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Children's Intention Understanding and the Development of Religious Concepts

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Psychology

by

Nicholas John Shaman

March 2016

Dissertation Committee:
Dr. Rebekah Richert, Chairperson
Dr. Mary Gauvain
Dr. Misaki Natsuaki

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2016

The Dissertation of Nicholas John Shaman is approved:

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Committee Chairperson

University of California, Riverside

ACKNOWLEDGMENTS

The word “dissertation” is derived from the Latin verb “dissertare,” which means to debate or discuss. A person cannot have a meaningful debate or discussion with oneself, at least I cannot. It was a long journey to finish my dissertation and I want to acknowledge the many people who joined in the discussion along the way.

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of the passage of time, children develop into adults and I was able to study a small part of that development. Without the passage of time, I am no longer young enough to know everything. I now realize my discussion is just beginning.

DEDICATION

I dedicate this dissertation to my parents and sisters. May we always win the board game of life.

ABSTRACT OF THE DISSERTATION

Children's Intention Understanding and the Development of Religious Concepts

by

Nicholas John Shaman

Doctor of Philosophy, Graduate Program in Psychology
University of California, Riverside, March 2016
Dr. Rebekah Richert, Chairperson

The development of children's religious concepts is influenced by socio-cultural factors, such as the beliefs, doctrines, and rituals of their religion. A mechanism by which socio-cultural factors influence concept development is through the internalization of cultural concepts. Children's ability to understand intention allows internalization to happen. The present study interviewed children between the ages of 4- and 7-years-old to assess their understanding of intention in the context of the ritual of baptism as well as their concepts of God and supernatural causality. Children judged the efficacy of four variations of a prototypic baptism, which varied in the practitioner's intention and performance. Children's efficacy judgments held together among two dimensions: intentional and accidental acts. Children's efficacy judgments of intentionally performed religious behavior were related to their concept of God's knowledge. Children's efficacy judgments of accidentally performed religious behavior were related to their concept of God's properties and natural explanations of baptism. These findings are discussed in terms of why intention understanding along these two dimensions influences the internalization of religious concepts differently.

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Chapter 1

Children's Intention Understanding and the Development of Religious Concepts

Religion is a significant part of people's lives: in the US, 82% of adults claim religion is important in their lives; 75% pray at least weekly; and 54% attend religious services at least once a month (Pew Research Forum, 2008). Many parents are raising their children in religious environments and teaching their children to become part of a religious community. For a child to engage in her or his religion, he or she must be able to conceptualize the beliefs, doctrines, and rituals of that religion. Research on children's religious development has shown that significant age-related changes occur in children's religious thinking during early childhood (Richert & Granqvist, 2013). Additionally, the type of religious environment influences how religious concepts develop (Lane, Wellman, & Evans, 2012; Legare, Evans, Rosengren, & Harris, 2012; Richert, Shaman, Saide, & Lesage, in press).

Children's social and cultural environment contributes greatly to the development of children's concepts (Gelman, 2009). However, the mechanisms by which the environment influences concept development need to be more fully explored. For example, children actively explore their physical environments and discover knowledge on their own (Piaget, 1960). Self-directed development and direct perceptual experiences are not divorced from the socio-cultural context. A child learning to count by using toy blocks is using a cultural artifact-- toy blocks. Religious concepts afford researchers the opportunity to explore how the social and cultural environment influences concept development divorced from those other mechanisms of development. Religious

phenomena cannot be directly experienced; therefore, children must learn about these phenomena from others.

The social and cultural environment can influence concept development in many ways; for example, the environment may afford children the opportunity to engage in self-directed development, such as in the toy block example above. Concept development, rooted in the socio-cultural environment and divorced from other mechanisms, requires internalizing cultural ideas, systems, and symbols from others. Internalization of culture from others requires understanding the minds of other people (Tomasello, Kruger, & Ratner, 1993). Children learn culturally by observing people's behavior and internalizing the intentions and goals behind those behaviors. Thus, the development of religious concepts is determined by children's ability to understand the intentions and minds of others. As children's social cognitive abilities develop, the development of their religious concepts should adjust accordingly.

Religious rituals are a set of socio-cultural experiences through which children learn about religious phenomena. By observing and engaging in religious rituals, children are exposed to how religious practitioners behave in relation to related religious phenomena. For example, when a Christian child observes a baptism, the child sees how practitioners expect the outcome to be achieved and how they act towards God. Additionally, rituals are conceptualized in a way that suggests the mental states of the practitioners play a role in whether the ritual works or not (Barrett & Lawson, 2001; Richert, 2006). When a practitioner acts intentionally, rituals are judged to be more effective. Therefore, religious rituals provide a unique opportunity to explore how

children's understanding of intention influences the development of their religious concepts.

The present study explored children's religious concept development and how religious concepts were influenced by children's understanding of intention in the context of religious rituals. Specifically, Christian children's understanding of intention as a causal mechanism of the ritual of baptism was assessed, along with their concepts of God and supernatural causality. To frame the present study, reviews of concept development and religious concepts are presented, followed by reviews of cultural learning, the development of intention understanding, and religious rituals.

Concept Development

A concept is a "mental representation that organizes experience" (Gelman, 2009, p. 4). Humans use concepts to organize information in memory, such that new experiences are not stored haphazardly (Gelman, 1999). Humans begin to develop and use concepts early in development, forming concepts such as faces, speech sounds, colors, and objects in infancy. For example, by 9-months-old, infants are able to categorize objects beyond the predominant perceptual properties (Mandler & McDonough, 1993; Pauen, 2002). When a child experiences something new, for example an unknown animal, the properties of the animal are matched to the properties of the concept 'animal' and the new experience can be conceptualized as an animal.

Concepts do more than organize information into memory, they allow people to understand incoming information, make inferences, and, generally, guide action (Case, 1998; Gelman, 1999). Humans use concepts to make inferences and guide action as soon

as they begin to develop concepts, as evidenced by the surprise infants show when events occur in ways the infants do not expect (Gelman, 1999; Mandler, 2007). For example, children in their second year are able to make inferences about objects that are not evident from the perceptual properties of the objects (Mandler & McDonough, 1998). When a child has to make a decision about approaching the unknown animal, they use their 'animal' concept to decide if the new animal is docile or aggressive. Without concepts, humans have greater difficulty using past experience to reason about and act upon the world. For example, people would be unable to reason abstractly or understand and use complex language.

A full review of the empirical literature on concept development is beyond the scope of this dissertation (see Gelman & Kalish, 2006 for a review of the literature), but some examples are discussed to provide a general sense of the developmental trajectory in early childhood. In the first year of life, children defer imitation of other's behaviors, indicating basic concepts about the object that was acted upon and the goal-directed behavior (Carver & Bauer, 1999; Meltzoff, 1988; Mandler, 2007). In early childhood, children reason about non-obvious concepts that are unable to be directly perceived, such as germs, mental states, bodily organs, and energy (Gelman, 1999). By 2.5- and 3-years-old, children can reliably incorporate non-perceivable properties into their concepts (Gelman & Kalish, 2006). By 4 years, children can use concepts to explain inferences when the conceptual properties conflict with the perceptual properties (Gelman & Markman, 1986). In the fourth and fifth years, children begin to assert that the insides of

objects are more important for category membership than the outsides of objects (Gelman & Wellman, 1991).

Concepts within certain domains develop along a similar trajectory. Within the physical domain, preschool-aged children can conceptualize physical causation and are able to attribute events to the proper causal factors (Shultz, 1982). Even at 3-years-old, children can use analogical reasoning with their concepts of physical causation. Within the biological domain, preschool-aged children have an understanding of biological causation beyond human action and intention (Gelman & Kremer, 1991).

Within the psychological domain, 2- and 3-year-old children have a concept of 'desire' and understand that desires are a causal force for human behavior (Wellman & Woolley, 1990). Children begin to develop a concept of beliefs around the age of 3-years-old and use beliefs as a causal explanation for human behavior (Wellman & Bartsch, 1988). By 5 years, children's belief concepts include a truth property (i.e., beliefs can be correct or incorrect) (Wellman, Cross, & Watson, 2001). At 4 years, children have a concept of perception as another causal explanation for human behavior (Wimmer, Hogrefe, & Perner, 1988).

In summary, concepts begin to develop in infancy and change dramatically throughout early childhood. Concepts begin as broad and general representations, encompassing many things, and have limited inferential power beyond what is perceptually salient. However, as children grow, new concepts form and old concepts begin to differentiate (Waxman, 1991). Foundational, superordinate concepts, such as 'living thing' or 'physical object,' develop first and are concepts upon which new concepts

develop, such as 'animal,' 'plant,' and 'human' (Carey, 1985). Concepts form not only about objects that children can directly perceive, but also things such as physical and mental forces, unseen objects, and unseen properties.

Concept development is not just an acquisition of new concepts and a refinement of old concepts. Children also gain and improve skills in using their concepts. For example, children exhibit significant errors when forming and using new concepts, such as the mutual exclusivity bias. Children under 4-years-old have a tendency to assume only one label can be applied to an object (Merriman, Bowman, & MacWhinney, 1989). Additionally, children do not fully utilize concepts. At 3-years-old, children have a concept of ‘belief,’ but use their concept of ‘desire’ to reason about human behavior (Wellman & Bartsch, 1988). It is only by 5-years-old children begin to incorporate their ‘belief’ concept into their reasoning.

The influence of other developing cognitive abilities must also be considered when examining concept development. For example, most research indicates that children are unable to reason about beliefs as being incorrect before 4.5-years-old (Wellman et al., 2001). However, some research methodologies are able to get children to correctly reason about incorrect beliefs at earlier ages. These findings are explained as evidence for improved cognitive ability not conceptual change. The 'belief' concept changes around 3-years-old and includes the truth property, but children do not have the inhibitory ability to not use the correct information. Only by 4.5-years-old do children have sufficient inhibitory ability and can properly use their 'belief' concept. The change seen at 4.5-years-old is not due to a conceptual change but an improvement in another

cognitive ability. Thus, any changes in concepts found in the empirical literature must be considered in light of changing cognitive abilities.

Theoretical Perspectives of Concept Development

Concept development has been investigated through many different theoretical perspectives (Case, 1998). Each perspective proposes different mechanisms through which concepts emerge and change.

Empiricist. The empiricist theoretical perspective proposes that knowledge and knowledge structures are derived from direct perceptual experience (Case, 1998). Concept development occurs through classical and operant conditioning (Lipsitt, 1966). Overtime, children begin to associate certain experiences with other experiences and the association is the foundation of the concept. Concepts then change and differentiate as new experiences accumulate and are associated with different outcomes.

Structuralist. The structuralist theoretical perspective proposes that concepts undergo qualitative shifts in structure (Case, 1998). Piaget's (1960) developmental theory is structuralist. The conceptual structure that develops is general and applies to all knowledge and experience. Additionally, the structure of concepts changes in universal and predictable patterns. For example, according to Piaget's (1960) work, before 2-years-old, concepts are sensorimotor, based entirely on perception and action. After 2-years-old, concepts become symbolic. Concepts develop as children actively engage in the world to learn and modify their concepts.

Nativist. The nativist theoretical perspective proposes that certain concepts develop through the maturation of innate cognitive mechanisms (Case, 1998; Chomsky,

1957; Leslie, 1992). These innate cognitive mechanisms are hardwired into the human genome and explain how certain concepts, such as 'belief' and 'desire' concepts, are learned early in development and show drastic change over a brief period of time. The way these mechanisms work within the brain is debated, ranging from the mechanisms making children highly sensitive to certain information in the environment to containing the information itself without needing any environmental input.

Naïve theories. The naïve theory theoretical perspective proposes that concepts are derived from foundational theories that emerge early in development (Carey, 1985; Case, 1998; Wellman & Gelman, 1992). These foundational theories are a connection of concepts that relate to each other in regard what they represent in the real world. The foundational theories are referred to as naïve theories because, like scientific theories, they are general frameworks for understanding the world, but, unlike scientific theories, are imprecise and prone to error. It is from these foundational theories, networks of early concepts, that further concept development happens.

Sociocultural. The sociocultural theoretical perspective proposes that concepts are an internalization of cultural ideas, systems, and symbols (Case, 1998; Gauvain, 2001). These forms of socio-cultural input shape the structure of the concepts in addition to the content of the concepts. Vygotsky's (1978) developmental theory is an example of the sociocultural theoretical perspective. Cognition, including concepts, begins externally and then becomes internalized through the individual's interaction with advanced members of society.

Summary of mechanisms. These theoretical perspectives each propose mechanisms for concept development. Some of the mechanisms include direct perceptual experience, structural change through active discovery, brain maturation, general frameworks for understanding the world, and internalization of socio-cultural factors. However, the mechanisms are not mutually exclusive; they interact to foster concept development. The interactions between these mechanisms make determining the specific influence of a particular one difficult. By examining religious concepts, many of these mechanisms can be factored out. Religious concepts handle religious experiences, which are cultural in nature. Additionally, the religious phenomena, which are conceptualized, cannot be directly experienced. Though certain mechanisms, such as brain maturation, cannot be ruled out, the parsimonious explanation is religious concepts are due to the internalization of socio-cultural factors.

Religious Concepts

Religious concepts are mental representations that serve to organize religious experiences (Gelman, 2009; Richert & Smith, 2009). Children learn religious concepts through their social and cultural experiences within their religious tradition. Theoretically, religious concepts are similar to everyday concepts, but have some properties that violate expectations (Boyer & Ramble, 2001). For example, a ghost is conceptualized similarly to the way humans are conceptualized, except they are invisible. These properties are critical for the development of religious concepts as the violations are what make the concepts memorable and differentiated from everyday concepts. Given that they are non-natural, these properties are not directly experienced so they can

only be learned through cultural participation. Examples of religious concepts are concepts of supernatural agents, supernatural causality, and religious rituals.

Properties of Religious Concepts

When children attend religious services, engage in religious behavior, or discuss religious topics, they are learning about phenomena that are slightly different than the phenomena they experience on a day-to-day basis. That these phenomena violate people's expectations of how the natural world operates, they are counterintuitive. Importantly, the amount of violated expectations is minimal. Thus, religious concepts are theorized to be minimally counterintuitive (Boyer, 1994).

The minimally counterintuitive properties of religious concepts allow them to be easily remembered and easily transferred. Because these concepts differ only minimally, they fit within a broader category of concepts (e.g., angels can be categorized as persons); and thus, can be remembered with fidelity and easily explained to others. Because these concepts are counterintuitive, they attract attention similar to how novel stimuli attract attention in habituation tasks, and thus, are more likely to be remembered and shared with others. Research in experimental and narrative tasks has confirmed that minimally counterintuitive concepts are more easily remembered and more likely to be transferred (Boyer & Ramble, 2001; Barrett & Nyhof, 2001; Norenzayan, Atran, Faulkner, & Schaller, 2006). However, religious concepts are not synonymous with minimally counterintuitive concepts.

Research on the development of religious concepts tends to examine how the development of everyday concepts structures and constrains the development of religious

concepts (Barrett & Richert, 2003; Lane & Harris, 2014; Rottman & Kelemen, 2012). The argument behind this research is in order for a concept to be counterintuitive, a person must have an intuition to be violated. However, this reasoning often does not take into account the socio-cultural factors contributing to the development of religious concepts (Richert & Granqvist, 2013). In early childhood, children are introduced to religious phenomena alongside everyday phenomena. The formation of religious concepts may happen in the same way as all other concepts and be just as intuitive to children. Therefore, religious concept development must be examined from a socio-cultural perspective, particularly an examination of the internalization of social and cultural factors.

Concepts of Supernatural Agents

Supernatural agents are conceptualized as psychological agents that differ on properties normally attributable to humans or animals (Barrett, 2008). Examples of supernatural agents are gods, spirits, ghosts, angels, ancestors, and kami. For example, a ghost is conceptualized in the same way a human is conceptualized, except it is intangible. Two types of methodologies assess the development of supernatural agent concepts: agent knowledge tasks and agent properties tasks (Barrett, Richert, & Driesenga, 2001; Giménez Dasí, Guerrero, & Harris, 2005; Lane, Wellman, & Evans, 2010; Richert et al., in press; Shaman, Saide, Lesage, & Richert, in press; Shtulman, 2008). Agent knowledge tasks are modified versions of theory-of-mind tasks, but additionally assess children's judgments of a supernatural agent's mental state. Agent

properties tasks assess multiple properties of a supernatural agent, usually among three domains: psychological, biological, and physical.

Agent knowledge. A common method for examining the development of supernatural agent concepts is to assess children's understanding of the supernatural agent's knowledge (Barrett, Newman, & Richert, 2003; Barrett et al, 2001; Giménez Dasí et al., 2005; Lane et al., 2010, 2012; Makris & Pnevmatikos, 2007; Richert & Barrett, 2005). The methodology resembles a generic false-belief task. Children are asked to reason about the knowledge of another agent and whether that knowledge is correct or incorrect. These tasks are done with a supernatural agent and a natural agent; for example, God and the child's best friend (Giménez Dasí et al., 2005).

In a traditional unexpected-contents false-belief task, children are tested for whether they understand that another person has incorrect knowledge (Wellman et al., 2001). In this task, children are usually shown a cracker box and asked to guess what is inside the box. After guessing the contents of the box (most children guess crackers or something similar), children are shown the true contents: the box contains crayons. Finally, children are asked what their mother would think was inside the cracker box. When children claim their mother would think crayons are in the box (i.e., true content), the response indicates children do not have a mature theory-of-mind. When children claim their mother would think crackers are in the box (i.e., incorrect content), the response indicates children do have a mature theory-of-mind. Children generally exhibit a mature theory-of-mind after 4.5-years-old (Wellman et al., 2001).

Barrett and colleagues (2001) modified this methodology to assess children's supernatural agent concepts. All the steps of the unexpected-contents task were the same, except children were asked about multiple agents, such as their mother or God. When children indicated the agent knew the true content, the response indicated children conceptualized the agent as having infallible knowledge. When children indicated the agent did not know the true content, the response indicated children conceptualized the agent as having fallible knowledge. Barrett and colleagues (2001) found children under 5-years-old conceptualized their mother as having infallible knowledge and children over 5-years-old conceptualized their mother has having fallible knowledge. This was consistent with the theory-of-mind literature. However, all children conceptualized God as having infallible knowledge, even children over 5-years-old. The interpretation of these findings was even young children are capable of conceptualizing God as omniscient. Additionally, a concept of 'God' does not need to be based off a concept of 'human.' This finding has been replicated with children from multiple cultures (Knight, Sousa, Barrett, & Atran, 2004), other perceptual abilities of supernatural agents (Richert & Barrett, 2005), and background knowledge of supernatural agents (Barrett et al., 2003).

