Young Children's Source Monitoring and Selective Learning from Problematic Individuals

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Dedication

For my parents, John and Carol Stephens.

Abstract

Children are often highly dependent on other people to learn about the world around them. However, information communicated by others is not guaranteed to be correct, and sources differ vastly in both knowledge and intent. Recent research suggests that as early as preschool, if not before, children actively monitor the knowledge and intentions of potential sources of information, and, all else being equal, prefer to learn from more competent and moral individuals, a phenomenon termed *selective learning* (see, e.g., Koenig & Stephens, 2014 for a review). Thus far, the extant research on children's selective learning has focused exclusively on describing children's sensitivity to various indicators of source competence and morality. The primary aim of this dissertation project was to go beyond the level of description to investigate *how* young children selectively learn from individuals varying in the dimensions of competence and morality. Specifically, the current study sought to determine (1) the extent to which children demonstrate enhanced memory for situations involving incompetent and immoral individuals, and (2) how this potential memory bias manifests in children's selective learning preferences, retention of communicated information, and source monitoring in learning situations featuring incompetent and immoral informants. Experiment 1 directly addressed the first aim by presenting preschoolers with a series of individuals described as smart, nice, not smart, and not nice and assessing their recognition memory and memory for the described characteristics of each individual. Children demonstrated enhanced memory for the described characteristics of immoral and incompetent individuals relative to their moral and competent counterparts.

Experiment 2 addressed the second aim by presenting children with two individuals varying in competence and morality and then assessing children's willingness to solicit novel information from them, their tendency to express belief in them, their retention of the content of the novel facts they communicated, and their memory for the source (i.e., who told them) of each communicated fact. Children exhibited a preference to solicit novel information from and express belief in competent and moral individuals, greater retention of information communicated by competent and moral individuals, and more accurate source judgments when a competent or moral individual had served as the informant. Children's source monitoring performance was associated with both their selective learning preferences and their selective retention of communicated information.

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CHAPTER 1: Introduction

Children are often highly dependent on other people to learn about the world around them. Many domains of information, such as history, religion, and science, are difficult or impossible to acquire independently (e.g., Harris & Koenig, 2006). However, information from others is not always correct, and sources differ vastly in both knowledge and intent (see e.g., Stephens, Suarez, & Koenig, 2015). Recent research suggests that children are not credulous consumers of communicated information, and, instead, are sensitive to various indicators of source unreliability (e.g., Clement, Koenig, & Harris, 2004; Koenig et al., 2004; Koenig & Harris, 2005; Birch, Vauthier, & Bloom, 2008). As early as preschool, if not before, children actively monitor the knowledge and intentions of potential sources of information, and, all else being equal, prefer to learn from more competent and moral individuals, a phenomenon termed *selective learning* (see, e.g., Koenig & Stephens, 2014; Mills, 2013; Poulin-Dubois & Brosseau-Liard, 2016 for reviews). Thus far, the extant research on children's selective learning has focused primarily on describing children's sensitivity to various indicators of source competence and morality. The primary aim of this dissertation project is to go beyond the level of description to investigate *how* young children selectively learn from individuals varying in the dimensions of competence and morality, by examining basic mechanisms in children's memory for sources and their statements as it relates to their learning decisions.

The current project focuses on children's source monitoring decisions, judgments that attribute information to a specific origin (Johnson, Hashtroudi, & Lindsay, 1993), as

a potential cognitive process supporting children's selective learning decisions. The selective learning literature clearly indicates that young children actively keep track of individual sources' reliability and use that information to inform their learning decisions (see Koenig & Stephens, 2014 for a review). The source monitoring literature, in contrast, characterizes young children as generally poor monitors of source-specific information, particularly when compared to older children and adults (e.g., Ackil & Zaragoza, 1995; Drummey & Newcombe, 2002; Roberts & Blades, 1998). Accounts of source monitoring deficits cite episodic memory binding (e.g., Sluzenski, Newcombe, & Kovacs, 2006), prefrontal cortical and medial temporal lobe development (Cycowicz & Friedman, 2003; Ghetti, DeMaster, Yonelinas, & Bunge, 2010; Mitchell & Johnson, 2009), executive functioning (Raj & Bell, 2010), and metacognition (Taylor & Esbensen, 1994) as aspects of cognitive development underlying age-related deficits in performance. An important secondary aim of the current study, therefore, is to reconcile the contradictory characterizations of young children's source monitoring performance in the selective learning and source monitoring literatures by examining children's explicit monitoring of source information in the context of a selective learning task.

Overview of the Source Monitoring Framework

Children and adults are often required to recall the source, or origin, of their memories, knowledge, and beliefs. *Source* can refer to any identifying feature of the situation in which a memory, fact, or belief was acquired, including the context, the mode of presentation, the sensory modality with which it was perceived, or the particular informant from which it was communicated (Johnson, Hashtroudi, & Lindsay, 1993).

Effective recall of source information is critical to everyday life. It facilitates discriminations between reality and imagination (e.g., Foley, Johnson, & Raye, 1983), true memories and false ones (e.g., Lindsey & Johnson, 2000), quality informants and poor informants (e.g., Corriveau & Harris, 2009; Lampinen & Smith, 1995), original ideas and others' ideas (e.g., Bredart, Lampinen, & Defeldre, 2003), among other things. Failure to recall accurate source information can result in severe consequences, including the incorporation of misinformation from thoughts, imaginations, and suggestions into eyewitnesses' testimony of criminal events (e.g., Ceci & Bruck, 1993), unintentional plagiarism (e.g., Marsh, Landau, & Hicks, 1997), and acceptance of information previously marked as false (e.g., Begg, Anas, & Farinacci, 1992).

According to the Source Monitoring Framework (Johnson et al., 1993; Johnson & Raye, 1981), source information is not specifically 'tagged' during the encoding of events (see, e.g., Brainerd & Reyna, 2002), but is inferred during recollection through a set of processes termed *source monitoring*. The SMF outlines three specific categories of source monitoring. *External monitoring* refers to discriminating between sources of externally transmitted information, which might include differentiating between distinct individuals, presentation modalities, or learning contexts. *Internal monitoring* refers to discriminating between sources of internally derived information, which might include differentiating between performed and imagined actions, also known as 'realization judgments' (Lindsay, Johnson, & Kwon, 1991). *Reality monitoring* refers to discriminating between sources of externally derived and internally derived information, which might include differentiating between perceived and imagined events or between

self-produced and other-produced actions. The current study focuses specifically on children's *external monitoring*.

Source judgments across all categories often occur automatically, requiring minimal conscious effort or reflection. From the perspective of the SMF, rapid source judgments exploit variations in the qualitative characteristics of memories from different origins (Johnson, Foley, Suegas, & Raye, 1988), including differences in perceptual, contextual, emotional, cognitive, and semantic details. These memorial characteristics serve as cues to correct source attributions. Memories with greater or more vivid perceptual details, for example, will most likely be attributed to experienced as opposed to imagined events, whereas memories with greater cognitive operation details will most likely be attributed to imagined as opposed to experienced events. When automatic processes fail to conclusively indicate a memory's source, more effortful strategic processes are employed. Such processes involve active evaluation of potential source attributions in relation to one's prior knowledge and beliefs. External supporting information might also be called upon to corroborate source attributions. Johnson et al. (1988), for instance, found that adults frequently cited supporting information as evidence that a target event (e.g., attending dinner with colleagues) had been experienced as opposed to imagined. Evidence cited included the existence of receipts or bills from the dinner and conversations with colleagues about the dinner after its occurrence. These strategic source-monitoring processes are more frequently employed when the demand for correct source attributions is high (Johnson et al., 1993).

Children's External Monitoring of Unmarked Sources

In learning contexts, children are often in the position of monitoring multiple *external* sources of information. The current project examines children's external source monitoring in the context of a selective learning task. In the traditional selective learning paradigm (e.g., Koenig, Clement, & Harris, 2004), children are presented with two similar speakers (i.e., individuals of the same gender, with similarly neutral expressions, wearing similar styles of clothing) via video, photographs, or live presentation, who vary according to a specific dimension or characteristic of interest (e.g., competence, as evidenced by accurate labeling of common objects). During a test phase, the two speakers provide conflicting novel information (e.g., conflicting labels in reference to a novel object), and children are asked to endorse the information communicated by one of the informants. Findings typically reveal that preschool-aged children effectively monitor speakers' histories of reliability and prefer to endorse novel information communicated by a more reliable individual both immediately and after delays of up to 1 week (e.g., Corriveau & Harris, 2009; see Koenig & Stephens, 2014 for a review). The following section reviews children's source monitoring performance on traditional external monitoring tasks, which tend to feature 'unmarked' sources, or sources with whom children have no prior experience and no reason to mistrust. Given the methodological relevance to selective learning tasks, specific attention is paid to variations in young children's external source monitoring performance in relation to the similarity of sources, the mode of presentation, and the length of the retention interval.

A direct prediction from the SMF (Johnson et al., 1993) is that source attributions should be less accurate when there are fewer *unique* source-specifying cues available. In

other words, source attributions should be less accurate when sources are highly similar to each other. Research suggests that young children are particularly likely to demonstrate source-monitoring deficits when sources are *perceptually* similar to each other. In a seminal study, Lindsay, Johnson, and Kwon (1991) exposed 4-year-olds, 6-year-olds, and adults to a series of words emitted from two audio speakers situated on opposite sides of the room. Participants either heard the same female voice coming from both speakers, or heard distinct voices (one male, one female) coming from both speakers. When the voices were distinct, children performed as well as adults at indicating the side of the room from which they heard specific words. However, children performed below chance at attributing location information when the voices were identical. Powell and Thompson (1996) examined preschool and school-aged children's source memory accuracy for a repeated classroom event in which the event *structure* (i.e., order and gist) remained similar across iterations, but the superficial details of the event varied. For example, a story was told across all iterations, but how it was told (e.g., read by a teacher or played on a tape), its contents (e.g., a person as the main character or an animal), and where children sat to hear it (e.g., individual rubber mats or a large sheet) varied. When asked about a particular instance of the event either a few days or several weeks after it had occurred, those who had experienced the event repeatedly demonstrated better recall for details that were consistent across all iterations, but often misattributed details of other instances of the event to the particular instance they were reporting on. Both of these examples confirm the SMF prediction that similar external

sources (be they perceptually or structurally similar) are more difficult for young children to discriminate than dissimilar sources.

Social transmission of information is not constrained to learning situations featuring live communication or action. Children and adults often learn from others through reading books, watching television, listening to the radio or podcasts, and viewing slideshows. Do children remember certain presentation modalities better than others? Roebers, Gelhaar, and Schneider (2004) explored this possibility by exposing 5- to 10-year-old children with a magic show live, via film, or via slides, and interviewing them about the event a week later. Results indicated that children who observed the show live recalled the event most accurately and were most resistant to misleading questions about the event, suggesting that live learning events might be particularly salient, memorable, and protected from source confusions, perhaps due to the richer perceptual details associated with them.

Further investigations of children's external source monitoring have revealed that even very young preschoolers successfully discriminate between multiple external sources immediately following a live event, but, for 3-year-old children, performance deteriorates rapidly following a delay period. Kovacs and Newcombe (2006) showed 4- and 5-year-olds a video of two dissimilar speakers (one male, one female) who made a series of statements. When asked to identify the source of the statements immediately after their presentation, 4-year-olds performed well above chance and 5-year-olds performed at ceiling. Gopnik and Graf (1988) demonstrated similarly high levels of external monitoring performance. Three-, 4-, and 5-year-old children learned about the

contents of several drawers by seeing, being told, or inferring what was inside. When asked how they learned about a drawer's contents immediately after each trial, all age groups were able to identify source information at rates above chance. However, age differences were evident as memory demands increased. After delays of a few minutes, 4- and 5-year-olds maintained their high performance, but 3-year-olds struggled to recall accurate source information. When delays are more substantial, source-monitoring performance of older preschoolers suffers. Drummey and Newcombe (2002) exposed 4-, 6-, and 8-year-olds to a series of novel facts communicated by either a puppet or the experimenter. After a week delay, children's memory for the facts and the source of each fact was assessed. Fact memory improved linearly with age, but source memory was substantially better for the 6- and 8-year-old children relative to the 4-year-old children, suggesting a dramatic improvement in the ability to retain source information over time between 4 and 6 years of age. When an even longer retention period is introduced, source monitoring performance in both preschoolers and early school-aged children suffers. Sugimura (2008), for instance, exposed 4- to 6-year-olds and adults to a magic show featuring tricks from 3 female magicians. One month later, participants were asked to identify both the specific tricks they had observed and the magicians who had performed each specific trick. Children displayed high levels of accuracy when recalling specific magic tricks, but performed substantially worse than adults when recalling the source of each specific trick.

In summary, preschoolers' source memory performance is negatively impacted by situations featuring similar sources, events depicted via video or slides, and long retention

intervals. Yet, when participating in selective learning tasks, 3- and 4-year-old children effectively discriminate between perceptually similar sources, who communicate information in structurally similar ways, across a variety of presentation modalities (live, video, or photographs; see Cowell et al., 2013 for a methodological review), in tasks that incorporate long retention intervals (Corriveau & Harris, 2009). It may be that children are particularly biased to monitor and remember *untrustworthy* external sources and more motivated to effectively use source information when asked to make decisions relevant to their learning. The current study explores these possibilities by focusing on children's attention to and memory for untrustworthy (i.e., incompetent and immoral) individuals in Experiment 1, and how children's memory for such individuals relates to their selective learning decisions in Experiment 2.

