

TRANSFORMING REALITY WITH RITUAL: CHILDREN'S UNDERSTANDING OF  
RITUAL GRAMMAR AND CAUSALITY

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# TRANSFORMING REALITY THROUGH RITUAL: CHILDREN'S UNDERSTANDING OF RITUAL GRAMMAR AND CAUSALITY

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Ritual action, aimed at transforming social and material reality, is found in all cultures (Bell, 1997). Ritual is used to create marriages or systems of authority in the social domain and to eradicate illness or ensure good crops in the material domains. Two theoretical strands explain the universal structure of ritual: That it is marked by a unique universal grammar with intuitive, internal logic (Rappaport, 1999) and that it rests on intuitive inferences about causal power (Boyer, 2001; Lawson & McCauley, 2002). Ritual grammar serves to instantiate social realities. Ritual causality follows the logic of agents, actions, and patients that are marked for special powers. This study with children (5- to 6-years and 8- to 9-years) experimentally examined how participants of different ages understand ritual for transforming social and material reality. Interviews with children were comprised of three tasks to examine children's recognition, their causal understanding of ritual grammar, and what connections they made to their prior experience. Children's explanations were examined. A parent rating of children's prior experience was also included. An adult sample provided a comparison. In general, ritual grammar understanding emerged in the age period studied and was unrelated to parent rating of children's prior experience. Some ritual grammar elements were understood earlier than others. There were few differences between the social and material conditions; children (and adults) seemed to have a general understanding of ritual grammar regardless of domain. Children (and adults) showed little evidence of connections to their prior experience, suggesting a weak explicit

framework for ritual grammar. Results are discussed in terms of the possible cognitive underpinnings of ritual grammar understanding. Children's understanding of ritual is grounded in socio-cultural, cognitive, and developmental theory and considered to be an important part of children's developing participation in cultural construction.

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## 1. INTRODUCTION

Ritual is a cultural act that marks extra-ordinary transformations to social and material reality. It marks a special kind of action that is set apart from ordinary causality. Social rituals mark extra-ordinary transformations of identity as found in rituals marking marriages or coronations. Magical rituals mark changes to material reality as found in rituals marking cures for illness or success in commerce/hunting. The word ritual can be used to denote a wide variety of action including cultural celebrations or personal habitual behavior. Here it is specifically defined as an action with a universal, unique grammar and inference structure that is performed to transform social or material reality. All societies have ritual acts in some form (Bell, 1997); ritual understanding is necessary for full cultural participation.

There are two current theoretical strands that explain the universal nature of the structure of ritual. One, from cultural anthropology and social philosophy, is that ritual is comprised of a universal grammar that makes it comprehensible as a special action with unique consequences. This strand has focused on ritual in the social domain and how it imputes social weight to otherwise insubstantial social constructions. The other, from cognitive anthropology and psychology, is that ritual action activates intuitive inference structures in the way humans think about ordinary causality. It also marks extra-ordinary powers, such as supernatural agents, that make violations to ordinary causal models possible. This strand has focused on magical transformations to material reality and how it allows the mind to transcend ordinary causal possibilities as credible. The two strands have an underlying similarity at base and each enrich the other in detail. Both describe intuitive systems of extra-ordinary action and both rely on a

linguistic model whereby basic intuitive representational structures of mind create unique inferences about ritual.

There have been no empirical studies that examine children's developing understanding of ritual transformation. Developmental studies have addressed children's understanding of transformations to social kinds such as changing conventions (Kalish, Weissman, & Bernstein, 2000) and material transformations such as changing the biology of a natural kind (e.g., Wellman & Gelman, 1997), and "magic" (e.g., Rosengren & Hickling, 2000). But no studies have addressed ritual transformation in the service of transcending ordinary causal models of reality, whether to add importance to social reality beyond mere convention or to add credibility to urgently important physical violations to ordinary causality. This type of intuitive cultural knowledge will be examined in the following study.

Two theoretical strands that explain the universal structure of ritual will be reviewed and considered in terms of developmental implications. For the social domain, ritual is considered to provide the necessary causal weight beyond mere convention. For the material domains, ritual provides extra-ordinary causal power necessary beyond ordinary causal models. Against this background, relevant literature will be reviewed considering the development of intuitive concepts that may underlie the understanding of ritual acts. Predictions about children's understanding of ritual can then be put into a broader developmental context.

## 2. LITERATURE REVIEW

Developmental questions about ritual understanding can be framed in terms of an amalgam of two theoretical strands that come out of different traditions but overlap in many ways. One theoretical strand describes ritual for social transformations. In this case, emphasis is on the grammatical structures that impute social weight to abstract social realities such as marriages. The other strand describes ritual for material transformations with an emphasis on intuitions about extra-ordinary causal power transforming the material world such as curing a fatal illness. Even though the explanations come out of different traditions, they have overarching similarities. They both (1) describe ritual understanding as an intuitive framework of mind that (2) explains why rituals in different cultures are similar in structure, (3) utilize a linguistic model whereby ritual action can be understood as grammatical in structure, and (4) mark extra-ordinary actions leading to extra-ordinary consequences.

