

HOW DO CHILDREN (AND ADULTS) INTERPRET CONFIDENCE CUES?

AIMIE-LEE JUTEAU

Thesis submitted to the University of Ottawa
in partial Fulfillment of the requirements for the
Doctor of Philosophy (Ph.D.) in Clinical Psychology

School of Psychology
Faculty of Social Sciences
University of Ottawa

© Aimie-Lee Juteau, Ottawa, Canada, 2025

Abstract

We often think that children absorb everything that they are told, but they are in fact quite selective when learning from others. For instance, previous research has demonstrated that children prefer to imitate and learn from a confident individual over a hesitant one. Importantly, very few studies to date have examined why children use confidence cues. In this dissertation, I thus focus on how confidence cues are interpreted. In Experiment 1, whether preschoolers interpret confidence cues as situational or person-specific was examined. Experiments 2a and 2b explored children's and adults' interpretation of confidence cues as epistemic or social and examined the preference for confidence as opposed to the hesitancy avoidance. Results from Experiment 1 indicate that 4- and 5-year-olds primarily treat confidence cues as situational when learning novel words. Experiment 2a suggests that adults associate confidence to both knowledge-related and social traits, whereas findings from Experiment 2b reveal that children ages 7 to 10 mainly perceive confidence as an indicator of knowledge (i.e., making knowledge-related attributions). Experiments 2a and 2b also indicate a hesitancy avoidance in adults and school-age children where hesitancy appears more salient and impactful than confidence. These findings have important implications for developmental research and, more specifically, for children's selective learning. It enlightens us on the situational interpretation of confidence cues, at least for younger children, hints towards a developmental progression in the attribution of traits inferred from confidence and reveals that hesitancy and confidence seems to be treated differently.

Keywords: Social cognition, selective social learning, confidence interpretation, situational cues, person-specific cues, epistemic cues, social cues

Co-Authorship

I hereby certify that this thesis is entirely my own original work except where otherwise indicated. I am aware of the University's regulations concerning plagiarism, including those concerning consequent disciplinary actions. Any use of the works of any other author, in any form, is properly acknowledged at their point of use.

For Chapter 2, a different version of the manuscript was published in the journal *PLoS ONE* in 2024 (DOI: 10.1371/journal.pone.0298183). The published manuscript had the following co-authors: Aimie-Lee Juteau, Yasmeeen A. Ibrahim, Sara-Emilie McIntee, Rose Varin & Patricia E. Brosseau-Liard. Changes were made to the published manuscript to include it in this dissertation. Specifically, there were two additional experiments presented in the manuscript. One of them is briefly mentioned and is referred to as a previous experiment in the present version (Juteau, Ibrahim, McIntee, Varin & Brosseau-Liard, 2024). The third experiment presented in the published manuscript serves as the first experiment of this dissertation.

Chapter 3 (with minor modifications) has been submitted for publication in the journal *Cognitive Development* in July 2024 and is currently under review. The published manuscript had the following co-authors: Aimie-Lee Juteau, Carolyn June Holmes & Patricia E. Brosseau-Liard. Changes were made to the submitted manuscript to include it in this dissertation. Specifically, the first and second experiment in this manuscript serve as the last two experiments of this dissertation and are thus presented as Experiment 2a and Experiment 2b

Acknowledgements

This dissertation is the culmination of many years of dedication and could not have been accomplished without the guidance and encouragement of many. I would first like to express my deepest gratitude to my thesis supervisor, Dr. Brosseau-Liard, whose invaluable mentorship has allowed me to develop immensely both professionally and personally.

I extend my gratitude to my thesis committee members, Dr. Christopher Fennell, Dr. Fanny-Alexandra Guimond, Dr. Stuart Hammond, and Dr. Elisa Romano, for their insightful feedback, which greatly enhanced my research. I also want to thank the members of the Childhood Thinking Laboratory, whose aid in recruiting, creating materials, and collecting data was pivotal to this work. Thank you to my fellow graduate students, my colleagues, and friends from the graduate program, who accompanied me through shared moments of joy and frustration.

I am also deeply indebted to my friends and family, whose support helped me navigate this Ph.D. journey. Special thanks to my dear friends Bronwyn O'Brien, Ana-Brigitte Poveda, and Alexia Villeneuve, who offered endless encouragement, much needed laughs, and understanding throughout my graduate studies. To my parents, the most heartfelt thank you for your unwavering love, and for always being there and believing in me.

I would also like to acknowledge the financial support from the University of Ottawa, the Fonds de Recherche du Québec, the Social Sciences and Humanities Research Council, and the Government of Ontario. Lastly, thank you to all the children and families who participated in my studies and made this dissertation possible.

Table of Contents

Abstract.....	ii
Co-Authorship	iii
Acknowledgements.....	iv
List of Tables	vii
Chapter 1 Introduction	1
1.1 Types of Cues Used in Selective Social Learning.....	1
1.2 Confidence Cues.....	5
1.2.1 <i>Confidence Cues in Older Children and Adults</i>	8
1.3 Interpretation of Confidence Cues.....	9
1.3.1 <i>Confidence Cues: Situational or Person-Specific?</i>	9
1.3.2 <i>Confidence Cues: Epistemic or Social Indicators?</i>	14
1.3.3 <i>Confidence Preference or Hesitancy Avoidance</i>	21
1.4 Objectives	22
Chapter 2 Study 1 “Do Children Interpret Informants’ Confidence as Person-Specific or Situational?” ...	44
2.1 Abstract.....	44
2.2 Introduction.....	44
2.2.1 <i>Motivation of the present experiment</i>	50
2.3 Method.....	51
2.3.1 <i>Participants</i>	51
2.3.2 <i>Materials and procedure</i>	52
2.3.2.1 History Phase.	52
2.3.2.2 Test Phase – Part 1: Word Learning.	52
2.3.2.3 Test Phase – Part 2: Attributions.	52
2.3.2.4 Test Phase - Memory Check.....	53
2.4 Results and Discussion	54
2.4.1 <i>Part 1: Word Learning</i>	54
2.4.2 <i>Part 2: Attributions</i>	54
2.4.3 <i>Memory Check</i>	55
2.5 Discussion.....	56
Chapter 3 Studies 2a and 2b “Confidence Cues: Epistemic or Social?”	68
3.1 Abstract.....	68
3.2 Introduction.....	69

3.3 Experiment 2a.....	73
3.3.1 Method.....	74
3.3.2 <i>Participants</i>	74
3.3.3 <i>Materials and Procedure</i>	74
3.3.3.1 Introductory Phase.....	75
3.3.3.2 Test: Informant-Specific Attributions.....	75
3.3.3.3 Test: General Confidence Understanding.....	76
3.3.3.4 Coding of Open-ended Responses.....	78
3.3.4 Results and Discussion	79
3.3.5 <i>Informant-Specific Attributions</i>	79
3.3.6 <i>General Confidence Understanding</i>	83
3.4 Experiment 2b.....	83
3.4.1 Method.....	84
3.4.2 <i>Participants</i>	84
3.4.3 <i>Materials and Procedure</i>	84
3.4.3.1 Introductory Phase.	84
3.4.3.2 Test Phases: Informant-Specific Attributions and General Confidence Understanding.....	84
3.4.3.3 Coding of Open-ended Responses.	87
3.4.4 Results and Discussion	87
3.4.5 <i>Manipulation and Attention Checks.</i>	87
3.4.6 <i>Attributions to the Informant</i>	87
3.4.7 <i>General Confidence Understanding</i>	90
3.4.8 General Discussion	90
Chapter 4 General Discussion	111
4.1 Situational vs Person-specific Interpretation	111
4.2 Epistemic vs Social Interpretation	114
4.2.1 <i>Epistemic Interpretation</i>	114
4.2.2 <i>Social interpretation</i>	116
4.2.3 <i>Links with cognitive abilities</i>	119
4.3 Confidence Preference vs Hesitancy Avoidance	121
4.4 Contributions and Implications.....	123
Appendix A.....	137

List of Tables

Table 1 <i>Experiment 2a: Test Questions in Order of Presentation</i>	76
Table 2 <i>Experiment 2a: Mentions of Each Variable for Open-Ended Questions Pertaining to the Informant</i>	82
Table 3 <i>Experiment 2b: Test Questions in Order of Presentation</i>	85
Table 4 <i>Experiment 2b: Mentions of Each Variable for OQ1</i>	89
Table 5 <i>Mean Scores by Condition for Likert Scale Question Pertaining to the Model</i>	103
Table 6 <i>Responses by Condition on True-or-False Questions Pertaining to the Model</i>	105
Table 7 <i>Mean Scores by Condition for Likert Scale Question Pertaining to Confidence in General</i>	105
Table 8 <i>Mixed-Effects Model Predicting Scores on 7-Point Likert Scale Questions in Experiment 2a</i> ...	107
Table 9 <i>Independent Samples T-Test Results for Each Likert Scale Question of Experiment 2b</i>	108
Table 10 <i>Mixed-Effects Model Predicting Scores on 3-Point Likert Scale Questions in Experiment 2b</i> .	110

Chapter 1

Introduction

Knowledge acquisition is a process that begins at a very early age. Even if this process can be done with firsthand information, humans and particularly children often have to rely on others to learn (Legare & Heyman, 2013; Tomasello, 2014; Harris, 2012). They can engage in social learning by observing, imitating, or trusting the information that is given to them (see Gelman, 2009, Sobel & Legare, 2014, and Rendell et al., 2011 for reviews). However, instead of being indiscriminately credulous during this social learning, children can show skepticism and assess one's credibility when receiving information (see Harris et al., 2018, and Sobel & Finiasz, 2020 for reviews). This inclination to learn from or prefer some individuals over others based on their characteristics is a phenomenon referred to as *selective social learning* (Koenig & Sabbagh, 2013; and Poulin-Dubois & Brosseau-Liard, 2016 for reviews).

1.1 Types of Cues Used in Selective Social Learning

Children can use many cues to decide whom to learn from. Literature on selective social learning has seen a surge of interest in the study of these different types of cues (see Mills, 2013 and Nurmsoo et al., 2010 for reviews). One category of cues that children can rely on is *epistemic cues*. These cues have an indicative value of how knowledgeable someone is. Relying on such cues could be particularly important to optimize children's learning, especially when they lack relevant information or prior experience (Harris et al., 2018). The terms epistemic trust and epistemic vigilance have even been coined to depict how children use epistemic cues to decide who to trust and develop a critical stance when evaluating different sources of information (Koenig & Harris, 2005a, Sperber et al., 2010).

The paradigm developed to study these concepts often involves two informants presenting contradictory information (see the “conflicting sources paradigm” in Koenig & al., 2004 for more information). This is when the epistemic cues are commonly established. Then, depending on the epistemic cue at hand, a variety of protocols can measure how children evaluate and learn from these informants. These include “endorse questions” (i.e., from which informant they endorse information), “ask questions” (i.e., from which informant they ask information) and “explicit judgement questions” (i.e., which informant knows what they are doing/talking about, or which one performs better at certain tasks).

Many epistemic cues have been studied using a variation of this paradigm. One such cue is *expertise*. For example, in one of their studies, Landrum and colleagues (2013) examine how preschoolers take into account *expertise*. They presented 3- to 5-year-olds with two informants differing in their domain of expertise (i.e., a bird expert and a bicycle expert). The two experts provided conflicting claims about novel object names. The objects were either related to one of their domain of expertise (i.e., related to vehicles or birds) or not (e.g., related to cookie jars). Landrum and colleagues found that children ages 4 and 5 learn novel labels from the relevant expert (e.g., learning labels for vehicle-related objects from the bicycle expert) whereas 3-year-olds did not show this preferential learning. This suggests that at least older preschoolers prefer to trust experts when learning new semantic information.

Evidence also suggests that even at a very young age, children are sensitive to *accuracy* cues (e.g., Birch et al., 2008; Koenig & Woodward, 2010; Zmyj et al., 2010). These cues often refer to an informant’s accurate description or usage of an object (e.g., describing or playing appropriately with a familiar toy). Accuracy can also be established through an informant’s appropriate labelling of familiar object. For instance, after being presented with a previously

accurate informant who correctly labelled familiar objects (i.e., a ball, a cup, a book) and with a previously inaccurate one who incorrectly labelled the same objects, children ages 3 and 4 can correctly identify which informant was inaccurate (Koenig & Harris, 2005b). When both informants later present conflicting labels for novel objects (e.g., a “mido” vs a “loma” for an unrecognizable woven object), 4-year-olds can even select the labels provided by the previously accurate informants (Koenig & Harris, 2005b). Brosseau-Liard & Birch (2010) also demonstrated that 5-year-olds are able to adequately use an informant’s prior accuracy at labeling familiar objects to predict her knowledge of words. Even young children show some sensitivity to accuracy cues: around 1 year of age, children seem surprised when an individual is inaccurate (Koenig & Echols, 2003) and are less likely to imitate an inaccurate speaker in comparison to an accurate one (Brooker & Poulin-Dubois, 2013).

Children even seem to be able to reason about the relative relevance of certain epistemic cues. When an informant labels objects inaccurately, but have visual access to information (i.e., clearly saw the content of two boxes), 4- and 5-year-olds later doubt the informant’s claims when learning novel words but trust them when determining the location of hidden objects (Brosseau-Liard & Birch, 2011). Children do not penalize the informant inaccurately labeling objects when their knowledge in another area is proven reliable and relevant. Additionally, if children know that an object has multiple functions, but witness an informant providing incomplete (but not necessarily incorrect) instructions about said object, they perceive the informant as unreliable and mistrust her later (Gweon et al., 2014). Many other studies demonstrated that children not only rely on epistemic cues, but also understand the differential relevance of certain epistemic cues according to different situations (Fitneva et al., 2013; Kushnir et al., 2013; Sobel & Macris, 2013). For instance, when children are asked about the visible and invisible properties of entities

(e.g., hair colour vs liking pizza) and have the option to either look for the answers themselves or ask an expert in the entities, 6-year-olds prefer to ask the expert about the invisible properties of the entities but look for visible properties themselves (Fitneva et al., 2013). Expertise does not seem as relevant when children can access visible information directly. This indicates that children can treat the same epistemic cue as having a different epistemic value depending on circumstances.

Children can also decide whether to learn from an individual or not by using non-epistemic cues, which we define as cues that differentiate individuals, but are not related to their level of knowledge (Brosseau-Liard et al., 2015). Children can thus rely on cues that have no apparent epistemic value but that are instead social in nature. These social cues, such as a speaker's accent (Kertesz et al., 2021), their native language (Kinzler et al., 2012) or ethnicity (Chen et al., 2013), can provide information on someone's identity or affiliation. For example, 14-month-olds prefer to imitate novel actions demonstrated by someone speaking their language over a foreign-language speaker (Buttelmann et al., 2013). They also prefer to imitate familiar actions by same-aged peers (Zmyj et al., 2012). Even 3-, 4- and 5-year-olds are more likely to trust speakers sharing their native accent (3-year-olds: Corriveau et al., 2013b; 4- and 5-year-olds: Kinzler et al., 2011) or speakers of the same age group (e.g., children vs adults) and gender (Shutts et al. 2010).

Research has also shown that 4-year-old children, but not 3-year-olds, rely on group status (e.g., sharing similar characteristics or being part of the same group or not) to decide who to trust (MacDonald et al., 2013; McDonald & Ma, 2016). For instance, Chen and her colleagues (2013, 2018) found that children between the age of 4 and 7 are more likely to mistrust informants of a different race. In fact, all else being equal, children are more inclined to

trust claims made by a similar over a dissimilar informant (e.g., Elashi & Mills, 2014; Hetherington et al., 2014; Kinzler et al., 2011; Ma & Woolley, 2013; MacDonald et al., 2013; Qian et al., 2016; Reyes-Jaquez & Echols, 2013). They can also use familiarity and physical attractiveness when choosing who to learn from: they are more likely to endorse information about novel objects provided by a familiar or more attractive informant rather than an unfamiliar or less attractive informant (Corriveau & Harris, 2009; Wood et al., 2013; Bascandziev & Harris, 2014 and 2016).

It has even been demonstrated that children as young as 3 years of age prefer to trust claims made by a benevolent (i.e., someone having good intentions or wanting to help) rather than a malevolent (i.e., someone having malicious intentions or wanting to deceive) communicator (Mascaro & Sperber, 2009). Even children aged up to 6 years old prefer to request and endorse information provided by nice and honest informants (Lane et al., 2013). A meta-analysis by Tong and colleagues (2020) also evidenced that 3 to 6-year-olds prefer to learn from informants displaying positive social traits.

1.2 Confidence Cues

Although children rely on a variety of cues, both epistemic and social, when engaging in selective learning (see Sobel & Finiasz, 2020 for a review of both types of cues in selective word learning), this thesis will specifically focus on confidence cues. Confidence as a selective learning cue has been studied along development from infancy (e.g., Birch et al., 2010; Brosseau-Liard & Poulin-Dubois, 2014; Buttelmann & Zmyj, 2020; Lee & Rutherford, 2018) to adulthood (e.g., Aghazadeh & Joe, 2022; Brauer et al., 2023; Pozzi & Mazzarella, 2024). We define these confidence cues or what is often referred to as expressed confidence by the *numerous* ways an informant can express the extent to which they believe in their own

capability, knowledge or perspective (London et al., 1971; Swerts & Krahmer, 2005). Someone's level of confidence can be reflected through linguistic or verbal cues. Studies have shown that verbal features such as lexical markers or specific words such as "I'm not sure", "I think" and "maybe" and "fillers" like "uh/uhm" are used to indicate different levels of certainty (Morgan, 1953; Hübscher et al., 2017). Nonverbal cues such as intonation or prosodic patterns, including frequent pauses and upward inflections, and visual signals such as facial expressions and gestures (e.g., nodding or scratching one's head) have also been shown to reflect one's level of confidence (Scherer et al. 1973; Bolinger, 1986; Hübscher et al., 2017, see Borràs-Comes et al., 2011 for a review).

A combination of verbal and nonverbal cues is most commonly used to express confidence (Swerts & Krahmer, 2005, see Borràs-Comes et al., 2011 for a review) which could explain why some researchers looked at how both types of cue influence children's selective learning (Bridgers et al., 2016; Jaswal & Malone, 2007; Tenney et al., 2011). For example, Jaswal & Malone (2007) presented 3-year-olds with hybrid objects having the properties of two different objects but designed to look like they belonged in one object category more than the other (e.g., a key-spoon hybrid mostly resembling a key but having some spoon-like features). In a standard condition, the informant labelled the hybrid objects in a declarative way (e.g., "This is a spoon"). In another condition, the informant labelled the hybrid objects with both verbal and nonverbal cues of hesitancy (e.g., saying "I think" with facial expression of uncertainty). When later asked to describe the hybrid objects' functions, children in the standard condition were able to infer the functions from the informant's labels (e.g., the key-spoon hybrid being used as a spoon to eat cereal as it had been labelled a spoon) even though the labels did not match the

hybrid objects' appearance, but those in the hesitant condition did not and instead ignored the labels provided to them with uncertainty.

Other studies examined one cue or the other (not at the same time). For instance, from a young age, children understand that confidence cues can be expressed specifically through language (e.g. "I know", "I think", "I guess", Moore et al., 1989; Howard et al., 2008) and they can infer information about different speakers based on verbal cues of confidence (Sabbagh & Baldwin, 2001). When presented with two speakers, one using verbal cues denoting certainty such as "I know" as opposed to one using verbal cues denoting uncertainty such as "I don't know" or "I think" "", preschoolers prefer to learn from the speaker using certain language (Stock et al., 2009).

Toddlers also prefer to learn from informants who demonstrate non-verbal cues of confidence (e.g., upright posture with shoulders back and chin high) rather than from informants who demonstrate non-verbal cues of hesitancy (e.g. shoulders shrugged, head tilted, 2- and 3-year-olds: Birch et al., 2010, Experiment 1; 2-year-olds: Brosseau-Liard & Poulin-Dubois, 2014). Children aged 3 to 5 even seem to be able to differentiate between gestural and intonational cues of uncertainty (Hübscher et al., 2017). When presented with intonational and gestural cues to certainty as opposed to lexical and gestural cues to certainty, they perform better when gestures are included (Hübscher et al., 2017).

In addition to the findings listed above, numerous studies demonstrate that all else being equal children prefer to learn from confident individuals compared to hesitant ones. For example, infants as young as 14 months prefer to imitate the way a confident informant uses a novel object over the way a hesitant informant uses the same object (Buttelmann & Zmyj, 2020). By preschool age, children prefer to learn words (Birch et al., 2020; Fobert et al., 2024; Juteau et al.,

2024; Sabbagh & Baldwin, 2001, Sabbagh et al., 2003), facts (Brosseau-Liard et al., 2014), and the usage of objects (Wagner et al., 2014) from more confident informants.

1.2.1 Confidence Cues in Older Children and Adults

However, most research focuses on the preschool age group (e.g., Birch et al., 2020; Brosseau-Liard et al., 2014; Jaswal & Malone, 2007). Older children have largely been left out of the research, and the studies that include school-age children mostly examined confidence in relation to another cue. For example, Kominsky et al. (2016) examined whether children (and adults) prefer to learn from informants who are more confident or from informants who have more plausible answers. They found that younger children (ages 5 to 8) prefer learning from confident informants with implausible responses. In contrast, older children (ages 9 and 10) prefer learning from informants with plausible responses, but low confidence. Huh et al. (2019) investigated whether children prefer to use confidence or information access as a cue of credibility. They found that children ages 4 to 6 only prefer to side with opinions from confident informants over hesitant informants when the informants have complete information. When they only have partial information, children show no preference between learning from confident or hesitant informants. Fobert and colleagues (2024) looked at whether children prefer to use confidence or accuracy to determine an informant's knowledge. They found that school-age children prefer to make knowledge attributions based on direct cues of knowledge (visual access to knowledge and accuracy) over the indirect cue of confidence. Additionally, both Birch et al. (2020) and Tenney et al. (2011) examined calibration which refers to how proportional confidence is compared to knowledge. They explored how the correspondence between an informant's level of confidence and their visual access to knowledge (Birch et al., 2020) or their

accuracy (Tenney et al., 2011) influences selective learning in children ages 3 to 12 (Birch et al., 2020) and 5 to 6 (Tenney et al., 2011).

Research with adults also demonstrates that adults rely on confidence cues in various contexts. Adults favor confident informants when solving problems (Tenney et al., 2019), witnessing testimony (Tenney et al., 2011), and learning facts (Kominsky et al., 2016). Adults also rely on confidence cues to guide decisions about whom to listen to in a variety of different fields including job recruiting (Tenney & Spellman, 2011), finance (Aghazadeh & Joe, 2022; Brauer et al., 2023; Sah et al., 2013), politics (Ballew & Todorov, 2007; Todorov et al., 2005), and law (Cramer et al., 2011; Penrod & Cutler, 1995; Pozzi & Mazzarella, 2024). For instance, researchers found that jurors, mock jurors, and lawyers were influenced by witnesses or experts expressing confidence (Brewer & Burke, 2002; Cramer et al., 2011; Pozzi & Mazzarella, 2024; Price & Stone, 2004; Tenney et al., 2007).

1.3 Interpretation of Confidence Cues

Although there is ample evidence that children and adults attend to confidence cues and generally prefer confident over hesitant individuals, it remains unclear how they interpret or understand confidence. Therefore, this thesis will focus on this overarching question of how children and adults interpret confidence cues. As demonstrated above, previous research has looked at which different selective learning cues children and adults use, but we rarely truly know why they use these cues or what they think of them. It is particularly the case for confidence cues which have been relatively recently the focus of many studies in selective learning. Examining interpretations of such cues can provide information on the way children think about, know, and understand these cues as well as how their cognitions change as they age.

1.3.1 Confidence Cues: Situational or Person-Specific?

A specific aspect of the interpretation of confidence cues that remains unclear is how much children believe an individual's confidence indicates something durable about that person's trustworthiness. When describing the different epistemic cues that one could use to evaluate an individual's credibility, Miller (2000) drew a distinction between *situational* and *individual* cues to knowledge. To avoid confusion with other uses of the term "individual", we will refer to the latter as *person-specific* instead (as in Brosseau-Liard & Birch, 2011).

Person-specific cues indicate something durable about someone beyond the immediate situation where the cues are produced and suggest a durable trait that can extend to different situations (Miller, 2000). Children can thus generalize what they infer from these person-specific cues to a variety of contexts as these cues remain stable over time. For instance, *person-specific cues* related to knowledge would be informative of an individual's overall knowledge across situations (Brosseau-Liard, 2017) such as a person's domain of expertise (i.e., their expertise remains the same across situations). Age can also be considered a person-specific cue, as demonstrated by how children prefer to learn novel labels from adults over children, believing that greater general knowledge is indicated by greater age (Jaswal & Neely, 2006).

In contrast, *situational cues* are only informative of someone's knowledge in a particular situation and can be seen as independent of an individual's personal attributes. Although situational cues can provide information about someone, they only do so in relation to a particular situation and are independent of personal traits. That information cannot be transferred into another situation like a personal trait would. Research initially focused on these situational indicators of knowledge mostly examining perceptual access to information. For instance, someone looking inside a box knows the contents of that box, whereas someone else who has not had access to that box does not know what is inside (Brosseau-Liard & Birch, 2011). Similarly,

someone who can see a familiar object knows its label, whereas someone who is blindfolded (i.e., can't see it) does not know its label (Nurmsoo & Robinson, 2008). The knowledge that these individuals hold depends solely on the situation.

Unlike many other cues, confidence could conceivably be interpreted both ways. On one hand, children could interpret confidence or hesitancy cues as indicators of how a person feels *right now* about the knowledge they are *currently* sharing. Such confidence cues, under this *situational* interpretation, would thus not guide people's future decisions because they are not informative of how knowledgeable that person would be in other situations. On the other hand, confidence cues could be interpreted as person-specific. Expressions of confidence in one situation could be interpreted as indicative of someone's knowledge in other situations. Children could thus make broader attributions based on confidence. They could assume, for instance, that someone who expresses themselves confidently is a person who is generally smart, knowledgeable or possessing high social status granted for instance by expertise. In contrast, a hesitant individual could be perceived as generally ignorant.

To our knowledge, most studies on how adults interpret confidence cues did not investigate whether these cues were perceived as situational or person-specific cues. In fact, these studies were designed to be inherently situational. For instance, in studies on eyewitness testimony, researchers often evaluate how participants associate an informant's level of confidence with other aspects that are only relevant or related to their testimony. However, this does not allow us to know whether those aspects would be transferrable to other situations as well (e.g., would the confident witness be perceived as credible in other situations or only when recalling the specific event they witnessed). For instance, after witnessing conflicting testimonies from informants differing in their level of confidence, participants prefer to trust the confident

informant and perceive them as being more accurate, credible and believable in present situations pertaining to their testimonies (Sah et al., 2013, Tenney et al., 2008, Tenney et al., 2011). This seems to support the confidence heuristic stating that confidence could be used as a “short-cut” to assess whether someone is more likely to convey reliable information (Thomas & McFadyen, 1995) as confident individuals are seen as being more accurate, correct, knowledgeable and credible (see Price & Stone, 2004 and Pulford et al., 2018 for more information on the “confidence heuristic”). However, it does not tell us whether people would transfer these inferred traits to other situations. In fact, other researchers using similar situational tasks demonstrated that confidence is not necessarily always correlated with accuracy (Deffenbacher, 1980; Kassin, 1985, Shaw & McClure, 1996) and that its perceived associated credibility can be different depending on the type of perceiver (e.g., judge vs juror) and context (e.g., legal case, type of witness, etc.; see Cramer et al., 2011 for a review).