External Monitoring of Untrustworthy Sources

Despite children's frequent dependence on external sources, externally derived content is not guaranteed to be accurate, and sources can differ markedly in quality. Human sources, specifically, often provide information with the intent to influence the beliefs and behaviors of learners, sometimes at the expense of accuracy and helpfulness (Faulkner, 2011). Evolutionary psychologists propose that specialized cognitive architecture has evolved in humans to facilitate our detection of individuals unlikely to cooperate in situations of social (or communicative) exchange (e.g., Cosmides & Tooby, 1992). Indeed, research suggests that adults demonstrate enhanced attention to and source memory for encounters with untrustworthy individuals. Buchner and colleagues, for example, showed that adults display equivalent recognition memory for faces described

as engaging in cheating behavior, trustworthy behavior, or unusual behavior irrelevant to social exchange, but enhanced source memory for the descriptions of cheaters (Buchner, Bell, Mehl, & Musch, 2009). The authors argue that source memory for untrustworthy individuals serves a greater protective function in situations of social exchange than does recognition memory alone, because it enables one to recall not only that an individual was encountered previously, but that the individual behaved in an untrustworthy manner. Similar patterns of enhanced source memory for untrustworthy individuals have been found in work with young children. Baltazar, Shutts, and Kinzler (2012), for instance, found no differences in 4-year-olds' recognition memory for individuals described as 'mean' relative to those described as 'nice.' However, children were more likely to accurately recall that a 'mean' individual was, in fact, mean and to identify the specific acts that 'mean' individuals were said to have committed.

Investigations of source memory for social exchange-related information (i.e., indicators of an individuals' likelihood of cooperating with others) in children have thus far focused on immoral behavior. One possibility is that, given its principal relevance as an indicator of one's willingness to cooperate in situations of social (Cosmides & Tooby, 1992) and communicative (Sperber et al., 2010) exchange, children have a specific bias to attend to and remember individuals engaging in immoral behavior. Consistent with this proposition, sensitivity to negative evidence of individuals' morality is evident very early in life, with evidence that even young infants discriminate between helpful and hindering social agents (e.g., Hamlin & Wynn, 2011; Hamlin, Wynn, & Bloom, 2007). Furthermore, evolutionary psychologists have argued that an early-developing bias to

attend to and remember immoral or threatening individuals represents an evolutionary adaptation of memory (Bjorklund & Sellers, 2013).

Social psychologists agree that individuals' intentions are important indicators of their likelihood of cooperating in situations of social (or communicative) exchange, but argue that the ability to *act* on those intentions, or individuals' competence, is equally important (Fiske, Cuddy, & Glick, 2007). Effective learning from others in children (and adults) depends on actively monitoring sources for signs of both morality and competence and an ability to evaluate and doubt information communicated by sources likely to be incompetent or immoral (Sperber et al., 2010). Research suggests that morality and competence represent universal dimensions by which adults perceive individuals (Fiske et al., 2007) and social groups (Fiske, Cuddy, Glick, Xu, 2002). Thus, an additional possibility is that children preferentially attend to and remember both immoral *and* incompetent individuals. Experiment 1 will investigate this question by presenting children with individuals described as varying in competence and morality and examining associated differences in their visual attention and memory for these individuals. Given the argument for the primacy of morality and competence in one's social perceptions (Fiske et al., 2007), it might be expected that children display the same pattern of heightened memory for contexts associated with incompetent individuals as they do for contexts associated with immoral individuals (Baltazar et al., 2012).

Another possibility is that children preferentially attend to and remember any form of negative social information. Research supports the existence of a negativity bias, or the tendency to attend to, remember, learn from, and act on negative information more

than positive information, in both children (e.g., Vaish, Grossmann, & Woodward, 2008) and adults (e.g., Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). Research on source memory in adults, however, does not support the contention that all negative social information is monitored and remembered equivalently. For example, adults demonstrate enhanced source memory for individuals described as perpetrators of cheating, but the pattern fails to generalize to individuals described as the victims of cheating, despite the content and valence of the social information remaining largely the same (Bell & Buchner, 2011). Children, however, may require substantial social experience to recognize the primary importance of monitoring and remembering negative characteristics that are maximally relevant to social exchange. The extent to which children, like adults, exclusively show enhanced monitoring and memory when exposed to information relevant to social exchange as opposed to other forms of negative social information will be directly examined Experiment 2, which assesses children's source memory for individuals described immoral, incompetent, or as passive observers of immoral behavior.

Children's Selective Learning from Untrustworthy External Sources

Over a decade of research on preschoolers' selective learning indicates that young children demonstrate precocious monitoring of source-specific information when faced with *incompetent* sources, as evidenced by explicit source judgments and selective learning behavior. In the traditional selective trust paradigm (e.g., Koenig, Clement, & Harris, 2004), preschoolers are presented with two speakers who label a series of familiar objects. One of the speakers consistently provides accurate labels for the familiar objects

and the other consistently provides inaccurate labels. Next, children explicitly judge whether each speaker was "very good" or "not very good" at labeling the objects. During a test phase, the original speakers provide conflicting novel labels for a series of novel object, and children are asked to endorse one of the presented labels. Findings reveal that children as young as 3 or 4 years of age effectively monitor the history of speakers' labeling accuracy and selectively endorse novel labels presented by a previously accurate speaker (Clement, Koenig, & Harris, 2004; Koenig et al., 2004; Koenig & Harris, 2005; Birch, Vauthier, & Bloom, 2008). Children's vigilance against incompetent sources is not restricted to learning situations featuring object labels. Variations of the traditional selective learning task have further revealed that preschoolers effectively monitor and avoid learning from speakers whose messages contain grammatical errors (Sobel & Macris, 2013), factual episodic errors (Ganea, Koenig, & Millet, 2011) insufficient information (Gillis & Nilsen, 2013), and poor underlying epistemic reasons (Koenig, 2012).

Young children monitor not just individuals' statements but also their actions. Infants are more likely to imitate novel actions modeled by an individual who previously interacted with familiar objects competently as opposed to incompetently (Zmyj, Buttleman, Carpenter, & Daum, 2010). Children take into account the success of a source's actions when deciding whether to learn from them as well. Preschoolers more often endorsed and imitated a source who attained successful outcomes through 'inaccurate' or unconventional means (e.g., drinking a glass of water with one's feet) than a source who attained unsuccessful outcomes through conventional means (e.g., picking

up a glass of water with one's hands and spilling it; Scofield, Gilpin, Pierucci, & Morgan, 2013). Children's imitation of successful actions is influenced by group norms. When both the actions of a group and the actions of an individual result in successful outcomes, preschoolers imitate the actions of a group (Wilks, Collier-Baker, & Nielsen, 2014). However, when the actions of a group lead to unsuccessful outcomes, preschoolers imitate the actions of a successful individual.

A growing body of literature suggests that young children also demonstrate enhanced monitoring of source-specific information when presented with evidence of source *immorality*. For example, 3- and 4-year-olds are more likely to accept information from a source described as "nice" than from one described as "mean" (Mascaro & Sperber, 2009), suggesting that the ability to monitor and make epistemic inferences based on trait descriptions indicative of source morality is present early in development. Older preschoolers take into account more specific behavioral descriptions of immoral behavior. For instance, 4-year-olds, but not 3-year-olds, appropriately reject information from a source described as a "big liar who always tells lies" (Mascaro & Sperber, 2009). Older preschoolers also monitor a source's history of immoral behavior. For example, Vanderbilt, Liu, and Heyman (2011) presented 3- to 5-year-olds with a source who consistently helped or tricked a series of 'finders' in a sticker-finding task. When children then adopted the role of 'finder,' 4- and 5-year-olds, but not 3-year-olds, systematically rejected advice offered by the source who had tricked previous finders.

Do children rely more heavily on sources' histories of competent behavior or moral behavior when deciding whom to learn from? Liu, Vanderbilt, and Heyman (2013)

investigated children's evaluations of sources who varied in both morality and competence. They found that 5- and 6-year-olds preferred to accept information from a source with a history of good intentions as opposed to one with a history of bad intentions, regardless of whether their information led to positive or negative outcomes (i.e., an individual finding or failing to find a treat). However, children did not ignore outcome information. They also preferred to accept information from a source whose testimony consistently led to positive outcomes over one whose testimony consistently led to negative outcomes, regardless of their intentions. Thus, children monitor sources for both morality and competence information, and their learning decisions appear to be influenced by both dimensions. The current study also compares children's learning preferences when presented with informants varying in competence and morality, but presents evidence of source competence and morality separately, and additionally examines how children's *memory* for sources varying in these dimensions influences their learning preferences.

Children also must evaluate sources' competence and morality in relation to situational demands when making decisions about whom to learn from. For example, a notoriously dishonest individual might nonetheless have expertise about a topic in question, or a notoriously incompetent individual might have unique access to needed information. Research suggests that young children effectively monitor both the described characteristics of potential sources of information and the demands of the learning situation when deciding whom to learn from, but may sometimes weight trait information more heavily in their decision-making process. Landrum, Mills, and

Johnston (2013) demonstrated that preschoolers more often endorsed claims made by an individual described as nice with relevant expertise over an individual described as nice with irrelevant expertise, suggesting that children were indeed attentive to indicators of situational competence. However, children more often endorsed claims made by a 'nice' non-expert than those made by a 'mean' expert, even when the claims were directly related to the 'mean' expert's area of expertise. Interestingly, children also attributed more knowledge to the 'nice' non-expert than to the 'mean' expert, leading the authors to argue that the moral trait information may have resulted in children exhibiting a 'halo effect,' whereby they attributed other positive characteristics (i.e., knowledge) to the 'nice' source (see also Brosseau-Liard & Birch, 2010 for evidence of a 'halo effect' in the absence of trait labels). Further research suggests a similar tendency for young preschoolers to attribute knowledge to individuals with positive traits. Three-year-olds, for instance, were more likely to attribute knowledge about the contents of a closed box to individuals described as nice, honest, or smart as opposed to those described as mean, liars, or not smart, even though the negative individuals, but not the positive individuals, had seen the contents of the box (Lane, Gelman, & Wellman, 2013).

Together, these findings indicate that trait labels (i.e., 'nice,' 'smart') are highly salient to children and may be more impactful to their learning decisions than other forms of evidence (e.g., areas of expertise, visual access to information) about a source's situational competence. It is also important to note that children relied heavily on the trait labels communicated by others (i.e., the experimenter) to evaluate sources, despite the fact that children never actually witnessed the sources engaging in trait-confirming

behaviors. In fact, communicated trait information was even *more* powerful than observed evidence of sources' situational competence for children in the work by Lane and colleagues (2013), The current study similarly relies on communicated trait information and will examine children's retention of source trait information following a delay period. Previous research has revealed that children demonstrate excellent retention of informants' behavioral histories over time (Corriveau & Harris, 2009), but, given the salience of trait information for young children, it might be expected that children would demonstrate even better memory for sources' traits as opposed to their behavioral histories.

Sources' group affiliations also influence children's perceptions of their competence and morality. According to the Stereotype Content Model (SCM; Fiske, et al., 2002), for example, high-status, competitive out-groups (e.g., rich people) tend to be perceived as highly competent but lacking in moral warmth, whereas low-status, non-competitive out-groups (e.g., non-native English speakers) tend to be perceived as lacking in competence but morally warm. Individuals generally associate morally warm behavior with their in-group members, given their lack of competitiveness with each other (Fiske et al., 2002). Research suggests that children are highly attentive to social group membership information when encountering potential sources of information. Consistent with the SCM prediction that some out-group members will be perceived as less competent than in-group members (Fiske et al., 2002), preschoolers demonstrate a selective preference to accept novel information from native-accented as opposed to foreign-accented sources, even when learning scenarios feature non-linguistic

information, and even when native accent is established through nonsense speech (Kinzler, Corriveau, & Harris, 2011).

Children's preference for in-group members appears to be disrupted when in-group members behave incompetently. Research relying on arbitrary group assignment has shown that evidence of incompetence neutralizes 3- and 4-year-olds' selective preference to solicit and endorse information communicated from an in-group member (MacDonald, Schug, Chase, & Barth, 2013). For 6- and 7-year-olds, evidence of an in-group member's incompetence reverses their in-group bias (Elashi & Mills, 2014). Children's in-group bias is also influenced by moral behavior. Preschoolers show reduced social preferences for and willingness to share with an in-group member who behaves antisocially (Hetherington, Hendrickson, & Koenig, 2014). However, preschoolers still demonstrate a selective preference for novel information communicated by an antisocial in-group member as opposed to a neutral out-group member. Such findings seem to suggest that children do not take a singular stance when evaluating an informant's history of moral behavior, evaluating sources who commit immoral acts in a uniformly negative way. Instead, these findings suggest that children's learning decisions and prosocial evaluations might be dissociated judgments: children may indeed dislike antisocial individuals, but they may nevertheless be willing to learn new information from them. Experiment 2 will further investigate this possibility by examining children's social preferences and willingness to share with immoral individuals (in the absence of group information) in addition to their selective learning from such individuals.

