagelkerke R^2	χ^2	*B*	*SE*	Wald	*p*	OR	95% CI
Model 1 (constant)	.259	17.16	-5.10	1.96	6.80	.009	.01	
Age (continuous)			.81	.23	12.12	<.001	2.26	1.43-3.57
Condition			-.77	.51	2.30	.130	.46	.17-1.25

Note. OR, odds ratio; CI, confidence interval.

Question Delegation Analysis

For questions in the inaccurate expert's domain of knowledge, children chose the inaccurate expert to answer the questions 77% of the time, the control expert 9% of the time, and themselves 14% of the time (see Table 13). For questions in the control expert's domain of knowledge, children chose the inaccurate expert to answer the questions 4% of the time, the control expert 87% of the time, and themselves 9% of the time (see Table 14).

Table 13

Frequency of Assignment of Inaccurate Expert's Question Type (x5) in the Question Delegation Task by Age Group and Condition

		Inaccurate Expert's Domain Questions		
		Inaccurate	Control	Self
Younger	Doctor	74	5	21
	Mechanic	80	7	13
Older	Doctor	75	17	8
	Mechanic	77	8	15

Table 14

Frequency of Assignment of Control Expert's Question Type (x5) in the Question Delegation Task by Age Group and Condition

		Control Expert's Domain Questions		
		Inaccurate	Control	Self
Younger	Doctor	0	93	7
	Mechanic	1	84	15
Older	Doctor	9	84	7
	Mechanic	6	87	7

Excluding the trials where children selected themselves, a chi-squared goodness-of-fit test was conducted to determine if there was a difference in frequency between the number of questions assigned to the inaccurate expert for questions within the inaccurate expert's domain and the number of questions assigned to the control expert for questions within the control expert's domain. This analysis resulted in a significant difference, $\chi^2(1) = 4.69$, $p = .030$, suggesting that children assigned more questions to the control expert for questions within the control expert's domain than questions to the inaccurate expert for questions within the inaccurate expert's domain.

A paired samples t-test was conducted to determine if participants assigned more questions to themselves for the inaccurate expert's domain of knowledge questions than the control expert's domain of knowledge questions. This resulted in a significant difference, $t(79) = 2.03$, $p = .046$, such that children assigned more questions to themselves for the inaccurate expert's domain questions ($M = .71$, $SD = 1.09$) than the control expert's domain questions ($M = .45$, $SD = .59$).

Justification Coding.

Of the 80 participants, 7 participants were included in an initial version of the study and were not asked the Question Delegation justification (i.e., "Why did you pick him [the inaccurate expert] sometimes?"), 4 participants never selected the inaccurate expert in the Question Delegation task (which resulted in this question being irrelevant), and 1 participant's answer was not recorded. Therefore, 68 participants' answers were transcribed. Two independent coders, blind to the participant's age, coded 38% (n=26) of the justifications. Overall percent agreement was 93.59% and there was very high interrater reliability (Cohen's $\kappa = .82$). Disagreements were resolved through discussion. Each coder then coded 31% (n=21) of the sample on their own. One participant responded, "I don't know" and therefore was coded as such. Table 15 displays the frequency of each code provided by participants within each age group.

As can be seen in Table 15, older children were more likely than younger children to provide justifications that refer to their own lack of knowledge. However, children in each age group gave other justifications (i.e., referring to expertise or the expert has knowledge, referring to the control expert not having knowledge, and referring to the specific question asked) at similar rates.

Table 15

Frequency of Justification Codes for Question Delegation Justifications in Study 2

Justification code	Age Group	
	6- & 7-year-olds (n = 35)	8- & 9-year-olds (n = 33)
Expertise/Inaccurate Expert Has Knowledge	18 (51.4%)	16 (48.5%)
Control Expert Does Not Have Knowledge	7 (20%)	7 (21.2%)
Self Does Not Have Knowledge	6 (17.1%)	12 (36.4%)
Question Type	13 (37.1%)	10 (30.3%)

Note. Justifications were not mutually exclusive; therefore, totals are more than 100%.

Predictors of Question Delegation

For the question delegation task, children were categorized into 4 different types of responders: 1) Inaccurate Preference (i.e., children who assigned the majority of inaccurate expert's domain questions to the inaccurate expert), 2) Self Preference (i.e., children who assigned the majority of inaccurate expert's domain questions to themselves), 3) Control Preference (i.e., children who assigned the majority of the inaccurate expert's domain questions to the control expert), and 4) Mixed Preference (i.e., children who assigned the majority of inaccurate expert's domain questions to both themselves and the control expert). Eighty-three percent of children were categorized as having an Inaccurate Preference, 1% as Self Preference, 2% as Control Preference, and 1% as Mixed Preference (see Table 16). Because of the lack of variability in the types of responders, formal analyses could not be conducted.