However, even in these studies that presented confidence in a very situational environment, adults sometimes seem to be able to make more generalizable attributions based on confidence. For instance, after reading or hearing two conflicting testimonies, a majority of participants chose the informant displaying greater confidence when asked which one of the two informants they thought deserved respect and admiration (Anderson et al., 2012) and was more knowledgeable (Price & Stone, 2004). Other personal traits such as honesty were also sometimes associated with one’s level of confidence (Tenney et al., 2008). Interestingly, in that specific case, participants rated the less confident informant as being more honest (Tenney et al., 2008). However, in other cases, hesitation was shown to be perceived as being related to deception (e.g., seen as suspicious, Kraut, 1978) and to be negatively associated with competence (e.g., McCroskey & Mehrley, 1969). Additionally, Tenney and colleagues (2019), employing similar

situational tasks, found that overconfident individuals could still be evaluated positively even after their true poor performance was revealed. This suggests that there are social benefits associated with overconfidence. This indicates that at least adults can make person-specific attributions related to confidence, although most of the literature concentrates on confidence about one specific event and uses inherently situational conditions which makes it unclear whether these attributions are only related to that event or could be transferred to other situations as well. This also underlines the importance of specifically investigating situational and person-specific interpretations of confidence cues.

Findings also suggest that children, at least school-age children, can make some types of attributions based on confidence cues. For instance, Fobert et al., (2024, Experiment 1) found that school-aged children (ages 6 to 8) generalize confidence as a predictor of knowledge: they attribute more knowledge to a confident individual over a hesitant one, but only in the same specific domain in which confidence was first demonstrated and not in other types of learning (i.e., labelling objects while demonstrating confidence cues leads to more attributions of general knowledge of word labels but not of facts, skills, or any other type of attribution). Children aged 3 to 5 did not make any attributions.

However, most studies still focus primarily on the immediate event where confidence is being demonstrated, keeping individuals' confidence constant. It is thus difficult to know if children's interpretation of confidence cues lingers beyond the situation where they are produced. To our knowledge, few researchers looked at both past and current confidence cue (e.g., Moore et al., 1990; Moore et al., 1993). For instance, in Moore and colleagues (1989), two puppets alternated in their verbal expressions of certainty about the location of a piece of candy over twelve trials. In this study, children aged 4 and up preferred to side with the statement of a

currently certain puppet, and did not appear to do so more or less in the first versus the second half of the study. Nevertheless, these studies by Moore and colleagues (1990; 1993) involved cues that are inherently situational (i.e., episodic information such as an object location which depended on the current situation and was not transferable to other situations) and were not designed to examine whether person-specific attributions could be made from confidence cues. Another series of studies led by our research team did investigate how children use confidence when its level changes (e.g., previously hesitant to currently confident informant and vice-versa) and found that 4- to 5-year-olds only seemed to rely on the currently confident informant, suggesting a situational interpretation of confidence (Juteau et al., 2024).

In those studies where past and present cues conflict, children seem to focus on present cues. However, this could be because of a working memory issue. Children may not be able to focus on past cues and to keep them in memory to then manipulate the information and combine it to present cues. There could also be an inhibition issue where disregarding immediate cues is cognitively harder. Children may not have been able to inhibit the information drawn from present cues to consider the past cues. Therefore, a study examining the situational vs person-specific interpretation of confidence cues where *no current cues* are being presented is necessary. Thus, results could not be attributed to challenges related to working memory or inhibition (i.e., no need to memorize and manipulate two different types of information and to inhibit conclusions drawn from current cues).

1.3.2 Confidence Cues: Epistemic or Social Indicators?

Nonetheless, even once it becomes clearer whether children perceive confidence cues as situational or person-specific, the question as to why they rely on such cues during selective social learning remains. Another aspect of the interpretation of confidence that is not addressed

by the situational vs person-specific distinction is whether it is perceived as an epistemic or social cue.

In fact, the foremost hypothesis regarding children's interpretation of confidence cues proposes that they use confidence as an *epistemic indicator or cue* (e.g., a cue having an indicative value of how knowledgeable people are). Indeed, most people assume that when someone holds knowledge, they will likely appear confident and express certainty through verbal markers (i.e., saying "Oh! I know!" and "For sure!") and non-verbal cues (i.e., nodding and having an upright posture, an assured and rapid tone of voice). A person who is uncertain about their knowledge will likely show hesitancy both verbally (i.e., saying "Hmm? I guess?" and "Maybe?") and non-verbally (i.e., shrugging and having a puzzled facial expression, a hesitant tone and an upward inflection). For instance, when showing that children attend to confidence cues, some researchers refer to these confidence cues as "markers of [one's] knowledge" (Birch et al., 2010, p.364) or point to the relationship between an informant's behavior (e.g., expressed level of confidence) and their knowledge (Jaswal & Malone, 2007). Researchers describe confidence cues as cues of credibility because confidence can indicate the robustness or accuracy of information (e.g. whether someone is knowledgeable or ignorant about a word-referent link based on their level of confidence), thus being the reason why children would attend to such cues (Sabbagh & Baldwin, 2001). Even ignorance is often operationalized through a low level of confidence or what we could consider hesitancy cues (Koenig & Harris, 2005b).

Moreover, there is evidence that some children understand the possible epistemic value of confidence cues compared to other knowledge cues. Studies have indeed found that older children can understand the concept of *calibration*. According to this concept, a well-calibrated individual would act confidently when they are knowledgeable, but display hesitancy when they

are ignorant. A poorly-calibrated individual would display confidence cues that are disproportional to their true knowledge. For example, Birch and colleagues (2020) investigated calibration specifically between confidence and visual access during word-learning of 3- to 12-year-olds. Tenney et al. (2011) also studied calibration but between confidence and accuracy during witness testimony with children ages 5 and 6. Both research groups found that school-age children are not sensitive to hesitancy calibration (i.e., having no preference for a justifiably hesitant informant over a unjustifiably hesitant one), however they differed on their findings about confidence calibration: Tenney et al. (2011) found that school age children were not sensitive to confidence calibration (i.e., preferring the confident yet poorly-calibrated informant), while Birch et al. (2020) found that they were sensitive to confidence calibration (i.e., children prefer someone whose confidence is justified). These conflicting findings could be due to experimental design; Birch and colleagues (2020) provided repeated evidence of the informant's calibration whereas Tenney and colleagues (2011) only provided one demonstration. Nonetheless, Birch and colleagues' findings (2020) still suggest that by age 5 children can associate confidence with knowledge attributions and take into account calibration; children judge a confident and well-calibrated informant to be smarter than a confident but miscalibrated informant. Interestingly, when looking at adults, Tenney and colleagues (2011) found similar results (i.e., adults were sensitive to informants' calibration).

Even other comparisons between confidence cues and cues of accuracy indicate that children understand, to some degree, how confidence can be linked to knowledge. For instance, Brosseau-Liard and colleagues (2014) found that younger children do not consistently discriminate between confidence and accuracy, even when it is clear that confidence does not indicate knowledge. After witnessing a confident informant stating inaccurate facts (e.g., "Oh! I

know whales live in the ground!”) and a hesitant informant stating accurate facts (e.g., “I guess whales live in the water?”), only older children (e.g., 5-year-olds) prefer learning novel words from the hesitant, but accurate informant. The 4-year-olds did not seem to favor accuracy over confidence and chose the hesitant and accurate informant at chance. This could be explained by a developmental progression in which older preschoolers have a better appreciation of the informativeness of different knowledge cues, understanding that accuracy is a more important knowledge cue than confidence (while still interpreting confidence as an epistemic cue). Although younger children could still use confidence as a knowledge cue to assess someone’s credibility, they might not have the cognitive abilities to understand that someone’s level of confidence can be disproportional to their actual knowledge (Tenney et al., 2007; Tenney et al., 2011) and that people might in fact be overconfident (Mannes & Moore, 2013).

Interestingly, when accuracy is not at play, the confidence heuristic still seems to apply for adults (Sah et al., 2013) and for school-age children (Fobert et al., 2024). In both age group, using confidence could be the fastest strategy to evaluate informants’ reliability, at least in simpler situations (i.e., without another type of cue conflicting with confidence). For instance, Fobert and colleagues (2024) demonstrated that when only confidence cues are present children aged 6 to 8 (but not those aged 3 to 5) perceive confidence as a predictor of knowledge (i.e., attributing more correct word labelling to a confident informant over a hesitant one), but when conflicting accuracy information was involved (i.e., the confident informant was inaccurate and vice-versa) they no longer attributed knowledge to the confident but inaccurate informant. It could be that the confidence heuristic does not apply in more complex circumstances where the epistemic relevance and value of other cues are involved.

However, a recent series of studies assessing the consistency of children's performance on selective learning tasks based on epistemic cues, including accuracy and confidence, found relatively low correlations between these tasks (Brosseau-Liard et al., 2018). This could suggest that children's understanding of those cues may not be based on the same general epistemic interpretation. Instead of suggesting an epistemic interpretation, this could indicate that children interpret confidence not only as a non-epistemic cue but even as a *social indicator or cue* (e.g., confident individuals are seen as being prosocial) that is separate from knowledge.

This thus points to another possibility for why children sometimes rely on confidence cues, even when it does not seem to lead to optimal learning (e.g., when accuracy conflicts with confidence and they still rely on a confident yet inaccurate informant, Tenney et al., 2011). Indeed, children may not treat confidence as indicative of someone's knowledge, but rather as signaling positive social characteristics. The possibility that children may use confidence cues for social reasons seems to have been less emphasized by researchers, who appear to assume that confidence is epistemic. Even in studies where clear social cues are conflicting with epistemic cues and where children preferentially rely on social cues, authors sometimes still assume that it might be for epistemic reasons (Corriveau et al., 2013b; Landrum et al., 2013). For example, when Johnston et al. (2015) found that 3- to 5-year-olds did not seem to favor accuracy over niceness (i.e., they did not prioritize a mean but accurate informant over a nice but inaccurate one), they suggested that this was because benevolence could be a better indicator of competence than competence itself. Clément (2010) even suggests that children selectively learn from benevolent informants because these individuals have good intentions thus are more likely to provide accurate information but omits the social nature of such cue. There could indeed be many other reasons why children rely on certain cues (Koenig et al., 2022). Nonetheless, for

instance in the recent accuracy literature, researchers are starting to consider that even in learning contexts children's preference for some individuals may reflect more social rather than epistemic interpretations (Jaswal & Kondrad, 2016; Koenig et al., 2022; Over & Carpenter, 2012).

Research on conformity is another good example of how social goals can at times be prioritized. For instance, in studies using an adapted Asch's conformity task (Asch, 1956), 3- and 4-year-olds were asked to choose the longest of three lines after seeing adults selecting the smallest one (Corriveau & Harris, 2010; Corriveau et al., 2013a). Children often selected the same line as the adults (i.e., the smallest one) even if they knew that it was not the longest one. This shows that children may have other goals (e.g., social ones) than seeking accurate knowledge. Another series of studies shows that even toddlers do not always aim to acquire accurate knowledge and instead may prioritize social goals over epistemic. Haun and colleagues (2014) found that when 2-year-olds have previously learned within which box (out of three) to drop a ball to obtain a reward, but are later presented with peers who selected another box, participants adjust their choice to match that of their peers. They did so even more in the presence of their peers than in their absence, emphasizing all the more a social motivation. Social motivations, such as previously discussed with conformity, could also come into play when evidenced that children favor group membership over accuracy (i.e., 4-year-olds did not prefer to trust accurate outgroup members, MacDonald et al., 2013).

Children could thus prefer confident individuals because of social motivations and ultimately perceive confidence as a social cue. Social cues are defined as cues providing socially relevant information such as an informant's social status, identity, affiliation, or personality (see Harris et al., 2018 and Tong et al., 2020 for reviews). In the same way that children prefer to befriend a nice individual over a mean one (i.e., for social goals), it is possible that they

generally prefer confident individuals because their evaluation of those individuals are based on social considerations leading to a desire to affiliate, to maintain a positive relationship or to be liked (Fawcett & Liskowski, 2012; Over & Carpenter, 2012; Song et al., 2015) rather than on whether the information provided by them is epistemically relevant. For instance, adults have been found to side with a confident individual to make social interactions easier (Pulford et al., 2018; Zarnoth & Snizek, 1997). Adults also associate overconfidence with higher social status (Anderson et al., 2012), suggesting that confidence also has a positive impact in the social domain, at least with adults, and is possibly seen as indicative of an *positive social traits*.

Culturally shared values or perspectives could contribute to a social interpretation of confidence (Lundeberg et al., 2000). Interestingly, a high proportion of the studies on confidence are from North America or Europe, which are known for individualistic rather than collectivistic values. Researchers found that expressing confidence is seen as more normative in individualistic cultures compared to more collectivistic ones (Heine & Lehman, 1999) and that weaker overconfidence is associated with a vision of a collective culture (Li & Fang, 2004). Especially in societies where confidence is generally valued, children could use confidence as a social cue given how it can be associated with various social status characteristics (e.g., confidence as normative and potentially preferred in individualistic cultures because it is associated with power). Some studies indeed showed that children's preferences in learning contexts are influenced by the perceived level of power or prestige of an individual (Chudek et al., 2012). For instance, children seem more likely to trust speakers with a dominant status over a subordinate one (Bernard et al., 2016). Other researchers found that children could associate certain people with a specific body language with success and could even perceive confidence

cues as social indicators (i.e., indicative of one's dominance, authority and prestige; Chudek et al., 2013).

Alternatively, some cognitive mechanisms may be required for certain interpretations of confidence cues to develop. For instance, children may need to understand others' mental states (i.e., *theory of mind*, Carlson et al., 2013; Brosseau-Liard et al., 2015) to fully comprehend complex cues such as confidence cues. Understanding a speaker's intention or motivation could help them decipher whether the information conveyed is epistemically relevant. However, evidence of the links between theory of mind and selective learning is quite mixed; results range from positive associations between the two (Crivello et al., 2018), to weak associations (Brosseau-Liard et al., 2018) or no association at all (Cossette et al., 2020). Although we hope to subsequently investigate the mechanisms underlying the interpretations of confidence cues, these remain conjectures which are not specifically addressed in this thesis.

1.3.3 Confidence Preference or Hesitancy Avoidance

Moreover, there is another aspect regarding the interpretation of confidence that is rarely examined in the selective learning field which is whether confidence and hesitancy are interpreted as two opposite ends of a continuum. Indeed, they may not be treated symmetrically, and children may not disfavour hesitancy as equally as they favour confidence. Although there are studies that investigate both confidence and hesitancy cues without directly comparing both cues using a within-subject design, none of them specifically examine how they may be interpreted differently. For example, results from Birch and colleagues (2020) suggest that children treat discrepancies between confidence and knowledge differently than between hesitancy and knowledge: children were sensitive to confidence but not hesitancy calibration.

This hints to how hesitancy may be seen particularly negatively, regardless of whether hesitancy is justified or not.

Stock and colleagues (2009) also compared cues of confidence and hesitancy, in addition to neutral cues. They namely found nuances in how children respond to different levels of confidence (i.e., confident, neutral, hesitant) when hearing generic statements. This suggests that confidence and hesitancy are not necessarily symmetrical. When generic statements are made, children learn novel objects' properties from a confident informant, and endorse the properties suggested by the confident or neutral informant more than those provided by the hesitant one. There was no difference in their endorsement of the confident versus neutral informant, which suggest no particular differential treatment between the two. It could be because confidence is treated similarly to a neutral level of confidence. However, children do seem to treat hesitancy as particularly detrimental to learning (i.e., not learning from a hesitant informant).

1.4 Objectives

As part of this dissertation, I aim to evaluate the interpretation of confidence from different angles: situation vs person-specific interpretation, epistemic vs social interpretation and confidence preference vs hesitancy avoidance.

In Experiment 1, my primary aim is to investigate whether preschoolers aged 4 to 5 interpret confidence cues as *situational or person-specific cues*. A secondary aim of this first study is to determine whether preschoolers make any type of enduring trait attribution based on past confidence cues. Another secondary aim is to explore whether children are sensitive to past confidence when the current level of confidence is neutral. Not only has no published study to date specifically examined this aspect, but children are also more often than not confronted with similar circumstances in their natural environment. For instance, they often encounter models

whom they have seen being previously confident or hesitant, yet cannot always access these models' current level of confidence.

In Experiments 2a, the main objective is to explore the potential *epistemic* and *social interpretations* of confidence cues by investigating the sorts of inferences and attributions adults make based on confidence in general and on confidence cues demonstrated by a confident or hesitant model. A secondary objective is to obtain information about the interpretation of confidence when only one informant is available, being either confident or hesitant. Using this single-speaker design addresses the possibility that participants base their answers on the positive and negative sides of, respectively, confidence and hesitancy when compared to their opposites. Examining participants' interpretation of confidence and hesitancy separately allows us to determine whether there truly is a preference for confidence or if it is rather an avoidance of hesitancy that drives the effect. This single-speaker design is also more representative of real-life circumstances, where we are not typically offered two conflicting choices (such as in studies using the conflicting sources paradigm).

Given Experiment 2b has the same objectives as Experiment 2a, which are to look at the *epistemic* and *social interpretations* of confidence and at the *confidence preference vs hesitancy avoidance* using the same experimental design, but with 7- to 10-year-olds (given how the selective learning field historically focused primarily on preschoolers) a secondary aim is to investigate how 7- to 10-year-olds interpret confidence as it could help fill the gap in the existing literature. To our knowledge, these two studies (i.e., Experiment 2a and 2b) are the first to date to examine the epistemic and social interpretations of confidence using such methodology with 7- to 10-year-olds and adults.

Moreover, a secondary aim of this dissertation in general is to examine the interpretation of confidence across different age groups. Looking at these three age groups (i.e., 4- to 5-year-olds, 7- to 10-year-olds, and adults) could enlighten us as to how the interpretation of confidence cues changes with age. Parallels between preschoolers', older children's and adults' cognition and way of interpreting information could also be drawn by investigating these different age groups.

Notably, although we expect participants to be able to recognize, identify and possibly use past confidence cues in all three of our experiments and thus also intend on replicating results from previous studies, we must mention that we investigate further children's interpretations of confidence cues by adopting an exploratory approach (i.e., using open-ended questions and general statements in Experiments 2a and 2b). Additionally, because no studies to our knowledge have tested these hypotheses regarding the possible social and epistemic interpretations of confidence cues, they mostly remain conjectures that are difficult to tease apart.

Overall, although a lot of research has been done on confidence cues, there seems to be an important lack of empirical evidence regarding their interpretation since most previous studies use inherently situational design and researchers seem to rely on assumptions about the epistemic nature of these cues. Indeed, this substantial gap in the existing literature in selective learning highlights the need to investigate how children truly interpret confidence cues. Gaining a better understanding of children's interpretation of confidence also has important implications in education for professionals and policymakers, whether before formal education, at its early stage, or even during as suggestions on how to best influence children's learning could be drawn from the current body of selective learning literature. Indeed, children's interpretation of confidence

cues will most likely follow them in their later academic learning, therefore gaining a better understanding of this process of interpretation could lead to different interventions and pedagogical strategies based on what is helpful or not to children. Concretely, understanding why children at times rely on confidence could guide educational interventions, which could be aimed at teaching children that confidence is ultimately an imperfect cue to knowledge. For example, the early education curriculum could be geared towards teaching a more nuanced interpretation of confidence.

References

- Anderson, C., Brion, S., Moore, D. A., & Kennedy, J. A. (2012). A status-enhancement account of overconfidence. *Journal of Personality and Social Psychology*, 103(4), 718–735.
<https://doi.org/10.1037/a0029395>
- Asch, S. E. (1956). Studies of independence and conformity: I. A minority of one against a unanimous majority. *Psychological Monographs*, 70(9), 1–70.
<https://doi.org/10.1037/h0093718>
- Aghazadeh, S., & Joe, J. R. (2022). Auditors' response to management confidence and misstatement risk. *Accounting, Organizations and Society*, 101, 101348-.
<https://doi.org/10.1016/j.aos.2022.101348>
- Ballem, C. C., & Todorov, A. (2007). Predicting political elections from rapid and unreflective face judgments. *Proceedings of the National Academy of Sciences*, 104(46), 17948–17953. <https://doi.org/10.1073/pnas.0705435104>
- Bascandziev, I., & Harris, P. L. (2014). In beauty we trust: Children prefer information from more attractive informants. *British Journal of Developmental Psychology*, 32(1), 94–99.
<https://doi.org/10.1111/bjdp.12022>
- Bascandziev, I., & Harris, P. L. (2016). The beautiful and the accurate: Are children's selective trust decisions biased? *Journal of Experimental Child Psychology*, 152, 92-105.
<https://doi.org/10.1016/j.jecp.2016.06.017>
- Bernard, S., Castelain, T., Mercier, H., Kaufmann, L., Van der Henst, J. B., & Clément, F. (2016). The boss is always right: Preschoolers endorse the testimony of a dominant over that of a subordinate. *Journal of Experimental Child Psychology*, 152, 307–17. <https://doi.org/10.1016/j.jecp.2016.08.007>

Birch, S. A. J., Akmal, N., & Frampton, K. L. (2010). Two-year-olds are vigilant of others' non verbal cues to credibility. *Developmental Science*, 13(2), 363–369.

<https://doi.org/10.1111/j.1467-7687.2009.00906.x>

Birch, S. A., Severson, R. L., & Baimel, A. (2020). Children's understanding of when a person's confidence and hesitancy is a cue to their credibility. *PloS one*, 15(1), e0227026.

<https://doi.org/10.1371/journal.pone.0227026>

Birch, S. A. J., Vauthier, S. A., & Bloom, P. (2008). Three- and four-year-olds spontaneously use others' past performance to guide their learning. *Cognition*, 107(3), 1018–1034.

<https://doi.org/10.1016/j.cognition.2007.12.008>

Bolinger, D. (1986). *Intonation and its parts : melody in spoken English*. Stanford University Press.

Borràs-Comes, J., Roseano, P., Vanrell, M. M., Chen, A., & Prieto, P. (2011). Perceiving uncertainty: Facial gestures, intonation, and lexical choice. In Kirchhof, C., Malisz, Z., & Wagner, P. (Eds.), *Proceeding of the 2nd Conference on Gesture and Speech in Interaction (GESPIN 2011)*. Bielefeld, Germany: Bielefeld University, from

https://paoloroseano.weebly.com/uploads/4/3/6/3/43633727/roseano_gespin.pdf.

Brauer, M., Wiersema, M., & Binder, P. (2023). “Dear CEO and Board”: How Activist Investors’ Confidence in Tone Influences Campaign Success. *Organization Science*, 34(4), 1487–1508. <https://doi.org/10.1287/orsc.2022.1625>

Brewer, N., & Burke, A. (2002). Effects of testimonial inconsistencies and eyewitness confidence on mock-juror judgments. *Law and Human Behavior*, 26(3), 353-364. <https://doi.org/10.1023/A:1015380522722>

- Bridgers, S., Buchsbaum, D., Seiver, E., Griffiths, T. L., & Gopnik, A. (2016). Children's Causal Inferences From Conflicting Testimony and Observations. *Developmental Psychology*, 52(1), 9–18. <https://doi.org/10.1037/a0039830>
- Brooker, I., & Poulin-Dubois, D. (2013). Is a bird an apple? The effect of speaker labeling accuracy on infants' word learning, imitation, and helping behaviors. *Infancy*, 18(s1), E46–E68. <https://doi.org/10.1111/infa.12027>
- Brousseau-Liard, P. E. (2017). The roots of critical thinking: Selective learning strategies in childhood and their implications. *Canadian Psychology/Psychologie Canadienne*, 58(3), 263–270. <https://doi.org/10.1037/cap0000114>
- Brousseau-Liard, P. E., & Birch, S. A. J. (2010). 'I bet you know more and are nicer too!': What children infer from others' accuracy. *Developmental Science*, 13(5), 772–778. <https://doi.org/10.1111/j.1467-7687.2009.00932.x>
- Brousseau-Liard, P. E., & Birch, S. A. J. (2011). Epistemic States and Traits: Preschoolers Appreciate the Differential Informativeness of Situation-Specific and Person-Specific Cues to Knowledge. *Child Development*, 82(6), 1788–1796. <https://doi.org/10.1111/j.1467-8624.2011.01662.x>
- Brousseau-Liard, P. E., Cassels, T., & Birch, S. (2014). You seem certain but you were wrong before: Developmental change in preschoolers' relative trust in accurate versus confident speakers. *PloS one*, 9(9), e108308. <https://doi.org/10.1371/journal.pone.0108308>
- Brousseau-Liard, P. E., Iannuzziello A., Varin J. (2018). Savvy or haphazard? Comparing preschoolers' performance across selective learning tasks based on different epistemic indicators. *Journal of Cognitive Development*, 19, 367–388. [10.1080/15248372.2018.1495219](https://doi.org/10.1080/15248372.2018.1495219)

- Brosseau-Liard, P., Penney, D., & Poulin-Dubois, D. (2015). Theory of mind selectively predicts preschoolers' knowledge-based selective word learning. *The British journal of developmental psychology*, 33(4), 464–475. <https://doi.org/10.1111/bjdp.12107>
- Brosseau-Liard, P. E., & Poulin-Dubois, D. (2014). Sensitivity to confidence cues increases during the second year of life. *Infancy*, 19(5), 461–475. <https://doi.org/10.1111/infa.12056>
- Buttelmann, D., & Zmyj, N. (2020). Fourteen-month-olds' imitation is influenced more strongly by a model's competence than by a model's certainty. *Infant Behavior & Development*, 60, 101458-. <https://doi.org/10.1016/j.infbeh.2020.101458>
- Buttelmann, D., Zmyj, N., Daum, M., & Carpenter, M. (2013). Selective Imitation of In-Group Over Out-Group Members in 14-Month-Old Infants. *Child Development*, 84(2), 422–428. <https://doi.org/10.1111/j.1467-8624.2012.01860.x>
- Carlson, S. M., Koenig, M. A., & Harms, M. B. (2013). Theory of mind. *WIREs Cognitive Science*, 4(4), 391–402. <https://doi.org/10.1002/wcs.1232>
- Chen, E. E., Corriveau, K. H., & Harris, P. L. (2013). Children Trust a Consensus Composed of Outgroup Members-But Do Not Retain That Trust. *Child Development*, 84(1), 269–282. <https://doi.org/10.1111/j.1467-8624.2012.01850.x>
- Chen, E. E., Corriveau, K. H., Lai, V. K. W., Poon, S. L., & Gaither, S. E. (2018). Learning and Socializing Preferences in Hong Kong Chinese Children. *Child Development*, 89(6), 2109–2117. <https://doi.org/10.1111/cdev.13083>
- Chudek, M., Birch, S. A. J., Brosseau-Liard, P. E., Birch, S., & Henrich, J. (2013). Culture-gene coevolutionary theory and children's selective social learning. In M. R. Banaji & S. A. Gelman (Eds.), *Navigating the social world: What infants, children, and other species*

- can teach us* (pp. 181 - 210). Oxford: Oxford University Press.
- <https://doi.org/10.1093/acprof:oso/9780199890712.003.0033>
- Chudek, M., Heller, S., Birch, S., & Henrich, J. (2012). Prestige-biased cultural learning: Bystander's differential attention to potential models influences children's learning. *Evolution and Human Behavior*, 33(1), 46-56.
- <https://doi.org/10.1016/j.evolhumbehav.2011.05.005>
- Clément, F. (2010). To Trust or not to Trust? Children's Social Epistemology. *Review of Philosophy and Psychology*, 1(4), 531–549. <https://doi.org/10.1007/s13164-010-0022-3>
- Corriveau, K., & Harris, P. L. (2009). Choosing your informant: Weighing familiarity and recent accuracy. *Developmental Science*, 12(3), 426–437. <https://doi.org/10.1111/j.1467-7687.2008.00792.x>
- Corriveau, K. H., & Harris, P. L. (2010). Preschoolers (Sometimes) Defer to the Majority in Making Simple Perceptual Judgments. *Developmental Psychology*, 46(2), 437–445. <https://doi.org/10.1037/a0017553>
- Corriveau, K. H., Kim, E., Song, G., & Harris, P. L. (2013a). Young Children's Deference to a Consensus Varies by Culture and Judgment Setting. *Journal of Cognition and Culture*, 13(3–4), 367–381. <https://doi.org/10.1163/15685373-12342099>
- Corriveau, K. H., Kinzler, K. D., & Harris, P. L. (2013b). Accuracy Trumps Accent in Children's Endorsement of Object Labels. *Developmental Psychology*, 49(3), 470–479. <https://doi.org/10.1037/a0030604>
- Cossette, I., Fobert, S. F., Slinger, M., & Brosseau-Liard, P. E. (2020). Individual Differences in Children's Preferential Learning from Accurate Speakers: Stable but Fragile. *Journal of*