Research clearly demonstrates that indicators of source competence and morality influence children's selective learning *preferences*. Less clear is the extent to which source competence and morality influence children's *retention*, or long-term learning, of communicated information. Children might *prefer* to learn from a more competent and moral individual when given the choice, but ultimately might accept and retain information communicated by any source. Little work has investigated children's long-term retention for information from privileged or problematic sources. The little extant evidence surrounding children's selective long-term learning suggests that children may demonstrate poorer retention of information that is communicated by incompetent sources. For example, 24-month-olds showed more fragile memory for word-object pairings presented by an inaccurate over an accurate source (Koenig & Woodward, 2010). Similarly, preschoolers failed to recall a word-object association after a brief delay when an admittedly ignorant speaker had presented it, but not when a knowledgeable speaker had presented it (Sabbagh & Shafman, 2009). The current study also examines children's selective retention (after a delay of 10 min) of information communicated by variably moral sources in an effort to determine the types of risks that children are sensitive to when learning from others. If children only selectively retain information in response to indications of incompetence and not their moral behavior, this may make them more sensitive to the risks posed by deceptive agents or speakers with conflicts of interest.

The Relation between Source Monitoring and Selective Learning

Although young children seem to demonstrate enhanced monitoring of source-specific characteristics when faced with sources varying in competence and morality, research has yet to directly investigate the relation between children's explicit source memory for problematic individuals and content memory for the information they provide. One possibility is that children's increased attention to sources with questionable competence or morality detracts from their attention to the content of presented information, resulting in heightened source memory but impaired content learning. Several findings suggest that increased attention to source information results in heightened memory for source characteristics. For example, Crawley et al. (2010) found that explicitly instructing preschoolers to direct their attention to the emotions or perceptual features of sources improved their source memory relative to those who focused on themselves or who were given no instructions. High retention for source-specific characteristics is similarly evident in tasks featuring incompetent or immoral individuals (e.g., Corriveau and Harris, 2009; Baltazar et al., 2012). There is also evidence to suggest that children's memory for content information might be impaired when communicated by a problematic source (Koenig & Woodward, 2010; Sabbagh & Shafman, 2009). The current study will directly examine the possibility of a source/content memory tradeoff: first, by determining the extent to which children show heightened attention to and memory for incompetent and immoral sources in Experiment 1, and, second, by assessing children's source memory for individuals varying in competence and morality in relation to children's content memory for the information they communicate in Experiment 2.

Another possibility is that enhanced monitoring of problematic individuals influences children's learning in a more active way by informing their deliberate decisions about when to accept (and reject) novel information from a source. Giles, Gopnik, and Heyman (2002) demonstrated a direct relation between preschoolers' source memory performance and their resistance to misinformation in leading questions. Moreover, preschoolers' resistance to misinformation improved when their source memory was probed prior to the administration of leading questions, suggesting a causal relation between source memory and resistance to suggestion. Further evidence of an active role for source monitoring in learning comes from several studies indicating that problematic sources do not automatically provoke attenuated learning in young children. In contrast, children seem to consider the psychological plausibility of sources' instances of incompetence by evaluating the magnitude, domain, and reasons for speaker errors. For example, preschoolers prefer to accept new information from an inaccurate source with a history of 'small' errors (e.g., saying that there are 9 dots when there are 10) as opposed to an inaccurate source with a history of 'large' errors (e.g., saying that there are 3 dots when there are 10) (Einav & Robinson, 2010; Kondrad & Jaswal, 2012). Preschoolers are also more likely to avoid learning from sources who commit errors for semantic, generalizable information, such as object labels, as opposed to transient, episodic information, such as object locations, despite effectively monitoring sources' histories of inaccuracy in both domains (Stephens & Koenig, 2015). Finally, young children appear to excuse mistakes resulting from a source's lack of relevant perceptual access, and readily accept information from a previously inaccurate source once relevant

perceptual access is restored (Nurmsoo & Robinson, 2009). Thus, children might show enhanced monitoring of negative or problematic sources and yet still accept novel information from them, but only when their prior instances of negative behavior are explainable or not considered relevant to children's learning. In the current study, this could manifest as enhanced source monitoring for individuals displaying any form of negative behavior but effective learning only from those whose behavior children consider less relevant to their learning (e.g., individuals who passively observe immoral behavior).

Children might also be able to effectively *use* source information to guide their selective learning decisions before they can explicitly report on it. A major methodological difference between selective learning tasks and traditional source monitoring tasks is the requirement for children explicitly to report on source information. Children's willingness to endorse communicated information is clearly influenced by source characteristics, but children are not required to explicitly report on who communicated which pieces of information. An example of children's use of source information without effectively reporting on it can be found in work by Robinson and colleagues (Whitcombe & Robinson, 2000; Robinson & Whitcombe, 2003), who investigated children's ability to implicitly use source information in tasks that presented conflicts between children's experience and the claims of a puppet. Both 3- and 4-year-olds consistently made decisions about whether to trust their own judgments about the identity of a hidden object or the claims of a puppet. Even the youngest children based their decisions upon who was the better-informed source, yet failed to explicitly recall the

source of their beliefs (often stating that they were the better-informed source, even when they deferred to the puppet's claim because the opposite was true). These findings suggest that young children might possess a functional, implicit understanding of source information as it relates to their learning before they are able explicitly report on it. In the current study, this implicit understanding could be in manifest children who demonstrate poor source monitoring performance (i.e., recalling who told them communicated information) while still engaging in effective selective learning (i.e., preferring to solicit information from a previously competent or moral source and retaining information communicated by a previously competent or moral source).

Additional Cognitive Processes Related to Selective Learning

The majority of research surrounding children's selective learning has focused on *describing* children's sensitivity to various characteristics of sources. Few studies have investigated the cognitive processes underlying children's abilities to learn selectively, and research on the topic has focused almost exclusively on executive functioning and social cognitive skills. Furthermore, among this subset of studies that investigate the cognitive correlates of selective learning, evidence is mixed regarding possible relations between both executive functioning and social cognitive skills.

Executive function (EF) refers to the constellation of abilities underlying goal-directed behavior, including inhibitory control, working memory, and cognitive flexibility (Miyake et al., 2000). EF supports the engagement of intentional, strategic decision processes, and improves markedly throughout the preschool years (see, e.g., Zelazo, Carter, Reznick, & Frye, 1997). Evidence in support of such a relationship is

found in work by Jaswal and colleagues (2014) who demonstrated that 2- and 3-year-old children's willingness to accept misleading information from consistently unreliable individuals was related to their performance on an inhibitory control task. Children who deferred to an unreliable source performed more poorly on incompatible trials in a spatial conflict task than did children who were less willing to defer. Doebel, Rowell, and Koenig (in press) found evidence for a relation between working memory and 4- and 5-year-olds' ability to detect inconsistency in speakers' messages in a selective learning task. In contrast, Lucas and colleagues (2013) found no relation between children's executive functioning and selective learning in a sample of Turkish and Chinese preschoolers. More specifically, no associations were evident between children's performance on tasks of working memory, cognitive flexibility, or inhibitory control and their tendencies to ask a previously accurate source for new information or endorse the new information she provided. Given the inconsistent findings of a relation between children's EF and selective learning, the current study further investigates the possibility of a relation by incorporating measures of inhibitory control, working memory, and cognitive flexibility into the selective learning task in Experiment 2.

Evidence for the relation between children's social cognitive skills and selective learning is also mixed. Lucas and colleagues (2013) found a positive association between children's performance on a series of false belief tasks and their selective preferences for a previously accurate source. Brosseau-Liard, Penney, and Poulin-Dubois (2015), using a similar task, also demonstrated a relation between children's performance on the Theory of Mind Scale (Wellman & Liu, 2004) and their selective preferences for a previously

accurate source. However, Pasquini and colleauges (2007) as well as Jaswal and colleagues (2014), using a slightly different task, found no relation between children's performance on the Theory of Mind Scale (Wellman & Liu, 2004) and their resistance to misleading testimony from a consistently unreliable source. Given the inconsistent findings of a relation between children's theory of mind and selective learning, the current study also incorporates a measure of social understanding into the selective learning task in Experiment 2.

The Present Studies

The specific aims of this project were (1) to determine whether children demonstrate enhanced memory for situations involving incompetent and immoral individuals, and (2) to determine the extent to which children's source memory relates to their learning decisions and retention of information communicated by incompetent and immoral individuals. Experiment 1 addressed the first aim by presenting children with individuals described as competent, incompetent, moral, or immoral. Children's recognition memory for each individual and memory for the details of each encounter was then assessed. In accord with previous research in children (Baltazar et al., 2012), it was expected that children would show enhanced memory for the details of their encounters with immoral relative to moral individuals, but no differences in their recognition of immoral or moral individuals. Given the additional relevance of competence information in situations of social and communicative exchange (Fiske et al., 2007), I expected children to exhibit a similar pattern of heightened memory for the details of their encounters with incompetent relative to competent individuals.

Experiment 2 addressed the second aim. Children were exposed to two individuals varying in competence and morality. The two individuals then presented a series of facts, and children indicated their preferences about whom to from and their belief in the individual sources. Following a delay, children recalled the content and source of each presented fact. Children's selective learning and selective retention of content was examined in relation to their source monitoring performance.

CHAPTER 2: Experiment 1

Introduction

The purpose of Experiment 1 was to determine whether preschool-aged children demonstrate enhanced memory for their encounters with incompetent and immoral individuals relative to those involving competent and moral individuals. To address this aim, children were presented with a series of photographs depicting faces described as smart, not very smart, nice, or not very nice. Children were then presented with the original faces paired with novel distractor faces and asked to indicate which face they had seen previously and whether that individual was smart, not very smart, nice, or not very nice. In addition, we monitored children's visual attention to each face to investigate the possibility that differences in memory corresponded to differences in looking times.

Method

Participants

The final sample consisted of 72 (45 female) typically developing preschoolers, 24 3-year-olds, 24 4-year-olds, and 24 5-year-olds. A priori power analyses indicated that a sample size of 70 was necessary to attain acceptable statistical power (.80). Participants

were recruited through the Infant Participant Pool (IPP) managed by the Institute of Child Development at the University of Minnesota. Participants were predominately Caucasian and from households of middle- to upper-socioeconomic status (SES), but a range of ethnicities and SES levels were represented.

Materials

Each participant was presented with photographs of 32 adult faces, 16 male and 16 female, with neutral expressions, on a computer monitor. Faces were obtained from the Center for Vital Longevity Face Database (Minear & Park, 2004). All faces selected as stimuli appeared Caucasian and lacked distinctive characteristics, such as facial hair, jewelry, and heavy makeup. The background of each photographed face was edited to white.

In addition, to ensure that the faces did not differ a priori with respect to experimentally-relevant characteristics, 19 undergraduate students indicated the extent to which they found each face attractive and trustworthy. Students were presented with each face individually for 4 sec and asked to rate the face's attractiveness and trustworthiness on a 9-point Likert scale, with 1 representing not at all attractive/trustworthy and 9 representing extremely attractive/trustworthy. Faces were rated as acceptably equivalent across both attractiveness (alpha = .92) and trustworthiness (alpha = .79).

Apparatus

A Tobii Eye Tracker 1750 and the associated software, Tobii Studio 1.0, were used to collect participant eye-tracking data. This particular eye-tracker relies on cameras attached to the computer monitor to track eye movements. Therefore, no head mount or

other technology was attached to participants during the task. Standard calibration procedures were used, and participants were seated approximately 60 to 70 cm from the computer screen to facilitate optimal calibration. All presented faces were established as Areas of Interest (AOI), and participants' fixation duration data for each AOI were exported following the conclusion of the experiment. No children were excluded from the experiment based on limited eye-tracking data, given that variation in children's visual attention represented a secondary aim of the present experiment. However, eye-tracking proved challenging for this age group, and only 38 participants (10 3-year-olds, 13 4-year-olds, and 15 5-year-olds) produced usable eye-tracking data.

Procedure

Each child participated in a Competence Block and a Morality Block, the order of which varied according to condition. Each block consisted of a Familiarization phase and a Test Phase.

Familiarization. The experimenter introduced the task by saying to the child, "Today you're going to see pictures of some new people on this screen. They will either be nice, smart, not very nice, or not very smart, and I want you to pay really close attention to each new person!" The child then observed a series of 8 faces on the computer monitor, each presented for 4 sec. Male and female faces were presented in alternating order.

In the Competence Block, the experimenter introduced and described each face as competent (e.g., "Sarah is a smart person. Today she did math problems and got all of them right.") or incompetent (e.g., "John is not a smart person. Today he did math

problems and got all of them wrong.") during its presentation. In the Morality Block, the experimenter introduced and described each face as nice (e.g., "Eric is a nice person. Today he brought in cookies and everyone got some.") or not nice (e.g., "Emma is not a nice person. Today she stole everyone's cookies and nobody got any.").

Across both blocks, descriptions were presented in positive/negative pairs. Using the example previously provided, the first and second faces presented in the Competence Familiarization phase might be described as being competent or incompetent at solving math problems, and then the third and fourth faces presented would be described as being competent or incompetent at a different skill (e.g., spelling). The faces were presented in constant order for all participants, but their appearance in the Morality or Competence blocks varied according to whether participants received the Morality Block first or the Competence Block first. The paired descriptions associated with each face were counterbalanced. The full list of descriptions used is shown in Table 2.

Test. The Competence and Morality Test phases immediately followed the associated Familiarization phases. In both Test phases, participants were presented with the 8 target faces presented during Familiarization paired with 8 distractor faces. For each target-distractor face pair, participants answered first, a recognition memory question and second, a source-specific memory question. The recognition memory question asked participants to indicate which face they had seen previously (e.g., "Which one is Sarah?"). The source-specific memory question asked participants to recall the described characteristics of each presented individual (e.g., in the Competence test, "Was Sarah very smart or not very smart"; in the Morality test, "Was Eric very nice or not very

nice?"). Children's memory for source-specific characteristics was assessed regardless of the correctness of their recognition memory response. Target faces were presented in the same order in which they appeared during Familiarization.