Table 16

Frequency of Type of Responder for Question Delegation Task by Age Group and Condition

		Type of Responder			
		Inaccurate Preference	Self Preference	Control Preference	Mixed Preference
Younger	Doctor	17	2	0	1
	Mechanic	17	1	1	1
Older	Doctor	16	0	4	0
	Mechanic	16	1	1	2

Discussion

The overall patterns of results from Study 1 were replicated in Study 2. Specifically, children decreased their knowledge rating of the inaccurate expert over time and about half the children said that the control expert knew more about the inaccurate expert's domain of knowledge than the inaccurate expert.

Although the overall patterns of results for the main task were replicated, when observing the results more closely, there are some distinct differences between Study 1 and Study 2. First, although children decreased their knowledge ratings of the inaccurate expert over time, the ratings reached floor levels more quickly in Study 2 than in Study 1. One explanation for this difference could be that Study 2 included forced-choice options that were not present in Study 1. When examining the two forced-choice explanations (i.e., General Trait Negative and Statement Focused Endorsement), children rarely chose the Statement Focused Endorsement explanation. Selecting the General Trait Negative explanation (i.e., "he does not know about X") could have influenced children's ratings by prompting them to acknowledge that the expert might not have a high amount of knowledge. The results of Study 1 support this proposal, such that children who provided

General Trait Negative explanations also rated the expert as having lower knowledge. Children's preference for General Trait Negative explanations makes sense given that previous research has shown children rarely endorse inaccurate information when given a forced-choice response (see Birch et al., 2008; Harris & Corriveau, 2011; Pasquini et al., 2007; Vanderbilt et al., 2014). This result suggests that even though children recognize and understand expertise, they are heavily swayed by an expert's inaccuracy and when given the option to not endorse the inaccurate information, they rarely do so.

Also, in Study 2 there was a main effect of condition, such that children were more likely to give a lower knowledge rating to the inaccurate doctor than to the inaccurate mechanic. This effect of condition could suggest that children judge different experts more or less harshly based on the domain of their knowledge. Practically, if a doctor makes a mistake in real life, it is more likely to cost someone their health/life than if a mechanic makes a mistake. Also, although children are equally familiar with a doctor and a mechanic as examples of experts (Lutz & Keil, 2002), children may interact more often and more personally with a doctor than a mechanic. Because children have more experience with doctors in their own lives who are presumably accurate, children may be more judgmental of an inaccurate doctor than an inaccurate mechanic.

One surprising result in Study 2 was that there was a statistically significant difference in knowledge rating for the control expert over time. One explanation for this result is that because children made more negative ratings of the inaccurate expert, they also decreased their ratings slightly for the other expert. However, although this result is "statistically significant" (i.e., $p < .05$), it could be argued that it is not meaningful because of the small effect size ($\eta^2 = .045$). Over the past decade, scientists and academics have suggested that effect sizes may be more meaningful than *p*-values (Sullivan & Feinn, 2012). The lack of significance when using a more precise analysis (i.e., post-hoc analysis with Bonferroni correction) further supports this explanation, such that none of the ratings were significantly different from each other at different time points.

Due to the lower ratings of the inaccurate expert and the low amount of variability between explanation types, the regression analyses performed in Study 1 were not able to be repeated in Study 2. Observationally, Statement Focused Endorsement explanations were selected by children during earlier trials and followed higher knowledge ratings. However, children selected General Trait Negative explanations the majority of the time and provided lower ratings for the inaccurate expert. This pattern of responses is consistent with research on the positivity bias: as children receive more negative observations, they are more likely to attribute a negative trait label than a positive or neutral trait label (Boseovski & Lee, 2006).

Finally, Study 2 replicated the finding from Study 1 in that around half the children selected the control expert as knowing more about the inaccurate expert's domain of knowledge. Due to skewed final knowledge ratings, this variable was not able to be included as a predictor for children's change in ratings. However, age predicted whether children selected the inaccurate expert or the control expert as knowing more about the inaccurate expert's domain of knowledge. Older children were more likely than younger children to say the control expert knew more about the inaccurate expert's domain of knowledge. This developmental difference is similar to findings in selective trust research involving experts who provide statements that are counter-intuitive (Lane

& Harris, 2015) or conflict with a consensus (Boseovski et al., 2017). In both of these studies, older children were less likely to endorse an expert's claim that was counter-intuitive or against consensus than younger children. Older children may be more sensitive to the information provided to them than younger children. Consequently, in the current study, older children may have been more likely to choose the control expert as knowing more about the inaccurate expert's domain of knowledge. Another explanation for this finding is that older children are more sensitive to inaccuracy than younger children. Previous research on inaccurate informants has found that by age 7, children only need one inaccurate answer from an informant to decide whether to trust the informant or not (Fitneva & Dunfield, 2010). Thus, the developmental differences in Study 2 demonstrate that older children are less sensitive to expertise and more sensitive to inaccuracy than younger children.