- Cognition and Development*, 21(3), 348–367.
<https://doi.org/10.1080/15248372.2020.1727479>
- Cramer, R. J., DeCoster, J., Harris, P. B., Fletcher, L. M., & Brodsky, S. L. (2011). A confidence-credibility model of expert witness persuasion: Mediating effects and implications for trial consultation. *Consulting Psychology Journal: Practice and Research*, 63(2), 129–137. <https://doi.org/10.1037/a0024591>
- Crivello, C., Phillips, S., & Poulin-Dubois, D. (2018). Selective social learning in infancy: Looking for mechanisms. *Developmental Science*, 21(3), e12592.
<https://doi.org/10.1111/desc.12592>
- Deffenbacher, K. A. (1980). Eyewitness accuracy and confidence: Can we infer anything about their relationship? *Law and Human Behavior*, 4(4), 243–260. <https://doi.org/10.1007/BF01040617>
- Elashi, F., & Mills, C. (2014). Trust based on group membership or accuracy? The role of group membership on children's trust decisions. *Journal of experimental child psychology*, 128C, 88-104. 10.1016/j.jecp.2014.07.003.
- Fawcett, C., & Liszkowski, U. (2012). Mimicry and play initiation in 18-month-old infants. *Infant Behavior and Development*, 35(4), 689– 696.
<https://doi.org/10.1016/j.infbeh.2012.07.014>
- Fitneva, S. A., Lam, N. H. L., & Dunfield, K. A. (2013). The Development of Children's Information Gathering: To Look or to Ask? *Developmental Psychology*, 49(3), 533–542.
<https://doi.org/10.1037/a0031326>

- Fobert, S. F., Cossette, I., & Brosseau-Liard, P. E. 2024. *Children presume confident informants will be accurate (until proven otherwise)*, [Manuscript submitted for publication]. School of Psychology, University of Ottawa.
- Gelman, S. A. (2009). Learning from others: Children's construction of concepts. *Annual Review of Psychology*, 60(1), 115–140. <https://doi.org/10.1146/annurev.psych.59.103006.093659>
- Gweon, H., Pelton, H., Konopka, J. A., & Schulz, L. E. (2014). Sins of omission: Children selectively explore when teachers are under-informative. *Cognition*, 132(3), 335–341. <https://doi.org/10.1016/j.cognition.2014.04.013>
- Harris, P. L. (2012). *Trusting what you're told how children learn from others*. Belknap Press of Harvard University Press. <https://doi.org/10.4159/harvard.9780674065192>
- Harris, P. L., Koenig, M. A., Corriveau, K. H., & Jaswal, V. K. (2018). Cognitive Foundations of Learning from Testimony. *Annual review of psychology*, 69(1), 251–273. <https://doi.org/10.1146/annurev-psych-122216-011710>
- Haun, D. B. M., Rekers, Y., & Tomasello, M. (2014). Children Conform to the Behavior of Peers; Other Great Apes Stick With What They Know. *Psychological Science*, 25(12), 2160–2167. <https://doi.org/10.1177/0956797614553235>
- Heine, S. J., & Lehman, D. R. (1999). Culture, self-discrepancies, and self-satisfaction. *Personality and Social Psychology Bulletin*, 25(8), 915– 925. <http://dx.doi.org/10.1177/01461672992511001>
- Hetherington, C., Hendrickson, C., & Koenig, M. (2014). Reducing an in-group bias in preschool children: the impact of moral behavior. *Developmental Science*, 17(6), 1042–1049. <https://doi.org/10.1111/desc.12192>

- Howard, A. A., Mayeux, L., & Naigles, L. R. (2008). Conversational correlates of children's acquisition of mental verbs and a theory of mind. *First Language*, 28(4), 375–402.
<https://doi.org/10.1177/0142723708091044>
- Hübscher, I., Esteve-Gibert, N., Igualada, A., & Prieto, P. (2017). Intonation and gesture as bootstrapping devices in speaker uncertainty. *First Language*, 37(1), 24–41.
<https://doi.org/10.1177/0142723716673953>
- Huh, M., Grossmann, I., & Friedman, O. (2019). Children show reduced trust in confident advisors who are partially informed. *Cognitive Development*, 50, 49–55.
<https://doi.org/10.1016/j.cogdev.2019.02.003>
- Jaswal, V. K., & Kondrad, R. L. (2016). Why Children Are Not Always Epistemically Vigilant: Cognitive Limits and Social Considerations. *Child Development Perspectives*, 10(4), 240–244. <https://doi.org/10.1111/cdep.12187>
- Jaswal, V. K., & Malone, L. S. (2007). Turning believers into skeptics: 3-year-olds' sensitivity to cues to speaker credibility. *Journal of Cognition and Development*, 8(3), 263–283.
<https://doi.org/10.1080/15248370701446392>
- Jaswal, V. K., & Neely, L. A. (2006). Adults Don't Always Know Best: Preschoolers Use Past Reliability Over Age When Learning New Words. *Psychological Science*, 17(9), 757–758. <https://doi.org/10.1111/j.1467-9280.2006.01778.x>
- Johnston, A. M., Mills, C. M., & Landrum, A. R. (2015). How do children weigh competence and benevolence when deciding whom to trust? *Cognition*, 144, 76–90.
<https://doi.org/10.1016/j.cognition.2015.07.015>

- Juteau, A.-L., Ibrahim, Y. A., McIntee, S.-E., Varin, R., & Brosseau-Liard, P. E. (2024). Do children interpret informants' confidence as person-specific or situational? *PloS One*, 19(5), e0298183–e0298183. <https://doi.org/10.1371/journal.pone.0298183>
- Kassin, S. M. (1985). Eyewitness identification: Retrospective self-awareness and the accuracy–confidence correlation. *Journal of Personality and Social Psychology*, 49(4), 878–893. <https://doi.org/10.1037/0022-3514.49.4.878>
- Kertesz, A. F., Alvarez, J., Afraymovich, M., & Sullivan, J. (2021). The role of accent and speaker certainty in children's selective trust. *Cognitive Development*, 60, 101114. <https://doi.org/https://doi.org/10.1016/j.cogdev.2021.101114>
- Kinzler, K. D., Corriveau, K. H., & Harris, P. L. (2011). Children's selective trust in native accented speakers. *Developmental Science*, 14(1), 106–111. <https://doi.org/10.1111/j.1467-7687.2010.00965.x>
- Kinzler, K. D., Dupoux, E., & Spelke, E. (2012). 'Native' Objects and Collaborators: Infants' Object Choices and Acts of Giving Reflect Favor for Native Over Foreign Speakers. *Journal of cognition and development : official journal of the Cognitive Development Society*, 13(1), 67-81. 10.1080/15248372.2011.567200.
- Koenig, M. A., Clément, F., & Harris, P. L. (2004). Trust in Testimony: Children's Use of True and False Statements. *Psychological Science*, 15(10), 694–698. <https://doi.org/10.1111/j.0956-7976.2004.00742.x>
- Koenig, M. A., & Echols, C. H. (2003). Infants' understanding of false labeling events: The referential roles of words and the speakers who use them. *Cognition*, 87(3), 179–208. [https://doi.org/10.1016/S0010-0277\(03\)00002-7](https://doi.org/10.1016/S0010-0277(03)00002-7)

- Koenig, M. A., & Harris, P. L. (2005a). The role of social cognition in early trust. *Trends in Cognitive Sciences*, 9(10), 457–459. <https://doi.org/10.1016/j.tics.2005.08.006>
- Koenig, M. A., & Harris, P. L. (2005b). Preschoolers Mistrust Ignorant and Inaccurate Speakers. *Child Development*, 76(6), 1261–1277. <https://doi.org/10.1111/j.1467-8624.2005.00849.x>
- Koenig, M. A., Li, P. H., & McMyler, B. (2022). Interpersonal trust in children’s testimonial learning. *Mind & Language*, 37(5), 955–974. <https://doi.org/10.1111/mila.12361>
- Koenig, M. A., & Sabbagh, M. A. (2013). Selective social learning: New perspectives on learning from others. *Developmental Psychology*, 49(3), 399–403. <https://doi.org/10.1037/a0031619>
- Koenig, M. A., & Woodward, A. L. (2010). Sensitivity of 24-Month-Olds to the Prior Inaccuracy of the Source: Possible Mechanisms. *Developmental Psychology*, 46(4), 815–826. <https://doi.org/10.1037/a0019664>
- Kominsky, J. F., Langthorne, P., & Keil, F. C. (2016). The Better Part of Not Knowing: Virtuous Ignorance. *Developmental Psychology*, 52(1), 31–45. <https://doi.org/10.1037/dev0000065>
- Kraut, R. E. (1978). Verbal and nonverbal cues in the perception of lying. *Journal of Personality and Social Psychology*, 36(4), 380–391. <https://doi.org/10.1037/0022-3514.36.4.380>
- Kushnir, T., Vredenburg, C., & Schneider, L. A. (2013). “Who can help me fix this toy?” The distinction between causal knowledge and word knowledge guides preschoolers’ selective requests for information. *Developmental Psychology*, 49(3), 446–453. <https://doi.org/10.1037/a0031649>
- Landrum, A. R., Mills, C. M., & Johnston, A. M. (2013). When do children trust the expert? Benevolence information influences children’s trust more than expertise. *Developmental Science*, 16(4), 622–638. <https://doi.org/10.1111/desc.12059>

- [Lane, J. D., Wellman, H. M., Gelman, S. A. \(2013\) Informants' traits weigh heavily in young children's trust in testimony and in their epistemic inferences. *Child Development*, 84\(4\), 1253-1268. <https://doi.org/10.1111/cdev.12029>](#)
- Legare, C. H., & Heyman, G. D. (2013). Social Cognitive Development: Learning from Others. In *The Oxford Handbook of Social Cognition*. Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780199730018.013.0036>
- Lee, V., & Rutherford, M. D. (2018). Sixteen-month-old infants are sensitive to competence in third-party observational learning. *Infant Behavior and Development*, 52, 114–120.
<https://doi.org/10.1016/j.infbeh.2018.07.001>
- Li, S., & Fang, Y. (2004). Respondents in Asian Cultures (e.g., Chinese) are More Risk-Seeking and More Overconfident than Respondents in Other Cultures (e.g., in United States) but the Reciprocal Predictions are in Total Opposition: How and Why?, *Journal of Cognition and Culture*, 4(2), 263-292. <https://doi.org/10.1163/1568537041725123>
- [London, H., McSeveney, D., & Tropper, R. \(1971\). Confidence, Overconfidence and Persuasion. *Human Relations \(New York\)*, 24\(5\), 359–369. <https://doi.org/10.1177/001872677102400502>](#)
- Lundeberg, M. A., Fox, P. W., Brown, A. C., & Elbedour, S. (2000). Cultural influences on confidence: Country and gender. *Journal of Educational Psychology*, 92(1), 152–159. <https://doi.org/10.1037/0022-0663.92.1.152>
- Ma, L., & Woolley, J. D. (2013). Young Children's Sensitivity to Speaker Gender When Learning From Others. *Journal of Cognition and Development*, 14(1), 100–119.
<https://doi.org/10.1080/15248372.2011.638687>

- MacDonald, K., Schug, M., Chase, E., & Barth, H. (2013). My people, right or wrong? Minimal group membership disrupts preschoolers' selective trust. *Cognitive Development*, 28(3), 247–259. <https://doi.org/10.1016/j.cogdev.2012.11.001>
- Mannes, A., & Moore, D. (2013). I know I'm Right! A Behavioural View of Overconfidence. *Significance*, 10(4), 10–14. <https://doi.org/10.1111/j.1740-9713.2013.00674.x>
- Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mind reading components of children's vigilance towards deception. *Cognition*, 112(3), 367–380. <https://doi.org/10.1016/j.cognition.2009.05.012>
- McCroskey, J. C., & Mehrley, R. S. (1969). The effects of disorganization and nonfluency on attitude change and source credibility. *Speech Monographs*, 36(1), 13–21. <https://doi.org/10.1080/03637756909375604>
- McDonald, K. P., & Ma, L. (2016). Preschoolers' credulity toward misinformation from ingroup versus outgroup speakers. *Journal of Experimental Child Psychology*, 148, 87–100. <https://doi.org/10.1016/j.jecp.2016.03.011>
- Miller, S. (2000). Children's Understanding of Preexisting Differences in knowledge and Belief. *Developmental Review*, 20(2), 227–282. <https://doi.org/10.1006/drev.1999.0501>
- Mills, C. M. (2013). Knowing When to Doubt: Developing a Critical Stance When Learning From Others. *Developmental Psychology*, 49(3), 404–418. <https://doi.org/10.1037/a0029500>
- Moore, C., Bryant, D., & Furrow, D. (1989). Mental Terms and the Development of Certainty. *Child Development*, 60(1), 167–171. <https://doi.org/10.2307/1131082>

- Moore, C., Harris, L., & Patriquin, M. (1993). Lexical and Prosodic Cues in the Comprehension of Relative Certainty. *Journal of Child Language*, 20(1), 153–167.
<https://doi.org/10.1017/S030500090000917X>
- Moore, C., Pure, K., & Furrow, D. (1990). Children's Understanding of the Modal Expression of Speaker Certainty and Uncertainty and Its Relation to the Development of a Representational Theory of Mind. *Child Development*, 61(3), 722–730.
<https://doi.org/10.1111/j.1467-8624.1990.tb02815.x>
- Morgan, B. Q. (1953). Question Melodies in American English. *American Speech*, 28(3), 181–191. <https://doi.org/10.2307/454131>
- Nurmsoo, E., & Robinson, E. J. (2009). Identifying unreliable informants: do children excuse past inaccuracy? *Developmental Science*, 12(1), 41–47. <https://doi.org/10.1111/j.1467-7687.2008.00750.x>
- Nurmsoo, E., Robinson, E. J., & Butterfill, S. A. (2010). Children's selective learning from others. *Review of Philosophy and Psychology*, 1(4), 551–561.
<http://dx.doi.org/10.1007/s13164-010-0043-y>
- Over, H., & Carpenter, M. (2012). Putting the social into social learning: explaining both selectivity and fidelity in children's copying behavior. *Journal of comparative psychology*, 126(2), 182–92. <https://doi.org/10.1037/a0024555>
- Penrod, S., & Cutler, B. (1995). Witness confidence and witness accuracy: Assessing their forensic relation. *Psychology, Public Policy, and Law*, 1(4), 817–845.
<https://doi.org/10.1037/1076-8971.1.4.817>

- Poulin-Dubois, D., & Brosseau-Liard, P. (2016). The Developmental Origins of Selective Social Learning. *Current Directions in Psychological Science*, 25(1), 60-64.
<https://doi.org/10.1177/0963721415613962>
- Pozzi, M., & Mazzearella, D. (2024). Speaker trustworthiness: Shall confidence match evidence? *Philosophical Psychology*, 37(1), 102–125.
<https://doi.org/10.1080/09515089.2023.2193220>
- Price, P.C., & Stone, E.R. (2004). Intuitive evaluation of likelihood judgment producers: evidence for a confidence heuristic. *Journal of Behavioral Decision Making*, 17(1), 39-57. <https://doi.org/10.1002/bdm.460>
- Pulford, Colman, A. M., Buabang, E. K., & Krockow, E. M. (2018). The Persuasive Power of Knowledge: Testing the Confidence Heuristic. *Journal of Experimental Psychology. General*, 147(10), 1431–1444. <https://doi.org/10.1037/xge0000471>
- Qian, M. K., Heyman, G. D., Quinn, P. C., Messi, F. A., Fu, G., & Lee, K. (2016). Implicit Racial Biases in Preschool Children and Adults From Asia and Africa. *Child Development*, 87(1), 285–296. <https://doi.org/10.1111/cdev.12442>
- Rendell, L., Fogarty, L., Hoppitt, W. J., Morgan, T. J., Webster, M. M., & Laland, K. N. (2011). Cognitive culture: theoretical and empirical insights into social learning strategies. *Trends in Cognitive Sciences*, 15(2), 68–76. <https://doi.org/10.1016/j.tics.2010.12.002>
- Reyes-Jaquez, B., & Echols, C. H. (2013). Developmental Differences in the Relative Weighing of Informants' Social Attributes. *Developmental Psychology*, 49(3), 602–613.
<https://doi.org/10.1037/a0031674>
- Sabbagh, M. A., & Baldwin, D. A. (2001). Learning Words from Knowledgeable versus Ignorant Speakers: Links Between Preschoolers' Theory of Mind and Semantic

- Development. *Child Development*, 72(4), 1054–1070. <https://doi.org/10.1111/1467-8624.00334>
- Sabbagh, M. A., Wdowiak, S. D., & Ottaway, J. M. (2003). Do word learners ignore ignorant speakers? *Journal of Child Language*, 30(4), 905–924.
<https://doi.org/10.1017/S0305000903005828>
- Sah, S., Moore, D. A., & MacCoun, R. J. (2013). Cheap talk and credibility: The consequences of confidence and accuracy on advisor credibility and persuasiveness, *Organizational behavior and human decision processes*, 121(2), 246-255.
<http://dx.doi.org/10.1016/j.obhdp.2013.02.001>
- Scherer, K. R., London, H., & Wolf, J. J. (1973). The voice of confidence: Paralinguistic cues and audience evaluation. *Journal of Research in Personality*, 7(1), 31–44.
[https://doi.org/10.1016/0092-6566\(73\)90030-5](https://doi.org/10.1016/0092-6566(73)90030-5)
- Shaw, J. S. III, & McClure, K. A. (1996). Repeated postevent questioning can lead to elevated levels of eyewitness confidence. *Law and Human Behavior*, 20(6), 629–653. <https://doi.org/10.1007/BF01499235>
- Shutts, K., Banaji, M. R., & Spelke, E. S. (2010). Social categories guide young children's preferences for novel objects. *Developmental Science*, 13(4), 599–610.
<https://doi.org/10.1111/j.1467-7687.2009.00913.x>
- Sobel, D. M., & Finiasz, Z. (2020). How Children Learn From Others: An Analysis of Selective Word Learning. *Child Development*, 91(6), e1134–e1161.
<https://doi.org/10.1111/cdev.13415>
- Sobel, D. M., & Legare, C. H. (2014). Causal learning in children. *WIREs Cognitive Science*, 5(4), 413–427. <https://doi.org/10.1002/wcs.1291>

- Sobel, D. M., & Macris, D. M. (2013). Children's understanding of speaker reliability between lexical and syntactic knowledge. *Developmental Psychology*, 49(3), 523–532. <https://doi.org/10.1037/a0029658>
- Song, R., Over, H., & Carpenter, M. (2015). Children Draw More Affiliative Pictures Following Priming With Third-Party Ostracism. *Developmental Psychology*, 51(6), 831–840. <https://doi.org/10.1037/a0039176>
- Sperber, D., Clément, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G., & Wilson, D. (2010). Epistemic Vigilance. *Mind & Language*, 25(4), 359–393. <https://doi.org/10.1111/j.1468-0017.2010.01394.x>
- Stock, H. R., Graham, S. A., & Chambers, C. G. (2009). Generic Language and Speaker Confidence Guide Preschoolers' Inferences About Novel Animate Kinds. *Developmental Psychology*, 45(3), 884–888. <https://doi.org/10.1037/a0015359>
- Swerts, M., & Krahmer, E. (2005). Audiovisual prosody and feeling of knowing. *Journal of Memory and Language*, 53(1), 81–94. <https://doi.org/10.1016/j.jml.2005.02.003>
- Tenney, E. R., MacCoun, R. J., Spellman, B. A., & Hastie, R. (2007). Calibration trumps confidence as a basis for witness credibility. *Psychological Science*, 18(1), 46-50. <https://doi.org/10.1111/j.1467-9280.2007.01847.x>
- Tenney, E. R., Meikle, N. L., Hunsaker, D., Moore, D. A., & Anderson, C. (2019). Is overconfidence a social liability? The effect of verbal versus nonverbal expressions of confidence. *Journal of Personality and Social Psychology*, 116(3), 396–415. <https://doi.org/10.1037/pspi0000150>

- Tenney, E. R., Small, J. E., Kondrad, R. L., Jaswal, V. K., & Spellman, B. A. (2011). Accuracy, Confidence, and Calibration: How Young Children and Adults Assess Credibility. *Developmental Psychology*, 47(4), 1065–1076. <https://doi.org/10.1037/a0023273>
- Tenney, E. R., & Spellman, B. A. (2011). Complex Social Consequences of Self-Knowledge. *Social Psychological and Personality Science*, 2(4), 343–350. <https://doi.org/10.1177/1948550610390965>
- Tenney, E. R., Spellman, B. A., & MacCoun, R. J. (2008). The benefits of knowing what you know (and what you don't): How calibration affects credibility. *Journal of Experimental Social Psychology*, 44(5), 1368–1375. <https://doi.org/10.1016/j.jesp.2008.04.006>
- Thomas, J. P., & McFadyen, R. G. (1995). The confidence heuristic: A game-theoretic analysis. *Journal of Economic Psychology*, 16(1), 97–113. [https://doi.org/10.1016/0167-4870\(94\)00032-6](https://doi.org/10.1016/0167-4870(94)00032-6)
- Todorov, A., Mandisodza, A. N., Goren, A., & Hall, C. C. (2005). Inferences of Competence from Faces Predict Election Outcomes. *Science*, 308(5728), 1623–1626. <https://doi.org/10.1126/science.1110589>
- Tomasello, M. (2014). *A Natural History of Human Thinking*. Harvard University Press.
- Tong, Y., Wang, F., & Danovitch, J. (2020). The role of epistemic and social characteristics in children's selective trust: Three meta-analyses. *Developmental Science*, 23(2), e12895. <https://doi.org/10.1111/desc.12895>
- Wagner, L., Dunfield, K. A., & Rohrbeck, K. L. (2014). Children's Use of Social Cues When Learning Conventions. *Journal of Cognition and Development*, 15(3), 479–494. <https://doi.org/10.1080/15248372.2013.782459>

- Wood, L. A., Kendal, R. L., & Flynn, E. G. (2013). Whom do children copy? Model-based biases in social learning. *Developmental Review*, 33(4), 341–356. <https://doi.org/10.1016/j.dr.2013.08.002>
- Zarnoth, P., & Sniezek, J. A. (1997). The social influence of confidence in group decision making. *Journal of Experimental Social Psychology*, 33(4), 345–366. <https://doi.org/10.1006/jesp.1997.1326>
- Zmyj, N., Buttelmann, D., Carpenter, M., & Daum, M. M. (2010). The reliability of a model influences 14-month-olds' imitation. *Journal of Experimental Child Psychology*, 106(4), 208–220. <https://doi.org/10.1016/j.jecp.2010.03.002>
- Zmyj, N., Aschersleben, G., Prinz, W., & Daum, M. (2012). The peer model advantage in infants' imitation of familiar gestures performed by differently aged models. *Frontiers in Psychology*, 3, 252–252. <https://doi.org/10.3389/fpsyg.2012.00252>

Chapter 2

Study 1 “Do Children Interpret Informants’ Confidence as Person-Specific or Situational?”

2.1 Abstract

Children prefer to learn from confident rather than hesitant informants. However, it is unclear how children interpret confidence cues: these could be construed as strictly *situational* indicators of an informant’s current certainty about the information they are conveying, or alternatively as *person-specific* indicators of how “knowledgeable” someone is across situations. In the present study, 4- and 5-year-olds ($N=41$) saw informants differing in confidence. Each informant’s confidence cues were present during the history but not the test phase. Results suggest that 4- and 5-year-olds primarily treat confidence cues as situational as they did not favor any informant in the absence of current confidence cues.

2.2 Introduction

Knowledge acquisition is a continuous process that begins at a very early age. It is not always possible for children to obtain information first-hand. Hence, they learn about various topics from people around them (Harris & Koenig, 2006), often through observation, imitation, and trust in information that is given to them. Social learning can also be a selective process that allows children to be skeptical when assessing the credibility of the informants providing them with information (see Clément, 2010 for a review). Indeed, people are fallible and can intentionally or inadvertently mislead children. Research has widely corroborated that children engage in *selective social learning*, that is, the inclination to learn from or prefer some sources of information over others (Harris, 2007; Koenig & Sabbagh, 2013; Mills, 2013).

Many cues can help children decide whether or not to learn from a given individual. For instance, preschool- and young school-age children appear to prefer learning from those who are nicer (3- to 5-year-olds; Mascaro & Sperber, 2009), more attractive (4- to 5-year-olds; Bascandziev & Harris, 2016), and who share their language or accent (3- to 6-year-olds; Kertesz et al., 2021; Kinzler et al., 2011). Some of these cues may seem to have little relation to the likelihood that individuals provide adequate information; yet, there are numerous cues children can use that can be considered *epistemic* indicators, or likely indicators of how knowledgeable the individual providing information is. For example, many studies have shown that, before the age of two, young children can detect and use individuals' past reliability (Bazhydai et al., 2020; Brooker & Poulin-Dubois, 2013; Koenig & Woodward, 2010; Zmyj et al., 2010), expertise (Stenberg, 2013), and age (Zmyj et al., 2012), all of which likely correlate with the individual's knowledge, to decide whether to learn from that individual or not.

The cue of particular interest in the present research is the expressed *confidence* of an individual. When one is knowledgeable, one frequently expresses certainty through non-verbal indicators, such as nodding, an upright posture, and a rapid, assured tone of voice, accompanied by verbal confidence markers such as "I know" or "for sure"; conversely, when one is ignorant or uncertain, this is commonly expressed by verbal hedging such as "I guess" or "maybe", combined with paralinguistic and non-verbal markers such as a hesitant tone, shrugging, and a puzzled facial expression (Hübscher et al., 2017). By 24 months, toddlers are more likely to imitate the actions of an individual expressing non-verbal confidence cues over a counterpart portraying uncertainty (Birch et al., 2010; Brosseau-Liard & Poulin-Dubois, 2014). Preschoolers aged 3 to 5 years old also prefer to learn from those who express their certainty both verbally and non-verbally over those who express hesitation or uncertainty (Hübscher et al., 2017; Jaswal &

Malone, 2007; Sabbagh et al., 2003; Sabbagh & Baldwin, 2001). Of course, confidence is far from a perfect knowledge cue: whether intentionally or not, an individual could be poorly *calibrated*, that is, showing confidence cues that are disproportional to their true knowledge (Tenney et al., 2007). There is evidence that older preschoolers, aged 5, possess some understanding that confidence is not as reliable a credibility cue as, for instance, an individual's history of accuracy when the two conflict directly (Brosseau-Liard et al., 2014); however, this remains challenging to them when the relation between an individual's accuracy and confidence is complex (Tenney et al., 2011).