However, there are also conflicting findings in the literature regarding the developmental trajectory of the knowledge of supernatural agents. Lane and colleagues (2010, 2012) found children younger than 4.5-years-old and older than 5-years-old conceptualize God as omniscient. Children between 4.5- and 5-years-old, however, conceptualize God as having fallible knowledge. Similar findings have been found with children from other cultures (Giménez Dasí et al., 2005; Makris & Pnevmatikos, 2007).

While this discrepancy may be due to methodological differences, another possibility is differences exist between the samples. If the concept of God is stable in some children, but fluctuates in others, then the mechanism by which the concept of God develops may be socio-cultural.

Agent properties. Another methodology examines whether or not children attribute specific properties to supernatural agents (Richert et al., in press; Shtulman, 2008). Children are asked if multiple supernatural, fictional, and natural agents have certain properties. These properties fall into three general categories: psychological, biological, and physical. Examples of questions are "Do ghosts eat? Do angels stretch? Can God get bored?" The questions assess whether the supernatural agent concepts are human-like, or anthropomorphic. In other words, the questions assess which human-like properties are violated in a person's supernatural agent concept.

When comparing religious and fictional agents, Shtulman (2008) found that 5-year-olds anthropomorphized religious and fictional of agents across all three domains. The parents of those children, however, anthropomorphized religious agents significantly less than they anthropomorphized fictional agents. Parents anthropomorphized religious agents less than their children did. Additionally, parents indicated fictional and religious agents were more anthropomorphic along the psychological domain than the biological and physical domains.

A close examination of the anthropomorphic properties attributed to God has shown changes across age and due to socio-cultural factors (Richert e al., in press). Among children between 3.5- and 6-years old, children's age was negatively related to

attributions of anthropomorphism of God. Older children anthropomorphized God less than younger children. Additionally, parents' concepts of God and prayer predicted children's anthropomorphic concept of God. Parents' and children's concept of God were positively related; when parents anthropomorphized God, their children did as well. Parents who conceptualized prayer as a means of directing the mind towards God has children who anthropomorphized God more than parents who conceptualized prayer as causing communication with God. These findings indicate that children's concepts of supernatural agents change across the lifespan, even in the short window of early childhood. Additionally, supernatural agent concepts are related to their parents' religious concepts. Children's concepts are possibly internalizations of their parents' concepts and the religious environments that parents create.

Concepts of Supernatural Causality

Supernatural causality is conceptualized as a form of causality that is non-natural, or different from physical, biological, or psychological causality. Examples of supernatural causality are karma, bewitchment, and the Tao. For example, bewitchment is conceptualized in the same way biological causality is conceptualized, except the intentions of another person are causal factors. A common method for examining the development of supernatural causality concepts is to assess the explanations children provide for different events (Legare & Gelman, 2008; Woolley, Cornelius, Lacy, 2011). The methodology is derived from studies examining causal explanations for usual and unusual events (Hickling & Wellman, 2001). Children are asked to provide explanations for different events.

In developmental causal explanations task, children are tested for the explanations they provide for events (Hickling & Wellman, 2001). Children's explanations are categorized according to different types of reasoning: psychological, biological, or physical. In a textual analysis of speech patterns, Hickling and Wellman (2001) examined the causal explanations of four children from 2.5-years-old to 5-years-old. Overall, children provided more physical explanations than biological or psychological explanations. However, children are not exclusive in their explanations. Physical explanations were often provided in conjunction with psychological and biological explanations.

Legare and Gelman (2008) used a similar methodology to assess concepts of supernatural causality. Children between 5- and 15-years-old and adults for South African communities were provided with vignettes of specific events. After each vignette, participants were provided with multiple explanations for the event. The explanations fell into one of two categories: biological/natural and supernatural. Participants were allowed to endorse multiple explanations. For example, participants were provided with a vignette of an individual contracting AIDS and asked if this was because of contagion (biological) and/or bewitchment (supernatural). Legare and Gelman (2008) found both biological and supernatural explanations were endorsed by participants of all ages. Supernatural explanations were endorsed less frequently as age increased into adolescence, but then increased frequently again by adults, resulting in a U-shaped pattern.

In a similar study, Woolley and colleagues (2011) examined the causal explanations provided by 8- to 12-year-old children and adults. Overall, all participants provided more natural explanations than supernatural explanations. Among the children, younger children provided the least amount of supernatural explanations; supernatural explanations were provided more as age increased. Additionally, religiosity also affected the proportion of supernatural and natural explanations. Participants with low religiosity provided significantly more natural explanations than supernatural explanations; and participants with high religiosity provided both explanations equally.

Findings from other studies on supernatural causality concepts using different methodologies show other developmental trends. When presented with an unexpected event, children begin to attribute the cause to be an invisible agent after 7-years-old (Bering & Parker, 2006). Four- to six-year-old children accept magic explanations for unusual events, but not 6- to 9-year-old children (Subbotsky, 2004). Children's belief in the efficacy of magic and wishing decreases between 3- and 6-years-old (Woolley, Phelps, 2001; Woolley, Phelps, Davis, & Mandell, 2012)

These findings suggest that children's concepts of supernatural causality develop non-linearly during childhood. Legare and Gelman (2008) found endorsement of supernatural explanations decrease from 5- to 15-years-old; however, Woolley and colleagues (2011) found providing of supernatural explanations increased from 8- to 12-years-old. Both studies found high levels of supernatural explanations in adults. Among 3- to 9-year-old children, belief in the efficacy of wishing begins high but decreases during development (Subbotsky, 2004; Woolley, Phelps, 2001; Woolley et al., 2012).

This presents a U-shaped trajectory in which supernatural explanations are endorsed highly in early childhood, endorsed less into adolescence, and the endorsed highly again in adulthood. However, endorsement of supernatural causality does not equal a mature understanding of supernatural causality. The high endorsement in early childhood may be due to imitating explanations provided by adults, but not an internalization of those explanations. If this is true, the second half of the trajectory suggests supernatural explanations are not internalized until later childhood or adolescence. Natural explanations are endorsed by children of all ages. Concepts of natural causality develop earlier, which may be due to internalizing adults' explanations or due to other developmental mechanisms such as direct perceptual experience.

Cultural Learning

Multiple mechanisms exist through which socio-cultural factors influence the development of religious concepts. However, the influence of a socio-cultural factor does not mean the development is socio-cultural in nature. Socio-cultural factors are simply those that take place in a social and cultural environment. Even in a social and cultural environment, concepts can still be developed through direct perceptual experience. For example, when child learns shapes by playing with toy blocks, the blocks are a socio-cultural factor, but the learning may be though direct experience. Religious concepts, however, are learned through internalizing the beliefs, doctrines, and rituals presented by others.

According to the theory of cultural learning, human beings learn knowledge (i.e., develop concepts) through internalizing the perspective of other human beings

(Tomasello, Carpenter, Call, Behne, & Moll, 2005; Tomasello et al., 1993). Thus, the mechanisms through which socio-cultural concept development occurs allow a person to understand how other people see a situation and to incorporate those people's viewpoints into one's own understanding. These mechanisms are social-cognitive and unique to human beings (Herrmann, Call, Hernàndez-Lloreda, Hare, Tomasello, 2007; Tomasello et al., 1993). However, these social cognitive mechanisms do not exist in the same form at birth as they do in adulthood; they develop and change throughout the lifespan.

According to Tomasello and colleagues (1993), cultural learning develops through three stages, each according to the development of a social cognitive ability. The first stage of cultural learning is imitative. Imitative learning emerges sometime between 9 and 14 months of age. Imitative learning happens when children understand that the behavior of another person is goal-directed. Learning in this stage is evidenced by children not mimicking any behavior, but imitating behaviors that achieve a goal. The social cognitive ability that corresponds to imitative learning is perspective-taking. Perspective-taking allows children to engage in joint-attention and social referencing. With this ability, children conceptualize people as intentional agents, whose behaviors are goal-directed, not random.

The second stage of cultural learning is instructional. Instructional learning emerges around four years of age. Instructional learning happens when children reconcile that other people have beliefs, intentions, and other mental states different from their own. Learning in this stage is evidenced by children, not just learning and reproducing the learned behaviors, but also incorporating the interaction between

themselves and their teachers. The social cognitive ability that corresponds to instructional learning is intersubjectivity. Intersubjectivity allows children to understand false-beliefs and engage in deception. With this ability, children conceptualize people as mental agents, whose mental states can be understood in relation to their own.

The third stage of cultural learning is collaborative. Collaborative learning emerges around six years of age. Collaborative learning happens when children understand that other people are able reconcile different mental states between people. Learning in this stage is evidenced by children solving cognitively-difficult problems faster and more successfully with peers than alone. The social cognitive ability that corresponds to collaborative learning is recursive intersubjectivity. Recursive intersubjectivity allows children to understand second-order mental states (i.e., "Mary thinks that John thinks…"). With this ability, children conceptualize people as reflective agents, whose mental states may be directed towards another person's or their own mental states.

While many social-cognitive mechanisms underlie cultural learning, intention understanding is critical (Tomasello et al., 2005). Without the ability to understand intention, children would be learning from the affordances of the social environment, rather than through and with other people. Though the theory of cultural learning is not being tested in the present study, it does provide emphasis for the importance of intention understanding as a social cognitive mechanism necessary for socio-cultural concept development.

Although by 14-months-old, children conceptualize people as intentional agents, their understanding of intention is not fully formed. At this age, children understand that behaviors are goal-directed; but, not that intention is a mental state that causes behavior. Additionally, the development of intention understanding is not an all-or-nothing development. The development happens by degrees. Thus, concept development may be influenced by intention understanding differently at varying points during development.

Intention Understanding

The influence of socio-cultural factors on concept development is based on a person's ability to understand the intentions of other people. Research on the development of intention understanding provides an outline for examining concept development. Developmental research on intention understanding examines how people understand intentions as mental states and how people's developing concept of intention informs their understanding of the behavior, thoughts and emotions of others (Carpenter, Nagell, Tomasello, & Butterworth, 1998). Intentions are mental states concerning actions done with the purpose of achieving a goal (Malle, Moses, & Baldwin, 2001).

Intention concepts transition through three general stages during childhood (Moses, 2001). These stages are milestones between which further development occurs. Children's concept of intention begins as a desire concept. Children understand intentional behaviors are meant to achieve a goal. This form of the concept begins to form early in infancy and is established by 2-years-old. The second form of the intention concept is as a mental state that is a desire that causes behavior. Children understand intentions as mental states. Intentional behaviors are caused by intentions in order to

achieve a goal. This form of the concepts is established by 5-years-old. The third form of the intention concept is as a mental state that is a desire that causes a behavior and is consistent with the person's knowledge. Children understand intentions causes actions, so long as the person knows the action can achieve a goal. This form of the concept is established by 8-years-old and is close to the adult form.

The beginnings of the intention concept appear in infancy (Malle et al., 2001). As early as 3-months-old, infants look longer at goal-directed behavior in habituation paradigms when they first have experience performing the behavior than when they do not have experience (Sommerville, Woodward, & Needham, 2005). By 6-months-old, infants are surprised when animate and inanimate objects behave in ways that deviate from their goals (Csibra, 2008; Woodward, 1998). Between 9- and 10-months-old, infants are surprised when goal-directed behavior is interrupted, fails to complete, and does not behave rationally (Baldwin, Baird, Saylor, & Clark, 2001; Brandone & Wellman, 2009; Csibra, Gergely, Biro, Koos, & Brockbank, 1999; Saylor, Baldwin, Baird, & LaBounty, 2007). By the end of the first year of life, infants are surprised when actions indirectly achieve goals than when they directly achieve their goals (Gergely, Nadasdy, Csibra, & Biro, 1995; Phillips & Wellman, 2005; Sodian & Thoemer, 2004). One-year-old infants follow the gaze of intentional actors and point to redirect the attention of others (Johnson, Slaughter, & Carey, 1998; Tomasello, Carpenter, & Liszkowsi, 2007). One-year-olds also are more patient when adults are unable to perform actions than when adults are unwilling to perform actions (Behne, Carpenter, Call, &

Tomasello, 2005) and connect emotional expression to intentional action (Phillips, Wellman, & Spelke, 2002).

At 18-months-old, infants use information from intentional gestures but not non-intentional gestures (Aureli, Perucchini, & Genco, 2009; Gräfenhain, Behne, Carpenter, & Tomasello, 2009), reproduce intentional actions, but not accidental actions (Carpenter, Akhtar, & Tomasello, 1998; Meltzoff, 1995), and act upon others' desires and not their own (Repacholi & Gopnik, 1997). Between 2 and 3 years of age, children are able to make causal inferences learned from goal-directed behavior and begin to understand that belief underlies intentional action (Meltzoff, Waismeyer, & Gopnik, 2012; Moses, 1993).

During the first five years of life, children's concept of intention is coming into being as an understanding that it is a mental state that is connected to human behavior, particularly goal-directed actions. However, around 5-years-old, children's concepts of intention differentiate from their concepts of desire. Intentions, while similar to, are distinct from desires. Desires are mental states concerning the achievement of a goal. A desire can be satisfied without any action or even accidental action on the part of an agent. However, intentions can only be satisfied if an action is undertaken to achieve that goal. For example, if Sally desires a toy on a shelf, her desire is satisfied if she purposely reaches for the toy or if it falls off the shelf through some other means. However, if Sally intends to reach for a toy, her intention is only satisfied if she reaches for it, not if it falls off the shelf through some other means.

The development of the intention concept at 5-years-old is a qualitative shift. Prior to this shift, children recognize that behaviors can be goal-directed, gradually learn

to distinguish goal-directed behaviors from other behaviors, and learn how goal-directed behaviors are related to emotions and communication in others (Carpenter et al., 1998; Meltzoff, 1995; Moses, 1993). After this shift at 5-years-old, children are able to distinguish intentions from desires (Fienfield, Lee, Flavell, Green, & Flavell, 1999). Five-year-old children are theorized to understand intentions as mental states that generate actions (Shultz, 1982; Sobel, 2009). By this age, children understand identical actions can be motivated by different intentions and different actions can be motivated by the same intention (Baird & Moses, 2001). Five-year-old children are also able to distinguish the completion of a behavior from the accomplishment of a goal (Shultz & Shamash, 1981). Whereas 4-year-olds conflate the satisfaction of desires and intentions, 5-year-olds understand that desires can be satisfied without intentions being satisfied (Schult, 2002). Additionally, 5-year-olds, but not 4-year-olds, are able to differentiate accidental outcomes from intended outcomes, even when the desires an unknown (Phillips, Baron-Cohen, & Rutter, 1998).

While 5-year-olds understand that intentions are mental states that generate actions, by 8-years-old, children understand the role beliefs play in intentions (Shultz, 1982; Sobel, 2009). Beliefs, or knowledge, enable intentions to be fulfilled. For example, knowing a toy is on a shelf does not cause Sally to reach for the toy. But in order for Sally to intend to reach for the toy on the shelf, she must know it is there. For example, by 8-years-old, children understand that a person must know what an animal is to pretend to be that animal (Richert & Lillard, 2002).

The causal component of children's intention concept is a critical part of how children reason about human behavior. The causal component differentiates intentions from other mental states. Desires, perceptions, beliefs, emotions, and other mental states do not cause behavior. Other mental states are related to behavior, for example, beliefs enable intentions to be acted upon (Sobel, 2009) and desires dictate the goals of behavior (Baird & Moses, 2001). Only intentions are the causal mechanism of behavior. As children come to understand intentions as the causal mechanism of behavior, their learning from others changes as well.

The difference between understanding intention as desire and understanding intention as a mental state that is a cause of behavior has implications for concept development. Given that the influence of socio-cultural factors is dependent upon the concept of intention, other concepts may look very different before and after the shift in intention understanding. Children should be able to better internalize the concepts of others when they can better understand the intentions behind other people's behaviors. Religious concepts provide a lens to see how concepts may be different due to intentions. One avenue through which children learn religious concepts is through the observation and participation in religious rituals. The role of children's concept of intention is emphasized because intention is conceptualized uniquely in religious rituals.

Religious Rituals

A primary set of socio-cultural experiences through which religious concepts are learned are religious rituals. When children engage in and observe others engaging in religious rituals, they are receiving information about religious phenomena. Through the

specific actions performed by practitioners and the meaning ascribed to those actions by practitioners, children learn about their religion. Rituals contain information about the supernatural agent with whom is being communicated and the supernatural causal properties of the ritual. Therefore, religious rituals provide the opportunity to examine how children's religious concepts develop through socio-cultural factors.

Rituals also provide an opportunity to examine how children's understanding of intention influences the development of religious concepts. Theoretical and empirical examinations of how people understand religious rituals suggest that mental states play a role in the efficacy of rituals (Barrett, 2002; Barrett & Lawson, 2001; Barrett & Malley, 2007; Richert, 2006; Richert & Smith, 2009). Intentional actors are judged to be more important for the efficacy of a ritual than the correct actions (Barrett & Lawson, 2001; Richert, 2006). The efficacy of rituals are judged differently when the knowledge of the supernatural agent differs (Barrett, 2002). Therefore, religious rituals provide a methodological basis for judging children's understanding of intention as it relates to religious concepts.

The operational definition of religious rituals in cognitive and developmental research determines the conclusions that can be drawn from the research. Unfortunately, rituals have been operationalized in many ways, ranging in how symbolic and instrumental the rituals are. Operational definitions of rituals are varied: behaviors that lack clear causal explanations for their outcomes (Legare & Souza, 2012); instrumental behaviors with flawed causal outcomes (Nielbo & Sorenson, 2011); instrumental behaviors with 'non-natural' outcomes (Barrett & Lawson, 2001); symbolic behaviors

with no instrumental outcome (Richert, 2006); and symbolic behaviors that cause supernatural beings to cause instrumental outcomes (McCauley & Lawson, 2002). Whether rituals are operationalized as symbolic, meant to communicate information, or instrumental, meant to effect change on the world, determines how a person might conceptualize a ritual.