The Question Delegation measure in Study 2 was intended to further examine children's preferences and beliefs about the experts by raising the stakes and making expertise a necessity to complete the task. Although I predicted that children would not select the inaccurate expert to answer questions within his domain of knowledge, this was not the case. To my surprise, children continued to prioritize expertise even after rating the inaccurate expert as having little to no knowledge. Previous research by Boseovski et al. (2017) found that even after children did not prioritize expertise for an endorsement task, 6- to 8-year-olds were sensitive to expertise for the prospect of their own future learning. It is possible that judging an expert's knowledge for one task does not relate to children's need for that expertise in terms of social learning. Another possible explanation for why children selected the inaccurate expert could be that children trust an informant known to be inaccurate in the absence of an alternative informant (e.g., Vanderbilt et al., 2014). Thus, it is possible that children did not value themselves or the other expert as possible alternative options to answer the question correctly.

The explanations that children's need for expertise was higher in the Question Delegation task and that children lacked an appropriate alternative option to answer the questions are supported by children's justifications for why they selected the inaccurate expert to answer some of the questions. Children often gave explanations that either referred to the inaccurate expert having knowledge, or the control expert or themselves *not* having knowledge. If the goal of social learning is to receive the best answer from the best possible informant, children might prioritize expertise above all for future learning (i.e., asking a new question) but not prioritize it when making overall judgments about the individual's knowledge. Several other explanations for why children selected the inaccurate expert to answer the question are discussed in the General Discussion below.

CHAPTER IV

GENERAL DISCUSSION

In a world filled with mistakes and misinformation, it is important to understand how children think about experts who give inaccurate information. Although many research studies have investigated children's understanding of expertise, the current studies are the first to investigate children's specific judgments of an expert's knowledge once the expert provides inaccurate information. The studies in this dissertation addressed this gap in the literature and investigated potential developmental differences in children's judgments across early elementary school.

Children's Overall Knowledge Attributions to Experts

First, replicating previous results regarding children's understanding of expertise (e.g., Aguiar et al., 2012; Lutz & Keil, 2002; Shenouda & Danovitch, 2013), before being given any information about an expert's accuracy, children correctly attributed domain specific knowledge to the appropriate expert about 97% of the time. This result adds to the body of literature showing that children understand expertise and domain related knowledge as young as 6-years-old.

Although children were accurate at attributing relevant knowledge to the relevant expert *before* receiving any information about the expert's inaccuracy, this was not the case *after* hearing the four inaccurate answers. Around half of the children changed their response regarding who knows more about the inaccurate expert's domain of knowledge to say that the control expert would know more. Interestingly, not *all* children made this change, suggesting that individual differences may play a role in this decision. The two studies differed in what predicted children's attributions (final knowledge rating in Study 1 and age in Study 2); however, there was still variability in the model that was not predicted by these variables. These results suggest that there are other individual differences that determine children's choices. Previous research on the influence of accuracy on children's learning has found no effect of individual differences such as theory of mind and vocabulary (Cossette et al., 2020). Future research should consider measuring executive functioning to determine what predicts the unexplained variability in the model. Executive functioning, specifically inhibitory control, could be a predictor of the variability in children's responses. Inhibitory control is the ability to maintain attention to relevant task features and the ability to suppress or delay a dominant response to achieve a goal (Morasch & Bell, 2011). Considering that inhibitory control improves as children develop and older children in Study 2 were more likely to change their knowledge attributions, it is possible that children with higher inhibitory control would inhibit the characteristic that having the label of doctor or mechanic means that individual has a high amount of knowledge in their relevant domains and focus on the inaccurate information just provided. As a result, children with higher inhibitory control would attribute knowledge to the control expert more often than children with lower inhibitory control.

Another potential individual difference that future studies should consider is children's knowledge of the inaccurate expert's domain. Previous research has demonstrated that children rely on their own knowledge and disregard an informant's testimony when making decisions they are knowledgeable about (Corriveau, et al., 2009).

Children who are more knowledgeable about bodies or cars may be more sensitive to an expert's inaccuracy in that domain. Future research should include measures of biological and mechanical knowledge to determine if children's own knowledge of the domain influences their final knowledge attributions.

Future studies might also measure how other adults in children's lives (i.e., parents and teachers) answer questions. Recent research has shown that when parents answer difficult biological questions as if talking to their child, some parents acknowledge their knowledge limitations (e.g., they give an explanation prefaced by "I think" or say "I don't know") and other parents attempt to answer the question confidently even if their answer is not accurate (Mills et al., 2022). Children who are exposed to adults in their own lives who admit when they do not know something may be less sensitive to an inaccurate expert's errors because they may be more aware that adults do not always know everything.

Children's Repeated Knowledge Rating of Experts

After observing the expert's inaccuracy, children decreased their knowledge ratings over time. This result suggests that children are sensitive to inaccuracy even when it is weighed against expertise. As mentioned in the discussions for Study 1 and Study 2, one explanation for why children decreased their knowledge rating of the expert over time is because of the positivity bias. This explanation is especially relevant for Study 1 because of the significant predictor of age for children's knowledge ratings. Research on the positivity bias suggests that younger children are more likely than older children to pay attention to and process information selectively to have a positive view of themselves and/or others (see Boseovski, 2010, for a review). In addition, when given negative information about an individual, children need multiple pieces of evidence to then label that individual with a negative trait (Boseovski & Lee, 2006). The results of Study 1 add to this literature by suggesting that younger children need more negative pieces of evidence before judging an individual negatively than older children.