Though multiple studies have shown that children do attend to confidence cues and prefer, all else being equal, to learn from confident over hesitant individuals, it is unclear exactly how they interpret or understand confidence. One specific aspect of their interpretation that remains unclear is how much children believe an individual's confidence cues indicate something durable about that person's trustworthiness. When describing the different epistemic cues that one could use to evaluate an individual's credibility, Miller (2000) drew a distinction between *situational* and *individual* cues to knowledge (to avoid confusion with other uses of the term "individual", we will refer to the latter as *person-specific* instead, as per Brosseau-Liard & Birch, 2011).

Originally, most research on children's attributions of knowledge studied state-specific or *situational* indicators of knowledge — cues in a specific situation that indicate whether or not someone has the knowledge pertinent to that situation, regardless of how generally "knowledgeable" they might otherwise be. Many of these situational cues pertain to information accessed through perceptual or other means. For instance, a person looking inside a box has knowledge of its contents, whereas another person who has not looked inside that box does not

know what is inside. Traditional false-belief tasks (Wimmer & Perner, 1983) can be seen as evaluating children's understanding of others' situational knowledge or lack thereof (Robinson, 2000; Wellman et al., 2001). Research has generally demonstrated that preschoolers have a nascent but imperfect understanding of the relation between information access through various perceptual means and knowledge (O'Neill & Chong, 2001; Robinson et al., 2008). They can also understand more indirect situational knowledge indicators: For example, they understand that familiarity with an item makes one knowledgeable about it, without necessarily needing to identify the exact perceptual means of knowledge acquisition (Birch & Bloom, 2002).

Whereas *situational cues* are only informative of someone's knowledge in a particular situation and can be seen as independent of an individual's personal attributes, *person-specific cues* are informative about an individual's overall knowledge across situations (Brosseau-Liard, 2017). Indeed, some people know more than others, and observable attributes can help children figure out whether a given individual is more or less likely to be knowledgeable or ignorant. For instance, an individual's age can be a proxy for knowledge: children prefer to learn from adults over children (Jaswal & Neely, 2006; Wood et al., 2012). A person's past accuracy, domain of expertise, and social status can all be considered person-specific cues to that person's knowledge, and all can be used by children in the preschool years at least in some situations (see Mills, 2013 for a review).

What about confidence? Although research has demonstrated that children attend to cues of confidence, it is unclear whether they treat them as situational or person-specific. Unlike many other cues, confidence could conceivably be interpreted both ways. On one hand, children could interpret confidence or hesitation cues as indicators of how a person feels *right now* about the knowledge they are *currently* sharing, and not transfer this information to any other situation

involving the same person sharing other information. Alternatively, children could make broader attributions based on the same cues: they could assume, for instance, that someone who expresses themselves confidently is a person who is generally smart, knowledgeable or in possession of a high social status granted by expertise, while one who is hesitant could be perceived as being a more generally ignorant person. In other words, expressions of confidence in one situation could be interpreted as indicative of someone's knowledge in other situations.

Importantly, the way children perceive confidence could lead to significant mistakes should they not understand to what extent confidence is an “imperfect” cue to knowledge. Indeed, we know that older children can understand the concept of *calibration*, which refers to how proportional confidence is compared to knowledge (i.e., a well-calibrated individual would display confidence when they hold knowledge and hesitancy when they lack knowledge; Tenney et al., 2011, Birch et al., 2020). However, weighing different credibility cues is difficult for younger children, and interpreting confidence cues as person-specific could result in misinformed learning decisions. Simply picture how confident some public figures appear about their own knowledge even when they are speaking on topics outside their field of expertise, and how even otherwise savvy adults can be misled by misplaced confidence. The same could apply to young children in regard to their teachers, instructors, parents or peers. If children perceive confidence as indicative of an individual being generally knowledgeable across situations, this could, in some circumstances, lead to misinformed learning decisions (e.g., believing and learning from someone only because they previously expressed confidence while they might not actually know what they are talking about). On the contrary, if children perceive confidence as situational, they may be a bit less vulnerable to this specific type of misinformation: They would

instead perhaps rely on other cues, such as expertise, to decide whether to believe someone or not.

To date, however, most research investigating children's use of confidence cues has kept individuals' confidence constant, therefore making it difficult to tell whether children consider both individuals' past and current confidence cues when making judgments of trustworthiness. To our knowledge, the only exception is a series of studies by Moore and colleagues, which examined children's decision-making based on puppets' verbal (lexical and prosody cues) cues of certainty (Moore et al., 1990; Moore et al., 1993). In these studies, participants had to choose the box in which they believed there was candy based on statements from two puppets and with no opportunity to receive feedback in between trials. Statements from puppets implied contrasting cues of certainty and the puppet making the more certain statement varied across the twelve trials of the test session. Moore and colleagues found that four- and five-year-olds most often made their decision based on the puppet that used stronger lexical cues of certainty in the immediate trial (Moore et al., 1990; Moore et al., 1993; Moore et al., 1989). For instance, in one study (Moore et al., 1989), four- and five-year-olds favored information from whichever puppet implied certainty through a statement using "know" instead of "think" and did not appear to do so more or less in the first versus the second half of the study. However, these studies were not specifically designed to test the impact of prior or changing confidence on children's trust. Furthermore, guessing the transient location of a piece of candy involves a highly situational focus: some past research has found that children show less generalization of cues involving episodic information (e.g., where a piece of candy is hidden right now) compared to semantic information such as object labels and functions (Brosseau-Liard & Birch, 2011; Brosseau-Liard, 2014; Palmquist & Fierro, 2018; Stephens & Koenig, 2015).

2.2.1 Motivation of the present experiment

In one of our previous experiments (Juteau et al., 2024), we examined 4- to 5-year-olds' use of individuals' changing confidence cues when learning semantic information. Children witnessed a history phase where two individuals provided information, one confidently and the other hesitantly. At test, the same individuals either continued showing the same confidence cues (Consistent confidence condition) or switched from confident to hesitant and vice versa (Inconsistent confidence condition). Children overall did prefer to learn from the currently confident informant over the currently hesitant one, but performance did not significantly differ between conditions. In other words, 4- to 5-year-olds preferred to learn from the confident informant in the test phase regardless of their prior confidence. This may suggest that children interpret confidence cues as a situational indicator of knowledge, seeing confidence as a reflection of someone's current knowledge about a specific situation rather than as indicating someone's general knowledge across situations. However, there are some ambiguities with 4- to 5-year-olds's performance as there was a small but non-significant mean difference between conditions. This could be consistent with a small effect of prior confidence continuing to influence children's performance, but it might have been dwarfed by the influence of the current confidence cues.

In other words, it may be that children treat confidence *primarily* as situational, but *could* treat it as person-specific if no other more salient cue was present. There is also a possibility that children only relied on current confidence because they did not notice nor remember past confidence; we did not include any memory questions in our previous experiment, which could speak to this possibility. Moreover, the fact that children relied on the current confidence cues to learn novel words in our previous experiment does not mean that they did not make *any* type of

enduring trait attribution. The present experiment addresses these possibilities. We devised a different manipulation to examine whether past confidence cues influence 4- and 5-year-olds' responses when they do not conflict with any other cues. Specifically, at test, participants were read written answers which they were told were written by the informants. Since the answers were single written words that were read in a neutral voice by a third party (the experimenter), no confidence or hesitation cues were present at test. In addition, children were asked explicit attribution and memory questions to better support their interpretation. The word learning phase of this experiment was preregistered prior to data collection; the attribution and memory phases were not preregistered. For the word learning phase, based on previous findings suggesting that children ignore past confidence when it conflicts with present confidence (Juteau et al., 2024), we hypothesized that children would disregard past confidence cues when informants are presently neutral.

2.3 Method

2.3.1 Participants

We preregistered a sample size of 40 participants (link to preregistration: https://osf.io/9s63d?view_only=ede9c18920604ac68aa8ad697bcda67c), but additional children were tested to account for exclusions. Our final sample comprised 41 typically-developing 4- and 5-year-olds (48-71 months, $M_{\text{age}} = 59$ months; 21 girls and 20 boys), recruited from an in-lab participant database between December 8, 2019 and March 25, 2022. Children were predominately White (11 reported mixed ethnicity, two Asian, and one Black; four did not report race/ethnicity) and came in majority from families of average to above-average income (two reported below average income and three did not report family income). The study was either

conducted in English (28 children) or in French (13 children). There were four additional children that were excluded from our final sample due to failure to answer one or more trial.

2.3.2 Materials and procedure

The study began just as the COVID-19 pandemic began, which resulted in a shutdown of in-person research for an extended period; therefore, three participants were tested in-lab and the remaining participants were tested virtually via a videoconferencing app. All participants were introduced to a game where they were told they would have to name objects pictured on cards that were placed in front of them. To familiarize children with the fact that they would see unknown objects, we presented both highly familiar pictures (e.g., an apple) and unfamiliar ones (e.g., a coffee roaster) and asked them to name the pictures, providing feedback each time.

2.3.2.1 History Phase

Children were told that, for subsequent trials, they could receive help from two adult female informants of European descent presented on video (hereafter labelled B and S). They were introduced to the two informants via pictures shown on a screen, then watched a series of videos in which B and S named five familiar objects (e.g., dress, shoes, desk) while holding pictures that were not visible to the child (so that the child could not tell whether the informants were accurate or not). One informant was confident (e.g., saying: “Oh I know, that’s a dress!” with a declarative tone, while holding a picture not visible to the child, raising the index finger and having a satisfied facial expression) and the other was hesitant (e.g., saying: “I... guess that’s a dress?” with an upward inflection, while also holding a picture not visible to the child, shrugging shoulders and having a puzzled facial expression). The informants were always presented in the same order, B then S, but which informant served as the confident informant was counterbalanced to account for order effects. Notably, the selection of informants was made

based on actors' availability, resulting in the exclusive use of female informants of European descent.

2.3.2.2 Test Phase – Part 1: Word Learning

In each of five test trials, executed one after the other, a picture of an unfamiliar object was shown to participants. Children were told that the two informants wrote down (conflicting) labels that the experimenter then read to the children (e.g., “B called it a *bloof*, S called it a *heem*”). Children were asked which of the two answers they believed was the correct label then moved on to the next test trial.

2.3.2.3 Test Phase – Part 2: Attributions

Children were told the experimenter “had a few questions about B and S.” They saw pictures of both and were asked to explicitly choose which one possessed each of six attributes. The first two were knowledge attributes (i.e., “Who knows the names for a lot of bugs?” and “Who knows a lot about stars and planets?”). There were then questions about prosocial behaviours (i.e., “Who always says thank you?” and “Who shares her things with her friends and family?”), and affiliation (i.e., “With whom would you like to play?”). The last trial was about a neutral preference (i.e., “Who doesn’t like spaghetti?”), to serve as a distractor.

2.3.2.4 Test Phase – Memory Check

The last part of the study was a memory check to ensure children were able to recognize the confidence cues and remember them throughout the experiment. Children were asked which of the two informants was previously confident (“Now, remember earlier in the videos, one of them said « Oh, I know! » when she named pictures. Which one said that? B or S?”) and which was previously hesitant (“And one of them said “Hmm, I guess?” in the videos. Which one said that? B or S?”). The order of the two memory questions was counterbalanced.

2.4 Results and Discussion

2.4.1 Part 1: Word Learning

To determine whether participants relied on the past confidence cues when learning semantic information, we calculated how many times, in 5 trials, children sided with the informant who was confident in the history phase. We then compared the mean to chance (2.5) with a directional one-sample t-test, which revealed that children overall did not prefer to learn from the previously confident informant over the previously hesitant one, $M=2.51$, $SD=1.23$; $t(40)=.06$, $p=.475$, $d=0.01$, 95% CI [-.30, .32]. Additionally, we conducted trial-by-trial analyses (not preregistered) and results from nondirectional binomial tests reveal that children did not significantly perform above chance on any trials (Trial 1: 56%, $p=.533$; Trial 2: 54%, $p=.755$; Trial 3: 59%, $p=.349$; Trial 4: 37%, $p=.117$; Trial 5: 46%, $p=.755$). There were no significant gender effects found (Female: $M=2.52$, $SD=1.12$, Male: $M=2.50$, $SD=1.36$, $t(39)=.061$, $p=.951$, $d=0.02$). However, there was a significant correlation between age in months and performance ($r=.314$, $p=.046$). This observed increase in performance with age is consistent with existing literature, which suggests that children's sensitivity to confidence cues increases as they age.

2.4.2 Part 2: Attributions

Analyses for the attributions were not preregistered and should therefore all be considered exploratory. To examine whether participants attributed enduring traits to the informants based solely on their past confidence, we conducted binomial tests for each attribution trial. Two participants were not included in these analyses because they did not participate in this phase (although they had completed the word learning phase). Two participants who did not answer the last three attribution questions were only included for the first three questions. Participants did not attribute knowledge (knowledge of bugs: $N_{confident}=23/39$, $p=.337$; knowledge of stars and

planets: $N_{\text{confident}}=22/39$, $p=.522$) nor social traits (saying thank you: $N_{\text{confident}}=19/39$, $p=1.000$; sharing: $N_{\text{confident}}=19/37$, $p=1.000$) to either of the previously confident and hesitant informants, but reported that they would prefer to play with the previously confident one ($N_{\text{confident}}=25/37$, $p=.047$). However, when using a Bonferroni correction for a family-wise alpha of .10 (critical $p=.017$ for 6 tests), this result in no significant preference for the previously confident informant. As expected, for the distractor item, they did not favor either of the two informants ($N_{\text{confident}}=19/37$, $p=1.000$). These results suggest that overall, participants performed at chance when making attributions and thus don't seem to generalize traits that they could have inferred from the past confidence cues to a situation in which no current confidence cues are present.

2.4.3 Memory Check

To examine whether participants were able to detect and remember past confidence cues, we then performed a binomial test (considering only success or failure at memorizing who was previously confident versus hesitant). We only included children who succeeded at *both* questions and used a proportion of .50 as chance, although true random responding would lead to .25, to be conservative and given that children's responses to both questions are unlikely to be completely independent (i.e., pragmatically, if children named informant B in response to the first question, they could feel compelled to name informant S in response to the second question even if they did not remember anything about the History Phase). Results indicate that participants did succeed at the memory check above chance, $N_{\text{success}}=28$ (68%), $p=.014$.

We repeated our analyses for the Word Learning trials looking only at participants who succeeded at the memory check ($N=28$) to chance. Results revealed that they did not significantly rely on past confidence, $M=2.79$, $SD=1.23$; $t(27)=1.231$, $p=.115$, $d=.24$, 95% CI [-

.14, .61]. This suggests that the fact that participants did not rely on past confidence to learn semantic information is not merely because they could not remember the past confidence cues, which seems to support the idea that children perceive confidence cues as situational. Yet, given the direction of the mean, we cannot rule out that there is a small tendency, in children who best remember the History Phase, to treat confidence as person-specific, but that we did not have the statistical power to detect this difference.

For the attribution task, when looking at participants who succeeded at both memory questions, we obtained results that did not seem to significantly differ from chance, though statistical power was admittedly low (knowledge of bugs: $N_{confident}=18/27$, $p=.122$; knowledge of stars and planets: $N_{confident}=19/27$, $p=.052$; saying thank you: $N_{confident}=11/27$, $p=.442$; sharing: $N_{confident}=13/26$, $p=1.000$; play with: $N_{confident}=18/26$, $p=.076$).

2.5 Discussion

We investigated whether preschoolers use confidence as a situational or a person-specific knowledge cue. We expected that, were children to use confidence in a strictly situational manner, an individual's *history* of confidence should have no impact on young children's propensity to trust them: if no confidence cues are currently demonstrated children should perform at chance. If, however, confidence was treated as a person-specific knowledge cue, we would expect prior confidence (or lack thereof) to guide their current learning process when no confidence cues are currently present.

Taken together, our results suggest that four- to five-year-olds perceive confidence cues as situational cues to knowledge thus not transferring the inferred knowledgeability from past confidence cues to a current situation without any indicator of present confidence. Indeed, regardless of individuals' prior confidence or uncertainty, when learning novel words and

making knowledge and social attributions without any present confidence cues, children did not favor any informant. Moreover, we confirmed that four- to five-year-olds were able to pay attention and remember confidence cues, but they still did not use past confidence at test either in their learning preferences or in their explicit attributions.

We also noted that, when only selecting children who correctly answered both memory questions, many results were in the predicted direction for person-specific attributions though not significantly so; children sided slightly more often with the previously confident than previously hesitant person. We therefore cannot rule out the possibility that there is, in fact, a small tendency to make person-specific attributions that we did not detect because of low power. However, even if children do make a person-specific interpretation of confidence at some level, the impact of this interpretation on their learning is minimal compared to that of the situational interpretation (as demonstrated in the much larger effect sizes of *current* confidence in Juteau et al., 2024). It is also worth noting that correct answers to memory questions can both result from genuinely remembering the History Phase as well as from a coincidental positive bias towards the confident informant (or negative bias towards the hesitant informant) – for instance, some children may just like the look of one informant more than the other. It is thus difficult to unambiguously interpret responses on one type of test trial that select for answers on a different test trial, given that similar irrelevant biases could drive answers on all trials.

If confidence was interpreted as person-specific, we would have expected to see knowledge attributions made toward the previously confident informant even when no confidence cues were currently present since it would have been seen as a trait transferrable or generalizable across situation, but it was not the case. Importantly, we do not rule out that other types of attributions (other than knowledge attributions) could be made from past confidence

cues and that there could then be in some situations a person-specific interpretation of confidence cues that is not seen in learning or knowledge-related contexts. It has frequently been assumed by researchers that children pay attention to confidence as a knowledge cue specifically, however, this does not rule out that confidence could *also* be interpreted as a cue to something else, for instance social status, power or emotional trustworthiness. The results found for one of the social attribution trials (i.e., participants would prefer to play with the previously confident informant) could hint in this direction. Importantly, this finding may also be a type I error given the usage of a p-value of .05 and 6 tests, and as such, should be interpreted with caution. Other studies, perhaps looking more closely at the different types of attributions made towards confident informants could further examine these possible effects.

One may wonder how preschoolers' interpretations as revealed here compare to those of older children or adults. Indeed, it is perhaps not surprising to find preschoolers treating an indicator such as confidence as situational, for several reasons. First, current confidence is likely to be much more salient to a child than any past expressions of confidence or uncertainty simply by being more recent and thus requiring fewer cognitive resources to use. It is possible that one's history of confidence or hesitation would have a stronger or longer-lasting effect on the learning decisions of older individuals who possess greater cognitive resources. Second, preschoolers are known to be less likely than older children to form stable personal trait attributions, at least at an explicit level (Heller & Berndt, 1981; Kalish & Shiverick, 2004; Liu et al., 2007; Rholes & Ruble, 1984; Kalish, 2002). The tendency to associate one's expressed degree of confidence with the constructs of intelligence or trustworthiness may thus not appear until later in development. Future research could investigate the developmental patterns in the use of cues such as confidence which can conceivably receive multiple interpretations.

The present results may be of interest to researchers and practitioners interested in children's learning strategies: In order to, for instance, design educational interventions or make suggestions about how to best influence children's learning, it is not only important to know which learning strategies children can use, but also to know when and why children might use a given strategy. Knowing that preschoolers tend to treat confidence as situational may alleviate concerns that children would treat anyone who has *ever* shown hesitancy as untrustworthy (and should reassure parents, teachers and childcare professionals that sincere expressions of uncertainty when they genuinely do not know the answer to a question should not doom them to "untrustworthy" status!). However, the present results are not meant to be generalized to all possible learning situations involving confidence cues. Future research should consider applied, naturalistic investigations of children's interpretation of the confidence expressions that they encounter in their real-life conversation partners rather than a single laboratory manipulation featuring strangers.

As all studies, ours are not without limitations. We had just started recruiting when the COVID-19 pandemic shut down in-person developmental research. With the prolonged closure, we decided to adapt the experiment for online administration. Because the experiment was mostly conducted online, we cannot consider it to be fully comparable to other experiments conducted in person. However, significant efforts were made to make the experiment as similar as possible to in-person procedures, and we did not notice substantially different attrition or any systematic issue that would invalidate the virtual setting. In past research, we have frequently combined data collected at different sites (e.g., in lab versus in daycares with a wide range of set-ups, noise and distraction levels, etc.); the past few years have shown that online research can be conducted with preschool-age children. Some studies in fact formally investigated whether

online research leads to valid results. For instance, Schidelko and colleagues (2021) found that a false-belief task conducted online (i.e., presenting videos and having an experimenter moderating the online testing session) replicated the same results as the in-person task.

In conclusion, the present study, in addition to our previous ones (Juteau et al., 2024), is to our knowledge the first line of work that was specifically designed to test the impact of prior confidence on children's selective trust in an attempt to clarify whether preschoolers treat confidence as situational or person-specific. Our findings suggest that 4- and 5-year-olds treat confidence cues as situational indicators in learning situations. Failing to perceive confidence as a generalizable indicator of knowledge may contribute to reducing their vulnerability to making misinformed learning decisions. However, further research is needed to better understand the circumstances in which younger children attend, or not, to confidence cues.

References

- Bascandziev, I., & Harris, P. L. (2016). The beautiful and the accurate: Are children's selective trust decisions biased? *Journal of Experimental Child Psychology*, 152, 92-105.
<https://doi.org/10.1016/j.jecp.2016.06.017>
- Bazhydai, M., Westermann, G., & Parise, E. (2020). "I don't know but I know who to ask": 12-month-olds actively seek information from knowledgeable adults. *Developmental Science*, 23(5). <https://doi.org/10.1111/desc.12938>
- Birch, S. J., Akmal, N., & Frampton, K. L. (2010). Two-year-olds are vigilant of others non-verbal cues to credibility. *Developmental Science*, 13, 363-369.
<https://doi.org/10.1111/j.1467-7687.2009.00906.x>
- Birch, S. A. J., & Bloom, P. (2002). Preschoolers are sensitive to the speaker's knowledge when learning proper names. *Child Development*, 73(2), 434-444. <https://doi.org/10.1111/1467-8624.00416>
- Birch, S.A.J., Severson, R.L. & Baimel, A. (2020). Children's understanding of when a person's confidence and hesitancy is a cue to their credibility. *PLoS One*. 15(1), e0227026.
<https://doi.org/10.1371/journal.pone.0227026>
- Brooker, I., & Poulin-Dubois, D. (2013). Is a bird an apple? The effect of speaker labeling accuracy on infants' word learning, imitation, and helping behaviors. *Infancy*, 18, E46-E68. <https://doi.org/10.1111/infa.12027>
- Brosseau-Liard, P. E. (2014). Selective, but only if it is free: Children trust inaccurate individuals more when alternative sources are costly. *Infant and Child Development*, 23, 194-209.
<https://doi.org/10.1002/icd.1828>

- Brosseau-Liard, P. (2017). The roots of critical thinking: Selective learning strategies in childhood and their implications. *Canadian Psychology/Psychologie Canadienne*, 58, 263–270. <https://doi.org/10.1037/cap0000114>
- Brosseau-Liard, P. E., & Birch, S. A. J. (2011). Epistemic states and traits: Preschoolers appreciate the differential informativeness of situation-specific and person-specific cues to knowledge. *Child Development*, 82, 1788–1796. <https://doi.org/10.1111/j.1467-8624.2011.01662.x>
- Brosseau-Liard, P., Cassels, T., & Birch, S. (2014). You seem certain but you were wrong before: Developmental change in preschoolers' relative trust in accurate versus confident speakers. *PloS one*, 9(9), e108308. <https://doi.org/10.1371/journal.pone.0108308>
- Brosseau-Liard, P. E., & Poulin-Dubois, D. (2014). Sensitivity to confidence cues increases during the second year of life. *Infancy*, 19, 461–475. <https://doi.org/10.1111/infa.12056>
- Clément, F. (2010). To trust or not to trust? Children's social epistemology. *Rev. of phil. And psych.*, 1(4), 531-549. <https://doi-org.proxy.bib.uottawa.ca/10.1007/s13164-010-0022-3>
- Harris, P. L. (2007). Trust. *Developmental Science*, 10, 135–138. <https://doi.org/10.1111/j.1467-7687.2007.00575.x>
- Harris, P. L., & Koenig, M. A. (2006). Trust in testimony: How children learn about science and religion. *Child Development*, 77, 505–524. <https://doi.org/10.1111/j.1467-8624.2006.00886.x>
- Heller, K. A., & Berndt, T. J. (1981). Developmental changes in the formation and organization of personality attributions. *Child Development*, 52, 683-691. <https://doi.org/10.2307/1129190>

- Hübscher, I., Esteve-Gibert, N., Igualada, A., & Prieto, P. (2016). Intonation and gesture as bootstrapping devices in speaker uncertainty. *First Language*, 37, 1–18.
<https://doi.org/10.1177/0142723716673953>
- Jaswal, V. K., & Malone, L. S. (2007). Turning believers into skeptics: 3-year-olds' sensitivity to cues to speaker credibility. *Journal of Cognition and Development*, 8(3), 263-283.
<https://doi.org/10.1080/15248370701446392>
- Jaswal, V. K., & Neely, L. A. (2006). Adults don't always know best: Preschoolers use past reliability over age when learning new words. *Psychological Science*, 17, 757–758.
<https://doi.org/10.1111/j.1467-9280.2006.01778.x>
- Juteau, A.-L., Ibrahim, Y.A., McIntee, S.E., Varin, R. & Brosseau-Liard, P.E. (2024). Do children interpret informants' confidence as person-specific or situational? *PLoS One*.
<https://doi.org/10.1371/journal.pone.0298183>
- Kalish, C. (2002). Children's predictions of consistency in people's actions. *Cognition*, 84, 237–265. [https://doi.org/10.1016/S0010-0277\(02\)00052-5](https://doi.org/10.1016/S0010-0277(02)00052-5)
- Kalish, C. W., & Shiverick, S. M. (2004). Children's reasoning about norms and traits as motives for behavior. *Cognitive Development*, 19, 401–416.
<https://doi.org/10.1016/j.cogdev.2004.05.004>
- Kertesz, A. F., Alvarez, J., Afraymovich, M., & Sullivan, J. (2021). The role of accent and speaker certainty in children's selective trust. *Cognitive Development*, 60, 101114.
<https://doi.org/https://doi.org/10.1016/j.cogdev.2021.101114>
- Kinzler, K. D., Corriveau, K. H., & Harris, P. L. (2011). Children's selective trust in native-accented speakers. *Developmental Science*, 14, 106–111. <https://doi.org/10.1111/j.1467-7687.2010.00965.x>

- Koenig, M. A., & Sabbagh, M. A. (2013). Selective social learning: New perspectives on learning from others. *Developmental Psychology*, 49, 399-403. <https://doi.org/10.1037/a0031619>
- Koenig, M. A., & Woodward, A. L. (2010). Sensitivity of 24-month-olds to the prior inaccuracy of the source: Possible mechanisms. *Developmental Psychology*, 46, 815-826. <https://doi.org/10.1037/a0019664>
- Liu, D., Gelman, S. A., & Wellman, H. M. (2007). Components of young children's trait understanding: Behavior-to-trait inferences and trait-to-behavior predictions. *Child Development*, 78, 1543-1558. <https://doi.org/10.1111/j.1467-8624.2007.01082.x>
- Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mind reading components of children's vigilance towards deception. *Cognition*, 112, 367-380. <https://doi.org/10.1016/j.cognition.2009.05.012>
- Miller, S. A. (2000). Children's understanding of preexisting differences in knowledge and belief. *Developmental Review*, 20, 227-282. <https://doi.org/10.1006/drev.1999.0501>
- Mills, C. M. (2013). Knowing when to doubt: Developing a critical stance when learning from others. *Developmental Psychology*, 49, 404-418. <https://doi.org/10.1037/a0029500>
- Moore, C., Bryant, D., & Furrow, D. (1989). Mental terms and the development of certainty. *Child Development*, 60, 167. <https://doi.org/10.2307/1131082>
- Moore, C., Harris, L., & Patriquin, M. (1993). Lexical and prosodic cues in the comprehension of relative certainty. *Journal of Child Language*, 20, 153-167. <https://doi.org/10.1017/S030500090000917X>

Moore, C., Pure, K., & Furrow, D. (1990). Children's understanding of the modal expression of certainty and uncertainty and its relation to the development of a representational theory of mind. *Child Development*, 61, 722–730.