The multiple operational definitions of rituals stem from the reality of religious traditions. The functions, instrumental and/or symbolic, vary within and between religious traditions (Sax, Quack, & Weinhold, 2010). The same ritual can be conceptualized by practitioners as having different functions (Richert et al., in press). Some rituals are meant to be symbolic in which they represent and communicate a religious idea. For example, making the sign of the cross in Christianity is meant to represent the crucifixion of Jesus. Other rituals are meant to be instrumental in which they have a physical effect on the world. For example, rain dances in Native American religious traditions are meant to cause rain. And other rituals have social functions in which they change relationships between people. For example, weddings in most religious traditions are meant to change the relationship between individuals, from separate people to a singular family. These categories of ritual are not always mutually exclusive. For example, social and instrumental rituals include symbolic behaviors within them. The ways in which religious rituals are conceptualized and how those concepts develop provide insight into a proper operational definition of rituals.

Religious Ritual Concepts

Theoretically, religious rituals are conceptualized as a form of human behavior that involves communication with a supernatural agent (McCauley & Lawson, 2002). Examples of rituals are baptisms, bar mitzvahs, ancestor offerings, and animal sacrifices. Concepts of religious rituals are similar in structure to concepts of everyday actions, except rituals are inflexible. Rituals must be performed in a specific way or the ritual will not work. For example, the steps of a bath can happen in a different order and the bath will still be effective, but the steps of a baptism cannot happen in a different order or the person will not be baptized. The inflexibility of ritual actions is due to the actions communicating information to a supernatural agent.

Research on ritual concepts focuses on the efficacy and flexibility of religious rituals (Barrett, 2002; Barrett & Lawson, 2001; Kapitány & Nielsen, 2015; Legare & Souza, 2012; Richet, 2006; Shaman et al., in press; Sørensen, Liénard, & Feeny, 2006). These methodologies assess ritual concepts though questions about whether rituals will work under certain circumstance and whether aspects of rituals can be changed. Participants are presented with vignettes of either real religious rituals or novel behaviors approximating religious rituals.

Ritual efficacy. A foundational paradigm for studying ritual concepts explores judgments of the efficacy of a ritual if central components were changed (Barrett & Lawson, 2001). College students were presented with a prototypic novel ritual (e.g., "A successful religious action: A special person blew ordinary dust on a field and the field yielded good crops"). Participants then indicated how likely 12 permutations of the prototypic ritual were to work. The permutations were constructed through two changes:

a “special” qualifier was included or excluded from components of the ritual; and the components of the ritual were modified (e.g., “A person blew special feathers on a field). The central components of the ritual are the agent (practitioner of the ritual), instrument (items used in the ritual), act (physical behavior of the ritual), and subject (thing to which the ritual is done).

Barrett and Lawson (2001) found adults judged ritual permutations with changes to the agent as less effective than ritual permutations with changes to any other component. This finding suggests people conceptualize the agent as the most important component for a ritual’s efficacy. A second group of participants performed the same task, except the prototypic action was an instrumental action with no “special” components, not a ritual. When adults judged the instrumental action, they judged permutations with changes to the act as less effective than permutations with changes to the agent. This finding suggests people conceptualize rituals differently than they conceptualize instrumental actions; the agent is most important in concepts of rituals, while the act is most important in concepts of instrumental actions.

Barrett (2002) further examined ritual concepts and efficacy by manipulating the mental state of the supernatural agent. Because rituals are conceptualized as involving communication with a supernatural agent, the ability of the supernatural agent to receive and understand the communication influences whether the ritual was judged to be effective. Half the participants were presented with a prototypic ritual in which the supernatural agent had infallible knowledge; and, half the participants were presented with a prototypic ritual in which the supernatural agent had fallible knowledge.

Participants who received the ritual with the infallible-knowledge supernatural agent judged ritual permutations with changes to the agent as less effective than ritual permutations with changes to the act, similar to the findings of Barrett and Lawson (2001). However, participants who received the ritual with the fallible-knowledge supernatural agent judged ritual permutations with changes to the act as less effective than ritual permutations with changes to the agent. Barrett (2002) interpreted these findings as suggesting people conceptualize the act of the ritual as functioning to communicate to the supernatural agent. If the supernatural agent is unaware of the intentions of the practitioner and the practitioner performs the ritual incorrectly, then the ritual would be ineffective. However, if the supernatural agent is omniscient, then the supernatural would be aware of the practitioner's intentions and not need the act of the ritual for communication. Concepts of rituals with omniscient supernatural agents emphasize the practitioner because the supernatural agent can know the intentions of the practitioner.

Developmental examinations of ritual concepts have examined how efficacy and flexibility judgments change during childhood (Richert, 2006; Shaman et al., in press). Rituals are conceptualized as flexible if the ritual does not have to be performed in a specific manner. When presented with vignettes of novel ritual and instrumental actions, 5-year old children claim it is bad to perform the ritual and instrumental actions flexibly (Richert, 2006). However, 10-year-old children claim it is bad to do the ritual action flexibility, but claim it is not bad to do the instrumental action flexibly. When 4- to 6-year-old children judged the flexibility of prayer actions, age was negatively related to

flexibility, such that younger children judged prayer to be more flexible than older children (Shaman et al., in press). Children's judgments of prayer flexibility were also predicted by their parents' judgments of prayer flexibility and their own concept of their mother's knowledge. These findings suggest children's concept of ritual behavior is influenced by socio-cultural factors, but also social cognitive abilities.

Additional research on adults' concepts has examined other properties of ritual concepts. When rituals have more repetition of behavioral steps, greater amounts of behavioral steps, and contain religious iconography, rituals are more effective (Legare & Souza, 2012). When presented with causally-opaque behaviors (i.e., the cause behind the effect of the behavior cannot be determined), adults conceptualize the behaviors as rituals (Kapitány & Nielsen, 2015).

Religious rituals are conceptualized as having two unique properties: rituals are inflexible and must be performed in a specific way and rituals involve communication with a supernatural agent. However, the empirical literature seems to place these two properties at odds. Adults judge rituals to be flexible as long as the practitioner intends to perform the ritual, but judge instrumental behavior to be inflexible (Barrett & Lawson, 2001; Barrett, 2002). Ten-year-old children judge ritual behavior to be inflexible, but judge instrumental behavior to be flexible (Richert, 2006).

These two properties do not conflict; they are complimentary. McCauley and Lawson (2002) theorized that adults conceptualize rituals as communication with supernatural agents. The purpose of the behaviors was to communicate the practitioner's desire for a change upon the world. The supernatural agent then effects change upon the

world upon reception of the communication. The supernatural agent must know the intention of the ritual practitioner. This requirement for knowledge may be satisfied in one of two ways: the supernatural agent is omniscient and just knows the intention of the practitioner; or the supernatural is made aware of the intention of the practitioner through the ritual behaviors. The ritual behaviors must be inflexible in the same way words must be inflexible. If a speaker says a word incorrectly, the listener will not understand the communication. If a practitioner performs a ritual incorrectly, the supernatural agent will not understand the communication.

Whether or not children conceptualize rituals in this way depends upon their social cognitive abilities and their concept of supernatural agents. If children conceptualize the supernatural agent as having fallible knowledge, the children must understand how behaviors can communicate information, just like words. These children must also understand how a practitioner's intention is a causal factor in the outcome of the ritual. If children conceptualize the supernatural agent as having infallible knowledge, children must simply understand that the supernatural agent can know the mental state of the practitioner.

To properly assess children's concept of rituals, three criteria are needed in an operational definition of rituals. First, the ritual must contain information about how to perform the ritual correctly. This information will allow children to assess whether a practitioner performed the ritual flexibly or inflexibly. Second, the ritual must contain information about the practitioner's intention. This information will allow children to assess whether an intention can be communicated to the supernatural agent. Third, the

ritual must contain information about the supernatural agent's knowledge. This information will allow children to assess whether the supernatural agent knows the mental state of the practitioner.

Summary

The present study examined how children's understanding of intention as a causal mechanism in religious rituals influences the development of their religious concepts. By examining the development of religious concepts, the present study explored how concepts are internalized through social and cultural participation. According to sociocultural theories of concept development, such as cultural learning, internalization of concepts includes an internalization of the intentions of participants of social and cultural interactions. Thus, children's understanding of intention was hypothesized to be a predictor of the development of children's religious concepts. Religious rituals were used to explore children's understanding of intentions for two reasons: religious rituals are social and cultural activities that contain religious information; and intention is conceptualized as a causal factor for the efficacy of rituals. Therefore, the present study explored children's understanding of intention as a causal mechanism in religious rituals and how this understanding predicts children's religious concepts.

Research Questions and Hypotheses

The present study addressed two research questions. (1) Does understanding of intention as a causal mechanism in religious rituals vary by age and other individual factors? (2) Does understanding of intention as a causal mechanism in religious rituals predict children's religious concepts?

First Research Question

Regarding the first research question, the present study examined if understanding of intention as a causal mechanism in religious rituals varied by age and other individual factors. There were three hypotheses for the first research question.

Hypothesis 1a. The understanding of intention as a causal mechanism in religious rituals was hypothesized to increase as age increased. Around 5-years-old, children shift from understanding that behaviors are goal-directed to understanding that intention is a mental state that causes behavior (Meltzoff et al., 2012; Moses, 1993; Moses, 2001). Therefore, for children in early childhood, children were hypothesized to increasingly emphasize the intention of a practitioner for a ritual's efficacy as their age increased.

Hypothesis 1b. The understanding of intention as a causal mechanism in religious rituals was hypothesized to increases as previous religious exposure increased. Parents' understanding of prayer influences children's concepts of prayer and God (Richert et al., in press; Shaman et al., in press). Parents' understanding of religion is suggested to shape the context of children's religious experiences and religious concept development. Therefore, for children in early childhood, children were hypothesized to increasingly emphasize the intention of a practitioner for a ritual's efficacy as their previous religious exposure increased.

Hypothesis 1c. The understanding of intention as a causal mechanism in religious rituals was hypothesized to increase as children's general cognitive abilities increased. Previous research suggests that domain-general cognitive abilities afford

children the opportunity to develop specific cognitive skills through their cultural experiences (Sabbagh, Xu, Carlson, Moses, & Lee, 2006). The development of domain-general cognitive abilities is theorized to afford children the opportunity to develop specific cognitive skills through their cultural experiences (Sabbagh et al., 2006). When children have improved domain-general cognitive abilities, children are able to attend to and reason about more religious experiences. Therefore, for children in early childhood, children were hypothesized to increasingly emphasize the intention of a practitioner for a ritual's efficacy as their general cognitive abilities increased.

Second Research Question

Regarding the second research question, the present study examined if children's understanding of intention as a causal mechanism in religious rituals related to their religious concepts. There were three hypotheses for the second research question.

Hypothesis 2a. The understanding of intention as a causal mechanism in religious rituals was hypothesized to predict an increase in infallible knowledge attributed to a supernatural agent. As children come to understand intention as a mental state that causes behavior, their ability to internalize the understanding of a religious practitioner and the purpose of ritual behavior improves (Tomasello et al., 2005; Tomasello et al., 1993). Among monotheistic religious communities in the US, children attribute infallible knowledge to supernatural agents, especially in the later stages of early childhood (Barrett et al., 2001; Lane et al., 2012). Therefore, for children in early childhood, children were hypothesized to attribute infallible knowledge to a supernatural agent as

they increasingly emphasized the intention of a practitioner for a ritual's efficacy, controlling for individual factors.

Hypothesis 2b. The understanding of intention as a causal mechanism in religious rituals was hypothesized to predict a decrease in the anthropomorphic properties attributed to a supernatural agent. Among monotheistic religious communities in the US, children attribute less anthropomorphic properties to supernatural agents when they get older and attribute less anthropomorphic properties to supernatural agents when their parents do as well (Richert et al., in press). Therefore, for children in early childhood, children where hypothesized to attribute less anthropomorphic properties to a supernatural agent as they increasingly emphasized the intention of a practitioner for a ritual's efficacy, controlling for individual factors.

Hypothesis 2c. The understanding of intention as a causal mechanism in religious rituals was hypothesized to predict an increase in the supernatural causal explanations of a ritual. Among monotheistic religious communities in the US, children's attribution of flexibility to prayer is related to their parents' attribution of flexibility to prayer, and children attributed less flexibility to prayer when they better understood a human agent's mental state (Shaman et al., in press). Therefore, for children in early childhood, children were hypothesized to attribute more supernatural explanations for a ritual as they increasingly emphasized the intention of a practitioner for a ritual's efficacy, controlling for individual factors.

Chapter 2

Methods

The present study addressed these research questions by assessing Christian children's understanding of the ritual of baptism, as well as their concepts of God and supernatural causality. Children between the ages of 4- and 7-years-old were presented with a vignette of a prototypic infant baptism. Children judged the efficacy of four variations of the baptism in which the intentions and behavior of the practitioner varied. Children's efficacy judgments were used to determine their understanding of intention as a causal mechanism in the baptism. Children were interviewed to assess their concept of God and supernatural causality to determine how the concepts were related to children's intention understanding. Children also completed a working memory task as a measure of general cognitive ability. Finally, parents completed a survey assessing children's demographics and previous religious exposure.

Participants

Sixty-eight children participated in the present study. Two children did not complete the interview and were thus dropped from analyses. Children were between the ages of 3.85- and 7.75-years-old. Half of children were female (n = 32) and half were male (n = 34). The age breakdown by gender of children is found in Table 1. Families were recruited through local preschools, Craigslist postings, flyers posted on and around the university campus, and at local religious (e.g., churches) and public (e.g., city libraries) organizations. All families reported English as the primary language spoken in the home.

The majority of parents (n = 59) provided information on their child's ethnic background; children fell into the following groups: Hispanic/Latino (n = 17), White/Caucasian (n = 15), Black/African American (n = 4), Asian (n = 3), and Other (n = 20). The majority of parents (n = 57) provided information on their child's religious affiliation: Protestant Christian (n = 42) and Roman Catholic (n = 15). The majority of parents (n = 59) indicated if their children had been baptized: baptized (n = 20) and not baptized (n = 39). The majority of parents (n = 59) indicated if their children had exposure to other religions: exposure to other religions (n = 16) and no exposure to other religions (n = 43).

Table 1

Age Breakdown of Children in Study

	n	*M*	*SD*
Female	34	5.76	1.02
Male	32	5.26	1.02
Total	66	5.51	1.04

Procedure

Each child and her/his parent participated in an on-campus laboratory, at their preschool, or in the family's home. Children were interviewed by a trained experimenter while parents filled out a short survey. The interview lasted approximately 20 to 30 minutes. The experimenter began by presenting the child with a certificate of participation and explained the child would receive stickers for answering questions. The

experimenter familiarized the child with the procedure and asked for assent before conducting the interview. See Appendix A for the child interview.

The experimenter began the interview by reading the vignette of a prototypic baptism to the child with accompanying pictures. After reading the story to the child, the experimenter presented the child with pictures of four variations of the baptism. After viewing each ritual variation, the child indicated whether or not the variation would be successful. The rest of the child interview included questions assessing children's concepts of God and supernatural causality. The interview ended with a working memory task. The child was then congratulated for her/his hard work. Parents were compensated $10 per child.

Religious Ritual

The ritual of baptism used to assess children's understanding of intention as a causal mechanism. Baptism was chosen because it is a ritual common to most denominations of Christianity. The vignette of the baptism was generic and short (see Appendix B for the vignette and pictures). A generic and short vignette was created to ensure all Christian children would be familiar with the ritual and would conceptualize the baptism as a ritual performed correctly. Different Christian denominations perform baptism differently from one another. A story with too much detail would have been seen by some children as a baptism performed incorrectly. Additionally, children were told before hearing the vignette, "This is a story of people doing a baptism. Some people do baptisms differently than other people. This story is how these people do a baptism."

As described above, when assessing efficacy judgments of rituals, three criteria must be met in the operational definition. The participants must be presented with information about how to perform the ritual, the practitioner's intention, and the supernatural agent's knowledge. Therefore, the vignette of the baptism described six components of the ritual: (1) the name of the ritual, baptism; (2) the religious group, Christians; (3) the supernatural agent, God; (4) the ritual actor, the priest; (5) the ritual subject, the person being baptized; and (6) the prominent physical behavior, pouring water on the head. These components provided children with information on how the ritual is performed.

Information on the practitioner's intention is presented in the variations described below. Whether children conceptualized God as having fallible or infallible knowledge was assessed with an agent knowledge task described below. The purpose of the baptism, however, was not stated and left ambiguous. Just like the performance of the baptism, different denominations of Christianity conceptualize the purpose of the baptism differently from one another. Children were asked an open-ended question to determine how they conceptualized the purpose of baptism.

Ritual Variations

After hearing the vignette of the baptism, the experimenter presented children with four variations of the baptism. The variations varied along two dimensions: performance and intention. Along the performance dimension, two variations were presented as performed correctly and two variations were presented as performed incorrectly. Along the intention dimension, two variations were presented as performed

intentionally and two variations were presented as performed accidentally. Thus, the four ritual variations were as follows: correct and intentional ritual behavior; correct, but accidental ritual behavior; incorrect, but intentional ritual behavior; and incorrect and accidental ritual behavior. The order of the variations was randomized between participants and order did not significantly affect responses. See Appendix C for the ritual variations.

The ritual variations were presented as single pictures. The correct performance was represented as the priest pouring water on the head of the infant being baptized. The incorrect performance was represented as the priest pouring water on the feet of the infant being baptized. The intention (intentional or accidental) was represented as thought bubbles from the priest. In the intentional thought bubble, there was a picture of a baptism. In the accidental thought bubble, there was a picture of a baseball.

After each variation was presented to the child, the experimenter asked an efficacy assessment question: "Did the baptism work?" All responses were on a scale of *No-Really Sure (-2)* to *Yes-Really Sure (+2);* higher responses indicated the positive efficacy judgments.