Not only was the effect of age on children's knowledge ratings examined in the current studies, but whether the domain, or type of expert, mattered was examined as well. Study 1 did not result in a significant effect of condition and although the effect was significant in Study 2, it was a small effect size, suggesting that the differences in knowledge ratings between the doctor and the mechanic, while statistically significant, were small changes with little practical significance. The current study included a doctor and a mechanic as the experts based on evidence from previous research that children are familiar with these experts and can recognize their domains of knowledge (i.e., Lutz & Keil, 2002). Because these were experts within familiar domains, children could have weighed inaccuracy equally when judging the experts' knowledge. As mentioned previously, when children can use their knowledge to make decisions about testimony, they disregard the characteristics of the expert (Corriveau, et al., 2009). Future research should consider using experts with domains of knowledge that may not have a clear correct answer to children (e.g., art and music experts as used in Boseovski et al., 2017). Because expertise in art domains could be considered more subjective (e.g., one expert could say a painting is beautiful while another says it is ugly), future research should consider including testimony that is in conflict with children's own opinions. For example, an experimenter could present a child with different paintings and ask them to say if the painting is pretty or ugly. Then, when the expert provides their testimony, the expert would provide the opposite testimony of the child. Children could be less judgmental of an expert with knowledge in a more subjective domain who gives incorrect answers because children would not be as sure of the correct answer.

Children's Explanations for Inaccurate Answers

One important aspect of the current studies is the analysis of children's explanations for why they believed the expert said the inaccurate answer. Children provided informative and thoughtful explanations for why they believed the expert said the inaccurate answer the other 73% of the time. Although I predicted that children would provide explanations about the expert lacking knowledge, some of the other explanations (e.g., giving excuses and endorsing the statements) were surprising.

Given previous research that demonstrates that children prefer to trust an accurate rather than an inaccurate informant (Koenig et al., 2004; Koenig & Harris, 2005; Pasquini et al., 2007), I did not expect any child to endorse the inaccurate answers, yet children did so in 23% of trials in Study 1. One explanation for why children provided this explanation could be that there was no conflicting testimony provided by an accurate or neutral informant. Previous research has suggested that when there is no conflicting testimony provided, children will endorse the testimony provided by a previously inaccurate informant (Vanderbilt et al., 2014). Future research should consider having the control expert provide an answer as well (either accurate or neutral) and measure if children continue to endorse the inaccurate expert's statements.

When examining children's explanations, I was also not expecting children to excuse the expert's wrong answer. It is interesting to note that, by giving an excuse, children were recognizing that the expert was wrong, but they were also expressing that it was ok, and that the expert should not be judged negatively for it. Previous research has suggested that children consider excuses as a means of "self-preservation," such that children decrease consequences after an individual provides an excuse for their behavior (Banerjee et al., 2010). It is possible that children in Study 1 were attempting to preserve the expert's status and knowledgeability by providing an excuse for the inaccurate answer. These explanations further suggest that there may be individual differences in how children think about experts. Specifically, although some children may be comfortable making a negative judgment, others take expertise into consideration and try to provide explanations that maintain the expert's credibility.

One reason why children's overall knowledge attributions to experts and children's repeated knowledge rating of experts show different patterns of judgments involves children's evaluations of trait and state characteristics. Personality psychology research has long proposed an interaction between trait characteristics (i.e., characteristics that generalize across situations) and state characteristics (i.e., characteristics that are dependent on the situation at a specific moment; Schmitt & Blum, 2020). Some children may have viewed the overall knowledge attribution as a trait judgment while viewing the knowledge rating as a state judgment. Children's explanations support this possibility because some children provided explanations that were general trait attributions while others provided explanations focused on the statement provided.

If I were to repeat this study, I would consider changing the forced-choice options given to children to better understand their explanations in Study 2. As noted in Study 1, there are two general categories of explanations: Expert Focused and Statement Focused.

Although Study 2 used the two most frequently produced subcategories of those explanations that were also predictive of children's knowledge ratings, it could be insightful to give the broader categories as the forced-choice options. It is possible that children believe the expert said the inaccurate answer due to a reason concerning him (e.g., he does not know anything or learned the answer wrong) or due to a reason concerning the answer given (e.g., that answer is right or wrong). The current study did not include these options because I believed they would be too abstract for children to understand (e.g., "Why do you think the doctor said a person does not have any bones in their hands? Is it because of him or the question that was asked?"). Because children might need assistance in understanding more abstract questions like these, future research could include a practice or training section on what the question means, or an explanation that "Sometimes people answer questions wrong. Sometimes they are wrong because of something to do with the person, such as they are not smart or forgot the answer. Other times they say the wrong answer because of the question asked, such as the question was too hard, or the question did not make sense." Given enough training and support, children should be better able to answer the question and further our understanding for why children think experts provide inaccurate answers.