At the conclusion of the experimental session, children and families were thanked for their participation, and children were given a $10 gift card.

Results

Preliminary analyses revealed no effects of counterbalancing, block order, or gender. Thus, a repeated measures analysis of variance (ANOVA) was conducted with dimension (Competence vs. Morality) and valence (positive vs. negative) as repeated measures factors, and age group (3-year-olds, 4-year-olds, and 5-year-olds) as a between subjects factor. Dependent measures included the proportion of correct recognition judgments, the proportion of correct source-specific judgments, and average fixation duration. Proportional dependent measures were arcsine transformed.

Recognition Memory: "Which one is Sarah?"

Consistent with my expectations, children's proportion of correct recognition judgments did not vary according to dimension (Competence vs. Morality), $F(1, 69) = .012$, $p = .91$. or valence (positive vs. negative), $F(1, 69) = .24$, $p = .63$. Children demonstrated equivalent recall of previously presented faces described as competent, incompetent, moral, and immoral.

As depicted in Figure 1, analyses yielded a main effect of age on the proportion of correct recognition judgments, $F(2, 69) = 8.54$, $p < .001$, partial eta-squared = .20. Follow-up analyses indicated that 5-year-olds made significantly more correct

recognition judgments (M= .85) than did 3-year-olds (M= .66, p < .001) and marginally more correct recognition judgments than did 4-year-olds (M= .75, p = .054).

Source-Specific Memory: "Was Sarah very smart or not very smart?"

As depicted in Figure 2, analyses revealed a main effect of valence on the proportion of correct source judgments, $F(1, 69) = 11.78$, $p = .001$, partial eta-squared = .15. As demonstrated in Figure 1, children were more likely to recall their encounters with negative faces (M = .68), or those described as incompetent and immoral, than they were to recall their encounters with positive faces (M = .48), or those described as competent and moral. The accuracy of children's source-specific judgments did not vary according to dimension (Competence vs. Morality), $F(1, 69) = .002$, $p = .97$. or participant age $F(2, 69) = 1.49$, $p = .23$.

Eye-tracking Analysis

There were no significant effects of dimension, valence, or age on children's average fixation durations, all ps > .19, though this analysis was likely underpowered given the small sample size of children with usable eye-tracking data. Average fixation durations were slightly longer for immoral (M = 2.12) and incompetent faces (M = 2.30) than for their moral (M = 2.05) and competent (M = 2.18) counterparts, respectively.

Discussion

Experiment 1 aimed to examine the extent to which preschoolers show enhanced memory for their encounters with immoral and incompetent individuals relative to their moral and competent counterparts. Findings also replicated previous research with preschoolers and adults demonstrating more accurate reporting about whether previously

presented individuals were described as immoral (i.e., 'not nice') than moral (i.e., 'nice;' Baltazar et al., 2012; Buchner et al., 2009). Children demonstrated above-chance recognition of previously presented individuals overall, and accuracy rates increased linearly with age. Findings also replicated previous research with preschoolers and adults demonstrating more accurate reporting about whether a previously presented individual was immoral (i.e., 'not nice') as opposed to moral (i.e., 'nice;' Baltazar et al., 2012; Buchner et al., 2009).

The primary contribution of Experiment 1 was the demonstration of children's biased memory for the characteristics of incompetent individuals. Children's recognition and source memory for individuals varying in competence paralleled their recognition and source memory for individuals varying in morality. Specifically, preschoolers demonstrated equivalent recognition memory for previously presented competent and incompetent individuals, but more accurate reporting about whether an individual was incompetent (i.e., 'not smart') as opposed to competent (i.e., 'smart'). This indicates that children may be equally biased to remember negative evidence regarding two 'core' social dimensions, morality and competence, argued to be central to adults' perceptions of others (Fiske et al., 2007).

Unclear from Experiment 1 is the mechanism underlying differences in children's memory for situations involving individuals lacking morality and competence. One possibility explored in the current experiment is that differences in children's memory correspond to differences in their visual attention. No differences were evident in children's visual attention towards different types of individuals in the current study, but,

given the small subsample of children who produced usable eye-tracking data, further research is required to draw firm conclusions. However, biases in visual attention seem unlikely to account for the demonstrated differences in source memory given that source information was presented verbally, as opposed to visually. Another possibility is that children's more accurate reporting that previously immoral and incompetent individuals were, in fact, 'not nice' or 'not smart,' represents a response bias (i.e., a tendency to report that every source was 'not nice' or 'not smart') as opposed to enhanced memory for their encounters with negative individuals. However, if this were the case, one would expect children to demonstrate below-chance performance when recalling the smartness and niceness of positive individuals. In fact, children's source memory performance for positive individuals did not differ from chance (M = .48), indicating that, on average, they were equally likely to claim that a previously positive individual was smart/nice or not smart/not nice. There was variability in response patterns, and some children clearly applied the strategy of reporting that every source was 'not nice' or 'not smart:' 13 children (18%) demonstrated a strong negative response bias after being exposed to faces varying in morality (stating that 7/8 or 8/8 of the individuals had been 'not nice'), and 15 children (21%) did so after being exposed to faces varying in competence. The final possibility, and one that seems plausible for the majority of children in the current study, is that the differences in children's memory for situations involving individuals varying in competence and morality are attributable to biases in memory, as opposed to biases in attention or responding.

CHAPTER 3: Experiment 2

Introduction

Findings from Experiment 1 revealed that children are biased to remember the characteristics of incompetent and immoral individuals relative to their competent and moral counterparts. The primary aim of Experiment 2 was to determine whether children's enhanced memory for the characteristics of incompetent and immoral individuals relates specifically to their selective preferences to solicit information from and express belief in more competent and moral individuals and to their selective retention of information communicated by more competent and moral individuals. Toward this end, I assessed children's selective learning preferences and retention of novel facts communicated by competent, incompetent, moral, and immoral individuals as well as their memory for the source (i.e., who told them) each fact. Based on children's enhanced memory for the characteristics of incompetent and immoral individuals in Experiment 1, I expected that children would demonstrate enhanced source memory for incompetent and immoral individuals. No directional hypotheses were made regarding the nature of the relation between source memory and selective learning. As discussed previously, children's selective learning could be impacted by their source memory in several different ways, including, but not limited to, a source/content memory tradeoff (e.g., children demonstrate enhanced memory for negative sources but diminished retention for the information they communicate), active use of source information (e.g., children demonstrate enhanced memory for negative sources but diminished retention only for information communicated by individuals whose negative behavior is relevant to their learning), or implicit use of source of information, (e.g., children demonstrate poor

explicit reporting on source information and diminished retention for the information communicated by negative sources).

A secondary aim of Experiment 2 was to evaluate whether children show source memory and selective learning when presented with negative individuals whose characteristics are not directly relevant to social exchange. Therefore, a group of children participated in a 'neutral' condition, in which a 'positive-neutral' source was described as passively viewing moral behavior, and a 'negative-neutral' source was described as passively viewing immoral behavior.

A final aim of Experiment 2 was to investigate additional cognitive processes, apart from source monitoring, associated with children's selective learning. Given the promising yet inconsistent evidence for relations between children's selective learning and various components of executive function (Doebel et al., in press; Jaswal et al., 2014; Lucas et al., 2013) and theory of mind skills (Jaswal et al., 2014; Lucas et al,. 2013; Brosseau-Liard et al., 2015), these relations were further examined in Experiment 2.

Method

Participants

The final sample consisted of 96 (52 female) typically developing children, 48 4-year-olds and 48 6-year-olds. A priori power analyses indicated that a sample size of 90 was necessary to attain acceptable statistical power (.80). Participants were recruited through the IPP managed by the Institute of Child Development at the University of Minnesota. Participants were predominately Caucasian and from households of middle- to upper-socioeconomic status (SES), but a range of ethnicities and SES levels were

represented.

Materials

Stimuli. Each participant was presented with photographs of two female faces, representing the two informants, with neutral expressions, on a computer monitor. The two faces were obtained from the Center for Vital Longevity Face Database (Minear & Park, 2004). Those in the Competence Familiarization Condition were presented with photographs depicting a chair, shoe, and cup. Those in the Morality and Neutral Familiarization conditions were presented with photographs of scenes depicting an individual with a cookie, an individual handling money, and two individuals playing with toys. Photographs were edited such that faces were not visible in any scene. The photographs used during Familiarization are shown in Table 3. All participants, regardless of Familiarization condition, were presented with photographs of 12 rare animals and associated pseudo-word names during the Learning phase. Pilot testing confirmed that children were not familiar with the animals, nor their real names. The photographs of the animals and the associated names used during the Learning Phase are shown in Table 4. The backgrounds of all photographs used in the experiment were edited to white.

Parent-Report Measures. Parents completed the 42-item *Children's Social Understanding Scale* (Tahiroglu et al., 2014), which assess children's understanding of belief, knowledge, perception, desire, intention, and emotion. Parents also completed a 4-item Authoritarianism scale (Tagar et al., 2014).

Procedure

Participants were assigned to receive either Competence, Morality, or Neutral Familiarization. The remainder of the procedure was identical across conditions and consisted of Explicit Judgment, Affiliation, Resource Allocation, Learning, Delay, and Test.

Familiarization Phase. The experimenter introduced the task by saying, "Today you're going to see two new people. One of them is very smart (very nice; watched movies showing very nice people) and one of them is not very smart (not very nice; watched movies showing not very nice people). I want you to pay really close attention to these new people because I'm going to ask you some questions about them!" Participants were then shown photographs of the two informants and introduced to them (e.g., "This is Katie."; "This is Sarah.")

In the Competence Condition, participants were presented with a photograph of an informant along with a photograph of a familiar object. One of the informants was described as being smart and as labeling the familiar object correctly (e.g., "Sarah is very smart. See this? Sarah says this is a chair."), and the other was described as being not smart and as labeling the familiar object incorrectly (e.g., "Katie is not very smart. See this? Katie says this is a tree."). In the Morality Condition, participants were presented with a photograph of an informant and a photograph of a described scene. One of the informants was described as being nice and as telling the truth (e.g., "Sarah is very nice. See this? Sarah wanted the last cookie but she told her sister where it was hidden."), and the other was described as being not nice and as lying (e.g., "Katie is not very nice. See this? Katie wanted the last cookie so she lied to her sister about where it was hidden.").

In the Neutral Condition, participants were presented with the same photographs as those in the Morality Condition. The descriptions, however, varied. One of the informants was described as watching a movie showing a nice person that told the truth (e.g., "Sarah watched a movie showing a very nice person. See this? In the movie, a girl wanted the last cookie but she told her sister where it was hidden."), and the other was described as watching a movie showing a not nice person that lied (e.g., "Katie watched a movie showing a not very nice person. See this? In the movie, a girl wanted the last cookie so she lied to her sister about where it was hidden.").

Participants in all conditions observed three familiarization trials. The positive (i.e., smart, nice, etc.) informant remained positive across all three trials and the negative (i.e., not smart, not nice, etc.) informed remained negative across all three trials. The identity of the positive and negative informants was counterbalanced.

Explicit Judgment. After the Familiarization Phase, participants' memory for the smartness and niceness of the informants was assessed through Explicit Judgment questions. Participants were presented with photographs of both informants individually and asked to indicate whether that informant was very smart or not very smart (Competence Condition), very nice or not very nice (Morality Condition), or had watched movies showing a very nice or not very nice person (Neutral Condition). Participants were then presented with photographs of both informants and asked to indicate which of the two was smarter (Competence Condition), nicer (Morality Condition), or had watched movies of a nicer person (Neutral Condition). The purpose of these Explicit Judgment questions was to determine the extent to which children monitored information regarding

sources' competence, morality, and positivity.

Affiliation. Next, participants' willingness to affiliate with each informant was assessed. Participants were presented with photographs of both informants individually and asked two questions. First, they were asked to indicate whether or not they would be friends with the depicted informant (i.e., "Would you like to be friends with Sarah?). Second, they were asked to indicate who they would like to be friends with more (i.e., "Who would you like to be friends with more, Katie or Sarah?").

Resource Allocation. After the Affiliation judgments, two plastic cups bearing the faces of the two informants were placed in front of the participants. They were then given five paper coins and asked, "How many do you want to give to Sarah?" and "How many do you want to give to Katie?" Participants were encouraged to distribute all five of the coins between the two informants.

Learning Phase. The Learning Phase immediately followed Resource Allocation. During each Learning trial, participants were presented with a photograph of a novel animal along with photographs of the two informants. The experimenter labeled the animal and administered an Ask questions, requesting that the participant indicate which of the two informants they wanted to ask about the animal (e.g., "This is a matchie. Do you know about matchies? Who would you like to *ask* about matchies, Katie or Sarah?"). Participants were then presented with a photograph of the animal, a photograph of the animal's food or habitat, and a photograph of the informant described as relaying the information. The experimenter then communicated the animal fact to the participant (e.g., "Katie says that matchies live in the mountains."). In an effort to ensure that participants

paid attention to the communicated facts, the experimenter requested that the child repeat the fact immediately after hearing it (e.g., "Where did Katie say that matchies live?). The experimenter repeated the trial as many times as necessary for participants to report the fact accurately. Next, the experimenter administered a Source Endorse question, requesting that the participant indicate whether they believed the informant (e.g., "Do you believe Katie?").