Ritual Understanding

After children completed the four efficacy assessment questions, the experimenter asked two open-ended response questions. These questions assessed children's understanding of the baptism. Children answered the following two questions: (1) What did the priest want to happen?; and (2) Why do Christian people do the baptism? These questions provided a qualitative assessment of children's understanding of the purpose of

the baptism. Children's responses to the first question were categorized as referring to the actions of the baptism, the outcome of the baptism, or the intentions of the priest. Children's responses to the second question were categorized as referring to the outcome of the baptism, the intention of the practitioners, or the supernatural agent involved in the baptism.

Religious Concepts

Supernatural agent concepts. Children's concept of God was assessed after learning about the ritual. Supernatural agent concepts were assessed through open-ended questions and two tasks: an agent knowledge task (Barrett et al., 2003; Lane et al., 2012) and an agent properties task (Richert et al., in press; Shaman et al., in press). Prior to the agent knowledge and agent properties tasks, children answered one open-ended question that assessed the child's supernatural agent concepts: "What is God like?" The answers to this question provided a qualitative compliment to the force-choice tasks without being influenced by those tasks. Children's responses to this question were categorized as referring to the supernatural properties of God, the relation between God and the child, and the behaviors of God. Additionally, children's responses were categorized as a psychological, biological, and/or physical description of God.

Agent knowledge task. As part of the agent knowledge task, children completed a modified theory-of-mind task. The task was an occluded picture task used to assess children's understanding of ignorance and false-belief (Barrett et al., 2003). Children were presented with an occluded picture; the picture was a cartoon horse, but was covered in a way that children could not determine the true content. Children were asked

to guess the true content of the picture. No children correctly guessed the content of the picture. The experimenter informed the child that their guess was incorrect and only the experimenter knew the content of the picture.

The experimenter asked two sets of questions assessing children's judgments of agent knowledge. In each set of questions, children were asked about God and their mother, as a natural agent comparison. For each agent, children were asked whether the agent knew what the picture really was without having seen it before. The experimenter asked children the first set of questions after presenting the child with the occluded picture. After the first set of questions, the experimenter revealed the picture to the child, ensured the child knew what the picture was, and covered the picture again. Prior to asking the second set of questions, the experimenter asked a memory question. Children indicated if they had known the true content of the picture before it was revealed to them. Finally, the experimenter asked the second set of agent knowledge questions. All responses were on a scale of *No-Really Sure (-2)* to *Yes-Really Sure (+2)*; higher scores indicate infallible knowledge (i.e., omniscience). The two questions for each agent were averaged for a knowledge score for each agent (God: Chronbach's $\alpha = .72$; Mom: Chronbach's $\alpha = .55$).

After the agent knowledge task, children answered a question about God's knowledge during the baptism: "Does God know what the priest wants to happen?" The answers to this question provided more specific information on God's knowledge in the context of the baptism. Children's responses to these questions were categorized as

having an anthropomorphic description or not and whether or not children knew how they learned about God's property.

Table 2

Agent Properties Task Questions

Psychological
Can God forget things?
Can God feel happy?
Can God get bored?
Biological
Does God need to eat food and drink water?
Does God have a heart that keeps God alive?
Can God get sick?
Physical
Can God get wet when it rains?
Does God have to open a door to go through?
Can you touch God with your hand?

Agent properties task. In the agent properties task, children indicated whether God and their mother had specific anthropomorphic properties (Richert et al., in press; Shaman et al., in press). The experimenter asked the children about nine properties per agent. The properties were categorized in one of three domains: psychological, biological, and physical. The questions are presented in Table 2. All responses were on

a scale of *No-Really Sure (-2)* to *Yes-Really Sure (+2);* higher responses indicated anthropomorphic properties. Responses for the nine questions were averaged for an agent property score (God: Chronbach's $\alpha = .77$; Mom: Chronbach's $\alpha = .72$).

After each question, the experimenter asked children a follow-up open-ended question: "How do you know?" These questions provided a qualitative compliment to understand how children conceptualized the properties of God and their mother.

Supernatural causality concepts. Children's concepts of supernatural causality were assessed after their supernatural agent concepts. Supernatural causality concepts were assessed through an open-ended question (Legare et al., 2012) and causal explanations task (Legare & Gelman, 2008). Children were asked about the supernatural cause of the baptism.

Prior to the causal explanations task, children answered one open-ended question that probes the child's explanatory framework (Legare et al., 2012); "How does the baptism work?" This question provided a qualitative compliment to the causal explanations task. Children's responses to this question were categorized as referring to the behaviors of baptism or the cause of baptism.

In the causal explanations task, children identified the potential causes of the baptism (Legare & Gelman, 2008). The experimenter presented children with five potential causal explanations for the effects of the baptism: two natural explanations, two supernatural explanations, and one irrelevant explanation. After each explanation, children either endorsed or rejected each individual explanation on a scale of *No-Really Sure (-2)* to *Yes-Really Sure (+2*). This allowed children to accept all or none of the

explanation types. The supernatural responses were averaged for a supernatural causality score (Chronbach's $\alpha = .77$). The natural responses were averaged for a natural causality score (Chronbach's $\alpha = .22$).

The order of the explanations was randomized between participants and order did not significantly affect responses. Explanations were specific to baptism (see Appendix A for the explanations). The irrelevant explanation was used as a control to assess if children would endorse any explanation.

Individual Factors

Religious exposure. Children's religious exposure was assessed through a parent questionnaire. During the child interview, parents responded to a written survey assessing the previous religious exposure of the child. Questions assessed basic demographic variables, such as age, gender, and religious denomination. There were three sets of forced-choice religious exposure questions. See Appendix D for the parent questionnaire.

The first set of religious exposure questions assessed children's overall frequency of religious exposure. Parents indicated how often their child attended events sponsored by their religious organization, how often their child participated in public religious practices, how often their child participated in private religious practices, and how often their child received formal religious education or training. These four questions were answered on a 9-point scale, ranging from *Never (0)* to *Multiple times a day (9)*. The four questions were averaged for an overall religious exposure score (Chronbach's $\alpha = .85$).

The second set of religious exposure questions assessed children's weekly religious exposure. Parents indicated how often their child attended religious services in a normal week and how often the parent talked to their child about religious things. These two questions were answered on a 3-point scale, ranging from *Never (0)* to *More than once (2)*. The two questions were averaged for a weekly religious exposure score (Chronbach's $\alpha = .51$).

The third set of religious exposure questions assessed children's exposure to baptism. Parents indicated how often their child learned about baptism in church, how often their child learned about baptism at home, and how often their child has seen a baptism. These three questions were answered on a 5-point scale, ranging from *Never (0)* to *Over 20 times (4)*. The three questions were averaged for a baptism exposure score (Chronbach's $\alpha = .88$). Additionally, parents indicated if their child had been baptized and if their child had exposure to other religions.

Working memory. Children's working memory was measured to determine how much information the child is able to handle at one time. Working memory was measured through a digit span task (Espy & Bull, 2005). Children memorized digit sequences that were presented to them visually. Children then recalled the digit sequences in order of presentation as best they could. Each ensuing digit sequence increased by one digit, starting with a digit sequence of one. The task ended when children incorrectly recalled two digit sequences in a row. Digit sequences were predetermined, but random. The maximum digit span correctly recalled was recorded as the child's working memory score.

Chapter 3

Results

The research questions were addressed through three stages of analysis: (1) an analysis of the ritual variation questions; (2) an analysis of how children's individual factors related to intention understanding; and (3) an analysis of how children's religious concepts related to intention understanding**.**

Children's Understanding of Intention

Children judged the efficacy of the four ritual variations as an assessment of their understanding of intention as a causal mechanism in baptism. The four ritual variations were: (a) correct and intentional behavior; (b) correct, but accidental behavior; (c) incorrect, but intentional behavior; and (c) incorrect and accidental behavior. The correlations between, and mean, standard deviation, and confidence intervals, of each question are presented in Table 3.

Children's efficacy judgments of the ritual variations were submitted to a Repeated-Measures Analysis of Variance with intention (intentional versus accidental) and performance (correct versus in correct) as within-subjects factors. There was a significant main effect of intention, $F(1,65) = 53.391$, $p < .001$, $\eta_p^2 = .45$. Children judged intentionally-performed ritual variations as more effective than accidentally-performed ritual variations. There was no significant effect of performance, $F(1,65) = 0.256$, $p = .62$, $\eta_p^2 = .004$, nor a significant interaction, $F(1,65) = 0.081$, $p = .78$, $\eta_p^2 = .001$.

As seen in Table 3, efficacy judgments of the ritual variations were not all strongly related to one another. Except for the significant correlation between judgments

of the two accidental variations, the lack of relations suggests the task measures more than one dimension of children's intention understanding. Therefore, responses to the ritual variation questions were submitted to a principal components analysis. A principal components analysis is generally inappropriate to use when the number of variables is less than five. However, the present study did not use a principal components analysis to find latent factors and calculate weighted composite scores. The principal components analysis was used to determine an appropriate method of aggregating the efficacy judgments.

Table 3

Summary of Correlations, Means, Standard Deviations, and Confidence Intervals for Ritual Variation Questions

Ritual Variation Question	1	2	3	4	*M*	*SD*	95% CI	
							Low	Up
1. Correct – Intentional	–				0.85	1.26	0.54	1.16
2. Correct – Accidental	-.08	–			-0.45	1.24	-0.76	-0.15
3. Incorrect – Intentional	.06	.14	–		0.88	1.20	0.58	1.17
4. Incorrect – Accidental	-.02	.49**	.19	–	-0.35	1.46	-0.71	0.01

Note. †$p < .10$. *$p < .05$. **$p < .01$.

The factorability of the four ritual variation efficacy judgments was examined. Three criteria were met to suggest factoring was appropriate (Raykov & Marcoulides, 2012). First, Bartlett's test of sphericity was significant, $\chi^2(6) = 20.231$, $p = .003$. Second, the diagonals of the anti-image correlation matrix were all over .50. Third, the

extracted communalities were all above .30, indicating that each efficacy judgments shared common variance with at least one other efficacy judgments.

Table 4

Factor Loadings and Communalities based upon a Principal Components Analysis for Ritual Variation Questions

Ritual Variation Question	Factor 1 (Intentional Acts)	Factor 2 (Accidental Acts)	Communality
1. Correct – Intentional	.87		.77
2. Correct – Accidental		.82	.70
3. Incorrect – Intentional	.52		.47
4. Incorrect – Accidental		.83	.70

Two eigenvalues above 1.0 were identified and these two factors explained 40% and 26% of the variance respectively. The two factors indicated by the eigenvalues each had two ritual variations load onto them. As can be seen in Table 4, the factors are of theoretical interest. The first factor, labeled *Intentional Acts*, had the correct and intentional variation and the incorrect but intentional variation. The second factor, labeled *Accidental Acts*, had the correct but accidental variation and the incorrect and accidental variation.

Efficacy judgments were averaged within each factor. The correlations between, and mean, standard deviation, and confidence intervals, of the factors are presented in Table 5. The non-significant correlation between the two factors indicate the questions

assessed two distinct properties by which children conceptualized intention as a causal mechanism in baptism. Overall, children indicated that the baptism would work when performed intentionally and would not work when performed accidentally. However, their responses to these two sets of questions are not opposite ends of the same property. Children do not conceptualize the efficacy of intentional actions in the same way they conceptualize accidental actions.

Table 5

Summary of Correlations, Means, Standard Deviations, and Confidence Intervals for Ritual Variation Questions

Ritual Variation Question	1	2	*M*	*SD*	95% CI	
					Low	Up
1. Intentional Acts	–		0.86	0.89	0.64	1.00
2. Accidental Acts	.09	–	-0.40	1.17	-0.69	-0.11

Note. †$p < .10$. *$p < .05$. **$p < .01$.

Children's ritual understanding. Children responded to two open-ended questions regarding their understanding of baptism: (1) What did the priest want to happen?; and (2) Why do Christian people do the baptism?

Regarding children's understanding of the priest's intention, 35% of children did not know or did not have a response. Of the children who responded, 30% provided a straightforward answer; the priest wanted to baptize the baby. Another 35% referred back to the actions of the baptism. For example, the priest wanted to "pour water on the baby's head." Another 9% referred to the accidental intentions of the ritual variations;

for example, the priest wanted "to play baseball." Finally, 19% of children who responded provided a response that referred to an outcome of the baptism; for example, the priest wanted "the baby to grow up and be anything he wants" or "to make [the baby] good." The remaining responses did not refer to the baptism.

Regarding children's understanding of the reason Christian's perform baptism, 27% of children did not know or did not have a response. Of the children who responded, 29% indicated the purpose was for a change in the baby. For example, Christian people perform baptism to "learn about Jesus," "so the baby can be smart," or "to change their life." Another 17% of respondents provided a desire related response; for example, Christian people perform baptism because "they want to." Another 19% of children who provided a response indicated God was the purpose of the baptism; for example, Christian people perform baptism "for God" or "because Jesus did it." Another 8% indicated the purpose was for an instrumental outcome; for example, Christian people perform baptism because "the baby needs cleaning." Another 12% indicated a generic outcome; for example, Christian people perform baptism "to play games." Finally, 12% of children who responded provided a generic response; for example, Christian people perform the baptism "for the baby" or "because the baptism is important."

Children's Individual Factors and Intention Understanding

The relationship between children's individual factors and their understanding of intention as a causal mechanism in baptism was explored. First, t-tests were conducted to explore how children's efficacy judgments of intentional and accidental acts differed by gender, religious affiliation, baptismal status, and exposure to other religions. Second,

bivariate correlations were calculated to explore how children's efficacy judgments of intentional and accidental acts related to children's age, previous religious exposure, and working memory.

Gender. For children's efficacy judgments of intentional acts, no differences existed between males (M = .76, SD = 0.96) and females (M = .97, SD = 0.81), $t(64)$ = 0.927, p = .36, r = .12. For children's efficacy judgments of accidental acts, no differences existed between males (M = -.50, SD = 1.21) and females (M = -.30, SD = 1.13), $t(64)$ = 0.704, p = .48, r = .09.

Religious affiliation. For children's efficacy judgments of intentional acts, no differences existed between Protestant Christians (M = .85, SD = 0.87) and Roman Catholics (M = 1.03, SD = 1.06), $t(55)$ = 0.677, p = .50, r = .09. For children's efficacy judgments of accidental acts, no differences existed between Protestant Christians (M = -.56, SD = 1.22) and Roman Catholics (M = -.13, SD = 1.13), $t(55)$ = 1.183, p = .24, r = .16.

Baptismal status. For children's efficacy judgments of intentional acts, no differences existed between children who were baptized (M = .91, SD = 0.88) and children who were not baptized (M = 0.88, SD = 0.97), $t(57)$ = 0.141, p = .89, r = .02. For children's efficacy judgments of accidental acts, no differences existed between children who were baptized (M = -.54, SD = 1.13) and children who were not baptized (M = -.28, SD = 1.29), $t(57)$ = 0.806, p = .42, r = .11.

Exposure to other religious. For children's efficacy judgments of intentional acts, a trending towards significant differences existed between children who had no

exposure to other religions (M = .77, SD = 0.87) and children who had exposure to other religions (M = 1.25, SD = 0.93), $t(57) = 1.861$, p = .07, r = .24. Children who had exposure to other religions judged the baptism as more effective when performed intentionally than children who did not have exposure to other religions. For children's efficacy judgments of accidental acts, no differences existed between children who had no exposure to other religions (M = -.50, SD = 1.21) and children who had exposure to other religions (M = -.31, SD = 1.15), $t(57) = 0.537$, p = .59, r = .07.

Age. Hypothesis 1a was tested through the calculation of two bivariate correlations between children's age and their efficacy judgments of intentional and accidental acts (see Table 6). Age was calculated by subtracting children's date of birth from their date of participation. Age was not significantly related to children's efficacy judgments of intentional or accidental acts.

Previous religious exposure. Hypothesis 1b was tested through the calculation of six bivariate correlations between children's previous religious exposure and their efficacy judgments of intentional and accidental acts (see Table 6). Children's weekly religious exposure and baptism exposure were not significantly related to children's efficacy judgments of intentional or accidental acts. Children's overall religious exposure was trending toward a significant correlation with children's efficacy judgments of accidental acts (r = -.23, p = .08), but not intentional acts. Children who had more religious exposure through their lives judged accidentally performed baptisms to not work; children who had less exposure through their lives judged accidentally performed baptisms to work.

Table 6

Summary of Correlations, Means, Standard Deviations, and Confidence Intervals for Efficacy Judgments and Individual Factors

Measure	Intentional Acts	Accidental Acts	M	SD	95% CI	
					Low	Up
Age	.04	-.18	5.60	1.11	5.29	5.91
Overall Religious Exposure	-.01	-.23†	3.89	2.06	3.32	4.47
Weekly Religious Exposure	.04	-.15	1.37	0.51	1.22	1.51
Baptism Exposure	-.08	-.06	1.01	0.88	0.76	1.25
Working Memory	.10	-.41**	4.88	1.15	4.56	5.20

Note. †$p < .10$. *$p < .05$. **$p < .01$.

Working memory. Hypothesis 1c was tested through the calculation of two bivariate correlations between children's working memory and their efficacy judgments of intentional and accidental acts (see Table 6). Children's working memory was significantly correlated with children's efficacy judgments of accidental acts ($r = -.41$, $p = .002$), but not intentional acts. Children who had better working memory judged accidentally performed baptisms to not work; children who had worse working memory judged accidentally performed baptisms to work.

Summary. In summary, children's understanding of intention as a causal mechanism in baptism was related to some individual factors. Hypothesis 1a was not supported: age was not related to children's efficacy judgments of intentional or

accidental acts. Hypothesis 1b was supported. Children's efficacy judgments of intentional acts were related to their exposure to other religions; intention was emphasized when children had exposure to other religions. Children's efficacy judgments of accidental acts were related to their overall exposure to religion; intention was emphasized when children had more exposure religion over their lifespan. Hypothesis 1c was supported. Children's efficacy judgments of accidental acts were related to their working memory; intention was emphasized when children had better working memory.

Children's Religious Concepts and Intention Understanding

The relationship between children's religious concepts and their understanding of intention as a causal mechanism in baptism was explored. However, children's understanding of intention may not explain children's religious concepts above and beyond other individual factors. Therefore, children's religious concepts and their relationship between religious concepts and children's individual factors were explored first.