Children's Reliance on Expertise Regardless of Inaccuracy

In Study 2, children not only judged the expert's knowledge and indicated who knew more about the domain, but they were also tasked with a game where an expert's assistance would be helpful to win. Interestingly, although 91% of children rated the expert as having little to no knowledge by the final trial (i.e., a final knowledge rating of 1 or 2) and 56% of children said that the control expert knew more about the inaccurate expert's domain of expertise, children chose the inaccurate expert to answer questions within his relevant domain of knowledge 77% of the time during the game task.

Children may have weighed their options and decided that the inaccurate expert was the best informant to answer their questions, even after rating him as having little to no knowledge. One explanation for this decision is that the expert provided inaccurate answers confidently. Previous research has shown that children prefer to learn from a confident speaker over a hesitant one (Brosseau-Liard et al., 2014). However, Brosseau-Liard et al. also demonstrated that when given the choice between an inaccurate confident speaker and an accurate hesitant speaker, children prefer to learn from the accurate hesitant speaker. It is possible that because the control expert never provided information, children could not gauge his confidence or accuracy, therefore they simply relied on the inaccurate expert's confidence to guide their choices.

Another explanation for why children selected the inaccurate expert to answer the questions could be that, during middle childhood, children begin to grasp the nuances of expertise, including the difference between more sophisticated "specialist" knowledge and "generalist" knowledge (Landrum & Mills, 2015). It is possible that by age 6 children recognize that a doctor might know some things about the body but not others. Children's justifications further support this possibility, such that children were likely to say the reason they selected the inaccurate expert to answer the question was because the question was about the specific domain of expertise. Although the questions were intended to be similar to the inaccuracy trial questions, children could have judged the questions as a different set of specific knowledge and therefore believed that the inaccurate expert could still answer them.

A third explanation for why children selected the inaccurate expert is because assigning the question to the confident but inaccurate informant allows them to distance themselves from being at fault for not answering correctly. Previous research with adults suggests that when on a team, an adult will assign trivia questions to be answered by somebody else because if the question is answered incorrectly, it was not "their fault" because they did not produce the answer themselves (Fisher & Oppenheimer, 2021). Also, research with children shows that by age 6 children recognize when they do not know answers and then children will assign test questions correctly to experts (Aguiar et. al., 2012). Children's justifications for why they picked the inaccurate expert to answer the questions also support this explanation, such that some children (26%) said they would not know the answers to the questions. It is possible a younger age group would have shown a larger self-bias; therefore, future research should consider including younger children when measuring children's judgments of inaccurate experts.

Although these explanations provide insight as to why children selected the inaccurate expert or did not select themselves to answer questions, these explanations fail to explain why children did not select the control expert who provided no inaccurate answers. One reason they might have not selected the control expert was because the control expert never provided an answer to the other questions. Previous research has shown that children younger than 9-years-old believe experts who provide impossible answers to impossible questions (e.g., question: "'If you count all the leaves on all trees in the entire world, how many will you get?"; answer: "There are exactly 809,343,573,353,235 leaves on all trees in the world") are better experts than experts who admits to not knowing the answer (e.g., "I don't know because it is not possible to answer that question precisely"; Kominksy et al., 2016). In Study 2, the inaccurate expert provided an answer to all the questions, although the answers were inaccurate. Children may have believed an answer that may be inaccurate is better than no answer at all. Children's justifications for why they selected the inaccurate expert to answer the questions supports this explanation, such that 21% of children's justifications referenced that the control expert would not have known the answer, therefore they took the chance that the inaccurate expert would provide an answer rather than the chance the control expert would answer "I don't know" to the question.

Methodological Limitations

It is important to note that the current studies contain a few methodological limitations that future studies should attempt to address. One limitation is that, in the current studies, both experts were represented by images of white males. Future research should examine whether the experts' physical characteristics influence children's judgments of their expertise. Based on previous research that demonstrates that children attribute knowledge/brilliance to white men more than white women, and more than to both men and women of color (Jaxon et al., 2019), I did not want race or gender to bias children's perceptions of the experts before any introduction of inaccuracy. However, given previous research on the influence of race and gender on children's judgment of informants' knowledge, it is likely that children would judge a white male doctor differently than a white female doctor or a doctor of color when both give inaccurate information. Future research should consider attempting to replicate the finding of Study 1 and Study 2 with experts that are representative of individuals with minority/diverse identities.