<https://doi.org/10.2307/1130957>

O'Neill, D. K., & Chong, S. C. F. (2001). Preschool children's difficulty understanding the types of information obtained through the 5 senses. *Child Development*, 72, 803–815.

<https://doi.org/10.1111/1467-8624.00316>

Palmquist, C.M., & Fierro, M.G. (2018). The right stuff: Preschoolers generalize reliability across communicative domains when informants show semantic (not episodic) knowledge. *Journal of Cognition and Development*, 19, 552–567.

<https://doi.org/10.1080/15248372.2018.1526174>

Rholes, W. S., & Ruble, D. N. (1984). Children's understanding of dispositional characteristics of others. *Child Development*, 55, 550-560. <https://doi.org/10.2307/1129966>

Robinson, E. J. (2000). Belief and disbelief: Children's assessments of the reliability of sources of knowledge about the world. In K. P. Roberts & M. Blades (Eds.), *Children's source monitoring* (pp. 59–83). Mahwah, NJ: Erlbaum.

Robinson, E. J., Haigh, S. N., & Pendle, J. E. C. (2008). Children's working understanding of the knowledge gained from seeing and feeling. *Developmental Science*, 11, 299-305.

<https://doi.org/10.1111/j.1467-7687.2008.00676.x>

Sabbagh, M. A., & Baldwin, D. A. (2001). Learning words from knowledgeable versus ignorant speakers: Links between preschoolers' theory of mind and semantic development. *Child development*, 72(4), 1054-1070. <https://doi.org/10.1111/1467-8624.00334>

- Sabbagh, M. A., Wdowiak, S. D., & Ottaway, J. M. (2003). Do word learners ignore ignorant speakers? *Journal of Child Language*, 30(4), 905-924.
<https://doi.org/10.1017/S0305000903005828>
- Schidelko, L. P., Schünemann, B., Rakoczy, H., & Proft, M. (2021). Online Testing Yields the Same Results as Lab Testing: A Validation Study With the False Belief Task. *Frontiers in Psychology*, 12, 703238–703238. <https://doi.org/10.3389/fpsyg.2021.703238>
- Stenberg, G. (2013). Do 12-month-old infants trust a competent adult? *Infancy*, 18, 873–904.
<https://doi.org/10.1111/infa.12011>
- Stephens, E. C., & Koenig, M. A. (2015). Varieties of testimony: Children’s selective learning in semantic versus episodic domains. *Cognition*, 137, 182-188.
<https://doi.org/10.1016/j.cognition.2015.01.004>
- Tenney, E. R., MacCoun, R. J., Spellman, B. A., & Hastie, R. (2007). Calibration trumps confidence as a basis for witness credibility. *Psychological Science*, 18, 46–50.
<https://doi.org/10.1111/j.1467-9280.2007.01847.x>
- Tenney, E. R., Small, J. E., Kondrad, R. L., Jaswal, V. K., & Spellman, B. A. (2011). Accuracy, confidence, and calibration: How young children and adults assess credibility. *Developmental Psychology*, 47, 1065–1077. <https://doi.org/10.1037/a0023273>
- Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, 72, 655–684.
<https://doi.org/10.1111/1467-8624.00304>
- Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children’s understanding of deception. *Cognition*, 13, 103–128. [https://doi.org/10.1016/0010-0277\(83\)90004-5](https://doi.org/10.1016/0010-0277(83)90004-5)

- Wood, L. A., Kendal, R. L., & Flynn, E. G. (2012). Context-dependent model-based biases in cultural transmission: Children's imitation is affected by model age over model knowledge state. *Evolution and Human Behavior*, 33(4), 387–394. <https://doi.org/10.1016/j.evolhumbehav.2011.11.010>
- Zmyj, N., Buttelmann, D., Carpenter, M., & Daum, M. M. (2010). The reliability of a model influences 14-month-olds' imitation. *Journal of Experimental Child Psychology*, 106, 208-220. <https://doi.org/10.1016/j.jecp.2010.03.002>
- Zmyj, N., Daum, M. M., Prinz, W., Nielsen, M., & Aschersleben, G. (2012). Fourteen-month-olds' imitation of differently aged models. *Infant and Child Development*, 21, 250-266. <https://doi.org/10.1002/icd.750>

Chapter 3

Studies 2a and 2b “Confidence Cues: Epistemic or Social?”

3.1 Abstract

Previous research indicates a general preference to learn from confident individuals among both adults and children. However, the interpretation of confidence remains ambiguous. In two experiments, adults ($N=192$) and 7-to-10-year-olds ($N=143$) were presented with a short video featuring either a confident or a hesitant person. Participants were subsequently queried about social and knowledge-related traits associated with the person and with confidence as an attribute. In Experiment 2a, adults watching a confident person attributed more knowledge and positive social traits to the person than adults watching a hesitant person. In Experiment 2b, children attributed more knowledge, but not more positive social traits, to a confident rather than a hesitant person. These findings not only help us gain a better understanding of how people perceive confidence, but also hint to how this interpretation changes with age, findings which have important implications for our understanding of social cognitive development.

Keywords: Social cognition, attributions, confidence, knowledge

3.2 Introduction

From toddlerhood to adulthood, people notice whether someone they interact with is confident or hesitant (e.g., Aghazadeh & Joe, 2022; Brauer et al., 2023; Brosseau-Liard & Poulin-Dubois, 2014; Lee & Rutherford, 2018; Pozzi & Mazzarella, 2024). Infants as young as 14 months prefer to imitate the way a confident person uses a novel object over the way a hesitant person uses the same object (Buttelmann & Zmyj, 2020). By preschool age, children prefer to learn words (Birch et al., 2020; Fobert et al., under review; Juteau et al., 2024; Sabbagh & Baldwin, 2001), facts (Brosseau-Liard et al., 2014), and object functions (Jaswal & Malone, 2007; Wagner et al., 2014) from more confident informants. By age 5, children understand verbal cues (e.g., I know / I think; Howard et al., 2008), intonation of the voice; Hübscher et al., 2017) and non-verbal cues (e.g., head nodding / head tilt; Hübscher et al., 2017) associated with confidence and hesitancy. Adults prefer to solve problems with (Tenney et al., 2019), believe witness testimony from (Pozzi & Mazzarella, 2024; Tenney et al., 2011), and learn facts from (Kominsky et al., 2016) more confident people. Adults rely on confidence cues to help them make decisions about whom to listen to in a variety of fields including job recruiting (Tenney & Spellman, 2011), finance (Aghazadeh & Joe, 2022; Brauer et al., 2023; Sah et al., 2013), and law (Cramer et al., 2011; Pozzi & Mazzarella, 2024).

Although both children and adults prefer confident rather than hesitant people in a variety of contexts, it is not clear how confidence is interpreted and whether this interpretation changes with age. Past literature in both adults and children has frequently assumed that confidence is interpreted as a cue to a person's epistemic (i.e., knowledge) status, and that people prefer confidence over hesitancy because a confident person is seen as *knowing more*. However, confidence and hesitancy could alternatively be perceived as indicating many other things:

relative social status, popularity, affect, desire to engage in social interaction, or other socially desirable attributes, to name a few. Furthermore, these interpretations are not mutually exclusive: Indeed, research on trait attribution in both adults and children frequently demonstrates generalizations between seemingly unrelated traits. The halo effect, a tendency to make broad and positive attributions about a person based on one positive trait, is one well-documented example (Nisbett & Wilson, 1977). Research shows that children and adults make attributions about prosocial traits based on attributes such as attractiveness (Batres & Shiramizu, 2023; Masnari et al., 2013).

A few studies have probed adults' interpretation of confidence. Some suggested that adults indeed associate confidence with being knowledgeable (Price & Stone, 2004); some suggested broad positive impressions, with confidence leading, for instance, to respect and admiration (Anderson et al., 2012). In some contexts, adults side with a confident individual to make social interactions easier (Pulford et al., 2018). However, past studies did not specifically attempt to distinguish epistemic and non-epistemic interpretations of confidence in adults.

In children, research on the understanding of confidence has mostly used selective social learning methods. From a young age, children rely on a variety of cues about people to decide whom to learn from. Much of the literature on selective learning focuses on the use of epistemic cues, i.e., cues that children use to determine the knowledge of their informants (see Brosseau-Liard, 2017 for a review). Confidence has frequently been interpreted as falling under this umbrella of epistemic cues (e.g., Birch et al., 2010). Children, however, do not only use epistemic cues in their selective learning: For example, children prefer to learn from a kind person over a mean one (Mascaro & Sperber, 2009). Children may frequently pursue social goals rather than epistemic ones when choosing whom to learn from (see Over & Carpenter, 2012 for a

review). Therefore, the fact that children prefer to learn from confident over hesitant individuals does not conclusively indicate that they consider confidence as an epistemic cue. They could alternatively perceive confidence as an indicator of any positive attribute that increases their desire for affiliation with this person (e.g., popularity, dominance, positivity). This could be a conscious decision on children's part or reflect an implicit association between confidence and desirable social traits.

Selective learning research, including that focusing on confidence, has primarily focused on children ages 2 to 5 (Mills, 2013). Older children have largely been left out of the research, and the studies that include school-age children (up to 12 years) mostly examine confidence in relation to another cue and not its interpretation per se. For instance, Kominsky et al. (2016) examined whether children (and adults) prefer to learn from informants who are more confident or from informants who have more plausible answers: They found that younger children (ages 5 to 8) prefer learning from confident informants (with implausible responses), while older children (ages 9 and 10) prefer learning from informants with plausible responses (but low confidence). A few studies have focused on school-age children's understanding of the calibration between confidence and other possible knowledge cues (Birch et al., 2020; Tenney et al., 2011). Huh et al. (2019) found that children only prefer to side with opinions from confident informants over hesitant informants when the informants have complete information. All of these studies suggest an increasingly flexible use of confidence as a cue to credibility in middle childhood but do not probe what children think confidence means in the first place.

In contrast, a few recent studies have probed preschoolers' interpretation of confidence. These studies suggest that confidence is interpreted in a highly situational manner by very young children. For instance, 4- and 5-year-olds only use situation-specific indicators of confidence or

hesitancy, and *not* past confidence or hesitancy, to guide their learning (Juteau et al., 2024). When asked overtly what traits they attribute to individuals who differ by confidence, 3- to 5-year-olds did not make any differential attributions to a confident versus a hesitant source; in contrast, 6- to 8-year-olds attribute more knowledge to a confident individual than a hesitant one, but only in the same narrow domain in which confidence was first demonstrated (i.e., word learning, Fobert et al., under review). In light of these findings suggesting that preschoolers may not make lasting attributions from confidence and hesitancy, and to fill the current gap in the literature on the understanding of confidence in middle childhood, we focused the present research on school-age children and adults.

The current research examines whether adults and school-age children (7- to 10-year-olds) interpret confidence cues as epistemic, social, or both and whether this interpretation changes with age. To do so, we presented participants with a video of an individual giving directions to a location either confidently or hesitantly. Although there is no specific protocol for developing such videos, we used verbal and non-verbal cues of confidence that are typically used in selective learning studies. Additionally, this scenario was chosen because it is a realistic situation where one might express confidence or hesitancy, it is likely a familiar context to both age groups, and it is relatively neutral (in contrast, a lot of the past research on confidence in adults used potentially less frequent and more sensitive scenarios, such as eyewitness testimony in a criminal trial; confidence cues could be interpreted very differently and have different implications in such a context than in more typical day-to-day interactions). After seeing the informant, participants were asked overtly about their impressions with both open-ended and forced-choice questions. They were subsequently directly asked what attributes they associate with confidence without reference to the informant, to see if their explicit beliefs about what

confidence means match the spontaneous attributions they make to a person based on confidence or hesitancy.

Of note, most studies to date (at least with children) have contrasted two informants, one being confident and the other being hesitant. We used a single speaker design to examine how confidence cues are interpreted when no alternatives are available and when there is only one speaker showing only confidence *or* a lack of confidence. This single-speaker design was chosen not only because it is more representative of real-life situations, but also because it addresses the possibility that participants in prior research may have noticed confidence or hesitancy precisely because each was directly contrasted to its opposite, and for adults the demand characteristics of the experiment may be stronger when both are visibly pitted against each other. Instead, we hoped to get at participants' interpretation of confidence and hesitancy when each is presented in isolation.

3.3 Experiment 2a

We first examined the interpretation of confidence and hesitancy cues with typically developing adults. Most studies to date have examined adults' interpretation of such cues in legal contexts (e.g., eyewitness testimony), whereas we sought to examine how such cues would be interpreted in a more mundane, everyday context (i.e., watching a person giving directions). Given our interest in probing children's interpretations, we took advantage of adults' greater cognitive abilities to ask a wide range of questions, with the goal to subsequently better target our questions for the child population.

3.3.1 Method

3.3.2 Participants

Participants were 192 students from a large Canadian university between the ages of 17 and 56 years old ($M = 20$ years; $SD = 4$ years; 95% of participants were between 17 and 25 years old), recruited through a university system where students obtain course credit for research participation. Three additional participants encountered technical difficulties that made them unable to watch the video of the informant (see procedure) and were therefore excluded. Participants were excluded from question-specific analyses if they provided answers that experimenters could not code (e.g., responded “n/a”, repeated the content of the question, answered the same answer as the previous question), or did not provide answers (see analyses for the sample sizes for each question). Although a power analysis conducted prior to data collection indicated that 128 participants would allow sufficient power (at least 80%) to detect medium effect sizes ($d=.5$) with one-sample t-tests, we accepted all participants who applied through the online system within the same academic year. Three participants identified as non-binary, 79% identified as female and 19% as male. Participants completed the questionnaire in either English (85%) or in French (15%), the two official languages of Canada. No data on socioeconomic status was collected. Even though our sample was comprised of individuals with a variety of ethnic backgrounds, a plurality identified as being from European descent (42%). Given the explorative nature of our experiment, we did not expect any specific gender or ethnic differences.

3.3.3 Materials and Procedure

Participants were asked to complete an online questionnaire taking approximately 20 to 30 minutes. This questionnaire consisted of three phases: an Introductory phase and two Test

phases (hereafter Test: Informant-Specific Attributions and Test: General Confidence Understanding).

3.3.3.1 Introductory Phase. Participants watched a short video of a female informant facing the camera, verbally giving geographical directions towards a museum to an off-screen conversation partner. Participants were randomly assigned to one of two conditions, the *Confident* condition or the *Hesitant* condition. In the *Confident* condition, the informant demonstrated confidence throughout the video by using both verbal (e.g., saying, “Oh, I know!”) and non-verbal (e.g., having an assured tone of voice, resolute facial expression and raising the index finger) indicators of confidence. In the *Hesitant* condition, the informant consistently showed hesitancy using equivalent cues of uncertainty (e.g., saying, “Hmm, I guess?”, having a hesitant tone of voice, upward inflection, puzzled facial expression, shrugging). The same female individual of European descent, with the same background, clothing, and hairstyle, as well as the same questions and instructions was used in both videos. The videos were of similar length (on average 1:20 minutes) to ensure that participants in both conditions were subjected to equivalent stimuli, apart from the model’s level of confidence.

3.3.3.2 Test: Informant-Specific Attributions. Following the short video of the informant, participants answered a series of questions pertaining to their evaluation of the individual they had just watched on video (see Table 1 for detailed questions in the order they were presented). Multiple question formats were used, including open-ended questions, 7- and 4-point Likert scales and true-or-false questions. The questions were designed to evaluate participants’ attributions of knowledge (or lack thereof) as well as different social attributes (of either positive or negative valence) to the informant based on the short video that they witnessed.

3.3.3.3 Test: General Confidence Understanding. After the informant-specific questions, additional questions (including open-ended questions and 7-point Likert scale questions) were designed to directly examine participants' thoughts on the concept of confidence without reference to the informant whom they saw in the video. Questions from this phase are listed in Table 1. Most questions were inspired by previous selective learning studies, although some were specifically designed for this study. Note that henceforth, specific questions will be referred to using their number (e.g., OQ1, 7LQ1, 4LQ1, TFQ1) as listed in Table 1.

Table 1

Experiment 2a: Test Questions in Order of Presentation

Types of questions	Questions
Test: Informant-Specific Attributions	
Open-ended	
OQ1	Generally speaking, what strikes you the most about this person? How would you describe this person?
OQ2	If you had been the one who was asked for directions to go to the museum, what would have been your instructions?
7-Point Likert (1=not at all, 7=a lot)	
7LQ1	How sure are you that turning left at the gas station is the right direction?
7LQ2	This person was good at giving directions.
OQ3	Why?
7LQ3	This person was sure of the directions they gave.
7LQ4	How nice is this person?
7LQ5	How smart is this person?
7LQ6	How popular is this person?
7LQ7	How much does this person know about different things?
7LQ8	Is this person generous with their friends?
7LQ9	How well is this person doing in school?
7LQ10	How polite is this person?

- 7LQ11 How many friends does this person have?
- 7LQ12 How intelligent would you say this person is?
- 7LQ13 How likable is this person?
- 7LQ14 How much would you want to be friends with this person?
- 7LQ15 How much does this person know about mathematics?
- 7LQ16 How much does this person know about animals?
- 7LQ17 How much does this person know about planets?
- 7LQ18 How much does this person know about arts?

4-Point Likert (1=Very False, 4=Very True)

- 4LQ1 This person cares about their friends.
- 4LQ2 This person is convincing.
- 4LQ3 This person steals things from their friends.
- 4LQ4 This person gives wonderful gifts to their friends.
- 4LQ5 This person is compassionate.
- 4LQ6 This person manipulates their friends.
- 4LQ7 This person is affectionate.
- 4LQ8 This person is confident.
- 4LQ9 This person lies to their friends.
- 4LQ10 This person loans money to their friends.
- 4LQ11 This person is credible.
- 4LQ12 I would like to spend time with this person

True or False

- TFQ1 I would like this person to teach me.
- TFQ2 I would like this person to help me with my work/schoolwork.
- TFQ3 If I needed advice for my romantic life, I would go to this person.
- TFQ4 If I needed to borrow money, I would go to this person.

Test: General Confidence Understanding

- OQ4 Generally speaking, what are characteristics you associate with confident people?

7-Point Likert (1=not at all, 7=a lot)

7LQ19	Generally speaking, confident people are nice.
7LQ20	Generally speaking, confident people are smart.
7LQ21	Generally speaking, confident people are successful.
7LQ22	Generally speaking, confident people are attractive.
7LQ23	Generally speaking, confident people are knowledgeable.
7LQ24	Generally speaking, confident people are caring.
7LQ25	Generally speaking, confident people are popular.
7LQ26	In your opinion, how important is it that we (in society in general) rely on individuals expressing confidence?
OQ5	Why?
7LQ27	In your opinion, how important is it that people in society in general display confidence?
OQ6	Why?
7LQ28	In general, how much would you say that you rely on what confident people say?
OQ7	Why?
7LQ29	In general, how much would you say that you prefer to hang out with confident people?
OQ8	Why?
7LQ30	In general, how much would you say that you like confident people?
OQ9	Why?

Note. The Open-ended questions are identified by “OQ,” the 7-point Likert scale questions by “7LQ,” the 4-point Likert scale questions by “4LQ,” and the True-or-False questions by “TFQ.”

3.3.3.4 Coding of Open-ended Responses. Participants’ responses to open-ended questions were coded by two coders (blind to experimental condition) using predetermined guidelines to determine if the participant’s answer contained any reference to the following categories: *Confidence* (e.g., “unsure,” “confident,” “hesitant”); *Knowledge of Directions* (e.g., “doesn’t know the area,” “gave the correct directions”), *General Knowledge* (e.g., “knowledgeable”), and *Social Characteristics* (this last category included references to a variety

of mental or behavioural traits unrelated to knowledge such as “helpful,” “nice” or “rude”).

Open-ended questions that did not refer to the informant (i.e., those in Test: General Confidence Understanding) were only coded for the last two categories (*General Knowledge* and *Social Characteristics*).

For each category, coders were instructed to look for specific words or sentences. Coders first evaluated the presence of references to each of these categories dichotomously (present/absent). For any category rated as “present,” coders then counted the number of utterances referring to that category in the answer (for example, “She was hesitant and kept saying I guess” would count as 2 utterances of Confidence), as well as the valence of each utterance (positive, negative, or neutral if the utterance was too ambiguous or simply stated a category without clear positive or negative connotation). Thus, for each of the four categories (i.e., Confidence, General Knowledge, Knowledge of Directions and Social Characteristics), three variables were computed: *presence*, *number of positive mentions* and *number of negative mentions* (the number of utterances rated as neutral was very low and therefore not analysed).

Coders double-coded 25% of the participants’ answers and the inter-rater reliability, assessed by calculating the percentage of agreement between the coders, was deemed as acceptable (93% agreement). For the codes on which the coders disagreed, each coder provided their rationale, then reached a consensus with the help of the first author by referring back to the predetermined guidelines.

3.3.4 Results and Discussion

3.3.5 Informant-Specific Attributions

We evaluated the responses to two questions (7LQ3 and 4LQ8) that served as a manipulation check to ensure that participants indeed perceived our model’s confidence and

hesitancy cues. Independent-samples *t* tests confirmed that participants rated the informant as more confident in the Confident rather than Hesitant conditions (both $p < .001$). We also asked participants what their instructions would have been if they had been the one asked for directions (OQ2) and coded whether participants referred to the same directions as their model did in the video or not, expecting greater endorsement of the model's directions in the Confident rather than Hesitant condition. However, regardless of condition, participants mostly gave different instructions than their model ($X^2(1, N=189) = .54, p = .462$, Confident condition=67, Hesitant Condition=68).

We then tested whether participants made different attributions to the informant by condition. To do so, we computed independent samples *t*-tests for all remaining 7- and 4-point Likert scale questions and chi-square tests of contingency for the true-or-false questions. Because this resulted in a large number of comparisons (28 *t* tests and 4 chi-square tests), we adjusted the critical *p* value with a Bonferroni correction and a family-wise type I error rate of .10, resulting in a critical *p* value of .003125. Even with this stringent threshold, all but five of the tests were statistically significant (see supplementary material – Appendix A) and in the expected direction (i.e., attributions of greater knowledge and positive social attributes in the Confident condition), suggesting that participants made broad attributions, both of knowledge and of general positive characteristics, to a person presenting as confident rather than hesitant. No gender differences were found in the attributions of traits depending on the level of confidence ($p > .003$).

To evaluate whether participants systematically differentiated between knowledge and social attributions, we examined participants' scores on our 7-point Likert scale questions (as this format included a sufficient number of both knowledge and social questions) using a linear

mixed-effects model. Condition (confidence condition=1, hesitant condition=0), type of attribution (knowledge attributions=1, social attributions=0) and their interaction served as predictors, with crossed random intercepts for participants and questions. The model was fit using the lme4 package (Bates et al., 2015) in R Version 4.3.3 and the p values were generated using the lmerTest package (Kuznetsova et al., 2017). The default estimation method for the lmer function was kept (i.e., restricted maximum likelihood). Our analysis confirmed that participants in the confident condition provided higher ratings than those in the hesitant condition, $b=1.24$, $SE=.13$, $p<.001$, (see online supplementary material – Appendix B), but scores did not vary according to the type of attribution ($p=.345$) and the two-way interaction between condition and type of attribution was not significant ($p=.296$). This suggests that the model's level of confidence did not have a differential impact on participants' attributions based on whether they were knowledge-related or not, which is consistent with the similarity between the effect sizes for both types of attributions (see supplementary material – Appendix A).

For open-ended questions OQ1 and OQ3, chi-square tests of contingency were computed on the Presence variable to determine if participants mentioned each category differently depending on condition (Bonferroni adjusted critical $p=.0125$ for 8 tests). This was the case for *Confidence* for both questions and for *Knowledge of Directions* and *Social Characteristics* for OQ1 (see Table 2 for detailed frequencies). Participants more frequently mentioned confidence/hesitancy and knowledge of the directions (or lack thereof) when describing a hesitant person but mentioned a variety of social characteristics more often when describing a confident person. These findings, particularly those on confidence and knowledge of directions, may suggest that *hesitancy* was more salient to participants than *confidence* was, a point we will return to in the general discussion.

Table 2*Experiment 2a: Mentions of Each Variable for Open-Ended Questions Pertaining to the Informant*

Open-ended questions	Variables							
	Confidence		Knowledge of the directions		General knowledge		Social characteristics	
OQ1 : How would you describe this person?	$X^2 (1, N=189)= 74.95, p<.001$		$X^2 (1, N=189)= 21.22, p<.001$		$X^2 (1, N=189)= .036, p=.850 (ns)$		$X^2 (1, N=189)= 33.95, p<.001$	
	<i>Conditions</i>		<i>Conditions</i>		<i>Conditions</i>		<i>Conditions</i>	
	<i>Confident</i>	<i>Hesitant</i>	<i>Confident</i>	<i>Hesitant</i>	<i>Confident</i>	<i>Hesitant</i>	<i>Confident</i>	<i>Hesitant</i>
	present=15 absent=82	present=72 absent=20	present=35 absent=62	present=64 absent=28	present=7 absent=90	present=6 absent=86	present=89 absent=8	present=50 absent=42
OQ3 : Why [was this person good at giving directions]?	$X^2 (1, N=189)= 32.94, p<.001$		$X^2 (1, N=189)= 2.67, p=.102 (ns)$		$X^2 (1, N=189)= .40, p=.530$		$X^2 (1, N=189)= 5.36, p=.021 (ns)$	
	<i>Conditions</i>		<i>Conditions</i>		<i>Conditions</i>		<i>Conditions</i>	
	<i>Confident</i>	<i>Hesitant</i>	<i>Confident</i>	<i>Hesitant</i>	<i>Confident</i>	<i>Hesitant</i>	<i>Confident</i>	<i>Hesitant</i>
	present=27 absent=70	present=64 absent=28	present=66 absent=31	present=52 absent=40	present=1 absent=96	present=2 absent=90	present=12 absent=85	present=3 absent=89

For both OQ1 and OQ3, we also compared the number of positive and negative utterances for each category between conditions using independent-samples t tests. As this resulted in a large number of tests (2 questions, 4 categories, 2 valences = 16 tests), we used the Bonferroni-adjusted critical p value of .00625, keeping family-wise type I error rate at .10. Compared to participants in the Hesitant condition, those in the Confident condition made a large number of mentions of confidence, OQ1, $t(187)=3.42, p=.001$; OQ3, $t(187)=4.97, p<.001$, and fewer mentions of hesitancy, OQ1, $t(187)=-11.51, p<.001$; OQ3, $t(187)=-10.98, p<.001$; were more likely to state that the informant knew the directions, OQ1, $t(187)=3.67, p<.001$; OQ3, $t(187)=6.57, p<.001$, and less likely to remark on the informant's poor knowledge of the

directions, OQ1, $t(187)=-8.89$, $p<.001$; OQ3, $t(187)=-3.77$, $p<.001$; and mentioned more positive social characteristics, OQ1, $t(187)=8.70$, $p<.001$; OQ3, $t(187)=2.90$, $p=.004$.