Participants received 12 learning trials total. Each informant was described as communicating six facts, three facts about animals' habitat and three about diet. The facts associated with each informant were counterbalanced. As such, the informant for each fact was predetermined by counterbalancing condition, and did not necessarily match the child's choice of informant based on their responses to Ask questions. In cases of a mismatch, the experimenter stated, "It looks like we're going to hear from Katie (Sarah) this time" and continued with the trial.

Delay. A 10-min delay followed the Learning Phase. The duration of the delay period was established through pilot testing and informed by prior research on external source monitoring by Kovacs and Newcombe (2006) that exposed children to two sources communicating a similar number of statements. During the delay period, children first completed the backward word span task (e.g., Carlson, Moses, & Breton, 2002). The task assesses working memory by requiring children to repeat a verbally-presented list of 2 to 5 words in reverse order. Next, children played a version of the game Memory, requiring them to remember the locations of and identify matching pairs of animals. Finally, children completed the Head Toes Knees Shoulders (HTKS) task (Ponitz et al.,

2008), which assesses inhibitory control and working memory. In the HTKS task, children are instructed to perform the opposite action of that requested by an experimenter. For example, when the experimenter says, "Touch your head," instead of following the command, the child is supposed to touch their toes. Likewise, when the experimenter says, "Touch your toes," the child is supposed to touch their head. These specific executive functioning tasks were chosen due to their short duration, reliability and validity for the age group in question, and their targeting of aspects of executive functioning (i.e., working memory and inhibitory control) found to be related to children's selective learning in previous work (Jaswal et al., 2014; Doebel et al., in press).

Test Phase. When the 10-min delay ended, participants completed a second set of Explicit Judgment questions identical to the first set. Participants were then presented with 12 test trials, assessing their memory for the facts and their associated sources that had comprised the previously presented 12 learning trials. In each test trial, participants first saw a photograph of a previously presented animal along with a photograph of its habitat/diet and a foil photograph of a habitat/diet associated with a different animal they learned about. Participants were asked to identify the photograph depicting the correct habitat/diet of the target animal (e.g., "Which one shows where matchies live?"). Next, participants rated their confidence in the fact on a 3-point scale consisting of a sad face (representing 'not sure'), a neutral face (representing 'a little sure'), and a happy face (representing 'very sure'). Finally, participants saw photographs of both informants and were asked to indicate who communicated the fact about the target animal (e.g., "Who

told you about matchies, Katie or Sarah?").

At the conclusion of the Test Phase, children and families were thanked for their participation, and children were offered a small toy in addition to a t-shirt or $10 gift card.

Results

Preliminary analyses revealed no effects of counterbalancing or gender. Thus, reported analyses collapse across these factors. All proportional dependent measures were arc-sin transformed.

Explicit Judgment Performance

When asked to state whether or not the previously positive informant was very smart (very nice; watched movies of very nice people), 100% of children in the Competence Familiarization condition, 97% of children in the Morality Familiarization Condition, and 87% of children in the Neutral Condition responded affirmatively. The difference across conditions was marginally significant, $F(2, 93) = 2.81, p = .06$. When asked the same question in reference to the negative informant, 0% of children in the Competence Familiarization condition, 0% of children in the Morality Familiarization condition, and 12.5% of children in the Neutral condition responded affirmatively. The difference across conditions was significant, $F(2, 93) = 4.43, p < .05$. When asked to indicate which of the two informants was *more* positive (i.e., smarter, nicer, etc.), 100% of children in the Competence condition, 100% of children in the Morality condition, 91% of children in the Neutral condition referenced the more positive informant. The difference across conditions was significant, $F(2, 93) = 3.21, p < .05$.

Following the delay period, when asked to state whether or not the previously positive informant was very smart (very nice; watched movies of very nice people), 97% of children in the Competence Familiarization condition, 97% of children in the Morality Familiarization Condition, and 87% of children in the Neutral Condition responded affirmatively. The difference across conditions was nonsignificant, $F(2, 93) = 1.60$, $p = .21$. When asked the same question in reference to the negative informant, 0.30% of children in the Competence Familiarization condition, 0.30% of children in the Morality Familiarization condition, and 12.5% of children in the Neutral condition responded affirmatively. The difference across conditions was nonsignificant, $F(2, 93) = 1.60$, $p = .21$. When asked to indicate which of the two informants was more positive (i.e., smarter, nicer, etc.), 100% of children in the Competence condition, 97% of children in the Morality condition, 84% of children in the Neutral condition referenced the more positive informant. The difference across conditions was significant, $F(2, 93) = 3.92$, $p < .05$. Children's initial explicit judgments did not differ significantly from their delayed explicit judgments in any Familiarization condition or in response to any question posed (all ps $> .38$).

Affiliation

When asked whether or not they would be friends with the previously positive informant, 87% of children in the Competence Familiarization Condition, 87% of children in the Morality Familiarization Condition, and 94% of children in the Neutral Familiarization Condition responded affirmatively. The difference across conditions was not significant, $p = .65$. When asked the same question in reference to the negative

informant, 28% of children in the Competence Familiarization condition, 6% of children in the Morality Familiarization condition, and 25% of children in the Neutral condition responded affirmatively. The difference across conditions was marginally significant, $F(2, 93) = 2.90, p = .06$. When asked to indicate which of the two informants they would like to be friends with more, 97% of children in the Competence condition, 94% of children in the Morality condition, 81% of children in the Neutral condition referenced the more positive informant. The difference across conditions was marginally significant, $F(2, 93) = 2.64, p = .078$.

Resource Allocation

A between-subjects ANOVA revealed a marginal effect of Familiarization Condition on the number of coins allocated to a previously positive informant, $F(2, 90) = 2.43, p = .09$, partial eta-squared = .05. Children in the Competence ($M = 3.59$) and Morality ($M = 3.66$) familiarization conditions tended to allocate a greater number of coins to the positive informant than did those in the Neutral condition ($M = 3.22$). Analyses also yielded a marginal effect of Age group on the number of coins allocated to a previously positive informant, $F(1, 90) = 3.18, p = .078$, partial eta-squared = .03. Six-year-olds ($M = 3.65$) tended to allocate a greater number of coins to the positive informant than did 4-year-olds ($M = 3.33$).

Selective Learning

A between-subjects ANOVA revealed no differences in the proportion of trials children preferred to *Ask* a previously positive informant for information about a novel animal according to Familiarization Condition, $ps > .20$. Children in the Competence (*M*

= .89), Morality (*M* = .88), and Neutral (*M* = .80) conditions all demonstrated strong preferences for the previously positive informant. However, analyses did yield a main effect of Age group on children's *Ask* question performance, $F(1, 90) = 6.10$, $p < .05$, partial eta-squared = .06. Six-year-olds preferred to ask the previously positive informant more frequently (*M* = .90) than did 4-year-olds (*M* = .80).

A repeated measures ANOVA revealed a significant main effect of Informant Valence on children's willingness to *Endorse* the source of communicated facts, $F(1, 90) = 109.43$, $p < .001$, partial eta-squared = .55. For example, when asked, "Do you believe Katie?", children more often expressed their belief in positive informants (*M* = .91) than in negative informants (*M* = .47), regardless of Familiarization Condition. This relation is depicted in Figure 3. However, this effect was qualified by a significant interaction between Informant Valence and Age group, $F(1, 90) = 10.92$, $p = .001$, partial eta-squared = .11. Both 6-year-olds (*M* = .95) and 4-year-olds (*M* = .86) expressed their belief in positive informants at high frequency, but 6-year-olds (*M* = .36) were less likely to express belief in negative informants than were 4-year-olds (*M* = .57).

Content Memory

A repeated measures ANOVA yielded a main effect of Informant Valence on the proportion of communicated facts recalled, $F(1, 90) = 8.10$, $p < .01$, partial eta-squared = .08. As shown in Figure 4, children recalled significantly more facts communicated by positive informants (*M* = .72) than facts communicated by negative informants (*M* = .62), regardless of Familiarization Condition.

In addition, the proportion of communicated facts recalled varied significantly

according to Age group, $F(1, 90) = 9.49$, $p < .01$, partial eta-squared = .09. Six-year-olds recalled significantly more facts overall ($M = .74$) than did 4-year-olds ($M = .62$).

Source Memory

Analyses also revealed a main effect of Informant Valence on the proportion of correct sources recalled, $F(1, 90) = 8.83$, $p < .01$, partial eta-squared = .09. As shown in Figure 5, children more often recalled who told them a fact when the source was positive ($M = .66$) as opposed to negative ($M = .55$), regardless of Familiarization Condition.

The main effect of Age group on the proportion of correct sources recalled was marginally significant, $F(1, 90) = 3.68$, $p = .058$, partial eta-squared = .04. Six-year-olds tended to recall the source of communicated facts ($M = .66$) more often than did 4-year-olds ($M = .55$).

Confidence

Analyses demonstrated a marginal effect of Informant Valence on children's average confidence in their recall of communicated facts, $F(1, 90) = 2.83$, $p = .096$, partial eta-squared = .03. Children tended to have more confidence in facts communicated by positive informants ($M = 1.56$) than in facts communicated by negative informants ($M = 1.49$), regardless of Familiarization Condition.

Correlational Analyses

Discussion of correlational findings is limited to those cognitive and social processes tested in relation to children's selective learning. The full correlation matrix is presented in Table 1.

Relation between Selective Learning and Source Memory. Children's source

memory for facts communicated by the positive source was associated with two measures of selective learning: the proportion of trials in which children preferred to ask the positive informant for information about novel animals, $r(96) = .37$, $p < .01$, and the proportion of trials in which children expressed belief in the negative informant, $r(96) = -.38$, $p < .01$. Children who exhibited a greater tendency to ask the positive informant for novel information demonstrated better source memory for facts communicated by the positive informant. In addition, those who were less likely to express belief in the negative informant demonstrated better source memory for facts communicated by the positive informant. These relations remained significant after controlling for age.

Individual Differences in Selective Learning. The proportion of trials in which children expressed belief in the negative informant was associated with their performance on the HTKS assessment, $r(96) = -.20$, $p < .05$. Specifically, children who more frequently expressed belief in the negative informant exhibited poorer performance on the HTKS task. Children's selective retention for facts communicated by the positive informant was associated with their performance on the HTKS task, $r(96) = .27$, $p < .05$, and the backward word-span task, $r(96) = .30$, $p < .05$. After controlling for age, however, these relations were no longer significant. Children's social understanding and parent authoritarianism were not related to their selective learning in the current study.

Discussion

Experiment 2 assessed children's selective learning of novel facts communicated by competent, incompetent, moral, and immoral individuals and their memory for the source of each fact. Replicating prior research on selective learning, children demonstrated a

strong preference to ask the previously competent and moral sources for new information. In addition, children were more likely to express belief in the competent and moral sources than in the incompetent or immoral sources. Children also exhibited selective retention of communicated information. Children recalled more facts, and expressed more confidence in their recollection of facts, when they were communicated by the competent and moral sources relative when they were communicated by the incompetent and immoral sources. Age-related differences were also evident in children's selective learning, resource allocation, source memory and content memory. Six-year-olds, relative to 4-year-olds, demonstrated a stronger preference to ask the previously competent/moral source for new information, a greater distribution of coins to the previously competent/moral source, better source memory overall, and better content memory overall.

With respect to source memory, contrary to expectations, children more often remembered the source of facts communicated by the competent and moral informants. One potential explanation for this is that, believing the competent and moral informants to be more likely to provide accurate information relative to the incompetent and immoral informants, children were more attentive during learning trials featuring the positive informant. This explanation is further supported by children's greater retention of the content of facts communicated by the competent/moral informant relative to those communicated by the incompetent/immoral informant. Another possibility is that children were more likely to infer that the more competent and moral informant was the source of a communicated fact in cases when they were unsure of who presented it. This

possibility corresponds with the predominate conception of source information as inferred based on one's recollection of source-specifying characteristics as opposed to specifically tagged during event encoding (Johnson et al., 1993). To differentiate between these two possibilities, future research might ask children to justify *how* they made a specific source judgment (e.g., "How do you know Katie told you about matchies?") and analyze the extent to which they recall details about the learning event (e.g., recalling Katie's face on the slide about matchies), or trait information about the source in question (e.g., recalling that Katie is very smart).

Experiment 2 explored the association between children's source memory and selective learning. Children who demonstrated better source memory for facts communicated by the competent/moral informant exhibited a greater tendency to (1) ask the competent/moral informant for novel information and (2) express disbelief in information communicated by the incompetent/immoral informant.

An additional goal of Experiment 2 was to examine children's patterns of selective learning and source memory for individuals with positive and negative characteristics not directly related to social exchange. Children in the Neutral condition were less likely to correctly indicate which of the informants was negative (i.e., watched movies of a not nice person) and positive (i.e., watched movies of a nice person) than those exposed to informants varying in competence or morality. This suggests that children might be less likely to track informant characteristics that are not relevant for social exchange. However, contrary to hypotheses, children in the Neutral condition still used the positive and negative informant information presented to modulate their learning and memory.

They performed comparably to those in the Competence and Morality conditions across all measures of selective learning and memory. Specifically, children in the Neutral condition demonstrated a preference to ask the previously positive-neutral informant for novel information and more often expressed belief in facts communicated by the positive-neutral informant. Children in the Neutral condition also demonstrated better retention, confidence, and source memory when recollecting facts communicated by the positive-neutral informant.