Children's religious concepts. Seven religious and non-religious concepts were analyzed: God's knowledge, mother's knowledge, God's knowledge of the priest's intention, God's anthropomorphic properties, mother's anthropomorphic properties, supernatural explanations of baptism, and natural explanations of baptism. The correlations between, and mean, standard deviation, and confidence intervals of each religious concept are presented in Table 7.

Table 7

Summary of Correlations, Means, Standard Deviations, and Confidence Intervals for Religious and Non-Religious Concepts

Religious Concept	1	2	3	4	5	6	7	M	SD	*95% CI*	
										Low	Up
1. God's Knowledge	–							-0.9	1.4	-1.25	-0.5
2. Mother's Knowledge	.36**	–						-0.2	1.4	-0.51	0.2
3. God's Knowledge of Priest's Intention	-.31*	0.04	–					0.76	1.6	0.35	1.16
4. God's Properties	0.03	-0.2	-	–				0.06	0.9	-0.16	0.29
5. Mother's Properties	-0.1	0.17	0.13	0.1	–			1.26	0.7	1.1	1.43
6. Supernatural Explanations of Baptism	.22†	0.07	-0.2	.32**	0	–		1.04	1.1	0.77	1.31
7. Natural Explanations of Baptism	-0.1	-.37**	-0.1	.33**	-.30*	.29*	–	0.57	1.4	0.22	0.92

Note. †$p < .10$. *$p < .05$. **$p < .01$.

Children's concept of God's knowledge. Children's concept of God's knowledge was assessed through the agent knowledge task. Children's concept of God's knowledge was significantly related to their concept of their mother's knowledge, r = .36, p = .004. Children who had attributed more knowledge to God attributed more fallible knowledge to their mother; children who attributed less fallible knowledge to God attributed less fallible knowledge to their mother. Overall, children attributed significantly less fallible knowledge to God than to their mother, $t(61) = 3.702$, $p < .001$, $\eta_p^2 = .18$.

Additionally, children reported whether God would know the priest's intentions during the baptism. Children's concept of God's knowledge, assessed by the agent knowledge task, was related to their concept of God's knowledge of the priest's intention during the baptism, r = -.31, p = .014. Children who had attributed more fallible knowledge to God conceptualized God as not knowing what the priest intended to do during the baptism; children who attributed less fallible knowledge to God conceptualized God as knowing what the priest intended to do during the baptism.

Children's concept of God's knowledge of the priest's intention was significantly related to their concept of God's properties, r = -.34, p = .005. Children who conceptualized God as knowing the priest's intentions during baptism attributed less anthropomorphic properties to God; children who conceptualized God as not knowing the priest's intentions during baptism attributed more anthropomorphic properties to God.

Children's concept of God's knowledge was trending toward a significant relationship to their supernatural explanations of baptism, r = .22, p = .085. Children who attributed more fallible knowledge to God attributed more supernatural explanations

to baptism; children who attributed less fallible knowledge to God attributed less supernatural explanations to baptism.

Free responses. Prior to completing the agent knowledge task, children answered an open-ended response question concerning their concept of God: "What is God like?" Approximately 11% of children did not know or did not have a response. Of the children who responded, 79% provided more than one description of God.

Children provided descriptions of God that fell into a variety of categories. Sixty percent of children who responded described God in a supernatural way; for example, God is "everlasting" and "a spirit." Fifty-nine percent of children who responded described God in relation to themselves; for example, God "likes you to be good" and "wishes you have a good day." Thirty-six percent of children who responded described God in terms of behavior; a description of what God does. For example, God "makes people." Forty percent of children who responded described God in terms of a general trait; for example, "God is great."

Of children who provided a response, 60% described God in psychological terms; for example, God "likes children" and "knows about so much stuff." Of children who provided a response, 16% described God in biological terms; for example, "God is a man." Of children who provided a response, 3% described God in physical terms; for example, God is "clear" and is 'in the sky."

Children's concept of God's properties. Children's concept of God's properties was assessed through the agent properties task. Children's concept of God's properties was not significantly related to their concept of their mother's properties. Overall,

children attributed significantly less anthropomorphic properties to God than to their mother, $t(65) = 8.515$, $p < .001$, $\eta_p^2 = .53$. As described above, children's concept of God's properties was related to their conceptualization of God's knowledge of the priest's intention during baptism.

Children's concept of God's properties was significantly related to their supernatural explanations of baptism, $r = .32$, $p = .009$. Children who attributed more anthropomorphic properties to God attributed more supernatural explanations to baptism; children who attributed less anthropomorphic properties to God attributed less supernatural explanations to baptism. Children's concept of God's properties was significantly related to their natural explanations of baptism, $r = .33$, $p = .006$. Children who attributed more anthropomorphic properties to God attributed more natural explanations to baptism; children who attributed less anthropomorphic properties to God attributed less natural explanations to baptism.

Free responses. While completing the agent properties task, children answered open-ended response questions concerning how they knew God had or did not have those each of the nine properties.

For the psychological properties, 30% of children did not know or did not have a response for any of the three agent properties. Of the children who provided a response, 20% provided an anthropomorphic explanation. For example, "God is just like mom" or "God is an adult too." Of the children who provided a response, 15% referred to the way in which they came to understand God in this way; for example, "I read it in the bible."

For the biological properties, 29% of children did not know or did not have a response for any of the three agent properties. Of the children who provided a response, 49% provided an anthropomorphic explanation. For example, "everyone has a heart" or "if he doesn't, he will die." Of the children who provided a response, 13% referred to the way in which they came to understand God in this way; for example, "I've seen him."

For the physical properties, 29% of children did not know or did not have a response for any of the three agent properties. Of the children who provided a response, 11% provided an anthropomorphic explanation. For example, "he would hit himself" or "everyone can." Of the children who provided a response, 11% referred to the way in which they came to understand God in this way; for example, "I've seen him."

Children's concept of supernatural causality. Children's concept of supernatural causality was assessed through the causal explanations task. Children's supernatural explanations of baptism were related to their natural explanations of baptism, $r = .29$, $p = .017$. Children who attributed more supernatural explanations to baptism attributed more natural explanations to baptism; children who attributed less supernatural explanations to baptism attributed less natural explanations to baptism. Overall, children attributed more supernatural explanations to baptism than natural explanations, $t(65) = 2.399$, $p = .019$, $\eta_p^2 = .08$.

As described above, children's attribution of supernatural explanations to baptism was related to their concept of God's knowledge and their concept of God's properties. Additionally, children's attribution of natural explanations to baptism was related to their concept of their mother's knowledge, $r = -.37$, $p = .003$. Children who attributed less

natural explanations to baptism attributed more fallible knowledge to their mother; children who attributed more natural explanations to baptism attributed less knowledge to their mother. And, children's attribution of natural explanations to baptism was related to their concept of their mother's properties, $r = -.30$, $p = .016$. Children who attributed more anthropomorphic properties to their mother attributed less natural explanations to baptism; children who attributed less anthropomorphic properties to their mother attributed more natural explanations to baptism.

Free responses. Before completing the causal explanations task, children answered an open-ended response question concerning their concept of the cause of baptism: "How does the baptism work?" Approximately 30% of children did not know or did not a response to the question. Of children who provided a response, 76% referred to the act of the baptism, specifically, the pouring of water. The remaining 24% of children who responded provided a generic response that did not include a causal explanation; for example, "It helps people" or "You baptize other people."

Summary. Regarding children's concepts of agent knowledge, children viewed God as more omniscient than their mother. When children viewed God as having infallible knowledge, they also conceptualized baptism as being driven by supernatural causes. When children viewed God as having infallible knowledge, they also thought God knew the intentions of the priest during the baptism. When children viewed God as knowing the intentions of the priest during the baptism, they anthropomorphized God less.

Regarding children's concept of agent properties, children viewed God as less anthropomorphic than their mother. When children viewed God as non-anthropomorphic, they thought God knew the intentions of the priest during the baptism. When children viewed God as non-anthropomorphic, they conceptualized baptism as being driven by supernatural and natural causes.

Regarding children's concept of supernatural causality, children viewed baptism as being driven by more supernatural causes than natural causes. When children viewed baptism as being driven by supernatural causes, they viewed God as non-anthropomorphic. When children viewed baptism as being driven by natural causes, they viewed their mother as having fallible knowledge, but non-anthropomorphic properties.

Table 8

Differences in Religious Concepts by Gender

	Male		Female			
Variable	*M*	*SD*	*M*	*SD*	*t*	*r*
God's Knowledge	-.78	1.54	-1.02	1.25	0.657	.09
Mother's Knowledge	-.19	1.47	-.12	1.34	0.198	.03
God's Knowledge of Priest's Intention	.44	1.81	1.19	1.15	1.984†	.24
God's Properties	.16	0.94	.02	0.86	0.626	.08
Mother's Properties	1.30	0.63	1.15	0.73	0.883	.11
Supernatural Explanations of Baptism	1.40	0.95	.75	1.08	2.589*	.31
Natural Explanations of Baptism	.56	1.43	.75	1.30	0.566	.07

Note. †$p < .10$. *$p < .05$. **$p < .01$.

Children's individual factors. First, t-tests were conducted to explore how children's religious concepts differed by gender, religious affiliation, baptismal status, and exposure to other religions. Second, bivariate correlations were calculated to explore how children's religious concepts related to children's age, previous religious exposure, and working memory.

Table 9

Differences in Religious Concepts by Religious Affiliation

	Protestant Christian		Roman Catholic			
Variable	*M*	*SD*	*M*	*SD*	*t*	*r*
God's Knowledge	-.88	1.44	-.75	1.60	0.271	.04
Mother's Knowledge	.04	1.39	-.63	1.54	1.419	.19
God's Knowledge of Priest's Intention	.90	1.53	.47	1.85	0.902	.12
God's Properties	-.01	0.83	.69	0.98	2.659*	.34
Mother's Properties	1.34	0.62	1.30	0.56	0.232	.03
Supernatural Explanations of Baptism	1.00	0.98	1.37	1.17	1.180	.16
Natural Explanations of Baptism	.44	1.44	.93	1.41	1.145	.15

Note. †$p < .10$. *$p < .05$. **$p < .01$.

Gender. As seen in Table 8, there was one religious concept difference between males and females and one concept that had a trending toward significant difference. Females believed God would know the priest's intentions more than males, $t(64) = 1.984$,

p = .052, r = .24. Females attributed less supernatural explanations to baptism than males, $t(64) = 2.589$, p = .012, r = .31.

Religious affiliation. As seen in Table 9, there was only one religious concept difference between Protestant Christian children and Roman Catholic children. Protestant Christian children attributed less anthropomorphic properties to God than Roman Catholic children, $t(55) = 2.659$, p = .01, r = .34.

Baptismal status. As seen in Table 10, there was only one religious concept difference between children who were baptized and children who were not baptized. Children who were baptized attributed more anthropomorphic properties to God than children who were not baptized, $t(57) = 2.144$, p = .04, r = .27.

Table 10

Differences in Religious Concepts by Baptismal Status

	Baptized		Not Baptized			
Variable	*M*	*SD*	*M*	*SD*	*t*	*r*
God's Knowledge	-.59	1.68	-.99	1.37	0.906	.12
Mother's Knowledge	-.53	1.58	.01	1.38	1.275	.17
God's Knowledge of Priest's Intention	.45	1.88	1.00	1.41	1.263	.17
God's Properties	.51	1.06	-.02	.79	2.144*	.27
Mother's Properties	1.37	.63	1.28	.64	0.486	.06
Supernatural Explanations of Baptism	1.35	1.20	1.00	.92	1.245	.16
Natural Explanations of Baptism	.63	1.49	.58	1.40	0.122	.02

Note. †p < .10. *p < .05. **p < .01.

Table 11

Differences in Religious Concepts by Exposure to Other Religions

	Exposure		No Exposure			
Variable	*M*	*SD*	*M*	*SD*	*t*	*r*
God's Knowledge	-1.47	1.12	-0.63	1.52	1.992†	.26
Mother's Knowledge	-0.50	1.39	0.00	1.46	1.169	.16
God's Knowledge of Priest's Intention	1.44	1.21	0.58	1.67	1.876†	.24
God's Properties	-0.01	0.96	0.22	0.90	0.891	.12
Mother's Properties	1.57	0.53	1.21	0.64	1.973†	.25
Supernatural Explanations of Baptism	0.75	1.14	1.26	0.96	1.710†	.22
Natural Explanations of Baptism	0.34	1.67	0.69	1.33	0.820	.11

Note. †$p < .10$. *$p < .05$. **$p < .01$.

Exposure to other religions. As seen in Table 11, there were four religious concepts that had trending toward significant differences between children who were exposed to other religions and children who were not exposed to other religious traditions. Children who had exposure to other religions attributed more infallible knowledge to God than children who had no exposure to other religions, $t(53) = 1.992$, $p = .05$, $r = .26$. Children who had exposure to other religions believed God would know the priest's intentions more than children who had no exposure to other religions, $t(57) = 1.876$, $p = .07$, $r = .24$. Children who had exposure to other religions anthropomorphized their mother more than children who had no exposure to other religions, $t(57) = 1.973$, $p = .05$, $r = .25$. Children who had exposure to other religions attributed less supernatural

explanations to baptism than children who had no exposure to other religions, $t(57) = 1.710$, $p = .09$, $r = .22$.

Table 12

Correlations between Religious Concepts and Individual Factors

Variable	Age	Overall Religious Exposure	Weekly Religious Exposure	Baptism Exposure	Working Memory
God's Knowledge	-.08	-.18	-.11	-.10	-.30*
Mother's Knowledge	.33**	-.01	.21	-.22	.14
God's Knowledge of Priest's Intention	.25*	.12	.44**	.25†	.14
God's Properties	-.28*	-.09	-.19	-.05	-.24†
Mother's Properties	.44**	.04	-.01	.14	.38**
Supernatural Explanations of Baptism	-.20	-.07	-.15	-.11	-.20
Natural Explanations of Baptism	-.43**	.01	-.07	.01	-.33*

Note. †$p < .10$. *$p < .05$. **$p < .01$.

Age. As seen in Table 12, children's age was significantly related to multiple religious concepts. Children's age was significantly related to their concept of their mother's knowledge, $r = .33$, $p = .008$. Older children attributed more fallible knowledge to their mother; younger children attributed less fallible knowledge to their mother.

Children's age was significantly related to conceptualization of God as knowing the priest's intentions, $r = .25$, $p = .044$. Older children conceptualized God as knowing the priest's intentions; younger children conceptualized God as not knowing the priest's intentions. Children's age was significantly related to their concept of God's properties, $r = -.28$, $p = .024$. Older children attributed less anthropomorphic properties to God; younger children attributed more anthropomorphic properties to God.

Children's age was significantly related to their concept of their mother's properties, $r = .44$, $p < .001$. Older children attributed more anthropomorphic properties to their mother; younger children attributed less anthropomorphic properties to their mother. Children's age was significantly related to their attributions of natural explanations to baptism, $r = -.43$, $p < .001$. Older children attributed less natural explanations to baptism; younger children attributed more natural explanations to baptism.

Previous religious exposure. As seen in Table 12, children's previous religious experience was significantly related to one religious concept. Children's overall religious experience was not related to any religious concept. Children's conceptualization of God as knowing the priest's intentions was related to their weekly religious exposure, $r = .44$, $p < .001$. Children with more weekly religious experience conceptualized God as knowing the priest's intentions; children with less weekly religious experience conceptualized God as not knowing the priest's intentions. Children's conceptualization of God as knowing the priest's intentions was trending toward a significant relationship with their baptism exposure, $r = .25$, $p = .059$. Children with more baptism experience

conceptualized God as knowing the priest's intentions; children with less baptism experience conceptualized God as not knowing the priest's intentions.

Working memory. As seen in Table 12, children's working memory was significantly related to multiple religious concepts. Children's working memory was related to their concept of God's knowledge, $r = -.30$, $p = .027$. Children with a high working memory attributed less fallible knowledge to God; children who had a low working memory attributed more fallible knowledge to God.

Children's working memory was trending toward a significant relationship with their concept of God's properties, $r = -.23$, $p = .059$. Children with a high working memory attributed less anthropomorphic properties to God; children with a low working memory attributed more anthropomorphic properties to God. Children's working memory was related to their concept of their mother's properties, $r = .38$, $p = .004$. Children with a high working memory attributed more anthropomorphic properties to their mother; children with a low working memory attributed less anthropomorphic properties to their mother.

Children's working memory was related to their attribution of natural explanations, $r = -.33$, $p = .027$. Children with a high working memory attributed less natural explanations to baptism; children who had a low working memory attributed more natural explanations to baptism.

Summary. Children's concepts of agent knowledge were related to multiple individual factors. Children who had exposure to other religions and had better working memories viewed God as having infallible knowledge. Children who were older, female,

and had high exposure to weekly religion, baptism, and other religions viewed God as knowing the intentions of the priest during the baptism. Children who were older viewed their mom has having fallible knowledge.

Children's concepts of agent properties were related to multiple individual factors. Children who were younger, Protestant Christian, not baptized, and had a better working memory viewed God as non-anthropomorphic. Children who were older, had exposure to other religions, and had a better working memory viewed their mother as anthropomorphic

Children's concepts of supernatural causality were related to multiple individual factors. Children who were male and had no exposure to other religions viewed baptism as having more supernatural causes. Children who were younger and had worse working memory viewed baptism as having more natural causes.

Children's intention understanding. For each religious concept, correlational and regression analyses were conducted to explore the effect of children's intention understanding on children's religious concepts. First, bivariate correlations were calculated to explore how children's religious concepts related to children's understanding of intention as a causal mechanism in baptism. Children who viewed intention as a causal mechanism in baptism had positive scores for the intentional act variable and negative scores for the accidental act variable. Second, regression analyses were conducted to determine if children's religious concepts were predicted by children's understanding of intention as a causal mechanism in baptism above and beyond other individual factors.