3.3.6 General Confidence Understanding

We evaluated what attributes participants associated with confidence when asked overtly. To do this, we compared participants' answers to 7-point Likert scale items, collapsing across both conditions (since these questions did not refer to the informant's confidence but rather to confidence as an attribute more generally), to the mid-point of the scale (4), using one-sample t tests and a Bonferroni correction for a family-wise alpha of .10 (critical $p=.0083$ for 12 tests). All means were significantly above the mid-point (all $ps<.001$). Thus, participants explicitly held broad positive associations with confidence, believing that confident people possess both greater knowledge and numerous positive social characteristics. Hence, the attributions made to the model in the previous phase are congruent with participants' expressed understanding of confidence and its associations. This was also reflected in responses to the open-ended questions OQ4 to OQ9. In all questions, participants were more likely to mention knowledge in a positive rather than negative valence (except questions OQ4 and OQ9) and to mention positive rather than negative social attributes (except question OQ4; $ps<.001$).

3.4 Experiment 2b

Experiment 2b investigated how confidence is perceived by children ages 7 to 10. This study parallels Experiment 2a's method to facilitate developmental comparisons, but with a shortened and simplified test phase to account for the developmental level of our participants.

3.4.1 Method

3.4.2 Participants

We recruited 143 typically-developing children between the ages of 7 and 10 (7;0-10;11, $M = 8;11$; 74 girls and 69 boys) via a database of interested families and word of mouth. Two additional participants were tested but excluded from the analyses due to known or suspected developmental delay. A power analysis run before data collection indicated that a sample size of 128 participants was large enough for independent sample t-tests to have at least 80% power to detect reasonable effects (i.e., at least medium effects of $d = .5$). We recruited additional participants to account for anticipated cancellations and exclusions. A plurality of participants had European origins (49%) while others reported a mixed ethnicity (20%), another ethnic background (18%), or did not report race/ethnicity (13%). The study was either conducted in English (82%) or in French (18%).

3.4.3 Materials and Procedure

The materials and procedure were closely modelled on Experiment 2a but adapted for child participants. Children were individually tested by an experimenter through a videoconference platform, and the experimenter read the script and test questions out loud. The experiment consisted of two phases, described below.

3.4.3.1 Introductory Phase. Participants were shown a picture of the same informant as in the previous experiment and were told that they would watch a video featuring this person. The same video as in Experiment 2a was shown. Participants were randomly assigned either to the Confident condition or to the Hesitant condition.

3.4.3.2 Test Phases: Informant-Specific Attributions and General Confidence Understanding. Children were asked to answer a series of questions following the video. These

questions were similar to those of Experiment 2a and aimed at exploring the same conceptual variables, but there were fewer questions with simpler wording. All the questions in order of presentation can be read in Table 3. Henceforth, questions will be referred to using their number (e.g., OQ1, ELQ1, ALQ1). In total, there were 21 questions (3 open-ended questions and 18 3-point Likert scale questions for which the answer options were “yes,” “no” and “in the middle”). Included were the following:

- One open-ended question asking children to describe the model (OQ1);
- Two practice questions to familiarize children with the structure of the questions (P1-2);
- An attention check trial asking participants where the informant gave directions to (ALQ);
- Two questions, meant to serve as manipulation check, to see if participants endorsed the directions given by the informant differently by condition (ELQ1-2);
- 9 questions (ALQ1-9) probing informant-specific attributions, including questions referring to knowledge/intelligence and questions referring to non-knowledge social attributes (niceness, popularity);
- 6 questions (2 open-ended; ALQ10, CLQ1-3, OQ2-3) probing general confidence understanding. This included one item (OLQ2) asking participants to define ‘confidence’ to ensure that they knew what the word meant, as well as one manipulation check item (ALQ10) where participants were asked if they thought the model they saw was confident or not.

Table 3

Experiment 2b: Test Questions in Order of Presentation

Types of questions	Questions
--------------------	-----------

Open-ended

OQ1 What do you think of her [the informant]?

Practice questions

P1 Do you think she was old, yes, no, or in the middle?

P2 Do you think she was tall, yes, no, or in the middle?

Attention check

ALQ Did she give directions to go to the theatre, the park or the museum?

Endorsement

ELQ1 Do you think she was good at telling how to go to the museum, yes, no, or in the middle?

ELQ2 Do you think she knows the directions to get to the museum, yes, no or in the middle?

Informant-Specific Attributions

ALQ1 Do you think she is smart, yes, no, or in the middle?

ALQ2 Do you think she always says thank you, yes, no, or in the middle?

ALQ3 Do you think she knows a lot about different things, yes, no, or in the middle?

ALQ4 Do you think she has a lot of friends, yes, no, or in the middle?

ALQ5 Do you think she knows a lot about animals, yes, no, or in the middle?

ALQ6 Do you think she lies to her friends, yes, no, or in the middle?

ALQ7 Do you think she is doing very well in school, yes, no, or in the middle?

ALQ8 Do you think she is someone you would like to play games with, yes, no, or in the middle?

ALQ9 Would you go to her to help you with your homework, yes, no, or in the middle?

General Confidence Understanding

OQ2 Do you know what it means to be confident? Can you tell me in your own words what it means to be confident for you?

ALQ10 Do you think she was confident, or not confident? Or in the middle?

CLQ1 Do you think being confident is a good or a bad thing, or in the middle?

OQ3 Why?

CLQ2 Do you think confident people know more than other people? Yes, no or in the middle?

CLQ3 Do you think confident people are nicer than other people? Yes, no or in the middle?

Note. The Open-ended questions are identified by “OQ” and the Likert scale questions by “LQ.”

3.4.3.3 Coding of Open-ended Responses. Responses to open-ended questions OQ1 and OQ3 were coded following the same procedures and coding scheme as for Experiment 2a. The inter-rater reliability was assessed to be acceptable (91% agreement). For OQ1, the variables Presence, Number of Positive Mentions and Number of Negative Mentions were calculated for the attributes General Knowledge, Confidence, Knowledge of Directions and Social Characteristics. There were very few utterances of neutral valence for each variable and were thus not included in the analyses. For OQ3, we only coded the numbers of positive and negative mentions for General Knowledge and for Social Characteristics.

3.4.4 Results and Discussion

3.4.5 Manipulation and Attention Checks.

Results from our manipulation check questions confirm that participants in the Confident condition thought their model was significantly more confident (ALQ10) and endorsed their directions more (ELQ1 and ELQ2) than those in the Hesitant condition. They also overwhelmingly ($n=136$) correctly stated that the informant gave directions to a museum. We decided to include the children who missed this question to be as representative as possible of all children (e.g., they could have still picked up on the confidence and hesitancy cues and provided answers to the following questions).

3.4.6 Attributions to the Informant

We compared mean scores by condition (Confident and Hesitant) on ALQ1-9 with independent samples t-tests, using a Bonferroni-corrected critical p of .011 (9 tests, family-wise error rate at .10; see supplementary materials - Appendix C for results). Children in the

Confident condition were more likely than those in the Hesitant condition to agree that the informant was “smart” (ALQ1) and “knows a lot of different things” (ALQ3). All other comparisons were nonsignificant (including when we investigated gender effects, $p > .05$). We submitted the nine items to a linear mixed-effects model to evaluate whether children differentiated between knowledge and social attributions. Condition (Confident Condition=1, Hesitant Condition=0), type of attributions (Knowledge Attributions=1, Social Attributions=0), age in months (mean-centered) and their interaction served as predictors. Crossed random intercepts for participants and questions were included. As in Experiment 2a, we fit the model using the lme4 package (Bates et al., 2015) in R Version 4.3.3 and generated the p values using the lmerTest package (Kuznetsova et al., 2017). We kept the default estimation method for the lmer function (i.e., restricted to maximum likelihood). Our analysis indicates that there was a significant interaction between condition and type of attributions, $b = .19$, $SE = .06$, $p = .003$, (see full model output in Appendix D). Decomposing the interaction, the effect of condition varied depending on the type of attribution questions: Children in the Confident condition ($M = 2.35$, $SD = .67$) provided higher ratings than those in the Hesitant condition ($M = 2.18$, $SD = .73$) for knowledge attributions, $b = .26$, $SE = .07$, $p < .001$, but not for social attributions, $b = .06$, $SE = .07$, $p = .399$ (see full model output in Appendix B). All other model coefficients were nonsignificant. Contrary to what was found with adults, this suggests that the model’s level of confidence did have a differential impact on children’s attributions based on whether they were knowledge- or social-related attributions. Of note, neither the coefficient for age nor its interaction with any other variable were significant; there did not seem to be clear age-related differences in these attributions in the range that was tested.

For the open-ended questions, 5 of the 143 participants were excluded from the analyses because they did not answer any of the open-ended questions, and additional participants failed to answer one or more questions. Sample sizes therefore differed by question: OQ1 N=133, OQ2 N=129, OQ3 N=122. When asked to describe the informant (OQ1), children were more likely to bring up confidence and general knowledge in the Hesitant rather than Confident condition (see Table 4). There was no significant condition effect for knowledge of directions or social characteristics. Most participants did not spontaneously make reference to any of our categories of interest; anecdotally, children frequently referred to the informant's physical appearance (e.g., "she has long hair," "she is a girl"). When examining the valence of the utterances, comparing the number of positive and negative utterances for each category between conditions using independent-samples t tests, we found that children in the Hesitant condition, compared to those in the Confident condition, were more likely to refer to the informant's hesitancy ($t(131)=-4.93$, $p<.001$), to state that the informant lacked general knowledge ($t(131)=-3.21$, $p=.002$), and to mention the informant's poor knowledge of the directions ($t(131)=-3.35$, $p=.001$).

Table 4

Experiment 2b: Mentions of Each Variable for OQ1

Variables							
Confidence		Knowledge of the directions		General knowledge		Social characteristics	
X^2 (1, N=133)= 31.08, $p<.001$		X^2 (1, N=133)= .96, $p=.328$		X^2 (1, N=133)= 4.69, $p=.030$		X^2 (1, N=)= .06, $p=.801$	
Conditions		Conditions		Conditions		Conditions	
Confident	Hesitant	Confident	Hesitant	Confident	Hesitant	Confident	Hesitant
present=1	present=27	present=20	present=25	present=4	present=12	present=38	present=36
absent=66	absent=39	absent=47	absent=41	absent=63	absent=54	absent=29	absent=30

3.4.7 General Confidence Understanding

For the question asking children to define confidence (OQ2), we rated whether the concept of confidence appeared understood by children regardless of how rudimentary or advanced answers were. Most children ($n=124$) gave an approximately correct answer. Notably, the few participants who did not understand the word ‘confidence’ were tested in French; the word used to refer to confidence in French (*confiance*) is more commonly used to mean "trust", and most children were familiar with this alternative meaning. (There exists another French word, *assurance*, which perhaps better refers to a confident mannerism, but that word can also mean "insurance" and is not a word that is frequently used by children in either meaning.) Excluding the children who did not provide the correct definition, we coded whether their answer to OQ3 (why they think confidence is a good thing or not) included positive or negative references to general knowledge and social characteristics. There were very few category-relevant mentions, but the few that were there were more likely to be positive than negative, General Knowledge: $t(123)=2.58, p=.011$; Social Characteristics: $t(123)=2.87, p=.005$).

3.4.8 General Discussion

In two studies, we investigated whether school-age children and adults made knowledge and social trait attributions based on confidence. The studies showed evidence for an epistemic interpretation of confidence in both age groups as well as broader social attributions made by adults but not child participants. These results are discussed in more detail below.

Experiment 2a showed that adults perceive confident people as having more knowledge and socially-valued traits, both in their open-ended answers and when asked to endorse specific attributes. Positive knowledge attributions to a confident informant and attributions of lack of knowledge to a hesitant informant indicate that confidence cues are interpreted at least partly as

epistemic cues by adults. Additionally, the fact that adults also attributed other desirable traits to confident people could be consistent with the presence of a tendency to make broad positive attributions based on one positive trait, or with an interpretation of confidence itself as indicative of an individual's positive social value (e.g., confidence could be seen as a proxy for high social status, which in turn might be seen as a proxy for a general well-regarded person possessing multiple positive attributes).

Experiment 2b examined the interpretation of confidence cues in children ages 7 to 10 years. Findings show that children perceive confident people as having some knowledge-related traits but not more social-related traits. Where adults spontaneously associated the model's level of confidence with their knowledge of the directions and with their social characteristics, children associated it only with their general knowledge. This could speak to the breadth of the interpretation that children make of confidence cues. Above, we mentioned that past research has shown preschoolers to use confidence in a strictly situational manner, and 6- to 8-year-olds to make narrow domain-specific knowledge attributions (Fobert et al., under review). There is some overlap in age range between that past study and the current one, but the design and test questions were substantially different. Perhaps past studies with young children, which were set up as selective learning paradigms with two speakers directly contradicting each other, elicited a different focus than the current study, with a single-speaker design and no learning trials. Additionally, perhaps slightly older school-age children perceive confidence cues as indicative of one's overall knowledge, making broader attributions than their slightly younger counterparts. This would be in line with documented findings that children become increasingly sophisticated in their understanding of behavioral traits as they progress through childhood (see Heyman, 2009 for a review). Adults, in contrast, are likely capable of making broad knowledge attributions, but

may have focused on the situational nature of the cues here because of their experience in similar situations (i.e., having themselves both given and received directions to specific locations in the past with varying levels of confidence). It may also be that a lot of children's answers were coded as "General Knowledge," and adults' answers as "Knowledge of Directions" because adults were simply more precise when they talked about the informant's knowledge and made it clear that they were specifically talking about the informant's knowledge *of how to get to the museum*, whereas, because of their less mature verbal and conversational skills, children tended to be vague about what aspect of the informant's knowledge they were talking about.

Nonetheless, these results indicate that both adults and children use confidence as an epistemic cue, while only adults also seem to also treat confidence as a general social cue. There are multiple possible explanations for this discrepancy. There is, of course, substantial cognitive development that happens between middle childhood and adulthood, which could account for the findings. It may alternatively (or additionally) reflect the social value associated with confidence in the particular culture where this study was run, something that children may still be in the process of learning. The reason could also be methodological: Adults are particularly sensitive to demand characteristics (Corneille & Lush, 2023; McCambridge et al., 2012) which could have been why they made broader attributions (i.e., thinking that this is what we were examining thus providing more information on their impressions). We also used wider scales with the adult participants which allowed for more precise answers than those provided by children. So, it is possible that we simply had more room to detect small effects with them. Indeed, we built the present two experiments to be similar but not identical, and thus any comparison between children's and adults' results should be made with caution.

Our single-speaker design demonstrates that both adults' and children's open-ended responses seem to have been mostly driven by an effect of hesitancy (i.e., hesitancy appearing more salient than confidence), specifically attributing negative knowledge-related characteristics to a hesitant individual as opposed to believing a confident person was especially knowledgeable. Perhaps displaying confidence is mostly expected and perceived as "normal," whereas hesitancy cues such as having an upward inflection and a puzzled facial expression stand out. There could be a salience bias (focusing more on prominent or striking stimuli; see Taylor & Fiske, 1978), where our hesitancy cues were considered as unexpected and were thus more noticeable. A negativity bias where negative stimuli are registered more readily than positive ones (see Rozin & Royzman, 2001 for a detailed definition) could also be at play. Despite our efforts to clearly demonstrate both hesitancy and confidence in our videos (e.g., multiple recordings of the model, specific instructions as to how to display the different cues), the cues of confidence that we used could have appeared more normative than those of hesitancy. That being said, adult participants' average ratings of the informant's confidence (question 4LQ8) appeared roughly symmetrical around the midpoint of the scale; this supports the conclusion that the informant was indeed highly confident in one condition and highly hesitant in the other, but participants simply saw hesitancy as more remarkable.

Although our findings hint at age differences in interpretation between middle childhood and adulthood, it is important to note that, for practical and developmental reasons, the procedures were different between the two studies, and results can therefore not be directly compared. Some of the apparent differences could be due to methodological discrepancies. For instance, the rating scales used in each study were different and thus not directly comparable, and the exact questions were different in nature and number. Additionally, adults were tested

asynchronously and did not interact with an experimenter in Experiment 2a, whereas children were tested synchronously via videoconference and interacted directly with an experimenter. A social desirability bias, or the tendency to give a socially favourable response to avoid being perceived badly by others, may have come into play: Children may have been reluctant to say anything that could be perceived as “mean” by the experimenter, such as responding negatively when asked whether the informant has a lot of friends. We know that children are influenced by this bias when responding to self-report measures (Camerini & Schulz, 2018; Guinn et al., 2010; Logan et al., 2008). It is worth noting, too, that the informant on video was an adult, and children may have been reluctant to outwardly express negative social judgment *about* one strange adult *to* another strange adult.

When interpreting the current results, several factors should be held in mind. First, our samples were ones of convenience, and their responses may not generalize to the wider population. The interpretations provided by our participants are unlikely to be universal: There are likely important cultural differences in how expressions of confidence are viewed and even in how confidence in one’s statements is expressed. Given that our studies comprised relatively homogeneous samples and did not allow us to examine such differences, future research could specifically address confidence’s interpretation through a cultural lens. Second, data for these studies were collected during the COVID-19 pandemic, after roughly three years of decreased social interactions, greater isolation, and, for some, a period of disruption in the progress of formal education. The pandemic may have affected our participants’ interpersonal evaluation abilities, or may have had impacts that influenced participants’ responses in ways we did not anticipate. This may be true for both our samples (even our adult sample was quite young on average, and some were teenagers during the pandemic), but is likely especially true for our child

participants. Decreased social interaction in childhood can lead to many adverse outcomes, including impaired learning of new skills and higher levels of cortisol, which is linked to memory impairment (Almeida et al., 2021). Further research with children who were not affected in the same way by the COVID-19 pandemic is needed to determine whether it played a part in the results.

In conclusion, although there are nuances in how children and adults perceive confidence as an epistemic cue, both show a preference for confidence (i.e., adults by disfavouring hesitancy and children by favouring confidence). The fact that 7- to 10-year-olds do not appear to interpret confidence cues as social cues, like adults do, suggests that early learning preferences from confident over hesitant individuals may genuinely reflect knowledge seeking. Investigating the mechanisms by which this interpretation changes with development is likely to be an area of interest for future research.

References

- Aghazadeh, S., & Joe, J. R. (2022). Auditors' response to management confidence and misstatement risk. *Accounting, Organizations and Society*, 101, 101348. <https://doi.org/10.1016/j.aos.2022.101348>
- Almeida, I. L. de L., Rego, J. F., Teixeira, A. C. G., & Moreira, M. R. (2021). Social isolation and its impact on child and adolescent development: A systematic review. *Revista Paulista de Pediatria*, 40, e2020385. <https://doi.org/10.1590/1984-0462/2022/40/2020385>
- Anderson, C., John, O. P., & Keltner, D. (2012). The Personal Sense of Power. *Journal of Personality*, 80(2), 313–344. <https://doi.org/10.1111/j.1467-6494.2011.00734.x>
- Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, 67(1), 1–48. <https://doi.org/10.18637/jss.v067.i01>
- Batres, C., & Shiramizu, V. (2023). Examining the “attractiveness halo effect” across cultures. *Current Psychology*, 42(29), 25515–25519. <https://doi.org/10.1007/s12144-022-03575-0>
- Birch, S. A. J., Akmal, N., & Frampton, K. L. (2010). Two-year-olds are vigilant of others' non-verbal cues to credibility. *Developmental Science*, 13(2), 363–369. <https://doi.org/10.1111/j.1467-7687.2009.00906.x>
- Birch, S. A. J., Severson, R. L., & Baimel, A. (2020). Children's understanding of when a person's confidence and hesitancy is a cue to their credibility. *PLOS ONE*, 15(1), e0227026. <https://doi.org/10.1371/journal.pone.0227026>

- Boseovski, J. J. (2010). Evidence for “rose-colored glasses”: An examination of the positivity bias in young children’s personality judgments. *Child Development Perspectives*, 4(3), 212–218. <https://doi.org/10.1111/j.1750-8606.2010.00149.x>
- Brauer, M., Wiersema, M., & Binder, P. (2023). “Dear CEO and Board”: How Activist Investors’ Confidence in Tone Influences Campaign Success. *Organization Science*, 34(4), 1487–1508. <https://doi.org/10.1287/orsc.2022.1625>
- Brousseau-Liard, P. E. (2017). The roots of critical thinking: Selective learning strategies in childhood and their implications. *Canadian Psychology / Psychologie Canadienne*, 58(3), 263–270. <https://doi.org/10.1037/cap0000114>
- Brousseau-Liard, P. E., Cassels, T., & Birch, S. (2014). You Seem Certain but You Were Wrong Before: Developmental Change in Preschoolers’ Relative Trust in Accurate versus Confident Speakers. *PloS One*, 9(9), e108308–e108308. <https://doi.org/10.1371/journal.pone.0108308>
- Brousseau-Liard, P. E., & Poulin-Dubois, D. (2014). Sensitivity to Confidence Cues Increases during the Second Year of Life. *Infancy*, 19(5), 461–475. <https://doi.org/10.1111/inf.12056>
- Buttelmann, D., & Zmyj, N. (2020). Fourteen-month-olds’ imitation is influenced more strongly by a model’s competence than by a model’s certainty. *Infant Behavior and Development*, 60, 101458. <https://doi.org/10.1016/j.infbeh.2020.101458>
- Camerini, A.-L., & Schulz, P. J. (2018). Social Desirability Bias in Child-Report Social Well-Being: Evaluation of the Children’s Social Desirability Short Scale Using Item Response Theory and Examination of Its Impact on Self-Report Family and Peer Relationships. *Child Indicators Research*, 11(4), 1159–1174. <https://doi.org/10.1007/s12187-017-9472-9>

- Corneille, O., & Lush, P. (2023). Sixty Years After Orne's American Psychologist Article: A Conceptual Framework for Subjective Experiences Elicited by Demand Characteristics. *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc*, 27(1), 83–101.
<https://doi.org/10.1177/10888683221104368>
- Cramer, R. J., DeCoster, J., Harris, P. B., Fletcher, L. M., & Brodsky, S. L. (2011). A confidence-credibility model of expert witness persuasion: Mediating effects and implications for trial consultation. *Consulting Psychology Journal: Practice and Research*, 63(2), 129–137. <https://doi.org/10.1037/a0024591>
- Fobert, S. F., Cossette, I., & Brosseau-Liard, P. E. (under review). *Children presume confident informants will be accurate (until proven otherwise)*.
- Guinn, C. H., Baxter, S. D., Royer, J. A., Hardin, J. W., Mackelprang, A. J., & Smith, A. F. (2010). Fourth-grade children's dietary recall accuracy for energy intake at school meals differs by social desirability and body mass index percentile in a study concerning retention interval. *Journal of Health Psychology*, 15(4), 505–514.
<https://doi.org/10.1177/1359105309353814>
- Heyman, G. D. (2009). Children's reasoning about traits. In P. Bauer (Ed.), *Advances in Child Development and Behavior* (Vol. 37, pp. 105–143). JAI. [https://doi.org/10.1016/S0065-2407\(09\)03703-3](https://doi.org/10.1016/S0065-2407(09)03703-3)
- Howard, A. A., Mayeux, L., & Naigles, L. R. (2008). Conversational correlates of children's acquisition of mental verbs and a theory of mind. *First Language*, 28(4), 375–402.
<https://doi.org/10.1177/0142723708091044>

- Hübscher, I., Esteve-Gibert, N., Igualada, A., & Prieto, P. (2017). Intonation and gesture as bootstrapping devices in speaker uncertainty. *First Language*, 37(1), 24–41.
<https://doi.org/10.1177/0142723716673953>
- Huh, M., Grossmann, I., & Friedman, O. (2019). Children show reduced trust in confident advisors who are partially informed. *Cognitive Development*, 50, 49–55.
<https://doi.org/10.1016/j.cogdev.2019.02.003>
- IBM Corp. (Released 2015). IBM SPSS Statistics for Windows (Version 23.0) [Computer Software]. Armonk, NY: IBM Corp.
- Jaswal, V. K., & Malone, L. S. (2007). Turning Believers into Skeptics: 3-Year-Olds' Sensitivity to Cues to Speaker Credibility. *Journal of Cognition and Development*, 8(3), 263–283.
<https://doi.org/10.1080/15248370701446392>
- Juteau, A.-L., Ibrahim, Y. A., McIntee, S.-E., Varin, R., & Brosseau-Liard, P. E. (2024). Do children interpret informants' confidence as person-specific or situational? *PloS One*, 19(5), e0298183. <https://doi.org/10.1371/journal.pone.0298183>
- Kominsky, J. F., Langthorne, P., & Keil, F. C. (2016). The Better Part of Not Knowing: Virtuous Ignorance. *Developmental Psychology*, 52(1), 31–45. <https://doi.org/10.1037/dev0000065>
- Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest Package: Tests in Linear Mixed Effects Models. *Journal of Statistical Software*, 82(13), 1–26.
<https://doi.org/10.18637/jss.v082.i13>
- Lee, V., & Rutherford, M. D. (2018). Sixteen-month-old infants are sensitive to competence in third-party observational learning. *Infant Behavior and Development*, 52, 114–120.
<https://doi.org/10.1016/j.infbeh.2018.07.001>

- Logan, D. E., Claar, R. L., & Scharff, L. (2008). Social desirability response bias and self-report of psychological distress in pediatric chronic pain patients. *Pain*, 136(3), 366–372.
<https://doi.org/10.1016/j.pain.2007.07.015>
- Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mindreading components of children's vigilance towards deception. *Cognition*, 112(3), 367–380.
<https://doi.org/10.1016/j.cognition.2009.05.012>
- Masnari, O., Schiestl, C., Weibel, L., Wuttke, F., & Landolt, M. A. (2013). How children with facial differences are perceived by non-affected children and adolescents: Perceiver effects on stereotypical attitudes. *Body Image*, 10(4), 515–523.
<https://doi.org/10.1016/j.bodyim.2013.05.007>
- McCambridge, J., de Bruin, M., & Witton, J. (2012). The Effects of Demand Characteristics on Research Participant Behaviours in Non-Laboratory Settings: A Systematic Review. *PLOS ONE*, 7(6), e39116. <https://doi.org/10.1371/journal.pone.0039116>
- Mills, C. M. (2013). Knowing when to doubt: Developing a critical stance when learning from others. *Developmental Psychology*, 49(3), 404–418. <https://doi.org/10.1037/a0029500>
- Nisbett, R. E., & Wilson, T. D. (1977). The halo effect: Evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, 35(4), 250–256.
<https://doi.org/10.1037/0022-3514.35.4.250>
- Over, H., & Carpenter, M. (2012). Putting the social into social learning: Explaining both selectivity and fidelity in children's copying behavior. *Journal of Comparative Psychology*, 126(2), 182–192. <https://doi.org/10.1037/a0024555>

- Pozzi, M., & Mazzarella, D. (2024). Speaker trustworthiness: Shall confidence match evidence? *Philosophical Psychology*, 37(1), 102–125.
<https://doi.org/10.1080/09515089.2023.2193220>
- Price, P. C., & Stone, E. R. (2004). Intuitive evaluation of likelihood judgment producers: Evidence for a confidence heuristic. *Journal of Behavioral Decision Making*, 17(1), 39–57. <https://doi.org/10.1002/bdm.460>
- Pulford, B. D., Colman, A. M., Buabang, E. K., & Krockow, E. M. (2018). The Persuasive Power of Knowledge: Testing the Confidence Heuristic. *Journal of Experimental Psychology. General*, 147(10), 1431–1444. <https://doi.org/10.1037/xge0000471>
- R Core Team (2024). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5(4), 296–320.
https://doi.org/10.1207/S15327957PSPR0504_2
- Sabbagh, M. A., & Baldwin, D. A. (2001). Learning Words from Knowledgeable versus Ignorant Speakers: Links Between Preschoolers' Theory of Mind and Semantic Development. *Child Development*, 72(4), 1054–1070. <https://doi.org/10.1111/1467-8624.00334>
- Sah, S., Moore, D. A., & MacCoun, R. J. (2013). Cheap talk and credibility: The consequences of confidence and accuracy on advisor credibility and persuasiveness. *Organizational Behavior and Human Decision Processes*, 121(2), 246–255.
<https://doi.org/10.1016/j.obhdp.2013.02.001>