Although the positive and negative informant information presented across conditions similarly influenced children's memory and selective learning decisions, it did not equivalently influence children's social affiliation and resource allocation decisions. Children were marginally less likely to state that they would want to be friends with an immoral individual relative to an incompetent individual or one who watched immoral actions in a movie. In addition, children in the Neutral condition demonstrated marginally lesser preferences to indicate the positive informant as the individual they would want to be friends with the most and to unevenly distribute resources in favor of the positive informant. These patterns suggest that children's decisions to affiliate with an individual may be especially influenced by the individual's history of moral behavior, and children's resource allocation decisions may be more impacted by an individual's history of moral or competent behavior than by less relevant actions carrying positive or negative valence.

The final goal of Experiment 2 was to investigate additional cognitive processes, apart from source monitoring, that might support children's selective learning. After

controlling for age, neither children's executive function (as measured by the HTKS and backward word-span tasks) nor their social understanding were related to their selective learning performance.

General Discussion

The current study sought to determine (1) the extent to which children demonstrate enhanced memory for situations involving incompetent and immoral individuals, and (2) how this potential memory bias manifests in children's selective learning preferences, retention of communicated information, and source monitoring in situations featuring incompetent and immoral informants. Experiment 1 directly addressed the first aim by presenting preschoolers with a series of individuals described as smart, nice, not smart, and not nice. We assessed their recognition memory and memory for the described characteristics of each individual. Children demonstrated enhanced memory for the described characteristics of immoral and incompetent individuals relative to their moral and competent counterparts. Experiment 2 addressed the second aim by presenting children with two individuals varying in competence and morality and assessed children's willingness to solicit novel information from them, the likelihood of expressing belief in the source, retention of the content of the novel facts they communicated, and memory for the source (i.e., who told them) of each communicated fact. Children exhibited a preference to solicit novel information from a competent/moral individual, greater belief in and retention of information communicated by a competent/moral individual, and more accurate source judgments when a competent/moral individual had served as the informant.

Children's tendency to show enhanced recall for positive sources of information in Experiment 2 (when asked, e.g., 'Who told you about matchies?') was somewhat unexpected given their memory advantage for negative individuals in Experiment 1 (when asked, e.g., 'Was Katie very smart/nice or not very smart/nice?'). However, given that these two questions probe distinct characteristics of a source, it might be more appropriate to examine children's memory performance in Experiment 1 in relation to their explicit judgment performance in Experiment 2, which also required children to indicate whether each informant was nice/smart or not nice/not smart. Nearly all children in the Competence and Morality conditions in Experiment 2 responded as expected in response to the explicit judgment questions, stating that the positive informant was smart/nice and that the negative informant was not smart/not nice, both initially and following the delay. This suggests that children in Experiment 2 were highly effective at monitoring and retaining both positive and negative indicators of competence and morality over time. Children's successful recall of both the positive and negative characteristics of speakers in Experiment 2 (as opposed to biased memory for negative characteristics of speakers in Experiment 1) may be a product of the lower memory demands in Experiment 2. Children were only exposed to two sources in Experiment 2, compared to 16 sources in Experiment 1. Interestingly, children's high levels of monitoring negative individuals across both experiments (and potentially biased memory for their characteristics in Experiment 1) did not generalize to the learning situation in Experiment 2, as evidenced by children's poorer content memory and poorer source memory for facts communicated by negative individuals. The underlying reasons for the

lack of generalization are unclear. However, it may be that because children were not in the position to use source information to make *learning decisions* in Experiment 1, their memory was more influenced by sources' negative characteristics. In novel learning situations, children may recognize the greater utility of attending to sources most likely to provide them with quality information, resulting in greater source memory for trustworthy individuals and greater retention of the information they communicate.

Taken together, Experiments 1 and 2 provide insight into the characteristics of individuals that children attend to and remember over time. Consistent with previous research with preschoolers and adults (e.g., Baltazar et al., 2012; Buchner et al., 2009), children attended to indicators of individuals' *morality* and retained that information over time. Experiment 1 revealed that children also attend to and retain information regarding individuals' *competence,* and Experiment 2 demonstrated that children use information about both morality and competence to inform their learning decisions and to selectively retain communicated content. The neutral conditions of Experiment 2 also showed that children do not exclusively take into account indicators of morality and competence when monitoring individuals or when making selective learning decisions, but also take into account to positive and negative characteristics that are arguably less relevant to social exchange. Children appeared less likely to spontaneously monitor the positive and negative information provided about the sources in the neutral condition, as evidenced by their poorer recall of which source had passively observed immoral behavior both immediately after being exposed to the sources and following the delay. However, children were similarly willing to learn from competent sources, moral sources, and

sources who passively observed moral behavior, and similarly resistant to learn from incompetent sources, immoral sources, and sources who passively observed immoral behavior. Children's broad pattern of selective learning and retention in the current study appear more consistent with accounts of a general negativity bias in childhood (e.g., Vaish, Grossmann, & Woodward) than with accounts suggesting the primacy of certain core dimensions (e.g., competence and morality in social perception in adults; Fiske, Cuddy, & Glick, 2007). One topic for future research is the extent to which the understanding of morality and competence as principally relevant during learning situations increases with development and greater social experience. Current research suggests that children's social environment meaningfully impacts the aspects of individuals they find salient and important. Physically abused children, for example, are highly attentive to those cues that suggest anger or hostility (see, Pollak, 2013 for a discussion). Additional work on the types of individuals that negatively influence children's learning and memory might shed light on the range of cues or signals that children find relevant to their social interactions and learning decisions.

Another possible explanation for children's resistance to learn from a negative individual in the Neutral condition in Experiment 2 is that children did not interpret the individual's behavior as 'neutral.' Despite the absence of information regarding the negative-neutral individual's intentions, children may have perceived the negative-neutral individual as having intentionally selected to watch a movie with immoral content, which would have then led them to believe that the negative-neutral informant was herself immoral or harbored odd or negative preferences. This possibility is supported by the fact

that a small number of participating children in the Neutral condition spontaneously asked the experimenter '*why*' the negative-neutral individual watched 'not very nice movies.' As with much research investigating possible negativity biases in learning and memory, a central limitation of Experiment 2 is that the neutral condition might not have been truly neutral (see also discussion by Baumeister et al., 2001; Doebel & Koenig, 2013; Rozin & Royzman, 2001; Vaish, et al., 2008). However, it is important to remember that not all children evaluated the negative-neutral individual as less moral, given the greater likelihood of them choosing to affiliate with and distribute resources to the negative individual than those in the Morality condition.

This study also provides insight into the relation between children's selective learning and source monitoring. More accurate source memory for facts communicated by the positive informant was associated with traditional measures of children's selective learning preferences. Specifically, children who demonstrated better source memory for facts communicated by the positive informant more often solicited the positive informant for novel information and expressed disbelief in the negative informant during a learning situation. Children's source memory was not related to their retention. This suggests that, even when children recall *who* told them information in learning situations featuring, their long-term learning of *what* was communicated is not guaranteed.

What is the mechanism underlying the relation between children's selective learning and source monitoring? One possibility is that children actively recruit source information during both novel learning situations and subsequent recall of communicated information and actively use it to guide their learning preferences and reporting of

communicated information. Results from the current study are consistent with this interpretation, given that effective source memory was associated with children's selective preferences for whom to learn from and selective endorsements of positive sources. Another possibility suggested in the extant literature is that children do not consciously recruit source information during learning situations, but use such information implicitly to guide their learning decisions and resist misinformation (e.g., Robinson & Whitcombe, 2003). Although children in the current study demonstrated their ability to explicitly recall source information when directly asked, the extent to which children's learning decisions were influenced by their conscious consideration of source information is unclear. Children could have used source information implicitly to guide their learning in-the-moment, and could have only engaged in conscious reflection on source information later when required to explicitly recall the source of each fact. Both possibilities could explain the pattern of results in the current study.

Another contribution of the current study is its demonstration of children's selective retention of information communicated by competent and moral sources. Children were less likely to accurately report the content of facts communicated by incompetent, immoral, or negative informants. Previous research found evidence for more fragile word-object associations in toddlers and preschoolers when such associations were presented by blatantly inaccurate (Koenig & Woodward, 2010) or admittedly ignorant (Sabbagh & Shafman, 2009) informants. The current study extended this prior research to the domain of morality and to more naturalistic, non-linguistic learning stimuli retained over a longer duration. An important outstanding question concerns *why* children exhibit

poorer retention of information communicated by negative individuals. As discussed previously, children may modulate their attention to learning situations featuring negative informants and, as a result, form weaker memory representations for the information they communicate. Alternatively, children may robustly attend to learning events featuring negative informants but actively reject the information they communicate, even in the midst of successful recollection, and select a different response option. Sabbagh and Shafman (2009) found that preschoolers demonstrate accurate episodic recall when asked by a previously ignorant informant, 'Which one *did I say* was the blicket' as opposed to 'Which one *is* the blicket.' However, children's recall for the word-object association presented by the ignorant informant, regardless of the questioning used, deteriorated rapidly. This work suggests that children might (1) initially recall the information communicated by a negative informant but actively reject generalizing it, and (2) thus, representation of this information in long-term semantic memory is blocked. Future research on children's selective retention should further examine variation in recall according to the question posed in order to determine what exactly children remember from learning event with problematic individuals, and for how long. Future work should also employ free-recall test designs to assess retention of information communicated by negative informants in the absence of alternative response options.

The current study examined additional cognitive processes, apart from source monitoring, that have been proposed to relate to children's selective learning. Experiment 2 assessed the relations between children's performance on two measures of executive functioning (HTKS and backwards word-span task), their parent-reported social

understanding, and their selective learning preferences and retention. No relation was evident between parent-reported social understanding and children's selective learning. Children's performance on the HTKS task was related to their selective learning preferences and their selective retention, and children's performance on the backward word-span task was also related to their selective retention. However, these findings were no longer significant after controlling for age. Conceptually, age-related improvements in cognitive processes such as working memory and inhibitory control may support selective learning by allowing children to keep relevant source-specific characteristics in mind while learning new information and to appropriately inhibit acceptance of information from problematic sources. Future research should explore additional social and cognitive processes related to selective learning and work to identify causal relations between cognitive processes such as source monitoring and executive functioning and children's selective learning. Work in this direction will further clarify *how* young children effectively learn selectively.

Conclusion

In summary, the current study examined children's potential source memory biases for individuals varying in competence and morality and the relation between children's source memory and selective learning. Findings yielded insights into *what* children monitor and use to guide their learning decisions by providing evidence supporting a general negativity bias, as opposed to evidence supporting the primacy of incompetence and immorality. Results also contributed to the selective learning literature by moving beyond the examination of children's selective learning *preferences* to demonstrating

children's selective *retention* of communicated information. Finally, the current study was the first, to my knowledge, to investigate the role of source memory in relation to children's selective learning. Results indicated an association between children's explicit source memory performance and both their selective learning preferences and their selective retention of communicated information.

Several areas remain open for further study. First, additional research is needed to establish the extent to which children demonstrate a general negativity bias during learning situations. The current study provided evidence that multiple types of negative information impact children's selective learning preferences and retention. To provide strong evidence for a general negativity bias in children's learning, future work would need to demonstrate the existence of positive-negative asymmetry, or evidence that children weight negative source information more heavily than positive source information (e.g., Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) when making decisions about whom to learn from. If a general negativity bias in children's learning exists, children's resistance to learn from any negatively-valenced source (regardless of the relevance of their negative characteristics for social exchange) relative to a non-valenced source will be greater than their preference to learn from a positively-valenced source relative to the non-valenced source. A negativity bias has been proposed to participate in children's selective learning decisions (Koenig & Doebel, 2012), and patterns of positive-negative asymmetry have been demonstrated in children's selective learning from speakers varying in competence (e.g., Corriveau, Meints, et al., 2009; Koenig & Jaswal, 2011) and morality (e.g., Doebel & Koenig, 2013). What remains to be

determined is if this pattern extends to learning situations featuring sources varying in characteristics unrelated to the domains competence and morality. Future studies on this topic should work to identify positive and negative characteristics that are less relevant to social exchange than those employed in the Neutral condition in this work and incorporate non-valenced comparison conditions into their designs. Research on source memory biases in adults have examined memory for individuals engaging in disgusting or expectation-violating behavior, for example (see Bell & Buchner, 2012). Work with additional age groups of children would also be useful to examine potential developmental differences in the use of various types of positive and negative source information to guide learning decisions. It may be that, with social experience, children become attuned to the characteristics of sources that are particularly relevant indicators of the quality of communicated information.

Second, additional research is also needed to clarify the nature of the relation between children's source monitoring and selective learning, and, in particular, to determine whether source monitoring is causally related to selective learning. Future work could engage young children in source monitoring training prior to their exposure to a selective learning task and investigate potential increases in their desire to solicit information from a more positive informant, their expression of disbelief in a more negative informant, and their retention of information communicated by a more positive informant. Source monitoring training has been applied successfully to children in this age group and has resulted in improvements in explicit monitoring of external sources of information (e.g., Thierry, Lamb, Pipe, & Spence, 2010) and in greater resistance to

misinformation presented in the context of leading questions (e.g., Giles, Gopnik, & Heyman, 2002).

Third, further research is needed to understand the implications that negative source characteristics carry for children's retention of communicated information. Children demonstrated poorer recall of facts communicated by immoral, incompetent, and negative informants in the current study. However, as discussed previously, it is unclear if children's performance is attributable to weaker memory representations of information communicated by negative informants, active rejection of information communicated by negative informants in favor of an alternative response option, or some combination of both. Also unclear is the extent to which selective retention might manifest in naturalistic learning situations, including educational settings, in cases where children have negative perceptions of individuals providing them with novel information. Future research should examine these questions through the use of free-recall test designs and more naturalistic learning environments.