Children's concept of God's knowledge. As seen in Table 13, children's concept of God's knowledge, assessed by the agent knowledge task, was not related to children's efficacy judgments of intentional or accidental acts. However, children's concept of God's knowledge of the priest's intentions during the baptism were trending toward a significant relationship with children's efficacy judgments of intentional acts, $r = .23$, $p = .058$. Children who judged intentional acts as more effective conceptualized God as knowing the priest's intentions; children who judged intentional acts as less effective conceptualized God as not knowing the priest's intentions.

Table 13

Correlations between Religious Concepts and Intention Understanding

Variable	Intentional Acts	Accidental Acts
God's Knowledge	-.11	-.01
Mother's Knowledge	.10	-.17
God's Knowledge of Priest's Intention	.23†	-.03
God's Properties	-.02	.25*
Mother's Properties	.22†	-.11
Supernatural Explanations of Baptism	.17	.16
Natural Explanations of Baptism	.03	.33**

Note. †$p < .10$. *$p < .05$. **$p < .01$.

Children's concept of God's knowledge of the priest's intentions during baptism was related to gender, exposure to other religions, weekly religious exposure, and baptism exposure. A regression analysis was conducted to predict children's concept of

God's knowledge. First, the base model predicting children's concept of God's knowledge from individual factors was analyzed. Second, the inclusion of intention understanding into the base model was analyzed.

Model 1 was significant, $R^2 = .26$, $R^2_{adjusted} = .22$, $F(3, 56) = 6.609$, $p = .001$. Children's gender, $\beta = -.24$, $t = -2.082$, $p = .042$, such that females attributed more infallible-knowledge to God, and weekly religious exposure, $\beta = .40$, $t = 3.264$, $p = .002$, were significant predictors of children's concept of God's knowledge of the priest's intentions during baptism. Children's baptism exposure was not a significant predictor.

Model 2 was also significant, $R^2 = .29$, $R^2_{adjusted} = .24$, $F(4, 55) = 5.628$, $p = .001$. However, children's efficacy judgments of intentional actions, $\beta = .17$, $t = 1.499$, $p = .140$, was not a significant predictor of God's knowledge of the priest's intentions during baptism. Nor did Model 2 explain more variance than Model 1, $F(1, 55) = 2.247$, $p = .140$, $R^2_{\Delta} = .03$. Despite not reaching statistical significance, the standardized coefficient of intentional acts (i.e., $\beta = .17$) was only slightly smaller than the correlation (i.e., $r = .23$). Thus, children who emphasized the efficacy of intentional actions attributed more knowledge of the priest's intention to God.

Children's concept of God's properties. As seen in Table 13, children's concept of God's properties was related to children's efficacy judgments of accidental acts, $r = .25$, $p = .047$. Children who judged accidental acts as less effective attributed less anthropomorphic properties to God; children who judged accidental acts as more effective attributed more anthropomorphic properties to God.

Children's concept of God's properties was related to religious affiliation, baptismal status, and age. A regression analysis was conducted to predict children's concept of God's properties. First, the base model predicting children's concept of God's properties from individual factors was analyzed. Second, the inclusion of intention understanding into the base model was analyzed.

Model 1 was significant, $R^2 = .19$, $R^2_{adjusted} = .14$, $F(3, 53) = 4.022$, $p = .012$. Age, $\beta = -.24$, $t = -1.856$, $p = .069$, was trending toward significantly predicting children's concept of God's properties. Neither religious affiliation nor baptismal status was a significant predictor.

Model 2 was also significant, $R^2 = .23$, $R^2_{adjusted} = .18$, $F(4, 52) = 2.777$, $p = .007$. Children's efficacy judgments of accidental acts, $\beta = .23$, $t = 1.814$, $p = .075$, were trending toward significantly predicting children's concept of God's properties. Model 2 was trending toward explaining significantly more variance than model 1, $F(1, 52) = 3.291$, $p = .075$, $R^2_{\Delta} = .05$. Despite not reaching statistical significance, the standardized coefficient of accidental acts (i.e., $\beta = .23$) was only slightly smaller than the correlation (i.e., $r = .25$). Thus, children who emphasized the non-efficacy of accidental actions anthropomorphized God less.

Children's concept of their mother's properties was trending toward a significant relationship with children's efficacy judgments of intentional acts, $r = .23$, $p = .070$. Children who judged intentional acts as more effective attributed more anthropomorphic properties to their mother; children who judged intentional acts as less effective attributed less anthropomorphic properties to their mother.

Children's concept of their mother's properties was related to age and working memory. A regression analysis was conducted to predict children's concept of their mother's properties. First, the base model predicting children's concept of their mother's properties from individual factors was analyzed. Second, the inclusion of intention understanding into the base model was analyzed.

Model 1 was significant, $R^2 = .24$, $R^2_{adjusted} = .22$, $F(2, 54) = 8.661$, $p = .001$. Age, $\beta = -.39$, $t = -2.705$, $p = .009$, was a significant predictor of children's concept of their mother's properties. Working memory was not a significant predictor.

Model 2 was also significant, $R^2 = .28$, $R^2_{adjusted} = .24$, $F(3, 53) = 6.917$, $p = .001$. Children's efficacy judgments of intentional acts, $\beta = .20$, $t = 1.685$, $p = .098$, were trending toward significantly predicting children's concept of their mother's properties. Model 2 was trending towards explaining significantly more variance than model 1, $F(1, 53) = 2.840$, $p = .098$, $R^2_{\Delta} = .04$. Despite not reaching statistical significance, the standardized coefficient of intentional acts (i.e., $\beta = .20$) was only slightly smaller than the correlation (i.e., $r = .22$). Thus, children who emphasized the efficacy of intentional actions anthropomorphized their mother more.

Children's concept of supernatural causality. As seen in Table 13, children's attribution of natural causes to baptism was significantly related to children's efficacy judgments of accidental acts, $r = .33$, $p = .006$. Children who judged accidental acts as less effective attributed less natural causes to baptism; children who judged accidental acts as more effective attributed more natural causes to baptism.

Children's attribution of natural causes to baptism was related to age and working memory. A regression analysis was conducted to predict children's attribution of natural causes to baptism. First, the base model predicting children's attribution of natural causes to baptism from individual factors was analyzed. Second, the inclusion of intention understanding into the base model was analyzed.

Model 1 was significant, $R^2 = .19$, $R^2_{adjusted} = .16$, $F(2, 54) = 6.190$, $p = .004$. Age, $\beta = -.34$, $t = -2.316$, $p = .024$, was a significant predictor of children's attribution of natural causes to baptism. Working memory was not a significant predictor.

Model 2 was also significant, $R^2 = .24$, $R^2_{adjusted} = .20$, $F(3, 53) = 5.699$, $p = .002$. Children's efficacy judgments of accidental acts, $\beta = .26$, $t = 2.006$, $p = .050$, was a significant predictor of children's attribution of natural causes to baptism. Model 2 explained significant more variance than Model 1, $F(1, 53) = 4.023$ $p = .050$, $R^2_{\Delta} = .06$. The standardized coefficient of intentional acts (i.e., $\beta = .26$) was only slightly smaller than the correlation (i.e., $r = .33$). Thus, children who emphasized the non-efficacy of accidental actions attributed less natural explanations to baptism.

Summary. In summary, children's understanding of intention as a causal mechanism in baptism did predict some religious concepts. Hypothesis 2a was partially supported. Children's understanding of intention did not predict children's concept of God's knowledge, as assessed by the agent knowledge task. But, when children thought God would know the priest's intentions during the baptism, children also placed emphasis on intentional acts. However, the emphasis on intentional acts was not a significant predictor when accounting for individual factors of gender and weekly

religious exposure. Though no longer statistically significant, the amount of variance explained by the emphasis on intentional acts did not change greatly.

Hypothesis 2b was partially supported. Children who emphasized the non-efficacy of accidental actions anthropomorphized God less. However, the emphasis on the non-efficacy of accidental actions was not a significant predictor when accounting for the individual factor of age. Though no longer statistically significant, the amount of variance explained by the emphasis on the non-efficacy of accidental acts did not change greatly.

Additionally, children who placed emphasis on intentional acts anthropomorphized their mother more. However, the emphasis on intentional acts was not a significant predictor when account for the individual factor of age. Though no longer statistically significant, the amount of variance explained by the emphasis on intentional acts did not change greatly.

Hypothesis 2c was not supported. Children's understanding of intention did not predict children's attribution of supernatural causes to baptism. But, when children attributed natural causes to baptism, they also placed emphasis on the efficacy of accidental acts. The emphasis placed on the non-efficacy of accidental acts was significant even when accounting for the individual factor of age. The amount of variance explained by the emphasis on the efficacy of accidental acts did not change greatly either.

Chapter 4

Discussion

The goal of the present study was to explore how children's understanding of intention as a causal mechanism in religious rituals influenced the development of their religious concepts. Protestant Christian and Roman Catholic children conveyed their concept of intention in the context of the ritual of baptism. Specifically, children judged how likely baptism would work if the intentions and acts of the practitioner were correct or incorrect. Given that children internalize the intentions of others as a mechanism of concept development, children's religious concepts were hypothesized to be predicted by their intention understanding.

Children's Understanding of Intention as a Causal Mechanism in Baptism

The first research question was does understanding of intention as a causal mechanism in religious rituals vary by age and other individual factors? An understanding of how children's religious concepts were influenced by intention understanding required an empirical examination of intention understanding in general.

Dimensions of intention understanding. Prior to analyzing how intention understanding varied by age and other individual factors, the structure of children's understanding was first explored. Children indicated whether the baptism would work if it was varied in each of the following ways: performed intentionally and correctly; performed intentionally, but incorrectly; performed accidentally, but correctly; and performed accidentally and incorrectly. When children's efficacy judgments of the four

ritual variations were submitted to a principle components analysis, two factors emerged: intentional and accidental acts.

Intention of the practitioner. Children's efficacy judgments of the four ritual variations varied primarily by the intention of the priest. The variation by intention was evidenced by the main effect of intention in the Repeated-Measures Analysis of Variance and the two factors that emerged from the Principle Components Analysis. Children responded similarly to the two variations in which the baptism was performed accidentally; the two questions had similar means, were highly correlated, and both loaded strongly on the accidental acts factor. Children viewed accidentally performed religious behavior similarly, regardless of whether the actions were correct or not. Children's responses were averaged for a score assessing their understanding of accidental acts.

Children also responded similarly to the two variations in which the baptism was performed intentionally: the two questions had similar means and both loaded on the intentional acts factor. However, the correlation between these two questions was weak and the factor loading of the intentional-incorrect question was not as strong. The weaker relationship between these two questions suggests children may have viewed intentionally performed religious behaviors differently, based upon whether the actions were correct or not. However, the lack of a main effect for performance and the lack of an interaction in the Repeated-Measures Analysis of Variance indicate that whether the actions were correct or not did not change how children were judging the efficacy of the intentional acts.

Another interpretation of the findings is children had difficulty understanding the baptism variation that was performed intentionally, but incorrectly. Although different from the two variations in which the priest did not intend to do the baptism, the intentional-incorrect variation is also an accident, in that the priest performed an action he did not intend to do. While also an accident, children did not respond to the intentional-incorrect variation similarly to the two accidental variations. Despite a weaker relationship, children's responses to the two intentionally-performed baptism variations did load on the same factor enough to justify averaging them for a score assessing their understanding of intentional acts.

Overall, children indicated that the baptism would work when performed intentionally and would not work when performed accidentally. However, children's intentional acts and accidental acts scores were unrelated to one another. Additionally, as seen below, each score was related to different individual factors and different religious concepts. These findings indicate that children's assessment of intentional religious acts and accidental religious acts are not opposite ends of the same conceptual property. Rather, children's understanding of the two types of acts and their effect on baptism are two distinct properties.

Performance of the practitioner. Children's efficacy judgments of the four ritual variations did not vary by the performance of the priest. The lack of variation by performance was evidenced by no significant main effect of performance in the Repeated-Measures Analysis of Variance. Responses to the two variations in which the ritual was performed correctly were not correlated with one another; and responses to the

two variations in which the ritual was performed correctly were not correlated with one another.

Children's open-ended responses to what the priest wanted to happen during baptism compliments this finding. The majority of children who provided a response referred back to the overall ritual or the actions of the ritual, as if the intention and the behaviors were one and the same. Only a small fraction of children indicated an outcome as the intention of the priest. The frequency of these types of responses suggests children may have conceptualized the pouring of water as the intended outcome and did not differentiate intentions and actions. This interpretation explains why the intention of the priest did explain variance in children's responses but the performance did not.

The lack of variance by performance in children's efficacy judgments supports McCauley and Lawson's (2002) theory that rituals are conceptualized as communication with supernatural agents. The purpose of the behaviors of a ritual are to communicate the practitioner's desire for a change upon the world. In the present study, when the priest did not intend to perform the baptism (accidental acts), children did not differentiate a correctly performed or incorrectly performed baptism. Although the actions are important for communicating intent to a non-omniscient supernatural agent, the actions are not important for communicating with an omniscient supernatural agent. The children in the present study attributed mostly infallible-knowledge to God. Within this theoretical framework, ritual behaviors are similar to spoken words. Generally, if a speaker says a word incorrectly, the listener will not understand the communication. But if the listener already has a general idea of what the speaker is attempting to

communicate, a misspoken word is less important. Similarly, if God already knows the intention of the practitioner, an incorrect action is less important.

Correlates of intention understanding. The covariation between children's understanding of intention in the context of baptism and other individual factors was explored. Children's age, previous religious exposure, and working memory were correlated with children's efficacy judgments of intention and accidental acts.

Children's age. The first hypothesis of the first research question considered children's age. Children were hypothesized to increasingly emphasize the intention of the priest for the baptism's efficacy as their age increased. This hypothesis was not supported. Neither children's judgments of intentional acts nor accidental acts were related to age.

These findings suggest that children in the present study may have reached a specific stage of intention understanding. Children's concept of intention undergoes two major shifts during childhood (Moses, 2001). A concept of intention is fully mature when it has three properties: intention is a mental state that is (a) a desire that (b) causes behavior, when (c) the behavior is consistent with the person's knowledge. Around 4 years old, children understand the second property of intention, that it causes behavior. Around 8-years-old, children understand the third property of intention, that the behavior must be consistent with the person's knowledge. The average age of the children in the present study was 5.5-years-old. The lack of a relationship with age may be due to most of the children understanding the second property already, but not understanding the third property.

Children's ability to internalize cultural ideas, systems, and symbols is in part determined by their understanding of intention (Tomasello et al., 1993; Tomasello et al., 2005). The type of cultural learning in which children are able to engage changes along with their shifts in intention understanding. As discussed below, children's intention understanding had few and weak relationships with children's religious concepts, which suggests the influence of intention understanding on religious concepts was relatively the same for most children. Nevertheless, children's efficacy judgments of intentional and accidental acts did vary, as did their religious concepts. Given that most of the children in the present study may be in the same stage of intention understanding, other individual factors may be contributing to the variation of and covariation between intention understanding and religious concepts.

Children's religious exposure. The second hypothesis of the first research question considered children's religious exposure. Children were hypothesized to increasingly emphasize the intention of the priest for the baptism's efficacy as their previous religious exposure increased. This hypothesis was partially supported.

Children's efficacy judgments of accidental acts were related to their overall exposure to religion. When children had more exposure to religion over their lifespan, they judged an accidentally performed baptism to be less effective than children who had less exposure to religion. This finding indicates that children learn about religious rituals and their social components as they participate in and observe their own religion. Rituals are conceptualized by practitioners in many ways, varying by how symbolic and/or instrumental they are (Richert et al., in press; Sax, Quack, & Weinhold, 2010). This

variation has led to multiple operational definitions used in the empirical literature. While children in the present study may not fully conceptualize rituals as behaviors that involve communication with a supernatural agent, they do come to understand that intention is a causal factor.

As children increasingly participate in and observe their own religion, they are more likely to emphasize intention in religious rituals. This finding suggests that the frequency of exposure to religion affords children the opportunity to learn how other members of their religion treat religious rituals. Though each member may conceptualize the purpose of a ritual differently, by early childhood, children are internalizing the concept that rituals are not the same as instrumental behaviors (Richert, 2006). Even during early childhood, children do view religious rituals as social.

Children's efficacy judgments of intentional acts were related to their exposure to other religions. When children had exposure to other religions, they judged an intentionally performed baptism to be more effective than children who did not have exposure to other religions. This finding suggests children may also generalize their understanding of intention in their own religion through their experience with other religions. But being exposed to religious other than their own, children have more opportunities to internalize how others understand intention in religious behavior.

However, parents only indicated dichotomously if their children were exposed to other religions, without any information of frequency. That direct experiences with other religious traditions directly influenced children's understanding of intention is difficult to determine. Unlike children's overall religious exposure, which assessed frequency of

experiences, children's exposure to other religions indicates the type of religious environment parents crafted for their children. Some children were raised in a uniform religious environment. Other children were raised in a more varied religious environment. By being in a more varied religious environment, children were afforded the opportunity to internalize different concepts of intention's role in religious rituals.

Children's efficacy judgments of intentional and accidental acts were not related to children's weekly exposure to religion and their exposure to baptism. The lack of a relationship with these forms of religious exposure indicates that children's learning about religious behavior happens generally and in the long term. The way in which parents shape the context of children's religious experiences has been suggested to influence children's understanding of religious behavior (Shaman et al., in press). These results suggest children need repeated exposure over their lifetime to develop these concepts. Additionally, the results suggest children's understanding of a specific religious behavior is influenced more by their overall exposure than their exposure to that specific religious behavior. Rather than a specific understanding of a specific behavior, religious exposure leads to the formation of generalizable concepts that can be applied to multiple types of religious behavior.

Children's working memory. The third hypothesis of the first research question considered children's working memory. Children were hypothesized to increasingly emphasize the intention of the priest for the baptism's efficacy as their general cognitive abilities increased. This hypothesis was supported.

Children's efficacy judgments of accidental acts were related to their working memory. When children had better a higher working memory, they judged an accidentally performed baptism to be less effective than children who had a lower working memory. Previous research suggests that domain-general cognitive abilities afford children the opportunity to develop specific cognitive skills through their cultural experiences (Sabbagh et al., 2006). Thus, these findings suggest that children's understanding of intention is influenced by a combination of children's experiences, as seen in the relationship with overall religious exposure, and general cognitive abilities.