- Taylor, S. E., & Fiske, S. T. (1978). Salience, Attention, and Attribution: Top of the Head Phenomena¹. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 11, pp. 249–288). Academic Press. [https://doi.org/10.1016/S0065-2601\(08\)60009-X](https://doi.org/10.1016/S0065-2601(08)60009-X)
- Tenney, E. R., Meikle, N. L., Hunsaker, D., Moore, D. A., & Anderson, C. (2019). Is overconfidence a social liability? The effect of verbal versus nonverbal expressions of confidence. *Journal of Personality and Social Psychology*, 116(3), 396–415. <https://doi.org/10.1037/pspi0000150>
- Tenney, E. R., Small, J. E., Kondrad, R. L., Jaswal, V. K., & Spellman, B. A. (2011). Accuracy, confidence, and calibration: How young children and adults assess credibility. *Developmental Psychology*, 47(4), 1065–1077. <https://doi.org/10.1037/a0023273>
- Tenney, E. R., & Spellman, B. A. (2011). Complex Social Consequences of Self-Knowledge. *Social Psychological and Personality Science*, 2(4), 343–350. <https://doi.org/10.1177/1948550610390965>
- Wagner, L., Dunfield, K. A., & Rohrbeck, K. L. (2014). Children’s Use of Social Cues When Learning Conventions. *Journal of Cognition and Development*, 15(3), 479–494. <https://doi.org/10.1080/15248372.2013.782459>

Appendix A

Tables of results for the Likert scale and True-or-False questions of Experiment 2a

Table 5

Mean Scores by Condition for Likert Scale Question Pertaining to the Model

Attributions	Confident condition		Hesitant Condition		<i>t</i> (185)	<i>p</i>	<i>d</i> (95%CI)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Endorsement of directions							
7LQ1 : How sure are you that turning left at the gas station is the right direction?	5.61	1.79	3.16	1.70	(186)=9.64	<.001	1.40[1.08, 1.72]
7LQ2 : This person was good at giving directions.	5.70	1.28	2.47	1.52	15.70	<.001	2.30[1.93, 2.66]
Confidence							
7LQ3 : This person was sure of the directions they gave.	6.15	1.20	1.99	1.35	22.35	<.001	3.26[2.81, 3.69]
4LQ8 : This person is confident.	3.44	.66	1.57	.79	17.53	<.001	2.58[2.18, 2.95]
Knowledge Attributions							
7LQ5 : How smart is this person?	5.32	1.31	3.34	1.10	11.19	<.001	1.63[1.30, 1.96]
7LQ7: How much does this person know about different things?	5.09	1.04	3.13	1.26	11.66	<.001	1.70[1.36, 2.03]
7LQ9: How well is this person doing in school?	5.51	1.18	3.75	1.09	10.60	<.001	1.55[1.21, 1.87]
7LQ12 : How intelligent would you say this person is?	5.46	1.13	3.78	1.15	10.04	<.001	1.47[1.14, 1.79]
7LQ15 : How much does this person know about mathematics?	4.51	1.21	3.29	1.25	6.82	<.001	.99[.68, 1.29]
7LQ16 : How much does this person know about animals?	4.30	1.36	3.82	1.29	2.46	.015 (<i>ns</i>)	.36[.07, .65]
7LQ17 : How much does this person know about planets?	3.94	1.47	3.15	1.32	3.82	<.001	.56[.27, .85]

Attributions	Confident condition		Hesitant Condition		<i>t</i> (185)	<i>p</i>	<i>d</i> (95%CI)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
7LQ18 : How much does this person know about arts?	4.47	1.75	3.74	1.61	2.98	.003 (<i>ns</i>)	.43[.14, .72]
4LQ11 : This person is credible.	3.27	.69	1.75	.77	14.30	<.001	2.08[1.72, 2.43]
Social Attributions							
7LQ4 : How nice is this person?	5.80	1.21	4.19	1.37	8.54	<.001	1.25[.93, 1.56]
7LQ6 : How popular is this person?	4.25	1.26	3.36	1.22	4.89	<.001	1.72[.42, 1.01]
7LQ8: Is this person generous with their friends?	5.25	1.40	3.96	1.49	6.12	<.001	.89[.59, 1.19]
7LQ10: How polite is this person?	5.86	1.24	4.35	1.61	7.23	<.001	1.05[.74, 1.36]
7LQ11: How many friends does this person have?	4.39	1.35	3.69	1.09	3.85	<.001	.57[.27, .86]
7LQ13: How likable is this person?	5.16	1.61	3.74	1.36	6.49	<.001	.95[.64, 1.25]
7LQ14: How much would you want to be friends with this person?	4.21	1.53	2.95	1.29	6.07	<.001	.89[.58, 1.19]
4LQ1 : This person cares about their friends.	3.29	.65	2.84	.69	4.67	<.001	.67[.37, .96]
4LQ2 : This person is convincing.	3.50	.60	1.46	.67	21.94	<.001	3.21[2.77, 3.63]
4LQ3 : This person steals things from their friends.	1.45	.65	1.70	.69	-2.61	.010 (<i>ns</i>)	-.37[-.66, -.08]
4LQ4 : This person gives wonderful gifts to their friends.	2.94	.71	2.43	.70	4.94	<.001	.72[.42, 1.02]
4LQ5 : This person is compassionate.	3.19	.77	2.46	.82	6.23	<.001	.92[.61, 1.22]
4LQ6 : This person manipulates their friends.	1.57	.81	1.99	.82	-3.50	.001	-.52[-.80, -.22]
4LQ7 : This person is affectionate.	2.79	.81	2.18	.75	5.39	<.001	.78[.48, 1.07]
4LQ9 : This person lies to their friends.	1.61	.77	2.18	.72	-5.12	<.001	-.76[-1.06, -.46]

Attributions	Confident condition		Hesitant Condition		<i>t</i> (185)	<i>p</i>	<i>d</i> (95%CI)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
4LQ10 : This person loans money to their friends.	2.54	.81	2.25	.72	2.57	.011 (ns)	.38[.09, .67]
4LQ12 : I would like to spend time with this person.	2.53	.86	1.98	.77	4.62	<.001	.67[.38, .96]

Table 6

Responses by Condition on True-or-False Questions Pertaining to the Model

Questions	Confident Condition		Hesitant Condition		<i>X</i> ² (1, <i>N</i> =187)	<i>p</i>
	<i>N</i> True	<i>N</i> False	<i>N</i> True	<i>N</i> False		
TFQ1: I would like this person to teach me.	66	30	7	84	73.18	<.001
TFQ2: I would like this person to help me with my work/schoolwork.	67	29	10	81	66.69	<.001
TFQ3: If I needed advice for my romantic life, I would go to this person.	27	69	13	78	5.32	.021 (ns)
TFQ4: If I needed to borrow money, I would go to this person.	38	58	17	74	9.83	.002

Table 7

Mean Scores by Condition for Likert Scale Question Pertaining to Confidence in General

Attributions	<i>M</i>	<i>SD</i>	<i>t</i> (189)	<i>p</i>	<i>d</i> (95%CI)
Knowledge Attributions					
7LQ20 : [...] confident people are smart	4.84	1.19	9.69	<.001	.71[.55, .86]
7LQ21: [...] confident people are successful	5.79	1.17	21.13	<.001	1.53[1.32, 1.74]
7LQ23: [...] confident people are knowledgeable	4.99	1.27	10.83	<.001	.78[.62, .94]
Social Attributions					

7LQ19 : [...] confident people are nice	4.73	1.27	7.90	<.001	.57[.42, .73]
7LQ22 : [...] confident people are attractive	5.68	1.21	19.10	<.001	1.39[1.19, 1.59]
7LQ24: [...] confident people are caring	4.42	1.24	4.70	<.001	.34[.19, .48]
7LQ25: [...] confident people are popular	5.88	1.25	20.76	<.001	1.50[1.30, 1.71]
Endorsement of Confidence in general					
7LQ26: [...] how important is it that we (in society in general) rely on individuals expressing confidence?	5.19	1.32	12.39	<.001	.90[.73, 1.07]
7LQ27: [...] how important is it that people in society in general display confidence?	5.39	1.27	15.12	<.001	1.09[.91, 1.27]
7LQ28: [...] how much would you say that you rely on what confident say?	4.69	1.31	7.273	<.001	.53[.37, .68]
7LQ29: [...] how much would you say that you prefer to hang out with confident people?	4.97	1.27	10.60	<.001	.76[.60, .92]
7LQ30: [...] how much would you say that you like confident people?	5.12	1.19	13.02	<.001	.94[.77, 1.11]

Appendix B

Table 8

Mixed-Effects Model Predicting Scores on 7-Point Likert Scale Questions in Experiment 2a

Fixed effects	<i>b</i>	<i>SE</i>	<i>p</i>
Intercept	3.75	.20	
Condition	1.24	.13	<.001
Type of attributions	-.25	.25	.345
Condition x Type of attributions	.08	.08	.296
Random effects	<i>Variance</i>	<i>SD</i>	
Participant intercept	.68	.82	
Question intercept	.23	.49	
Residual	1.14	1.07	

Note. Condition: Confident =1, Hesitant =0. Type of attributions: Knowledge=1, Social=0.

Bolded coefficients are statistically significant ($p < .05$).

Appendix C

Table 9

Independent Samples T-Test Results for Each Likert Scale Question of Experiment 2b

Attribution	Confident Condition		Hesitant Condition		<i>t(df)</i>	<i>p</i>	<i>d</i> (95%CI)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Knowledge Attributions							
ALQ1 : Do you think she [the informant] is smart?	2.62	.54	2.30	.60	3.32(139)	.001	.56[.22, .89]
ALQ3 : Do you think she knows a lot about different things?	2.29	.54	1.96	.67	3.28(140)	.001	.55[.21, .88]
ALQ5 : Do you think she knows a lot about animals?	1.91	.53	1.84	.69	.68(138)	.495 (<i>ns</i>)	.11[-.22, .45]
ALQ7 : Do you think she is doing very well in school?	2.53	.60	2.26	.70	2.48(140)	.014 (<i>ns</i>)	.42[.08, .75]
ALQ9 : Would you go to her to help you with your homework?	2.13	.82	1.84	.81	2.06(140)	.041 (<i>ns</i>)	.35[.01, .68]
Social Attributions							
ALQ2 : Do you think she always says thank you?	2.29	.70	2.33	.74	-.31(140)	.760 (<i>ns</i>)	-.05[-.38, .28]
ALQ4 : Do you think she has a lot of friends	2.32	.62	2.30	.62	.19(140)	.853 (<i>ns</i>)	.03[-.3, .36]
ALQ6 : Do you think she lies to her friends?*(reverse-coded)	2.80	.47	2.60	.67	2.09(139)	.038 (<i>ns</i>)	.35[.02, .68]
ALQ8 : Do you think she is someone you would like to play games with?	2.27	.74	2.19	.73	.66(139)	.508 (<i>ns</i>)	.11[-.22, .44]
Manipulation checks							
ELQ1: Do you think she was good at telling how to go to the museum?	2.64	.61	1.77	.62	8.38(139)	<.001	1.41[1.04, 1.78]

Attribution	Confident Condition		Hesitant Condition		<i>t(df)</i>	<i>p</i>	<i>d</i> (95%CI)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
ELQ2: Do you think she knows the directions to get to the museum?	2.83	.47	1.69	.55	13.28(140)	<.001	2.23[1.80, 2.64]
ALQ10 :Do you think [the model] was confident?	2.62	.59	1.81	.73	7.2(139)	<.001	1.22[.86, 1.57]

Appendix D

Table 10

Mixed-Effects Model Predicting Scores on 3-Point Likert Scale Questions in Experiment 2b

Fixed effects	<i>b</i>	<i>SE</i>	<i>p</i>
Intercept	2.36	.13	
	<i>2.04</i>	<i>.12</i>	
Age	-.006	.004	.170
	<i>-.006</i>	<i>.004</i>	<i>.162</i>
Condition	.06	.07	.399
	.26	.07	<.001
Type of attributions	.31	.16	.090
Condition x Type of attributions	.19	.06	.003
Condition x Age	-.00004	.005	.993
	<i>.003</i>	<i>.005</i>	<i>.514</i>
Type of attributions x Age	.0001	.003	.972
Condition x Type of attributions x Age	.003	.005	.456
Random effects	<i>Variance</i>	<i>SD</i>	
Participant intercept	.12	.34	
Question intercept	.05	.23	
Residual	.32	.56	

Note. Age Condition: Confident =1, Hesitant =0. Type of attributions: Knowledge=1, Social=0.

This model reflects the estimates for when the type of attributions = 0 (social), but the estimates for when the attributions are knowledge-related are included in italic. Bolded coefficients are statistically significant ($p < .05$).

Chapter 4

General Discussion

Previous research has established that individuals rely on confidence cues. However, the precise manner in which children and adults interpret confidence continues to be an area of uncertainty. This dissertation aimed to investigate the different interpretations of confidence. In the first experiment, we explored how four- and five-year-olds interpret past confidence cues, whether as situational or person-specific, when learning new words in the absence of current confidence or hesitancy cues. Experiments 2a and 2b examined the epistemic and social interpretations of confidence cues among adults and children aged 7 to 10 years.

4.1 Situational vs Person-specific Interpretation

In Experiment 1, four- to five-year-olds did not prefer to learn from a previously confident informant over a previously hesitant one, performing at chance on a word learning task. The informants' history of confidence (i.e., past confidence cues) thus had no impact on children's propensity to learn novel words. This indicates that preschoolers are not sensitive to past confidence when the current level of confidence is neutral, suggesting a *situational interpretation* of confidence.

One could be concerned that our participants did not rely on the confident informant because our cues may have been too subtle to detect or remember, especially given our participants' age and immature cognitive development. However, general linguistic cues are picked up and understood by children as young as 2 years of age (e.g., Birch & Bloom, 2002; Ganea et al., 2007). We also used a combination of verbal and non-verbal cues, which have both been used in previous selective learning studies, to make the levels of confidence even more

salient and sufficiently clear. Additionally, our memory check confirms that children were able to detect and remember the model's past level of confidence. Other studies also provide evidence that such confidence cues are detected by 4- and 5-year-olds when used in current situations (Juteau et al., 2024). Hence, our results cannot be attributable to this age group's inability to detect the cues.

Such a situational interpretation could be somewhat reassuring as it signifies that preschoolers do not rely on confident individuals beyond the situations in which they have observed confidence being demonstrated. This could indicate that preschoolers may be less vulnerable to misleading sources of information than commonly believed. To some extent, it could protect them from making misinformed learning decisions based on past confidence. It could protect them from trusting someone whom they have only witnessed being confident once and who might deceive them by subsequently providing inaccurate or unsupported information. By the time they are older, conserving a situational interpretation of confidence could allow them to exert vigilance when faced with overconfident public figures (e.g., in the media) and make them less susceptible to "fake news".

Nevertheless, as noted in the second chapter, there could also have been a small effect leaning towards a person-specific interpretation (i.e., a nonsignificant tendency to side with the previously confident informant) that we may not have been able to detect due to low power. That being said, this potential person-specific interpretation seems to have a minimal impact in learning contexts when compared to that of the situational interpretation (see the larger effect sizes of current confidence cues from Juteau et al., 2024). It could be that participants were able to perceive confidence as both situational and person-specific but reverted to simpler strategies in our word learning task. A situational interpretation would have required fewer cognitive

resources altogether: given that in the moment there were no confidence cues, it may have been simpler for preschoolers not to rely on the past confidence cues even if they were able to detect and remember them.

Importantly, the fact that our results here suggest a situational interpretation does not mean that confidence can never be interpreted as person-specific. Children could be able to treat confidence cues as being both situational and person-specific based on the circumstances. For example, in learning situations such as with a word learning task, children may favor a situational interpretation of confidence which could also extend to epistemic trait inferences (i.e., not making epistemic attributions based on past confidence). In social situations, they may however be able to perceive confidence cues as person-specific. It would be interesting to explore whether preschoolers employ different strategies in different domains and for instance, to determine if a person-specific interpretation is possible in social situations.

Additionally, results from Experiments 2a and 2b provide insights into the situational vs person-specific interpretation of confidence and also seem to suggest a developmental change in these interpretations. Overall participants in both experiments attributed some traits based on different levels of confidence (confident vs hesitant). This confirms that at least at ages 7 to 10 and by adulthood, confidence cues can lead to the inference of more durable traits, which requires greater cognitive resources. Indeed, researchers found that preschoolers may be less likely to engage in trait ascriptions (Kalish & Shiverick, 2004; Liu et al., 2007; Kalish, 2002), which is the ability to form stable personal trait attributions (see Hermes et al., 2015 for details on trait ascriptions). As demonstrated by our findings from Experiment 1, it could thus be that at a younger age (around 4 to 5 and younger), children primarily treat confidence as situational, not

being as likely yet to engage in trait ascriptions, but as they age, can also perceive it as person-specific and attribute enduring traits to confident individuals.

4.2 Epistemic vs Social Interpretation

It is important to acknowledge that some cues can be interpreted in multiple ways. Similar to how Tong and colleagues (2020) suggested that epistemic and non-epistemic cues could be seen as being part of a continuum, the epistemic and social interpretations of certain cues could be part of one spectrum. Both the epistemic and social interpretation could co-exist or meet at the middle of the continuum for some cues. For example, group membership can have both an epistemic and social value. In itself, whether someone is part of a group or not provides social information and thus holds social value. This affiliation can also indicate whether someone holds knowledge that is specific to a group. In such similar cases, the social and epistemic interpretations may be dependent on context. In a learning situation, a cue could be seen as having epistemic value (but no social value). In a social situation, the same cue could have interpersonal value (but no epistemic value). Similarly, confidence could be interpreted as being both a social and epistemic cue interchangeably or be positioned differently on this continuum depending on situations. Our results may thus apply to learning contexts, or at least to information-sharing contexts such as in the selective learning research, however, as mentioned above, future research could investigate whether the interpretation is different specifically by context.

4.2.1 Epistemic Interpretation

Results show that both adults and children ages 7 to 10 make knowledge attributions based on confidence cues (Experiment 2a and 2b), whereas preschoolers did not (Experiment 1). This seems to indicate a developmental progression in the epistemic interpretation of confidence

where it is by the age of 7 to 10 that children can explicitly associate knowledge-related traits to confidence. The epistemic interpretation of confidence and its potential developmental progression are further discussed below.

A cue's value as a knowledge indicator can be conveyed in different ways. Some cues can, for instance, indicate whether someone holds knowledge by speech act itself (e.g., using language to indicate that they know something, Chen & Waxman, 2013). Other more direct epistemic cues convey knowledge inherently: their intrinsic characteristics indicate knowledge (e.g., accuracy being a direct cue to knowledge, Corriveau et al., 2013; Kushnir et al., 2013; Scofield et al., 2013). Confidence arguably conveys epistemic value through the speech act itself or through its non-verbal expression. Its epistemic value can hardly be considered inherent as it is impossible to determine if a certain level of confidence is justified in the absence of additional cues indicating whether it corresponds to true knowledge. It may be that cues that do not have an inherent indication of knowledge require the usage of higher cognitive processes, which may develop only in late childhood and by adulthood. With such cues, these higher cognitive processes and the cognitive efforts needed to engage in epistemic vigilance (i.e., the careful evaluation of the reliability of different sources of information) may result in a cognitive overload in preschoolers. Future research examining this possibility would allow to further understand the processes involved in the interpretations of confidence.

Until such higher cognitive processes are acquired, children may have to resort to other strategies to decipher the epistemic value of cues that do not inherently convey this information. For instance, children may infer the epistemic value of confidence cues by associating them with other more direct or inherent epistemic cues. As suggested by Fobert (2024), children could see a link between confidence and accuracy. In their studies, Fobert and colleagues (2024) found that

school-age children inferred which of two informants accurately wrote the labels of different objects based only on the informants' level of confidence. It could thus be that, around middle childhood, children better understand the epistemic value of confidence because the association between confidence and accuracy becomes stronger (or more evident) as they age.

More generally, it could also be that with age children construe confidence cues as having greater epistemic value because they prioritize epistemic goals. A meta-analysis by Tong and colleagues (2020) reveals that children seem to increasingly value epistemic cues as they age, prioritizing such cues over social cues. This could have been reflected in findings from Experiment 2b: 7- to 10-year-olds associated knowledge-related traits to a confident informant and to confidence in general but not more social traits.

4.2.2 Social interpretation

Our results also indicate that only adults, not 4- to 5-year-olds nor 7- to 10-year-olds, attributed social traits based on confidence. The social interpretation could thus only emerge by adulthood, once the values generally associated with confidence are fully internalized which is typically later in development. For instance, there could be a link between personality factors and how confidence is perceived. Extroversion and introversion, for example, could be associated with confidence. Past research has established that extroversion is strongly associated with greater self-confidence, while introversion tends to be associated with lower self-confidence (Erol & Orth, 2011; Robins, Fraley, et al., 2001). As extroverted individuals tend to reach out to other people and their environment (Jung, 1923), they could have more opportunities to express their self-confidence in front of other people. However, the way someone feels about their own capacities (i.e., level of self-confidence) may not necessarily reflect how they portray themselves in front of others (confidence cues). In some circumstances, an otherwise introverted or even shy

individual could be quite confident in their own capacity and decide to express it to other by displaying a high level of confidence. To our knowledge no research in the selective learning field has specifically examined how confidence cues are interpreted based on their potential association with personality factors such as introversion and extroversion. Future research could examine how stable personality factors influence selective learning in relation to confidence cues.

There could also be cultural differences in the interpretation of confidence (Lundeberg et al., 2000). As already mentioned, confidence could even be treated as normative in individualistic cultures (Heine & Lehman, 1999). Although we did not examine whether our participants endorse individualistic or collectivist values, we can posit our participants primarily come from cultures with individualistic values given our geographical context. This could contribute to explaining why adults, but not children, seem to treat confidence as a general social cue: individualistic cultures may associate confidence with a certain social value, however school-age children may not have entirely internalized this notion yet. That being said, our relatively homogenous samples warrant caution when interpreting the results. Additionally, it is important to note that we did not measure cultural affiliation in our experiments, as our goal was not to address possible differences in confidence across cultures. Future studies should specifically investigate whether the interpretations of confidence differ across cultures, for instance, by comparing individualistic vs collectivist cultures.

It is also possible that these seemingly unrelated attributions made by adults about confident people are not rooted in deeply ingrained cultural beliefs. Instead, our findings may simply reflect an overgeneralization or a halo effect, wherein broad and often positive attributions are made about a person based on a single positive trait (Nisbett & Wilson, 1977).

While more broadly studied with adults, research has examined the halo effect with children as well. For example, Rumsey et al. (1986) found that 11-year-olds attribute more prosocial behaviors to individuals who are better looking. In fact, even children as young as 3 have been shown to associate positive traits, both social and epistemic, such as being nice or honest and being smart, to displays of knowledge even when this knowledge was clearly proven wrong (e.g., lacking visual access, Lane et al., 2013). This could indicate that children do not necessarily explicitly reflect on informants' knowledge (or even social characteristics) but rather tend to prefer positive aspects and generally associate them to other positive traits. However, as mentioned above, this way of seeing confidence as broadly positive may be culture-specific and only acquired later in development. This halo effect may thus only be observable or even emerge later in development: although children seem to interpret confidence cues as epistemic, as they age and eventually enter adulthood, they could believe that confidence cues are indicators of other positive characteristics about an informant.

Moreover, the halo effect implies the ability to make trait attributions, which in turn implies the understanding that traits are stable, internal and causal (Liu et al., 2007). Making inferences about such durable traits develops as children age. Preschoolers understand physical causal relations and make inferences based on such relations. For instance, once an object has sunk in water, they can infer that this object will continue to sink if placed back in the water (Kalish, 2002). When it comes to psychological causation, inferences seem more challenging at the preschool age (Kalish, 2002). Although preschoolers can make behavior to trait, and trait to behavior inferences (e.g., inferring that a nice child is likely to demonstrate helpful behaviors, Liu et al., 2007), they cannot make behavior to behavior attributions which is necessary to be able to infer psychological causal relations. To infer psychological causal relations, they must

combine the ability necessary to infer a stable trait from a person's behavior to the ability to use this inferred trait to make other inferences about the person's other behaviors. For example, children have to understand that sharing a snack (i.e., behavior) is indicative of selflessness (i.e., stable trait) to then understand that a selfless person is likely to share in the future. The knowledge required to make trait attributions only develops during middle childhood, as this is when children grasp the stable, internal, and causal nature of traits (Liu et al., 2007). This could contribute to explaining the lack of generalization in 4- to 5-year-olds and the observed halo effect in adulthood (i.e., adults attributing both knowledge-related and social traits to confidence). However, this explanation does not seem sufficient for 7- to 10-year-olds, as they should have acquired the knowledge required to make trait attributions and thus the ability to generalize based on single traits by then. Therefore, there must be another reason that could explain why the 7- to 10-year-olds did not make such generalizations here (i.e., not attributing social traits).

4.2.3 Links with cognitive abilities

Other factors that we did not investigate, such as cognitive mechanisms, could also be involved in shaping children's and adults' interpretations of confidence and in explaining the observed developmental differences. For instance, children's ability to understand others' mental states, which is referred to as *theory of mind* (Carlson et al., 2013, Brosseau-Liard et al., 2015), may not be sufficiently developed to understand the epistemic complexity of cues that can be considered both epistemic and social, such as confidence cues. To understand how epistemically relevant information is, especially in situations that could also have social connotations, one may have to understand an informant's intention or motivation. Not only could it be more challenging for children with weaker or less developed theory of mind (e.g., younger children) to adequately

select whom to learn from, but it could even be more challenging for them to infer stable traits from confidence cues, as such cues could have social implications as well. In contrast, those with more advanced theory of mind capacities (e.g., older children) could better understand knowledge states and thus be better able to favor knowledgeable sources of information in learning situations (e.g., Brosseau-Liard et al., 2015; Crivello et al., 2018; Mills & Elashi, 2014). Theory of mind could thus be one of the mechanisms accounting for the age differences that we observed (i.e., preschoolers not attributing any traits based on confidence whereas 7- to 10-year-olds attributes knowledge) as theory of mind skills may be needed to make person-specific trait attributions. However, it is worth noting that this discrepancy in findings could also be due to methodological differences between Experiment 1 and Experiment 2b, which were not intended for direct comparisons. Additionally, we did not assess theory of mind skills. Further research is needed to explore the potential links between theory of mind and the interpretation of confidence through trait attributions.

Moreover, as previously discussed, deciding whom to learn from could also depend on the development of inhibitory control (e.g., being able to inhibit current, possibly irrelevant information or distractors, Jaswal et al., 2014). Some authors even suggest that taking a critical stance when engaging in more complex selective learning requires general cognitive abilities to be sufficiently developed (Mills, 2013). Advanced cognitive skills and general intelligence have also been mentioned as factors that could influence children's abilities to engage in selective learning (Mills & Elashi, 2014). Taken together, these accounts could point toward a better understanding of confidence cues as general cognitive abilities increase, which generally occurs as we age.

4.3 Confidence Preference vs Hesitancy Avoidance

Another aim of this dissertation was to explore whether confidence and hesitancy are interpreted symmetrically as two opposite ends of a continuum. In Experiments 2a and 2b, we thus examined the interpretation of confidence when only one informant is available, being either confident or hesitant. The effects found in our open-ended questions seemed to have been driven by our hesitant condition: participants spontaneously mentioned their informant's level of confidence and knowledge of the directions more when in the Hesitant condition than in the Confident condition. Children and adults thus particularly disfavored the hesitant informant, but did not equally favor the confident one, which would have been demonstrated by also attributing more knowledge to the confident informant as a symmetrical counterbalance.