Finally, more research is needed to identify additional cognitive and social processes related to children's effective selective learning. The current study found evidence for source monitoring, inhibitory control, and working memory as candidate cognitive processes supporting children's selective learning. Parent-reported social understanding was not related to children's selective learning in the current task, but additional studies are needed to disentangle the conflicting findings in this area (e.g., Jaswal et al., 2014; Brosseau-Liard et al., 2015) and to more comprehensively characterize the relation between social cognitive skills and selective learning. Research

might also further explore the relation between children's selective learning and their metacognitive skills (e.g., Robinson & Whitcombe, 2003) and perceptual biases (e.g., Cassia, Lua, Pisacane, Li, & Lee, 2014). Work in this direction will contribute to a more complete understanding of *how* children learn selectively from others.

References

Ackil, J. K. & Zaragoza, M. S. (1995). Developmental differences in eyewitness suggestibility and memory for source. *Journal of Experimental Child Psychology*, *60*, 57-83.

Baltazar, N. C., Shutts, K., & Kinzler, K. D. (2012). Children show heightened memory for threatening social actions. *Journal of Experimental Child Psychology*, *112*(1), 102-110.

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, *5*(4), 323-370.

Begg, I. M., Anas, A., & Farinacci, S. (1992). Dissociation of processes in belief: Source recollection, statement familiarity, and the illusion of truth. *Journal of Experimental Psychology: General*, *121*(4), 446-458.

Bell, R., & Buchner, A. (2011). Source memory for faces is determined by their emotional evaluation. *Emotion*, *11*(2), 249.

Bell, R., & Buchner, A. (2012). How adaptive is memory for cheaters?. *Current Directions in Psychological Science*, *21*(6), 403-408.

Birch, S. A., 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.

Bjorklund, D. F., & Sellers, P. D. (2013). Memory development in evolutionary perspective. In P. Bauer & R. Fivush (Eds.)*The Wiley Handbook on the Development of Children's Memory* (126-150), *Hoboken, NJ*: Wiley.

Brainerd, C. J. & Reyna, V. F. (2002). Fuzzy trace theory and false memory. *Current Directions in Psychological Science*, *11*(5), 164-169.

Bredart, S., Lampinen, J., & Defeldre, A. C. (2003). Phenomenal characteristics of cryptomnesia. *Memory*, *11*, 1-11.

Brosseau-Liard, P. E., & Birch, S. A. (2010). 'I bet you know more and are nicer too!': what children infer from others' accuracy. *Developmental Science*, *13*(5), 772-778.

Brosseau-Liard, P., Penney, D., & Poulin-Dubois, D. (2015). Theory of mind selectively predicts preschoolers' knowledge-based selective word learning. *British Journal of Developmental Psychology*, *33*(4), 464-475.

Buchner, A., Bell, R., Mehl, B., & Musch, J. (2009). No enhanced recognition memory, but better source memory for faces of cheaters. *Evolution and Human Behavior*, *30*(3), 212-224.

Carlson, S. M., Moses, L. J., & Breton, C. (2002). How specific is the relation between executive function and theory of mind? Contributions of inhibitory control and working memory. *Infant and Child Development*, *11*(2), 73-92.

Cassia, V. M., Luo, L., Pisacane, A., Li, H., & Lee, K. (2014). How race and age experiences shape young children's face processing abilities. *Journal of Experimental Child Psychology*, *120*, 87-101.

Ceci, S. J. & Bruck, M. (1993). Suggestibility of the child witness: a historical review and synthesis. *Psychological Bulletin*, *113*(3), 403-439.

Clément, F., Koenig, M., & Harris, P. (2004). The ontogenesis of trust. *Mind & Language*, *19*(4), 360-379.

Corriveau, K. & Harris, P. L. (2009). Choosing your informant: Weighing familiarity with recent accuracy. *Developmental Science*, *12*(3), 426-437.

Corriveau, K., & Harris, P. L. (2009). Preschoolers continue to trust a more accurate informant 1 week after exposure to accuracy information. *Developmental Science*, *12*(1), 188-193.

Crawley, S. L., Newcombe, N. S., & Bingman, H. (2010). How focus at encoding affects children's source monitoring. *Journal of Experimental Child Psychology*, *105*(4), 273-285.

Cosmides, L., & Tooby, J. (1992). Cognitive adaptations for social exchange. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.)*The Adapted Mind: Evolutionary Psychology and the Generation of Culture*, 163-228, Oxford: Oxford University Press.

Crawley, S. L., Newcombe, N. S., & Bingman, H. (2010). How focus at encoding affects children's source monitoring. *Journal of Experimental Child Psychology*, *105*(4), 273-285.

Cycowicz, Y. M. & Friedman, D. (2003). Source memory for the color of pictures: Event-related brain potentials (ERPs) reveal sensory-specific retrieval-related activity. *Psychophysiology*, *40*(3), 455-464.

Doebel, S., & Koenig, M. A. (2013). Children's use of moral behavior in selective trust: Discrimination versus learning. *Developmental Psychology*, *49*(3), 462.

Doebel, S., Rowell, S. F., & Koenig, M. A. (in press). Young children detect and avoid logically inconsistent sources: The importance of communicative context and executive function. *Child Development*.

Drummey, A. B., & Newcombe, N. S. (2002). Developmental changes in source memory. *Developmental Science*, *5*(4), 502-513.

Einav, S., & Robinson, E. J. (2010). Children's sensitivity to error magnitude when evaluating informants. *Cognitive Development*, *25*(3), 218-232.

Elashi, F. B., & Mills, C. M. (2014). Do children trust based on group membership or prior accuracy? The role of novel group membership in children's trust decisions. *Journal of Experimental Child Psychology*, *128*, 88-104.

Faulkner, P. (2011). *Knowledge on Trust*. Oxford: Oxford University Press.

Fiske, S. T., Cuddy, A. J., & Glick, P. (2007). Universal dimensions of social cognition: Warmth and competence. *Trends in Cognitive Sciences*, *11*(2), 77-83.

Fiske, S. T., Cuddy, A. J., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, *82*(6), 878-902.

Foley, M. A., Johnson, M. K., & Raye, C. L. (1983). Age-related changes in confusion between memories for thoughts and memories for speech. *Child Development*, *54* 51-60.

Ganea, P. A., Koenig, M. A., & Millett, K. G. (2011). Changing your mind about things unseen: Toddlers' sensitivity to prior reliability. *Journal of Experimental Child Psychology*, *109*(4), 445-453.

Ghetti, S., DeMaster, D. M., Yonelinas, A. P., & Bunge, S. A. (2010). Developmental differences in medial temporal lobe function during memory encoding. *The Journal of Neuroscience*, *30*(28), 9548-9556.

Giles, J. W., Gopnik, A., & Heyman, G. D. (2002). Source monitoring reduces the suggestibility of preschool children. *Psychological Science*, *13*(3), 288-291.

Gillis, R. L., & Nilsen, E. S. (2013). Children's use of information quality to establish speaker preferences. *Developmental Psychology*, *49*(3), 480-490.

Gopnik, A., & Graf, P. (1988). Knowing how you know: Young children's ability to identify and remember the sources of their beliefs. *Child Development*, *59*(5),1366-1371.

Hamlin, J. K., & Wynn, K. (2011). Young infants prefer prosocial to antisocial others. *Cognitive Development*, *26*(1), 30-39.

Hamlin, J. K., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. *Nature*, *450*(7169), 557-559.

Harris, P. L., & Koenig, M. A. (2006). Trust in testimony: How children learn about science and religion. *Child Development*, *77*(3), 505-524.

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.

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.

Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1988). Phenomenal characteristics of memories for perceived versus imagined autobiographical events. *Journal of Experimental Psychology: General*, *117*(4), 371-376.

Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological Bulletin*, *114*, 3-28.

Johnson, M. K. & Raye, C. L. (1981). Reality monitoring. *Psychological Review*, *88*, 67-85.

Kinzler, K. D., Corriveau, K. H., & Harris, P. L. (2011). Children's selective trust in native-accented speakers. *Developmental Science*, *14*(1), 106-111.

Koenig, M. A. (2012). Beyond semantic accuracy: Preschoolers evaluate a speaker's reasons. *Child Development*, *83*(3), 1051-1063.

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.

Koenig, M. A., & Doebel, S. (2012). Children's understanding of unreliability: Evidence for a negativity bias. In M. Banaji & S. Gelman (Eds.) *Navigating the the social world: What infants, children, and other species can tell us*. NY: Oxford University Press.

Koenig, M. A., & Harris, P. L. (2005). Preschoolers mistrust ignorant and inaccurate speakers. *Child Development*, *76*(6), 1261-1277.

Koenig, M. A., & Jaswal, V. K. (2011). Characterizing children's expectations about expertise and incompetence: Halo or pitchfork effects?. *Child Development*, *82*(5), 1634-1647.

Koenig, M. A. & Stephens, E. (2014). Characterizing children's responsiveness to cues of speaker trustworthiness: Two proposals. In S. Einav & E. Robinson (Eds.) *Trust and Skepticism*, 13-27, New York: Psychology Press.

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.

Kondrad, R. L., & Jaswal, V. K. (2012). Explaining the errors away: Young children forgive understandable semantic mistakes. *Cognitive Development*,*27*(2), 126-135.

Kovacs, S. L., & Newcombe, N. S. (2006). Developments in source monitoring: The role of thinking of others. *Journal of Experimental Child Psychology*, *93*, 25-44.

Lampinen, J. M. & Smith, V. L. (1995). The incredible (and sometimes incredulous) child eyewitness: Child eyewitness' sensitivity to source credibility cues. *Journal of Applied Psychology*, *80*(5), 621-627.

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.

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.

Lindsay, D. S. & Johnson, M. K. (2000). False memories and the source monitoring framework: Reply to Reyna and Lloyd (1997). *Learning and Individual Differences*, *12*(2), 145-161.

Lindsay, D. S., Johnson, M. K. & Kwon, P. (1991). Developmental changes in memory source monitoring. *Journal of Experimental Child Psychology*, *52*(3), 297-318.

Liu, D., Vanderbilt, K. E., & Heyman, G. D. (2013). Selective trust: Children's use of intention and outcome of past testimony. *Developmental Psychology*, *49*(3), 439-445.

Lucas, A. J., Lewis, C., Pala, F. C., Wong, K., & Berridge, D. (2013). Social-cognitive processes in preschoolers' selective trust: Three cultures compared. *Developmental Psychology*, *49*(3), 579.

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.

Marsh, R. L., Landau, J. D., & Hicks, J. L. (1997). Contributions of inadequate source monitoring to unintentional plagiarism during idea generation. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 23*(4), 886-897.

Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mindreading components of children's vigilance towards deception. *Cognition*, *112*(3), 367-380.

Minear, M., & Park, D. C. (2004). A lifespan database of adult facial stimuli. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 630-633.

Mitchell, K. J., & Johnson, M. K. (2009). Source monitoring 15 years later: what have we learned from fMRI about the neural mechanisms of source memory? *Psychological Bulletin*, *135*(4), 638.

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. *Cognitive Psychology*, *41*, 49-100.

Nurmsoo, E., & Robinson, E. J. (2009). Children's trust in previously inaccurate informants who were well or poorly informed: When past errors can be excused. *Child Development*, *80*(1), 23-27.

Pasquini, E. S., Corriveau, K. H., Koenig, M., & Harris, P. L. (2007). Preschoolers monitor the relative accuracy of informants. *Developmental Psychology*, *43*(5), 1216.

Pollak, S.D. (2013). Emotion and Learning: New approaches to the old nature-nurture debate. In S. Gelman and M. Banaji (Eds). Navigating the social world: What infants, children, and other species can teach us. NY: Oxford University Press, pp. 54-57.

Ponitz, C. C., McClelland, M. M., Jewkes, A. M., Connor, C. M., Farris, C. L., & Morrison, F. J. (2008). Touch your toes! Developing a direct measure of

behavioral regulation in early childhood. *Early Childhood Research Quarterly*, *23*, 141–158.

Poulin-Dubois, D., & Brosseau-Liard, P. (2016). The Developmental Origins of Selective Social Learning. *Current Directions in Psychological Science*,*25*(1), 60-64.

Powell, M. B., & Thomson, D. M. (1996). Children's memory of an occurrence of a repeated event: Effects of age, repetition, and retention interval across three question types. *Child Development*, *67*(5), 1988-2004.

Raj, V., & Bell, M. A. (2010). Cognitive processes supporting episodic memory formation in childhood: The role of source memory, binding, and executive functioning. *Developmental Review*, *30*(4), 384-402.

Roberts, K. & Blades, M. (1998). The effects of interacting in repeated events on children's eyewitness memory and source monitoring. *Applied Cognitive Psychology*, *12*, 489-503.

Robinson, E. J., & Whitcombe, E. L. (2003). Children's suggestibility in relation to their understanding about sources of knowledge. *Child Development*, *74*, 48-62.

Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, *5*(4), 296-320.

Sabbagh, M. A., & Shafman, D. (2009). How children block learning from ignorant speakers. *Cognition*, *112*(3), 415-422.

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.

Sobel, D. M., & Macris, D. M. (2013). Children's understanding of speaker reliability between lexical and syntactic knowledge. *Developmental Psychology*,*49*(3), 523-532.

Sperber, D., Clément, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G., & Wilson, D. (2010). Epistemic vigilance. *Mind & Language*, *25*(4), 359-393.