Along the same lines as examining the influence of the experts' identities, future research should also gather data from a more diverse sample of children. Another limitation of the current studies was that all data in the current sample were collected from WEIRD populations (i.e., western, educated, industrialized, rich and democratic; Henrich et al., 2010). Members of WEIRD populations, including young children, do not necessarily represent all humans, yet most psychological research involves WEIRD participants (Henrich et al., 2010). Future research should consider replicating the current studies with samples that are inclusive of more diverse populations. Because the "E" in WEIRD stands for "educated", it is possible that children from non-WEIRD populations may respond differently to the current tasks because the pursuit of *formal* education is less common in these societies. It is possible that the label of expert in non-WEIRD populations does not hold the same epistemic meaning as it does in WEIRD populations. For example, a formally educated doctor may not exist in some societies, however there may be a tribal herbalist that has acquired their expertise through knowledge passed down over generations. Because knowledgeability may be treated differently in these populations, it would be important to replicate the current findings with non-WEIRD populations.

Another factor that could change the results between populations is different societal rules for respecting authority figures. In some societies, children may be raised to always respect authority (e.g., a doctor) and to never judge them in any negative way. In the current studies, this would be important to children's knowledge ratings and explanations, such that children in societies that value respect of authority may have children that do not give low knowledge ratings and do not provide explanations containing negative traits. Previous research in a WEIRD population has found that parents who score higher on authoritarianism (i.e., encouraging children to be obedient and respect authority) are less likely to admit when they do not know something than parents who score low on authoritarianism (Mills et. al., 2022). It is possible that children belonging to societies with more authoritarian values would continue to rate the expert as knowledgeable, even after viewing examples of inaccuracy, because they have been raised to respect authority and they have not been exposed to authority figures (e.g., parents) who model uncertainty or how to handle not always knowing the answers.

Conclusions

The studies presented here suggest that children weigh accuracy and expertise differently depending on the task at hand. Importantly, even within those tasks, there are individual differences between children in whether they prioritize an informant's accuracy or expertise. When attributing overall knowledge to an expert after the expert provides inaccurate information, children seem to be split on whether they continue to attribute knowledge to the inaccurate expert or not. Individual differences may play a key role in why some children make this change and not others. When judging an expert's amount of knowledge immediately following an inaccurate answer, children seem to weigh the expert's inaccuracy more than the label of expert. Finally, when faced with a new task where expertise would be helpful, children seem to weigh an expert's prior inaccuracy less than they did when simply rating knowledge. Thus, the results of the current studies suggest that children weigh expertise and inaccuracy differently depending on the task at hand.

Having a better understanding of children's judgments and beliefs about inaccurate experts allows educators, policy makers, and caregivers to better interact with children when discussing or explaining misinformation. As noted in the studies presented here, even if children think experts know everything, they are sensitive to inaccurate answers. It is important for parents and people who work closely with children (e.g., doctors, teachers, and coaches) to take note when they provide an inaccurate answer because the children are taking note themselves. These individuals should give explanations for why they might have provided the wrong answer and explain that just because someone gives a wrong answer, that does not mean that they lose their credibility. In cases where children are repeatedly given wrong answers (e.g., fake news on television), it is important for parents and educators to discuss that the label of expert (e.g., doctor) does not always mean that a person is the best informant. Parents and educators should explain that there are people who may have the label of expert (e.g., Dr. Oz) but they may not always provide the best information (e.g., providing non-scientific advice and supporting unproven products on a television show). Children should be encouraged to listen and think critically about the answers provided by experts before deciding whether they should consider the expert as the best source for future information.

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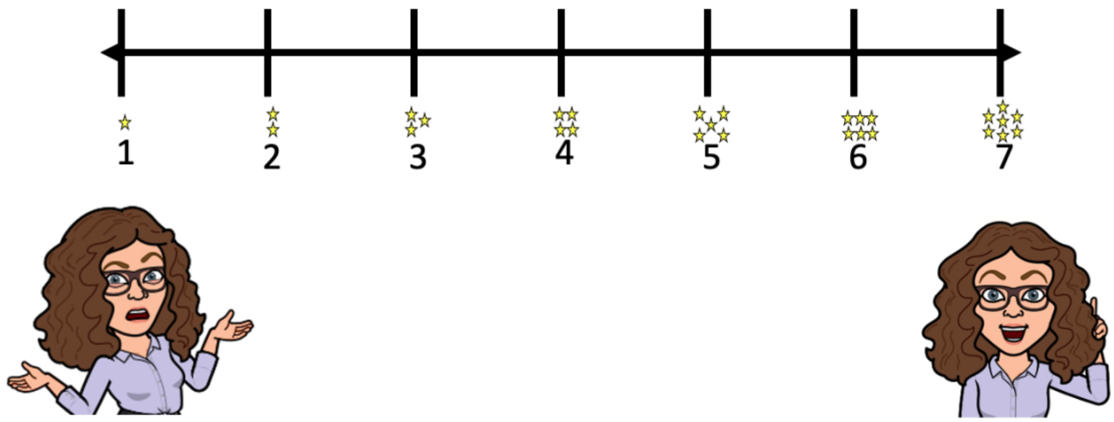
APPENDIX A

APPENDIX B

	Question	Answer
Doctor	How many bones are in a person's hand?	A person doesn't have any bones in their hand
	Which body part do people use to kick?	People kick with their ears
	What is used to fix a broken arm?	Blue paint is used to fix a broken arm
	Which body part do people use to see?	People see with their stomachs
Mechanic	How many wheels does a car have?	A car does not have any wheels
	Which part of a car helps it move side to side?	Cars have skis that move them side to side
	What is used to fix a flat tire?	Tooth paste is used to fix a flat tire
	Which part of a car is used to turn the car?	Seatbelts are used to turn the car

APPENDIX C



"1 star means a person does not know anything, 2 stars means they know almost nothing, 3 stars means they know a little bit, 4 stars means they know some things, 5 stars means they know a lot of things, 6 stars means they know most things, and 7 stars means they know more than anybody else."