Importantly, despite our efforts to depict opposite levels of confidence in our stimuli (i.e., high vs low confidence), because we did not assess the levels of confidence of our stimuli prior to testing, as we used standard cues from the selective learning field, we cannot assure that what was intended to be perceived as a "high" level of confidence may not have been seen as a typical level of confidence. However, when explicitly assessing their informant's level of confidence, not only did participants in the confident condition report higher ratings, but ratings from the confident versus the hesitant condition were roughly symmetric around the midpoint of the scale. This suggests that participants indeed considered the confident model to be confident. Regardless of the level of confidence perceived in the confident model (whether high or typical), participants in this condition still did not spontaneously mention their level of knowledge or confidence more than those in the hesitant condition. This supports the idea that confidence leads to fewer implications than hesitancy.

Alternatively, this hesitancy effect may be a reflection of how high levels of confidence and neutral ones are treated similarly. For instance, in the general introduction, we discussed other studies that found no significant differences in how confident and neutral informants are treated by 4-year-olds in selective learning tasks (Stock et al., 2009). There could indeed be a hesitancy avoidance because higher levels of confidence are not only treated like the neutral ones, but they could even be considered typical (or neutral). Considering the scenario presented in our experiment (i.e., providing geographical directions), it could be expected to see an informant, especially an adult one, display a certain level of confidence, whereas hesitancy would appear to be more striking in such circumstances. Even more generally, for instance, if we think of teachers or characters portrayed in the media, it could be more common for children, or even for adults in general, to be exposed to confident adults (as opposed to hesitant ones). Given that people tend to focus more on salient (see details on saliency bias in Taylor & Fiske, 1978) and negative stimuli (see details on negativity bias in Rozin & Royzman, 2001), hesitancy being more prominent and typically negative, it could have called for more spontaneous “negative” descriptions. In fact, both children and adults have been found to treat negative information more carefully (Baumeister et al., 2001). In all, this could contribute to explain why children seem to perceive hesitancy as especially detrimental, not learning from hesitant informants (Stock et al., 2009).

When looking at findings from Experiment 1, given our experimental design involving two conflicting informants, siding with one automatically implies not siding with the other one. This does not allow to examine the differential treatment between confidence and hesitancy. It would thus be interesting to continue exploring this hesitancy avoidance using a single-speaker design with preschool-age children. Additionally, because we know that models in single-

speaker design can be treated differently, even by children as young as 2, if no consistent history of level of confidence is present (Birch et al., 2010), it would be important to ensure that both hesitancy and confidence are sufficiently established. Future studies could also explore whether confidence and hesitancy are treated symmetrically when directly compared in a two-speaker design, but which allows for answers pertaining to confidence and hesitancy to be independent from one another.

Another interesting way to examine the relative perception of confidence and hesitancy would be to further investigate how confidence and hesitancy calibration are treated differently by various age groups. Indeed, although we know from previous research that school-age children do not favor a justifiably hesitant informant over an unjustifiably hesitant one (Birch et al., 2020; Tenney et al., 2011), it would be interesting to further examine whether this differential treatment between confidence and hesitancy calibration is also present when children are making trait attributions. For instance, future research could determine whether children continue to show no preference for a justifiably hesitant speaker over an unjustifiably hesitant one when attributing social traits, such as honesty, or if, on the contrary, they begin to be sensitive to hesitancy calibration in certain circumstances or at certain ages.

Our findings thus support a hesitancy avoidance (rather than confidence preference) where lack of confidence (or hesitancy) is not only more salient but also more impactful, at least when engaging in trait attributions and spontaneous descriptions with school-age children and adults exposed to a single-speaker design.

4.4 Contributions and Implications

The present thesis contributes to the existing selective learning literature by shedding light on the interpretations of confidence cues across different age groups. We not only

investigated novel perspectives on the use of confidence cues, but also explored how children and adults think about confidence.

In our first experiment, we investigated whether preschoolers interpret confidence cues as situational or person-specific. Building on established paradigms such as the “conflicting sources paradigm” (Koenig et al., 2004), we devised procedures that accounted for inhibition, memory, and saliency challenges. Compared to adult research, such as studies on eyewitness testimony where displays of confidence may lead to impactful decisions (Cramer et al., 2011), we employed more neutral scenarios, which are likely to have implications that are more applicable to everyday contexts. Nonetheless, our experimental situations still involved artificial components (e.g., participants watched a video of a stranger speaking to a camera). Further examining the interpretations of confidence using naturalistic methods would be highly interesting (e.g., recording interactions in participants’ natural environments and examining their reactions to displays of confidence).

Although future investigations should still aim to include even more applied tasks that could simulate naturalistic circumstances, our methods allow testing in a variety of contexts with a wide range of ages. For example, our stimuli and procedures are easily adaptable from in-person testing to virtual testing, as evidenced during the unexpected, forced changes resulting from the pandemic. Nevertheless, we have to be cautious when comparing our results to those of other experiments as they may not be fully comparable to in-person studies. Real-life interactions could lead to different effects. Research has demonstrated that when informants are presented through video recordings, children aged 2 are not as likely to imitate them (Nielsen et al., 2008). Our informants were presented through such recordings, and participants had no opportunities to interact directly with them. Indeed, there are differences in children’s performance when they

have the opportunity to interact with informants and to inquire to gather information (Mills & Landrum, 2014; Mills et al., 2010; 2011). Given the social nature of selective learning, replicating our experiments in in-person settings, with participants being able to interact with the informants, could lead to different results. This, yet again, shows the importance of the context within which confidence cues are presented.

Nonetheless, online testing presents certain advantages, particularly under circumstances such as the COVID-19 pandemic. For example, we observed fewer late cancellations and higher participation rates with online testing. This may be attributed to the convenience of such testing and the ease of scheduling procedures for participants. However, it is important to consider that significant periods of time, such as the COVID-19 pandemic, especially when they occur during developmental stages where changes occur rapidly, could result in cohort effects. These effects describe the impact of the social, historical, and cultural contexts of a specific era on development (Schaie, 1965; Trzesniewski & Donnellan, 2010). Indeed, children participating in our experiments grew up amid the pandemic. They may have experienced different social interactions due to enforced isolation and/or increased mask-wearing, which could have led to a weaker social interpretation of confidence. For instance, mask-wearing is associated with poorer emotion recognition (Chester et al., 2023). Children who grew up while mask mandates were in effect may have more difficulty identifying confidence cues. Recent studies examining children's social-emotional competencies also found that the pandemic lockdowns resulted in preschoolers exhibiting increased internalizing and externalizing problems (Alonso-Martínez et al., 2021). More generally, children who grew up during the pandemic, such as our participants, were not as exposed to a variety of people as is typical and had limited in-person interactions with unfamiliar informants. In contrast, the pandemic may have had a lesser effect on adults in

Experiment 2a as they were older during the pandemic. However, many of them were still teenagers during the pandemic and may still have been affected by the decreased in-person social interactions and other pandemic-associated circumstances. For instance, even for adults, mask-wearing resulting from the pandemic appears to be linked with decreased emotion processing capacities (Freud et al., 2020), emotion recognition accuracy (Marini et al., 2021), and face matching performance (Carragher & Hancock, 2020).

Additionally, as previously mentioned, we created our stimuli based on cues used in previous studies. Those of Experiment 2a and 2b were also devised to be as similar as possible (e.g., similar length, same background and clothes, same fully bilingual actor). However, all of our actors were chosen based on availability and the identity of the informant could possibly impact how confidence (or hesitancy) is interpreted. Specifically, it would have been interesting to include a male informant : confidence might be perceived differently when displayed by a female as opposed to a male informant. Additionally, this difference may only emerge later in development, when social norms (and stereotypically gendered traits) are more internalized.

Nevertheless, our results have significant theoretical and practical implications for both researchers and practitioners. On one hand, knowing that when learning semantic information (i.e., Experiment 1), preschoolers do not rely on past levels of confidence gives hope that even young children may not always fall prey to arguably misleading cues. On the other hand, it also signifies that they do not necessarily deem a person's past hesitancy as indicative of their future trustworthiness and could be open to revising their impressions.

As previously discussed, given that research on selective learning cues mostly focuses on preschool-age children, Experiment 2b also bridges an important gap in the existing literature by exploring the interpretation of confidence in school-age children. Moreover, by adopting an

exploratory approach and devising new methods (e.g., open-ended questions calling for spontaneous descriptions) sufficiently simple to avoid cognitive overload in children but permitting exploration of adults' interpretation of confidence as well, we were able to explore effects in three different developmental age groups. The current investigation is one of the first to explore the interpretation of confidence cues across such a wide age range and allows us to draw parallels between cognitions at different developmental ages. Our different results found in all three age groups, which suggests a possible developmental progression in the interpretations of confidence, also highlight the need for research at a variety of developmental ages.

Additionally, investigating spontaneous impressions via open-ended questions such as in Experiment 2a and 2b is relatively new in the selective learning field. Using such novel methodology could have allowed for more spontaneous answers as it does not involve any prompts directing participants in specific directions (e.g., asking social attribution questions hints to a social interpretation whereas simply asking for a broad description does not).

Furthermore, Experiment 2a and 2b used a single-speaker design, which has many advantages, such as holding more ecological validity (e.g., only seeing one informant being more realistic). This single-speaker design also ensures that the effects found do not merely reflect a preference for a confident informant in the context of a comparison between a confident and hesitant informant. Even more novel methodology, maybe combining both within and between subject methods that are cognitively appropriate for a wide array of ages, could address these limitations. Indeed, our use of both single-speaker and conflicting source paradigms in different studies in this dissertation is not without limitations, as we used them with different aims in mind and with different procedures, which essentially prevent direct comparisons.

Overall, better understanding children's learning strategies and why they may use some over others depending on circumstances can also guide educational interventions aimed at optimizing children's learning. Knowing that confidence could have an epistemic interpretation (and possibly a social one that develops later in development) can have a positive influence on educational practices. Despite being sensitive to confidence cues from a very young age, children do not always extend their preference for confidence to all situations (i.e., not always inferring knowledge or even positive social traits based on it). This offers an opportunity for teaching them more nuanced ways to use confidence cues. For instance, early education could emphasize that confidence cues are imperfect epistemic cues because they do not always truly reflect knowledge. More generally, children could be taught that different types of cues convey different informative values, which could from an early age help develop critical thinking skills. Future research could examine, in practice, how to devise and implement interventions based on findings from the selective learning field and determine how to foster critical thinking skills in classroom settings.

Conclusion

In conclusion, confidence as a selective learning cue is complex and involves different interpretations. As social beings, we often depend on various cues to discern whom to learn from. However, it is important to recognize that confidence cues can sometimes lead us astray. Therefore, understanding these different interpretations of confidence remains crucial. Although there is still much to discover to answer the overarching question of how children and adults interpret confidence, this thesis undoubtedly contributes to the existing literature and has important implications for the selective learning field. Confidence constitutes only one of the many credibility cues studied in the recent literature (see Mills, 2013; Nurmsoo et al., 2010 for

reviews). Given the wealth of sources of information we are exposed to, this thesis highlights the need for developmental research exploring the way we think about, know, and understand such credibility cues.

References

- Alonso-Martínez, A. M., Ramírez-Vélez, R., García-Alonso, Y., Izquierdo, M., & García-Hermoso, A. (2021). Physical Activity, Sedentary Behavior, Sleep and Self-Regulation in Spanish Preschoolers during the COVID-19 Lockdown. *International Journal of Environmental Research and Public Health*, 18(2), 693-.
<https://doi.org/10.3390/ijerph18020693>
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad Is Stronger Than Good. *Review of General Psychology*, 5(4), 323–370. <https://doi.org/10.1037/1089-2680.5.4.323>
- Birch, S. A. J., Akmal, N., & Frampton, K. L. (2010). Two-year-olds are vigilant of others' non verbal cues to credibility. *Developmental Science*, 13(2), 363–369.
<https://doi.org/10.1111/j.1467-7687.2009.00906.x>
- Birch, S. A. J., & Bloom, P. (2002). Preschoolers Are Sensitive to the Speaker's Knowledge When Learning Proper Names. *Child Development*, 73(2), 434–444.
<https://doi.org/10.1111/1467-8624.00416>
- Birch, S. A., Sevenson, R. L., & Baimel, A. (2020). Children's understanding of when a person's confidence and hesitancy is a cue to their credibility. *PloS one*, 15(1), e0227026.
<https://doi.org/10.1371/journal.pone.0227026>
- Brosseau-Liard, P., Penney, D., & Poulin-Dubois, D. (2015). Theory of mind selectively predicts preschoolers' knowledge-based selective word learning. *The British journal of developmental psychology*, 33(4), 464–475. <https://doi.org/10.1111/bjdp.12107>
- Carlson, S. M., Koenig, M. A., & Harms, M. B. (2013). Theory of mind. *WIREs Cognitive Science*, 4(4), 391–402. <https://doi.org/10.1002/wcs.1232>

- Carragher, D. J., & Hancock, P. J. B. (2020). Surgical face masks impair human face matching performance for familiar and unfamiliar faces. *Cognitive Research: Principles and Implications*, 5(1), 59–59. <https://doi.org/10.1186/s41235-020-00258-x>
- Chen, M. L., & Waxman, S. R. (2013). “Shall we *blick*?”: Novel words highlight actors' underlying intentions for 14-month-old infants. *Developmental Psychology*, 49(3), 426–431. <https://doi.org/10.1037/a0029486>
- Chester, M., Plate, R. C., Powell, T., Rodriguez, Y., Wagner, N. J., & Waller, R. (2023). The COVID-19 pandemic, mask-wearing, and emotion recognition during late-childhood. *Social Development (Oxford, England)*, 32(1), 315–328. <https://doi.org/10.1111/sode.12631>
- Corriveau, K. H., Kinzler, K. D., & Harris, P. L. (2013). Accuracy Trumps Accent in Children's Endorsement of Object Labels. *Developmental Psychology*, 49(3), 470–479. <https://doi.org/10.1037/a0030604>
- Cramer, R. J., DeCoster, J., Harris, P. B., Fletcher, L. M., & Brodsky, S. L. (2011). A confidence-credibility model of expert witness persuasion: Mediating effects and implications for trial consultation. *Consulting Psychology Journal: Practice and Research*, 63(2), 129–137. <https://doi.org/10.1037/a0024591>
- Crivello, C., Phillips, S., & Poulin-Dubois, D. (2018). Selective social learning in infancy: looking for mechanisms. *Developmental Science*, 21(3), e12592-n/a. <https://doi.org/10.1111/desc.12592>
- Erol, R. Y., & Orth, U. (2011). Self-Esteem Development From Age 14 to 30 Years: A Longitudinal Study. *Journal of Personality and Social Psychology*, 101(3), 607–619. <https://doi.org/10.1037/a0024299>

- Fobert, S. F., Cossette, I., & Brosseau-Liard, P. E. 2024. *Children presume confident informants will be accurate (until proven otherwise)*, [Manuscript submitted for publication]. School of Psychology, University of Ottawa.
- Freud, E., Stajduhar, A., Rosenbaum, R. S., Avidan, G., & Ganel, T. (2020). The COVID-19 pandemic masks the way people perceive faces. *Scientific Reports*, 10(1), 22344–22344. <https://doi.org/10.1038/s41598-020-78986-9>
- Ganea, P. A., Shutts, K., Spelke, E. S., & DeLoache, J. S. (2007). Thinking of Things Unseen: Infants' Use of Language to Update Mental Representations. *Psychological Science*, 18(8), 734–739. <https://doi.org/10.1111/j.1467-9280.2007.01968.x>
- Heine, S. J., & Lehman, D. R. (1999). Culture, self-discrepancies, and self-satisfaction. *Personality and Social Psychology Bulletin*, 25(8), 915– 925. <http://dx.doi.org/10.1177/01461672992511001>
- Hermes, J., Behne, T., & Rakoczy, H. (2015). The Role of Trait Reasoning in Young Children's Selective Trust. *Developmental Psychology*, 51(11), 1574–1587. <https://doi.org/10.1037/dev0000042>
- Jaswal, V. K., Pérez-Edgar, K., Kondrad, R. L., Palmquist, C. M., Cole, C. A., & Cole, C. E. (2014). Can't stop believing: Inhibitory control and resistance to misleading testimony. *Developmental Science*, 17(6), 965–976. <https://doi.org/10.1111/desc.12187>
- Juteau, A.-L., Ibrahim, Y. A., McIntee, S.-E., Varin, R., & Brosseau-Liard, P. E. (2024). Do children interpret informants' confidence as person-specific or situational? *PloS One*, 19(5), e0298183–e0298183. <https://doi.org/10.1371/journal.pone.0298183>
- Kalish, C. W. (2002). Children's predictions of consistency in people's actions. *Cognition*, 84(3), 237–265. [https://doi.org/10.1016/S0010-0277\(02\)00052-5](https://doi.org/10.1016/S0010-0277(02)00052-5)

- Kalish, C. W., & Shiverick, S. M. (2004). Children's reasoning about norms and traits as motives for behavior. *Cognitive Development*, 19(3), 401–416.
<https://doi.org/10.1016/j.cogdev.2004.05.004>
- Koenig, M. A., Clément, F., & Harris, P. L. (2004). Trust in Testimony: Children's Use of True and False Statements. *Psychological Science*, 15(10), 694–698.
<https://doi.org/10.1111/j.0956-7976.2004.00742.x>
- Kushnir, T., Vredenburg, C., & Schneider, L. A. (2013). “Who can help me fix this toy?” The distinction between causal knowledge and word knowledge guides preschoolers' selective requests for information. *Developmental Psychology*, 49, 446–453.
<https://doi.org/10.1037/a0031649>
- Lane, J. D., Wellman, H. M., Gelman, S. A. (2013) Informants' traits weigh heavily in young children's trust in testimony and in their epistemic inferences. *Child Development*, 84(4), 1253-1268. <https://doi.org/10.1111/cdev.12029>
- Liu, D., Gelman, S. A., & Wellman, H. M. (2007). Components of young children's trait understanding: Behavior-to-trait inferences and trait-to-behavior predictions. *Child Development*, 78, 1543–1558. <http://dx.doi.org/10.1111/j.1467-8624.2007.01082.x>
- Marini, M., Ansani, A., Paglieri, F., Caruana, F., & Viola, M. (2021). The impact of facemasks on emotion recognition, trust attribution and re-identification. *Scientific Reports*, 11(1), 5577–14. <https://doi.org/10.1038/s41598-021-84806-5>
- Mills, C. M. (2013). Knowing When to Doubt: Developing a Critical Stance When Learning From Others. *Developmental Psychology*, 49(3), 404–418.
<https://doi.org/10.1037/a0029500>

- Mills, C. M., & Elashi, F. B. (2014). Children's skepticism: Developmental and individual differences in children's ability to detect and explain distorted claims. *Journal of Experimental Child Psychology*, 124, 1–17. <https://doi.org/10.1016/j.jecp.2014.01.015>
- Mills, C. M., & Landrum, A. R. (2014). Inquiring minds: Using questions to gather information from others. In *Trust and Skepticism* (1st ed., pp. 55–68). Routledge.
<https://doi.org/10.4324/9781315849362-5>
- Mills, C. M., Legare, C. H., Bills, M., & Mejias, C. (2010). Preschoolers Use Questions as a Tool to Acquire Knowledge From Different Sources. *Journal of Cognition and Development*, 11(4), 533–560. <https://doi.org/10.1080/15248372.2010.516419>
- Mills, C. M., Legare, C. H., Grant, M. G., & Landrum, A. R. (2011). Determining who to question, what to ask, and how much information to ask for: The development of inquiry in young children. *Journal of Experimental Child Psychology*, 110(4), 539–560.
<https://doi.org/10.1016/j.jecp.2011.06.003>
- Nielsen, M., Simcock, G., & Jenkins, L. (2008). The effect of social engagement on 24-month-olds' imitation from live and televised models. *Developmental Science*, 11(5), 722–731.
<https://doi.org/10.1111/j.1467-7687.2008.00722.x>
- Nisbett, R. E., & Wilson, T. D. (1977). The halo effect: Evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, 35(4), 250–256.
<https://doi.org/10.1037/0022-3514.35.4.250>
- Nurmsoo, E., Robinson, E. J., & Butterfill, S. A. (2010). Children's Selective Learning from Others. *Review of Philosophy and Psychology*, 1(4), 551–561.
<https://doi.org/10.1007/s13164-010-0043-y>

- Robins, R. W., Fraley, R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A Longitudinal Study of Personality Change in Young Adulthood. *Journal of Personality*, 69(4), 617–640. <https://doi.org/10.1111/1467-6494.694157>
- Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5(4), 296–320. https://doi.org/10.1207/S15327957PSPR0504_2
- Rumsey, N., Bull, R., & Gahagan, D. (1986). A developmental study of children's stereotyping of facially deformed adults. *British Journal of Psychology*, 77(2), 269–274.
- Schaie, K. W. (1965). A general model for the study of developmental problems. *Psychological Bulletin*, 64(2), 92–107. <https://doi.org/10.1037/h0022371>
- Scofield, J., Gilpin, A. T., Pierucci, J., & Morgan, R. (2013). Matters of accuracy and conventionality: Prior accuracy guides children's evaluations of others' actions. *Developmental Psychology*, 49(3), 432–438. <https://doi.org/10.1037/a0029888>
- Stengel, E. (1972). Psychological Types. By C. G. Jung Collected Works. Vol. 6. Pp. 617. Routledge & Kegan Paul. 1971. Price £6.25. - Psychological Reflections. By C. G. Jung A New Anthology of his Writings. 1905–1961. Selected and edited by Jolande Jacobs in collaboration with R. F. C. Hull. Pp. 391. Routledge & Kegan Paul. 1971. Price £1.75. *British Journal of Psychiatry*, 120(557), 462–462. <https://doi.org/10.1192/bjp.120.557.462>
- Stock, H. R., Graham, S. A., & Chambers, C. G. (2009). Generic Language and Speaker Confidence Guide Preschoolers' Inferences About Novel Animate Kinds. *Developmental Psychology*, 45(3), 884–888. <https://doi.org/10.1037/a0015359>

- Taylor, S. E., & Fiske, S. T. (1978). Salience, Attention, and Attribution: Top of the Head Phenomena¹. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 11, pp. 249–288). Academic Press. [https://doi.org/10.1016/S0065-2601\(08\)60009-X](https://doi.org/10.1016/S0065-2601(08)60009-X)
- Tenney, E. R., Small, J. E., Kondrad, R. L., Jaswal, V. K., & Spellman, B. A. (2011). Accuracy, Confidence, and Calibration: How Young Children and Adults Assess Credibility. *Developmental Psychology*, 47(4), 1065–1076. <https://doi.org/10.1037/a0023273>
- Tong, Y., Wang, F., & Danovitch, J. (2020). The role of epistemic and social characteristics in children’s selective trust: Three meta-analyses. *Developmental Science*, 23(2), e12895. <https://doi.org/10.1111/desc.12895>
- Trzesniewski, K. H., & Donnellan, M. B. (2010). Rethinking “Generation Me”: A Study of Cohort Effects From 1976-2006. *Perspectives on Psychological Science*, 5(1), 58–75. <https://doi.org/10.1177/1745691609356789>

Appendix A

Certificates of Ethics Approval for Experiments 1, 2a and 2b

File Number: H04-16-10

Date (mm/dd/yyyy): 05/22/2019



Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

Ethics Approval Notice Health Sciences and Science REB

Principal Investigator / Supervisor / Co-investigator(s) / Student(s)

<u>First Name</u>	<u>Last Name</u>	<u>Affiliation</u>	<u>Role</u>
Patricia	Brousseau-Liard	Social Sciences / Psychology	Principal Investigator
Sophie	Fobert	Social Sciences / Psychology	Co-Investigator
Aimie-Lee	Jueteau	Social Sciences / Psychology	Co-Investigator
Florence	Aquilina	Social Sciences / Psychology	Student Researcher
Thilini	Herath	Social Sciences / Psychology	Student Researcher
Isabelle	Cossette	Social Sciences / Psychology	Research Assistant

File Number: H04-16-10

Type of Project: Professor

Title: Preschoolers' attention to the credibility of others

Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
05/26/2019	05/25/2020	Renewal

Special Conditions / Comments:
N/A



Ethics Approval Notice

Health Sciences and Science REB

Principal Investigator / Supervisor / Co-investigator(s) / Student(s)

<u>First Name</u>	<u>Last Name</u>	<u>Affiliation</u>	<u>Role</u>
Patricia	Brousseau-Liard	Social Sciences / Psychology	Principal Investigator
Sophie	Fobert	Social Sciences / Psychology	Co-Investigator
Aimie-Lee	Jueteau	Social Sciences / Psychology	Co-Investigator
Florence	Aquilina	Social Sciences / Psychology	Student Researcher
Thilini	Herath	Social Sciences / Psychology	Student Researcher
Isabelle	Cossette	Social Sciences / Psychology	Research Assistant

File Number: H04-16-10

Type of Project: Professor

Title: Preschoolers' attention to the credibility of others

Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
05/26/2020	05/25/2021	Renewal

Special Conditions / Comments:

N/A



Ethics Approval Notice

Health Sciences and Science REB

Principal Investigator / Supervisor / Co-investigator(s) / Student(s)

<u>First Name</u>	<u>Last Name</u>	<u>Affiliation</u>	<u>Role</u>
Patricia	Brousseau-Liard	Social Sciences / Psychology	Principal Investigator
Sophie	Fobert	Social Sciences / Psychology	Co-Investigator
Aimie-Lee	Jueteau	Social Sciences / Psychology	Co-Investigator
Florence	Aquilina	Social Sciences / Psychology	Student Researcher
Thilini	Herath	Social Sciences / Psychology	Student Researcher
Isabelle	Cossette	Social Sciences / Psychology	Research Assistant

File Number: H04-16-10

Type of Project: Professor

Title: Preschoolers' attention to the credibility of others

Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
05/26/2021	10/31/2021	Renewal

Special Conditions / Comments:

Renewal exceptionally granted due to the fact that the Principal Investigator is on maternity leave. A new application should be submitted through eReviews before the expiry date of the certificate.

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL
Numéro du dossier / Ethics File Number
Titre du projet / Project Title

H-10-21-7107

(English) Preschoolers' and
school-age children's attention to
the credibility of others (French)L'attention portée à la crédibilité
des autres chez les enfants
d'âge préscolaire et scolaire
Type de projet / Project Type
Recherche de professeur /
Professor's research project
Statut du projet / Project Status

Renouvelé / Renewed

Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)

18/10/2021

Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)

17/10/2023

Équipe de recherche / Research Team
Chercheur / Researcher
Affiliation
Role

Patricia BROSSEAU-LIARD

École de psychologie / School of Psychology

Chercheur Principal / Principal Investigator

Sophie FOBERT

École de psychologie / School of Psychology

Co-chercheur / Co-investigator

Aimie-Lee JUTEAU

École de psychologie / School of Psychology

Co-chercheur / Co-investigator

Isabelle COSSETTE

École de psychologie / School of Psychology

Co-chercheur / Co-investigator

Emma PELLEGRINI

École de psychologie / School of Psychology

Assistant de recherche / Research Assistant

Carolyn HOLMES

École de psychologie / School of Psychology

Assistant de recherche / Research Assistant

Conditions spéciales ou commentaires / Special conditions or comments

 550, rue Cumberland, pièce 154 550 Cumberland Street, Room 154
 Ottawa (Ontario) K1N 6N5 Canada Ottawa, Ontario K1N 6N5 Canada

 613-562-5387 • 613-562-5338 • ethique@uOttawa.ca / ethics@uOttawa.ca
www.recherche.uottawa.ca/deontologie | www.recherche.uottawa.ca/ethics