Stephens, E. & Koenig, M. A. (2015) The nature of the error is key: Children's selective learning in semantic and episodic domains. *Cognition*, *137*, 182-188.

Stephens, E. C., & Koenig, M. A. (2015). Varieties of testimony: Children's selective learning in semantic versus episodic domains. *Cognition*, *137*, 182-188.

Stephens, E., Suarez, S., & Koenig, M. (2015). Chapter Five-Early Testimonial Learning: Monitoring Speech Acts and Speakers. *Advances in Child Development and Behavior*, *48*, 151-183.

Sugimura, T. (2008). External source monitoring in a real-life event: developmental changes in ability to identify source persons. *Applied Cognitive Psychology*, *22*(4), 527-539.

Tagar, M. R., Federico, C. M., Lyons, K. E., Ludeke, S., & Koenig, M. A. (2014). Heralding the authoritarian? Orientation toward authority in early childhood. *Psychological Science*, *25*, 883-892.

Tahiroglu, D., Moses, L. J., Carlson, S. M., Mahy, C. E., Olofson, E. L., & Sabbagh, M. A. (2014). The Children's Social Understanding Scale: Construction and validation of a parent-report measure for assessing individual differences in children's theories of mind. *Developmental Psychology*, *50*(11), 2485-2497.

Taylor, M., Esbensen, B. M., & Bennett, R. T. (1994). Children's understanding of knowledge acquisition: The tendency for children to report that they have always known what they have just learned. *Child Development*, *65*(6), 1581-1604.

Thierry, K. L., Lamb, M. E., Pipe, M. E., & Spence, M. J. (2010). The flexibility of source-monitoring training: Reducing young children's source confusions. *Applied Cognitive Psychology*, *24*(5), 626-644.

Vanderbilt, K. E., Liu, D., & Heyman, G. D. (2011). The development of distrust. *Child Development*, *82*(5), 1372-1380.

Whitcombe, E. L., & Robinson, E. J. (2000). Children's decisions about what to believe and their ability to report the source of their belief. *Cognitive Development*, *15*(3), 329-346.

Wilks, M., Collier-Baker, E., & Nielsen, M. (2015). Preschool children favor copying a successful individual over an unsuccessful group. *Developmental Science*, *18*(6), 1014-1024.

Zelazo, P. D., Carter, A., Reznick, J. S., & Frye, D. (1997). Early development of executive function: A problem-solving framework. *Review of General Psychology*, *1*(2), 198-226.

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.

Appendix 1: Tables

Table 1.

Correlations among measures in Experiment 2, controlling for Age.

		1	2	3	4	5	6	7	8	9
1.	Prop. Trials Asked Positive Source	-	-	-	-	-	-	-	-	-
2.	Prop. Trials Endorsed Positive Source	.03	-	-	-	-	-	-	-	-
3.	Prop. Trials Endorsed Negative Source	-.26*	.13	-	-	-	-	-	-	-
4.	Prop. Positive Facts Correct	-.07	.06	-.02	-	-	-	-	-	-
5.	Prop. Negative Facts Correct	-.07	-.12	.36**	.33*	-	-	-	-	-
6.	Prop. Positive Sources Correct	.27*	.02	-.32*	-.38	.08	-	-	-	-
7.	Prop. Negative Sources Correct	-.12	-.08	.11	.01	.01	-.08	-	-	-
8.	Working Memory	-.05	-.13	.12	-.03	.01	.03	.13	-	-
9.	Head-Toes-Knees-Shoulders	-.02	-.10	-.09	-.20	.07	-.06	.08	.25*	-
10.	Social Understanding	-.03	.13	.13	.01	-.01	-.09	-.06	.09	.25

*$p < .05$; **$p < .01$

Appendix 2: Figures

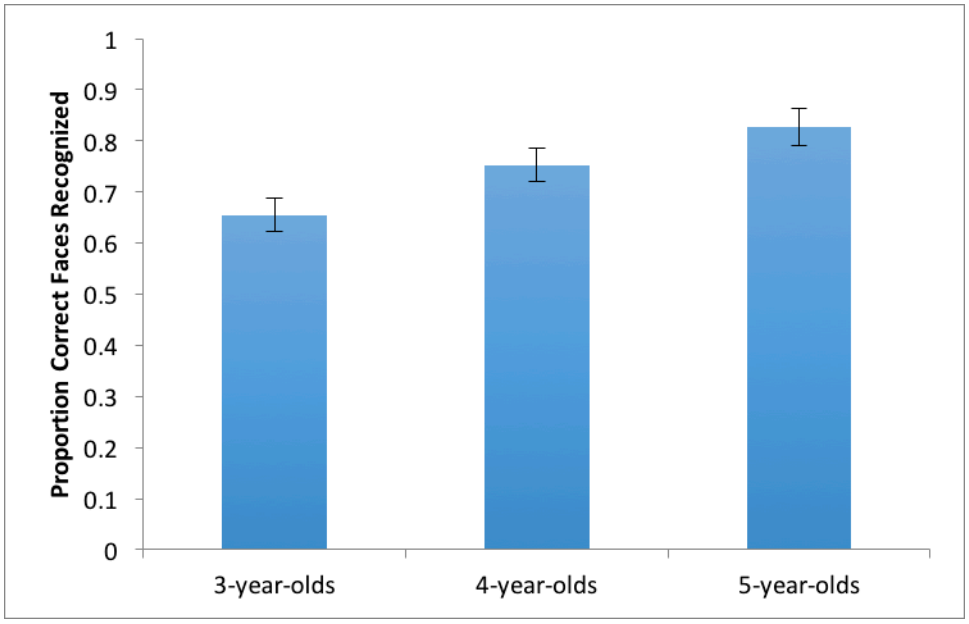

Figure 1. Proportion of correct faces recognized as a function of age.

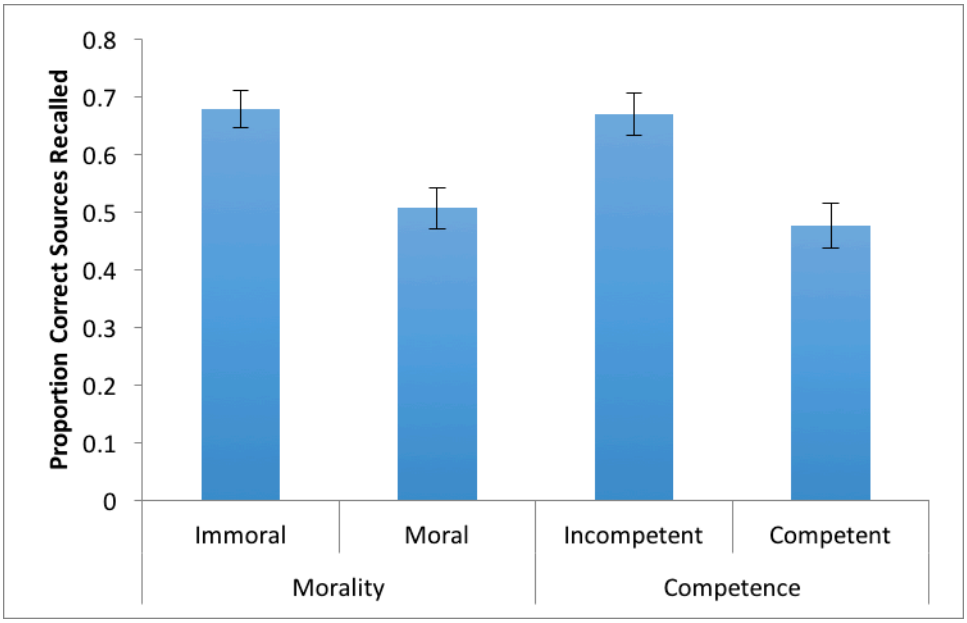

Figure 2. Proportion of correct sources recalled as a function of dimension and valence.

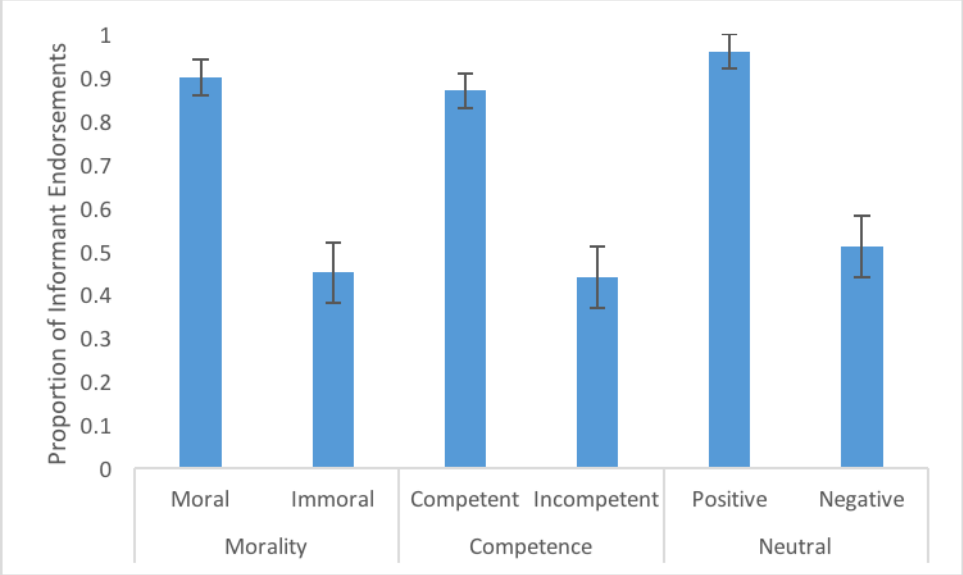

Figure 3. Proportion of trials in which children endorsed sources as a function of experimental condition and valence.

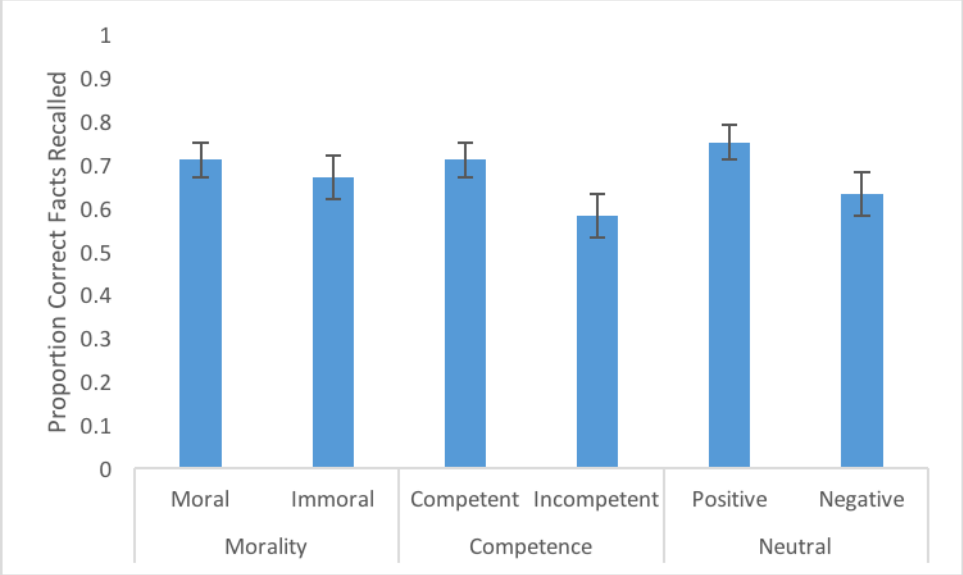

Figure 4. Proportion of correct facts recalled as a function of experimental condition and valence.

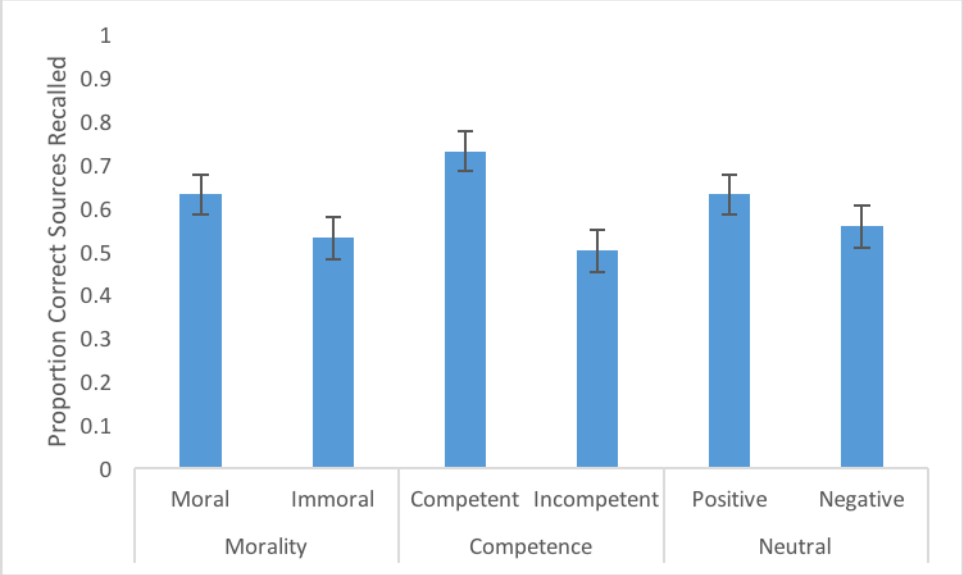

Figure 5. Proportion of correct sources recalled as a function of experimental condition and valence.