However, the relationship with working memory may be an indication of children's comprehension of the questions and the validity of the methodology. Even though the vignette of the baptism was relatively short, children were still required to reason about many components at once: the priest's intention, the priest's behavior, and God's knowledge of the priest's intentions. Children may have also been reasoning about components less relative to the questions, such as the infant being baptized, the mental state of the infant, the water, the parents of the infant, the church, and potential others. If children had limited working memory and were not able to reason about the priest's intention and the priest's behavior at once, or were reasoning about other components of the baptism instead, their responses may have been different. All children in the present study may understand intention similarly, but answer differently due to working memory differences. Children's responses to the open-ended questions about baptism compliment this finding. For all of the open-ended questions, a significant portion of children provided no answer. Children's lack of answers to the open-ended questions may be an

indication that children did not understand the questions or understand the vignette or variations of the baptism.

While the relationship between working memory and children's efficacy judgments of accidental acts was one of the strongest relationships in the present study, working memory was not related to efficacy judgments of intentional acts. Working memory was also significantly related to some religious concepts, but not others. If the relationship with working memory was an indication that the questions did not adequately assess children's understanding of intention, then working memory would be related similarly to children's understanding of accidental and intentional acts. Rather, the greatly different relationship indicates that each set of questions assessed a different aspect of children's intention understanding.

Additionally, children's lack of responses to the open-ended questions may reflect children's inability to explicitly verbalize their understanding, which requires working memory. However, the forced-choice questions assess children's implicit understanding of intention and religious concepts. The difference in missing data between the forced-choice and open-ended questions may indicate that children's explicit understanding is still developing during early childhood or children do not have the general cognitive abilities to verbalize that understanding.

Children's Religious Concepts

Prior to analyzing how religious concepts varied by children's efficacy judgments of intentional and accidental acts, the relationship between religious concepts and individual factors was explored. Age and other individual factors are strong predictors of

religious concepts during early childhood (Richert & Granqvist, 2013). Similar relationships were found in the present study.

God's knowledge. Regarding children's concept of God's knowledge, previous research presented conflicted findings related to the relationship between children's concept of God's knowledge and age (Barrett et al., 2001; Lane et al., 2012). The present study found no relationship between children's concept of God's knowledge and age. However, the different age trajectories found in other research is possibly due to differences in the samples rather than methodological differences.

In the present study, children who had exposure to other religions and had better working memories viewed God as having infallible knowledge. The relationship with exposure to other religions suggests that children with a varied religious environment are afforded with the opportunity to internalize varied concepts of supernatural agents. As described above, research suggests general cognitive abilities interact with cultural experiences to foster concept development (Sabbagh et al., 2006). Thus, the relationship with working memory suggests that children are better able to incorporate multiple concepts into their own at once time. The differences between a stable trajectory and a non-linear trajectory of concepts of God's knowledge may be due to samples having different levels of exposure, different levels of working memory, or a combination of the both.

God's properties. Regarding children's concept of God's properties, previous research found children anthropomorphized God less as they grew older (Richert et al., in press). The present study replicated this finding. While children's concept of God's

knowledge is stable, their concept of God's properties is not. This difference suggests children's concept of God does not develop evenly. Different aspects of the concept (i.e., knowledge or properties) develop differently. The socio-cultural and individual factors that contribute to the development of each aspect of children's concept of God need to be examined individually.

Additionally, children who attributed non-anthropomorphic properties to God were Protestant Christian, not baptized, and had a better working memory. Similar to children's concept of God's knowledge, the development of concepts of God's properties may be due to religious exposure, working memory, and/or a combination of the two. However, the type of exposure that relates to children's concept of God's knowledge and properties are different. The different types of exposure support the explanation that different aspects of children's concept of God develop differently.

Caution is also warranted because the effect of working memory was no longer significant after accounting for the effect of age in the regression analysis. The effect of working memory may simply be due to the strong relationship between age and working memory.

Supernatural causality. Regarding children's concept of supernatural causality, previous research found children attribute less supernatural causes to events as they grow into adolescence before providing more in adulthood (Legare & Gelman, 2008). The present study found no relationship between children's attribution of supernatural causes and age. This discrepancy is most likely due to the restricted age range of the present study compared to previous research. Children who were female and had exposure to

other religions viewed baptism as having less supernatural causes. While gender differences are difficult to explain, the relationship with exposure to other religions suggests that children are afforded the opportunity to internalize varied concepts of supernatural causality.

Age, however, was related to children's attribution of natural causes to baptism. Older children provided less natural explanations. This finding can be explained as either due to internalizing adults' explanations of how baptism works or non-sociocultural developmental mechanisms. As children come to better understand natural causality, they reason religious rituals are not due to natural causes.

Children's Understanding of Intention and Religious Concepts

The second research question was does understanding of intention as a causal mechanism in religious rituals predict children's religious concepts? Socio-cultural theories of concept development emphasize children's internalization of cultural ideas, systems, and symbols (Case, 1998; Gauvain, 2001). The internalization process is assisted by children's understanding of intention (Tomasello et al., 2005; Tomasello et al., 1993). Theoretically, children should be able to better internalize cultural concepts if they have a more sophisticated children's intention understanding. Children with a more sophisticated intention understanding were hypothesized in the present study to have religious concepts consisted with conventional Christian beliefs.

However, children's judgments of the efficacy of the ritual variations fell into one of two categories: judgments of intentional acts and judgments of accidental acts. Children's scores in these categories were unrelated to each other and each related to

different individual factors and religious concepts. Taken together, these findings indicate children's understanding of intention in the context of rituals varies along these two distinct dimensions. The effect these dimensions have on children's internalization of religious rituals is unclear. Explanations of the data must go beyond classifying children's intention understanding as sophisticated or not.

God's knowledge. The first hypothesis of the second research question considered children's concept of God's knowledge. Children were hypothesized to attribute infallible knowledge to God as they increasingly emphasized the intention of the priest for the baptism's efficacy, controlling for individual factors. This hypothesis was partially supported. Children's efficacy judgments of intentional and accidental acts did not predict children's concept of God's knowledge, as assessed by the agent knowledge task.

Children's efficacy judgments of intentional acts did relate to when children thought God would know the priest's intentions during baptism. Children who attributed more knowledge of the priest's intention to God also judged intentional acts as effective. However, the emphasis on intentional acts was not a significant predictor when accounting for individual factors. While the amount of variance explained by the emphasis on intentional acts did not change greatly after accounting for those individual factors, caution is required when interpreting this finding.

God's properties. The second hypothesis of the second research question considered children's concept of God's properties. Children were hypothesized to attribute less anthropomorphic properties to God as they increasingly emphasized the

intention of the priest for the baptism's efficacy, controlling for individual factors. This hypothesis was partially supported.

Children's efficacy judgments of accidental acts did relate to children's concept of God's properties. Children who attributed less anthropomorphic properties to God judged accidental acts as ineffective. However, the emphasis on accidental acts was not a significant predictor when accounting for individual factors. While the amount of variance explained by the emphasis on accidental acts did not change greatly after accounting for those individual factors, caution is required when interpreting this finding.

Supernatural causality. The third hypothesis of the second research question considered children's concept of supernatural causality. Children were hypothesized to attribute more supernatural explanations for baptism as they increasingly emphasized the intention of the priest for the baptism's efficacy, controlling for individual factors. This hypothesis was not supported. Neither children's judgments of intentional acts nor accidental acts were related to children's attribution of supernatural causes to baptism. However, children's judgments of accidental acts were related to children's attribution of natural causes to baptism. Children who attributed less natural causes to baptism judged accidental acts as ineffective. Even accounting for age, children's judgments of accidental acts was predictive and explained a similar amount of variance as the correlational analysis.

Concepts of mother's knowledge and properties. The present study did not hypothesize how children's concept of natural agents (i.e., their mother) varied, but some relationships were found. Children's concept of their mother's knowledge was related to

children's age. Consistent with research on children's theory-of-mind, older children attributed more fallible knowledge to their mother than younger children (Wellman et al., 2001).

Children's concept of their mother's properties was related to children's age, working memory, and efficacy judgments of intentional acts. When age, working memory, and efficacy judgments of intentional acts were analyzed as predictors of children's concept of their mother's properties in a regression analysis, working memory was no longer a significant predictor and judgments of intentional acts was trending towards being a significant predictor.

Children who attributed more anthropomorphic properties to their mother were older. This finding suggests children learn about the limitations and properties of their mother as they get older; however, many possible mechanisms could explain this development. Children most likely learn about their mother's properties through a combination of their own experiences and internalizing cultural concepts of human properties. Children who attributed more anthropomorphic properties to their mother also judged intentional acts as effective.

Understanding of intentional acts. Children's efficacy judgments of intentional actions predicted children's understanding of their mother's properties. Children who judged intentional actions as effective anthropomorphize their mother more; children who judged intentional actions as ineffective anthropomorphize their mother less. Children's efficacy judgments of intentional actions also predicted their understanding of God's

knowledge of the priest's intentions; however, this finding was not significant after accounting for individual factors.

These findings indicate that children's concept of intention along the intentional acts dimension does not predict the development of religious concepts during early childhood. Given that children's emphasis of intention in intentional acts did not vary by many individual factors (except exposure to other religions), this dimension of intention understanding either influenced all religious concepts similarly or did not influence religious concepts at all. Children's efficacy judgments of intentional acts most likely reflect children's general social-cognitive understanding of agents.

Children's general social-cognitive understanding of agents, assessed through their attribution of anthropomorphic properties to their mother, increased as their efficacy judgments of intentional acts increased. If children's concept of God's knowledge of the priest's intentions was a valid outcome, this concept requires second-order social-cognitive skills (i.e., what God thinks about another person's thoughts). Second-order social-cognitive skills have not fully developed in children until 8-years-old (Miller, 2009; Perner & Wimmer, 1985). Children's responses to this question most likely reflect their own understanding of the priest's intentions. Thus, children's efficacy judgments of intentional actions reflect their general social-cognitive understanding of the priest.

Understanding of accidental acts. Children's efficacy judgments of accidental acts predicted children's natural causal explanations of baptism. Children who judged accidental acts as ineffective attributed less natural causes to baptism; children who judged accidental acts as effective attributed more natural causes to baptism. Children's

efficacy judgments of accidental acts also predicted their concept of God's properties; however, this finding was not significant after accounting for individual factors.

These findings indicate that children's concept of intention along the accidental acts dimension does predict the development of some religious concepts. Assuming children's concept of God's properties was a valid outcome, these findings suggest that as children come to understand that accidental acts are ineffective, they internalize Christian beliefs, such as God being non-anthropomorphic and baptism not having natural causes.

Dimensions of Intention Understanding

Children's efficacy judgments of intentional and accidental ritual actions provide an indication of how children's understanding of intention enables children to internalize religious concepts. The lack of a relationship between these two types of judgments and their relationships with different individual factors and religious concepts suggest each represent a different dimension of children's understanding of intention as a cause of baptism. The findings suggest (1) children's efficacy judgments of intentional actions reflect general social-cognitive understanding of agents, and (2) children's efficacy judgments of intentional actions afford children the opportunity to internalize religious concepts. There are two possible explanations for why these two dimensions relate to different individual factors and religious concepts.

Intention as necessary and sufficient. Children's efficacy judgments of intentional and accidental actions may reflect children's understanding of intention as a necessary and/or sufficient causal mechanism in religious rituals. The necessary and

sufficient properties of intention can be determined from children's efficacy judgments of the ritual variations.

Children's indication that intentional religious behaviors are effective suggests children understand that intention is a sufficient causal factor. A condition is considered sufficient when the condition, if present, guarantees an outcome (Brennan, 2012). Thus, intention is considered sufficient when intention, if present, guarantees the baptism works. When children judge intentional acts as effective, they consider intention to be sufficient. When children judge intentional acts as ineffective, they consider intention to not be sufficient. If intention is judged to be sufficient, it does not preclude intention as being the only causal factor.

Children's indication that accidental religious behaviors are ineffective suggests children understand that intention is a necessary causal factor. A condition is considered necessary when the condition must be satisfied in order to obtain an outcome (Brennan, 2012). Thus, intention is considered necessary when intention must exist in order for the baptism to work. When children judge accidental acts as effective, they consider the intention to not be necessary. When children judge accidental acts as ineffective, they consider the intention to be necessary. If intention is judged to be necessary, it does not mean intention is the sole causal factor.

Religious exposure. In the present study, children's attributions of the sufficient and necessary properties of intention are related to different types of religious exposure. Children's understanding of intention as necessary was related to their overall lifespan

exposure to their own religion. Children's understanding intention as sufficient was related to their exposure to other religions.

The different types of religious exposure may cause children to learn about the different properties of intention. When children are exposed to other religions, they are presented with concepts different from the ones presented by their culture. This potentially leads to broader concepts of religious behavior or multiple concepts of multiple types of religious behavior. Thus children exposed to other religions may be presented with concepts of religious behaviors that have many potential causes, beyond intention.

When children are exposed long term to their own religion, they are presented with the same concepts repeatedly. By observing the same religious behaviors and concepts repeatedly, children become attuned to exactly what is necessary for those behaviors to work. Overtime, these children come to understand rituals must be performed intentionally.

Sufficient property. Children's concept of God as knowing the priest's intention was predicted by their efficacy judgments of intentionally performed religious behavior. Assuming children's concept of intentional acts is a true predictor, and the lack of statistical significance is due to low power, this finding suggests children are generalizing their concept of God's knowledge from their general social cognitive understanding of agents as they come to understand intention as a sufficient causal mechanism. Specifically, when children view intention as a sufficient causal mechanism, children view God as not knowing the priest's intentions. When children do not view intention as

a sufficient causal mechanism, children view God as knowing the priest's intentions. The sufficient property may be leading children to generalize, which is supported by the fact that both the sufficient property and children's concept of God as knowing the priest's intention are related to children's exposure to other religions, which affords children the opportunity to generalize concepts.

Necessary property. Children's concept of God's properties was predicted by their efficacy judgments of accidentally performed religious behavior. Assuming children's concept of accidental acts is a real predictor, and the lack of statistical significance is due to low power, this finding suggests children internalize religious ideas better as they come to understand intention as a necessary causal mechanism. Specifically, when children view intention as a necessary causal mechanism, children internalize the Christian belief that God is non-anthropomorphic. When children do not view intention as a necessary causal mechanism, children do not internalize that belief. A similar finding exists with children's attribution of natural explanations to baptism. The necessary property may be leading children to comprehend why people behave in certain ways during religious practices and incorporate that understanding into their own developing concepts.

Intention as desire and cause. Children's efficacy judgments of intentional and accidental actions may reflect children's understanding of intention as both a desire and a cause. A concept of intention is fully mature when it has three properties: intention is a mental state that is (a) a desire that (b) causes behavior, when (c) the behavior is consistent with the person's knowledge (Moses, 2001). The difference between

children's judgments of intentional actions and accidental actions may be due to reasoning about the first two properties.

When children reason about an intentionally performed behavior, the desire property and the causal property are consistent. The priest wants to perform a baptism and thus the baptism worked. However, when children reason about an accidentally performed behavior, the desire property and the causal property are inconsistent. The priest wants to do something else, even though he is performing a baptism. Thus, the stated intention of the priest does not cause the stated behavior.

Individual factors. In the present study, when children judged the efficacy of an intentionally performed baptism, they only needed to reason about one property of the intention: intention as a desire or intention as a cause. This explanation is supported by the finding that exposure to other religions is related to judgments of intentionally performed actions. If children experience religious behavior that is unfamiliar to them, children should find it easier to internalize the experience if the cognitive demands are lighter.

However, when children judged the efficacy of an accidentally performed baptism, they needed to reason about both properties. This explanation is supported by the finding that working memory is related to judgements of accidental actions. When children experience religious practitioners behave accidentally, they need to hold both the desire and causal properties in their working memory in order to internalize the information. The explanation is further supported by the finding that overall religious exposure is related to judgements of accidental actions. Given the added cognitive

demands of reasoning about accidentally performed religious behavior, more exposure is needed for the concept to be fully internalized.

Religious concepts. Children's concept of God as knowing the priest's intention was predicted by their efficacy judgments of intentionally performed religious behavior. Assuming children's concept of intentional acts is a real predictor, and the lack of statistical significance is due to low power, this finding suggests children do not internalize the understanding of religious practitioners and the purpose of religious behaviors when reasoning about only one of the properties of intention. Children's concept of accidental acts does not predict this type of concept of God, which suggests reasoning about only one concept is indicative of relying on pre-established concepts, such as the general concept of agents.

On the other hand, children's concept of God's properties was predicted by their efficacy judgments of accidentally performed religious behavior. Assuming children's concept of accidental acts is a true predictor, and the lack of statistical significance is due to low power, this finding suggests children internalize socio-cultural factors better as they are able to reason about the inconsistent desire and causal properties of intention. Children's concept of intentional acts does not predict this type of concept of God, which suggests children's ability to reconcile the inconsistent desire and causal properties of intention affords children the opportunity to internalize difficult religious concepts.

A concept of God that is completely non-anthropomorphic is abstract and difficult as there are few other phenomena with similar properties; in other words, a non-anthropomorphic concept of God is counterintuitive, but not minimally counterintuitive.

Additionally, a concept of intention in which the desire and causal properties are inconsistent is counterintuitive for children in early childhood, given they are just coming to conceptualize intention as desire that causes behavior. Thus, children's ability to reason about counterintuitive mental states affords children the ability to internalize a counterintuitive concept of God.

Similar reasoning can explain why children's concept of natural causal factors of baptism was predicted by their efficacy judgments of accidentally performed religious behavior. Children are internalizing the Christian belief that baptism is not caused by natural factors. Research suggests rituals are viewed as causally-opaque, lacking clear explanations for their outcomes (Legare & Souza, 2012). Human behaviors without clear explanations for their outcomes may be counterintuitive for children. If children are not presented with a natural explanation for the cause of baptism by socio-cultural factors, children may initially attribute natural explanations on their own until internalizing the idea that natural factors to not explain the cause of baptism. Only when children are able to reason about a counterintuitive concept of intention are they able to internalize a counterintuitive concept of causality.