APPENDIX D

	Question	Mean	SD
Biological	What is used to fix a broken tooth?	4.00	1.07
	How many eyelashes are on a person's eye?	5.00	0.00
	Which part of the body grows the fastest?	4.00	1.31
	How many ounces of blood are in a person's body?	4.75	0.46
	What is used to look in a person's ear?	4.00	0.76
	TOTAL	4.35	0.92
Mechanical	What is used to fix a broken car window?	4.25	1.04
	How many pipes are in a car's engine?	5.00	0.00
	Which part of a car turns gas into energy?	3.88	1.46
	How many parts of a car are made of copper?	4.50	1.07
	What is used to clean a car's engine?	4.00	0.54
	TOTAL	4.33	1.00

CURRICULUM VITAE

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EDUCATION

2022	Ph.D. Candidate in Experimental Psychology (Developmental) University of Louisville Advisor: Dr. Judith Danovitch
2019	M.S. in Experimental Psychology (Developmental) University of Louisville Advisor: Dr. Judith Danovitch
2017	B.A. in Psychology, *magna cum laude* Rider University Advisor: Dr. Cara DiYanni

AWARDS, GRANTS, AND HONORS

2022	Doctoral Dissertation Completion Award, University of Louisville
2021	Department of Psychological and Brain Sciences Experimental Psychology Doctoral Program: Excellence in Service Award, University of Louisville
2021	Graduate Student Regional Research Conference; 2nd Place for Outstanding Graduate Student Posters, University of Louisville
2020	Graduate Student Council Research Grant, University of Louisville
2020	Graduate Network in Arts and Sciences Research Award Fund, University of Louisville
2020	Mentored Undergraduate Research and Creative Activities Grant, University of Louisville

2019	Outstanding M.S. Graduate in Experimental Psychology, University of Louisville
2019	Department of Psychological and Brain Sciences Experimental Psychology Doctoral Program: Excellence in Research Award (junior level), University of Louisville

PUBLICATIONS

Published Empirical Articles

Williams, A. J., & Danovitch, J. H. (2022). Is what Mickey Mouse says impossible? Informant reality status and children's beliefs in extraordinary events. *Journal of Cognition and Development, 23,* 1-17 doi:10.1080/15248372.2021.2022680

Tong, Y., Wang, F., Danovitch, J., **Williams, A.,** & Li, H., (2021). Unsafe to eat? How familiar cartoon characters affect children's learning about potentially harmful foods. *Appetite, 167,* 105649. doi:10.1016/j.appet.2021.105649

Danovitch, J. H., Mills, C. M., **Williams, A.,** & Sands, C. (2021). Mind the gap: How incomplete explanations influence children's interest and learning behaviors. *Cognitive Psychology, 130,* 101421. doi:10.1016/j.cogpsych.2021.101421

Danovitch, J. H., Mills, C. M., Duncan, R. G., **Williams, A.,** & Girouard, L. (2021). Developmental changes in children's recognition of the relevance of evidence to causal explanations. *Cognitive Development, 58,* 101017. doi:10.1016/j.cogdev.2021.101017

Williams, A. J., Danovitch, J. H., & Mills, C. (2020). Exploring Sources of Individual Differences in Children's Interest in Science. *Mind, Brain, and Education, 15,* 67-76. doi:10.1111/mbe.12263

Danovitch, J. H., Mills, C. M., Duncan, R. G., **Williams, A.,** & Girouard, L. (2020). "How Helpful is this Observation?": Children's Evaluations of Scientific Evidence. In S. Denison., M. Mack, Y. Xu, & B.C. Armstrong (Eds.), *Proceedings of the 42nd Annual Conference of the Cognitive Science Society* (pp. 1873-1879). Cognitive Science Society. (link)

Williams, A. J., & Danovitch, J. H. (2019). What does Mickey Mouse know about food?: Children's trust in favorite characters versus experts. *Journal of Experimental Child Psychology, 187,* 104647. doi:10.1016/j.jecp.2019.05.014

CONFERENCE PRESENTATIONS

Williams, A. J., & Danovitch, J. H. (2021, May). *"He Doesn't Know Anything": Children's Judgements of Experts Who Provide Inaccurate Information.* Flash Talk presented at the Association of Psychological Science Annual Convention, Virtual.