Summary. Two possible explanations for why children's efficacy judgments of baptism split into two dimensions: judgements of intentional acts and judgments of accidental acts. Children are either judging the ritual variations by (a) the necessary and sufficient properties of intention; or (b) the desire and causal properties of intention. Each explanation has competing advantages and disadvantages.

The advantage of the first explanation is it best fits the data. Both children's judgments of intentional and accidental actions and the necessary and sufficient properties of intention are orthogonal. Children's judgments of intentional and accidental actions are unrelated to one another and are related to different individual factors and religious concepts. Theoretically, necessary and sufficient conditions are also unrelated; intention can be necessary and sufficient, either, or neither. However, the disadvantage of this explanation is its explanatory power. While the data suggests that viewing intention as necessary affords children the opportunity to internalize religious concepts, it is not clear why. The data and explanation cannot explain why each property of intention predicts the religious concept that they do.

The advantage of the second explanation is its explanatory power. The consistency or inconsistency of the desire and causal properties of intention provide a clear explanation for why certain religious concepts are developed in specific ways. When children are able to understand that the desire and causal properties of intention can conflict, they are also able to internalize difficult, counterintuitive religious concepts. Children's ability to reason about counterintuitive mental states affords children the ability to internalize a counterintuitive religious concept. This explanation is supported by the finding that working memory is related to judgments of accidental acts and the predicted religious concepts. However, the disadvantage of this explanation is it does not fit the data as well. By reducing the explanation to the counterintuitiveness of the intention property, the efficacy judgments are no longer theoretically orthogonal. This

explanation does not fit the unrelated structure of children's efficacy judgments of intentional and accidental acts.

Limitations of the Present Study and Future Directions

The findings of the present study should be explored with further research. The present study used a small sample size of children. The small sample made it difficult to detect significant relationships in the data. Many of the relationships found and discussed were trending towards significance. Additionally, children's understanding of intention in the regression analyses did not reach statistical significance, but were assumed to be true. Future research should utilize larger samples to determine if the effect sizes were accurate.

The aggregation of children's efficacy judgments of the ritual variations was made post hoc. The present study hypothesized a priori that children's efficacy judgments would vary along two dimensions: intention and performance. The ritual variations were created to detect variation along these dimensions. However, children's responses to whether the baptism was performed correctly or incorrectly did not hold together. Additionally, children's responses varied along two dimensions of intention, which was not predicted a priori. Future research should explore children's understanding of intentional actions and accidental actions separately and use assessments better attuned to those dimensions.

The explanations for the two dimensions of children's efficacy judgments were made post hoc and neither were fully satisfactory. The present study hypothesized a priori that children's efficacy judgments would vary along different dimensions.

Explanations for why the dimensions found predicted different religious concepts either lack explanatory power or do not fit the data well. Future research should test these explanations further and use methods that can directly test these explanations.

Regarding the explanations for children's efficacy judgments, neither fully explain why only certain religious concepts were predicted. For example, children's judgments of intentional actions predicted God's knowledge of the priest's intentions, but not God's knowledge assessed by the agent knowledge task. Both measures should assess the same concept. Future research should attempt to explore multiple religious concepts, which factors predict each, and why.

The present study specifically focused on Protestant Christian and Roman Catholic children and their understanding of the culturally appropriate ritual of baptism. This method ensured a greater level of ecological validity at the expense of generalizability. The findings in the present study on how children's understanding of intention as tool through which children internalize religious concepts may only apply to children of this religious group. Future research should endeavor to use different Christian rituals for Christian children and use children from different religious affiliations with a culturally appropriate ritual.

Finally, the goal of the present study was to explore how children's religious concept development was influenced by children's understanding of intention in the context of religious rituals. Theoretically, children's understanding of intention predicts the future development of religious concepts. The present study assessed both intention understanding and religious concepts at the same point in time. Future research should

examine children's understanding of intention as religious concepts are in flux. For example, children undergoing religious education would provide an ideal opportunity to explore how children's religious concepts change as a result of socio-cultural input and how understanding of intention moderates that change.

Conclusion

The pattern of findings in the present study suggest Christian children's understanding of intention in the context of baptism varies along two dimensions: intentional acts and accidental acts. Children's efficacy judgments of intentional acts predict children's concept of God's knowledge of the priest's intention and their mother's properties. Children's efficacy judgments of accidental acts predict children's concept of God's properties and their natural explanations of baptism. Thus, the different dimensions of children's intention understanding allow children to internalize the ideas, systems and symbols of their religion in different ways.

The ritual of baptism provided the opportunity to explore how children's understanding of intention influences the development of their religious concepts. By observing and participating in baptism and other religious practices, children are afforded the opportunity to learn how Christian practitioners understand religious phenomena such as God and supernatural causality. Children's understanding of intention in the context of baptism does relate to how children conceptualize those religious phenomena.

The findings from the present study support the theory that the social and cultural environment influences concept development. Specifically, by internalizing how religious practitioners conceptualize their religion, children develop their own religious

concepts. The internalization process is aided by children's understanding of intention. The religious concepts that children have are related to the different dimensions of intention understanding.

The implication of the present study is evidence of children's concept development by socio-cultural factors independent of other developmental mechanisms. Children's concept of God's non-anthropomorphic properties cannot be attributed to their direct experience with God. Therefore, the changes found in the present study must be attributed to children's observation of and participation in their own religion, which was aided by their understanding of intention.

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Appendix A

Ritual Concepts

"Now I want to ask you some questions about a baptism."

_____Variation 1 (Correct/Intentional)

"Look at what is happening in this picture. The priest is pouring water on the baby's forehead, and he wants to do the baptism."

1. Did the baptism work this time? Yes No Little Sure Really Sure

_____Variation 2 (Correct/Accidental)

"Look at what is happening in this picture. The priest is pouring water on the baby's forehead, but he doesn't want to do the baptism, he wants to play baseball."

1. Did the baptism work this time? Yes No Little Sure Really Sure

_____Variation 3 (Incorrect/Intentional)

"Look at what is happening in this picture. The priest is pouring water on the baby's feet, not the forehead, but he does want to do the baptism."

1. Did the baptism work this time? Yes No Little Sure Really Sure

_____Variation 4 (Incorrect/Accidental)

""Look at what is happening in this picture. The priest is pouring water on the baby's feet, not the forehead, and he doesn't want to do the baptism, he wants to play baseball."

1. Did the baptism work this time? Yes No Little Sure Really Sure

Free Response

1. What did the priest want to happen to baby?

2. Why do Christian people do the baptism?

God Concepts

Free Response

NOTE TO EXPERIMENTER: Use follow-up questions if needed.

1. Tell me about God.

Follow-up: What is God like?

Follow-up: What do you know about God?

Agent Knowledge

"OK. I have another activity for us to play. It is a guessing game."

Prior

1. **(Self)** Do you know what picture is under here? Yes No A little sure Really Sure

If child says yes: What do you think the picture underneath is?_____

"Actually, that's a great guess, but that's not what it is. Only I know what it is."

2. **(Mom)** Your mom has never seen this before. When your mom sees it for the very first time, do you think your mom will know what the picture underneath is?

Yes No A little sure Really Sure

3. **(God)** God has never seen this before. When God sees it for the very first time, do you think God will know what the picture underneath is?

Yes No A little sure Really Sure

Do you want to see the full picture? Here it is. What is it?_____

After

1. **(Self)** OK. Now we are going to cover the picture back up. Now, when you saw this for the first time, did you know what picture was underneath?

   Yes No A little sure Really Sure

2. **(Mom)** Your mom has never seen this before. When your mom sees it for the very first time, do you think your mom will know what the picture underneath is?

   Yes No A little sure Really Sure

3. **(God)** God has never seen this before. When God sees it for the very first time, do you think God will know what the picture underneath is?

   Yes No A little sure Really Sure

Agent Properties

Psychological

1. Could your Mom forget things? Yes No A little sure Really Sure

a. How do you know your Mom could/could not forget things?

2. Could your Mom feel happy? Yes No A little sure Really Sure

a. How do you know your Mom could/could not feel happy?

3. Could your Mom get bored? Yes No A little sure Really Sure

a. How do you know your Mom could/could not get bored?

4. Could God forget things? Yes No A little sure Really Sure

a. How do you know God could/could not forget things?

5. Could God feel happy? Yes No A little sure Really Sure

a. How do you know God could/could not feel happy?

6. Could God get bored? Yes No A little sure Really Sure

a. How do you know God could/could not get bored?

Biological

1. Does your Mom need to eat food and drink water?

Yes No A little sure Really Sure

a. How do you know your Mom does/does not need to eat food and drink water?

2. Does your Mom have a heart that keeps her alive?

Yes No A little sure Really Sure

a. How do you know your Mom does/does not have a heart that keeps her alive?

3. Could your Mom get sick? Yes No A little sure Really Sure

a. How do you know your Mom could/could not get sick?

4. Does God need to eat food and drink water? Yes No A little sure Really Sure

a. How do you know God does/does not need to eat food and drink water?

5. Does God have a heart that keeps God alive? Yes No A little sure Really Sure

a. How do you know God does/does not have a heart that keeps God alive?

6. Could God get sick? Yes No A little sure Really Sure

a. How do you know God could/could not get sick?

Physical

1. Could your Mom get wet when it rains? Yes No A little sure Really Sure

a. How do you know your Mom could/could not get wet when it rains?

2. Does your Mom have to open a door to go through?

Yes No A little sure Really Sure

a. How do you know your Mom does/does not have to open a door to go through?

3. Could you touch your Mom with your hand? Yes No A little sure Really Sure

a. How do you know could/could not touch your Mom with your hand?

4. Could God get wet when it rains? Yes No A little sure Really Sure

a. How do you know God could/could not get wet when it rains?

5. Does God have to open a door to go through? Yes No A little sure Really Sure

a. How do you know God does/does not have to open a door to go through?

6. Could you touch God with your hand? Yes No A little sure Really Sure

a. How do you know could/could not touch God with your hand?

<u>Baptism</u>

1. Does God know what the priest wants to happen?

Yes No A little sure Really Sure

Causality Concepts

Free Response

1. How does the baptism work?

Causal Explanations Task

"I asked other kids how they think the baptism works and I want to know if you think those kids are right."

1. ___. (**Natural**) Some kids think the baptism works because the water washes dirt off the baby. Do you think those kids are right?

Yes No Little Sure Really Sure

2. ___. (**Natural**) Some kids think the baptism works because everyone sees the priest do the baptism. Do you think those kids are right?

   Yes No Little Sure Really Sure

3. ___. (**Supernatural**) Some kids think the baptism works because God makes it work. Do you think those kids are right? Yes No Little Sure Really Sure

4. ___. (**Supernatural**) Some kids think the baptism works because the water is special. Do you think those kids are right? Yes No Little Sure Really Sure

5. ___. (**Irrelevant**) Some kids think the baptism works because the priest drank milk in the morning. Do you think those kids are right?

   Yes No Little Sure Really Sure

Cognitive Measures

Digit Span Test

"I want to see how much you can remember. I am going to show you numbers. Your job is to remember the numbers in order. When I stop, I want you to tell me the numbers you saw in order. Ok?"

Appendix B

I am going to tell you a story about a Baptism.

Tom and Sarah are Christians.

They are bringing their new baby, Jamie, to their Church to be baptized.

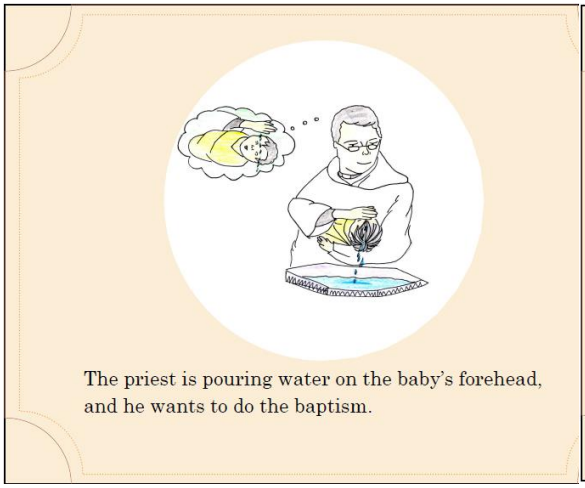
Jamie is going to be baptized by the priest, Father Jim.

Father Jim baptizes the baby Jamie for God.

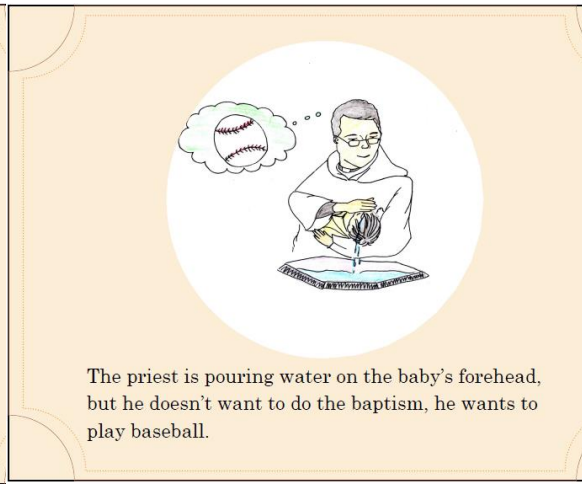
Father Jim pours water all over baby Jamie's forehead.

Baby Jamie is now baptized.

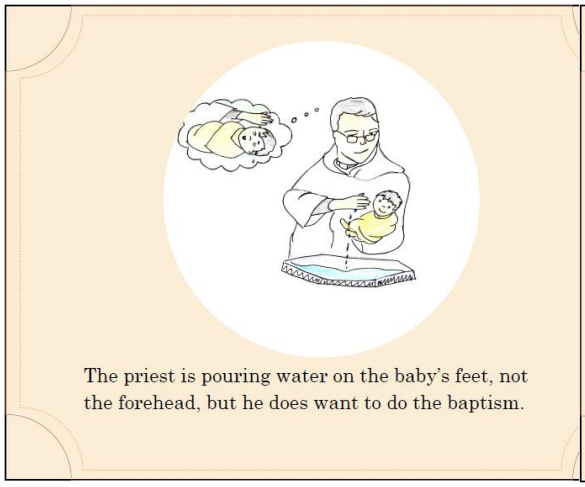
Appendix C



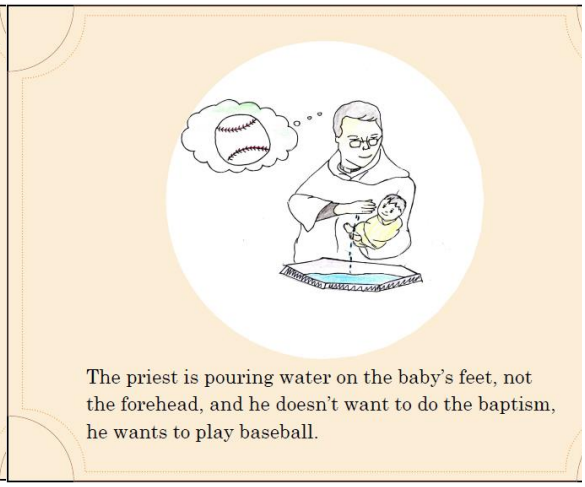
The priest is pouring water on the baby's forehead, and he wants to do the baptism.



The priest is pouring water on the baby's forehead, but he doesn't want to do the baptism, he wants to play baseball.



The priest is pouring water on the baby's feet, not the forehead, but he does want to do the baptism.



The priest is pouring water on the baby's feet, not the forehead, and he doesn't want to do the baptism, he wants to play baseball.

Appendix D

Parent Questionnaire

The information you provide will be kept completely confidential. You are welcome to skip any questions that you do not want to answer.

Section A: General Information. First, we would like to get some basic information about your child.

1) What is your child's gender? *M* *F*

2) When was your child born? _____/_____/_____

month day year

3) How would you describe your child's ethnic background or race? Check all that apply:

_____ *White*	_____ *Black*	_____ *Native American*	_____ *Hispanic/ Latino*
_____ *Asian*	_____ *Other*	_____ *Don't Know*	_____ *Decline to Answer*

4) What is your child's religious affiliation? _____

5) Has your child had exposure to any other religious affiliations? *Y* *N*

a. If so, which religious affiliations? _____

6) How often does your child attend events sponsored by your religious organization?

_____	_____	_____	_____	_____
Never	*Once a year*	*Multiple times a year*	*Once a month*	*Twice a month*

_____	_____	_____	_____
Once a week	*Multiple times a week*	*Once a day*	*Multiple times a day*

7) How often does your child participate in public religious practices (i.e., at a religious institution)?

_____	_____	_____	_____	_____
Never	*Once a year*	*Multiple times a year*	*Once a month*	*Twice a month*

_____	_____	_____	_____
Once a week	*Multiple times a week*	*Once a day*	*Multiple times a day*

8) How often does your child participate in private religious practices (i.e., at home)?

_____	_____	_____	_____	_____
Never	*Once a year*	*Multiple times a year*	*Once a month*	*Twice a month*

_____	_____	_____	_____
Once a week	*Multiple times a week*	*Once a day*	*Multiple times a day*

9) How often does your child receive any sort of formal religious education or training?

_____	_____	_____	_____	_____
Never	*Once a year*	*Multiple times a year*	*Once a month*	*Twice a month*

_____	_____	_____	_____
Once a week	*Multiple times a week*	*Once a day*	*Multiple times a day*

10) In a normal week, how many times do you go to church, temple, or some other religious service with your child?

_____	_____	_____
Never	*Once*	*More than once*

11) In a normal week, how often do you talk with your child about religious things?

_____	_____	_____
Never	*Once*	*More than once*

12) How often has your child learned about baptism in church?

_____	_____	_____	_____	_____
Never	*Only once or twice*	*Between 3 and 9 times*	*Between 10 and 20 times*	*Over 20 times*

13) How often has your child learned about baptism at home?

_____	_____	_____	_____	_____
Never	*Only once or twice*	*Between 3 and 9 times*	*Between 10 and 20 times*	*Over 20 times*

14) How often has your child seen a baptism?

_____	_____	_____	_____	_____
Never	*Only once or twice*	*Between 3 and 9 times*	*Between 10 and 20 times*	*Over 20 times*

15) Has your child ever been baptized?

_____	_____	_____
No	*I'm not sure*	*Yes*