Williams, A. J., & Danovitch, J. H. (2021, April). *How Informant Reality Status Influences Children's Belief in Extraordinary Events.* Poster presented at the Society for Research in Child Development meeting, Virtual.

Williams, A. J., & Danovitch, J. H. (2021, April). *The Influence of Familiar Characters on Children's Exploration of a Novel Object.* Poster presented at the Society for Research in Child Development meeting, Virtual.

Danovitch, J. H., Mills, C. M., Duncan, R. G., **Williams, A.,** & Girouard, L. (2020, July). *"How Helpful is this Observation?": Children's Evaluations of Scientific Evidence.* Poster presented at the 42nd Annual Conference of the Cognitive Science Society, Virtual.

Williams, A. J., & Danovitch, J. H. (2019, October). *Just Because Mickey Mouse Said It Doesn't Make It Impossible: How Informant Reality Status and Familiarity Influence Children's Belief in Extraordinary Events.* Poster presented at the Cognitive Development Society meeting, Louisville, KY.

Williams, A. J., Davila, L., Robinson, M., Scofield, J., & Danovitch, J. H. (2019, October). *Children's information sharing with a naïve listener in an open-ended task.* Poster presented at the Cognitive Development Society meeting, Louisville, KY.

Mills, C. M., Danovitch, J. H., Sands, K. R., & **Williams, A. J.** (2019, March). *What do you want to learn? Children selectively choose books to fill gaps in biological explanations.* Poster presented at the Cognitive Development Society meeting, Louisville, KY.

Williams, A. J., & Danovitch, J. H. (2019, March). *What does Mickey Mouse know about food?: Children's trust in favorite characters versus experts.* Poster presented at the Society for Research in Child Development meeting, Baltimore, MD.

Williams, A. J., & Danovitch, J. H. (2019, March). *Exploring sources of individual differences in children's interest in science.* Poster presented at the Society for Research in Child Development meeting, Baltimore, MD.

Davila, L., **Williams, A. J.,** Danovitch, J. H., & Scofield, J. (2019, March). *Children's selective information sharing.* Poster presented at the Society for Research in Child Development meeting, Baltimore, MD.

Mills, C. M., Danovitch, J. H., Mugambi, V., Sands, K. R., & **Williams, A. J.** (2019, March). *Examining individual differences in how parents respond to children's questions about biology.* Poster presented at the Society for Research in Child Development meeting, Baltimore, MD.

Mills, C. M., Danovitch, J. H., Sands, K. R., & **Williams, A. J**. (2019, March). *Children's engagement in additional learning following complete and incomplete*

explanations. Paper presented at the Society for Research in Child Development meeting, Baltimore, MD.

Mills, C. M., Danovitch, J. H., Sands, K. R., & **Williams, A. J**. (2019, March). *Examining the link between parental explanations about science and child outcomes.* Paper presented at the Society for Research in Child Development meeting, Baltimore, MD.

PRESENTATIONS

Williams, A. J. (2019, October). *The influence of familiar characters on children's reality judgements.* Department of Psychological and Brain Sciences, University of Louisville, Louisville, KY.

Williams, A. J. (2018, October). *What does Mickey Mouse know about food?: Children's trust in favorite characters versus experts.* Department of Psychological and Brain Sciences, University of Louisville, Louisville, KY.

SERVICE

2020-2021	Academic Technology Committee: Graduate Student Representative
2020-2021	Graduate Student Executive Council: Director of Graduate Travel
2019-2021	Graduate Student Council: Department Representative
2020	*Journal of Cognition and Development*: Ad hoc Journal Reviewer
2020	Louisville Regional Science and Engineering Fair: Presentation Judge
2019	University of Louisville Graduate Student Council Research Grant Review Committee
2018	National Conference on Undergraduate Research: Abstract Reviewer

TEACHING AND MENTORING EXPERIENCE

2017-Present	Mentor for Psychology Undergraduate Directed Research
Spring 2021	Research Methods in Psychology (Graduate Teaching Assistant)
Fall 2020	Statistics in Psychology (Graduate Teaching Assistant)
Spring 2020	Undergraduate Research and Creative Activities Grant Mentor: Hailey Waite
Fall 2019	Undergraduate University Honors Thesis Mentor: Madalynn Robinson
Fall 2019	Infant and Child Development (Graduate Teaching Assistant)

Spring 2019 Giving Psychology Away: Critical Thinking & Public Communication (Graduate Teaching Assistant)

Fall 2018 Child Development (Graduate Teaching Assistant)

PROFESSIONAL DEVELOPMENT

Summer 2021 The Inclusive STEM Teaching Project by the NSF IUSE project

Summer 2021 Service Learning Institute at University of Louisville

Spring 2021 The Graduate Teaching Assistant Academy Part 2: Advanced Concepts and Strategies in Post-Secondary Teaching

Fall 2019 The Graduate Teaching Assistant Academy Part I: Introduction to Teaching in Higher Education

PROFESSIONAL AFFILIATIONS

Society for Research in Child Development, Association for Psychological Science, Cognitive Development Society