A summary of the two theoretical strands are provided in Table I. The role of ritual in the transformation of social reality has, for the most part, been discussed in terms of a set of unique, universal grammatical structures by anthropologists and philosophers (see Bell, 1997; Rappaport, 1999; Searle, 1995). Ritual's role in the transformation of material reality has been discussed in terms of relying on universal causal constraints (see Boyer, 1994, 2001; Lawson & McCauley, 1990, 2002) with supernatural agents being defined by the capacity to violate such constraints. Both theoretical frameworks recognize the importance of agents and actions, extra-ordinary markers, and consequences that transcend ordinary causality. The first emphasizes grammatical structures that add meaning. The latter emphasizes supernatural agents and action.

**Table 1: Theorist Summary Chart**

	Theorist	Reason Ritual Exists	Cognitive Framework	Grammatical Markers
Social Transformation	Rappaport	<ul style="list-style-type: none"> <li>Acts that “substantiate the nonmaterial”</li> </ul>	<ul style="list-style-type: none"> <li>Meaning</li> <li>Connection with canonized symbols</li> </ul>	<ul style="list-style-type: none"> <li>Special agents as authority</li> <li>Performatives</li> <li>Special objects</li> <li>Supernatural connections</li> </ul>
	Searle*	<ul style="list-style-type: none"> <li>Create important social facts</li> </ul>	<ul style="list-style-type: none"> <li>Collective Intentionality</li> </ul>	<ul style="list-style-type: none"> <li>Authority</li> <li>Performative action</li> <li>Intended Context</li> </ul>
Material Transformation	Lawson & McCauley	<ul style="list-style-type: none"> <li>Action representation system</li> </ul>	<ul style="list-style-type: none"> <li>Ordinary causal action theory</li> </ul>	<ul style="list-style-type: none"> <li>Supernatural agents</li> <li>Action (by means of instrument)</li> <li>Patient</li> </ul>
	Boyer	<ul style="list-style-type: none"> <li>Recruitment of action inference systems</li> <li>Mark extra-ordinary action</li> </ul>	<ul style="list-style-type: none"> <li>Causal inference systems</li> <li>Taken for granted assumptions and memorable violations</li> </ul>	<ul style="list-style-type: none"> <li>Specific role to play</li> <li>Special place</li> <li>Actions performed in a special manner</li> <li>Non-substitutable special objects</li> <li>Script of ordered actions</li> </ul>

\*Although Searle does not specifically explain ritual, he does explain the creation of social realities, what he calls “institutional facts,” so is included here.

## 2.1 Social Transformation

Ritual helps add social weight to otherwise ordinary social transformations. Important changes to how individuals are related to each other (as in marriages) and to society (as in coronations) are most often marked by ceremonial rituals. Ritual acts mark the causal possibility of creating nonmaterial entities with a higher, more important reality. These cultural creations are substantiated (Rappaport, 1999) and imputed with weight through ritual actions. They seem to transcend the limitations of personal creation; they are perceived as objective and binding rather than subjective and arbitrary. The weight and importance of institutional reality lends stability to cultural interactions, entitlements, and obligations

The creation of social reality seems to require something more than ordinary intentional action and language. For instance, making and stating a personal decision does not seem to hold as much weight as performing ritual acts. Ordinary language is limited in the weight, or importance, it can bestow on human-created truth (Rappaport, 1999). Rappaport states two reasons that ordinary language falls short thus necessitating ritual acts and words to crystallize social reality. First, ordinary language has the potential for being intentionally false. If what is intended is not demonstrated through words or actions there is the potential to lie (Rappaport). For example, Rappaport describes a ritual dance of the Maring of Papua New Guinea which entails a vow to provide protection for another's family in case of war. Perhaps the ritual dancer will not live up to his promise one day when war comes to their village, but there is no question that he has vowed this protection (Rappaport). The dance demonstrates the obligation.

In ordinary language there is also the potential for alternatives in meaning (Rappaport, 1999). When ritual or ritualized actions are performed, there is more certainty that one thing is intended over another. When an authorized person in the culturally-intended context pronounces a man and woman husband and wife there is no room for alternatives for their created relationship.

Ritual provides the logical, unconscious infrastructure that makes the subsequent social realities seem “to come from sources beyond the power of the community” paralleling traditional authority as in the divine right of kings (Bell, 1997, p. 70). It naturalizes the nonmaterial (Rappaport, 1999, pp. 164-168). From a handshake to formalized written contracts to vows of oath, words and acts have causal power within culturally specified contexts (Searle, 1995). They do more than communicate ideas in these cases; they bring about the existence of cultural entities (Searle) and demonstrate their reality (Rappaport).

Ritual can take many forms, but there seems to be a general structure, or grammar, underlying rituals used for creating social reality. Ritual causality has been examined using a linguistic model, examining the underlying, logical structure. (See Bell, 1997 for a review.) In the social domain, ritual acts consist of a grammar that communicates ideas (Bell) and demonstrates adherence to those ideas through participation (Rappaport, 1999). Grammatical elements from the literature include Performative words (instrumental words), Performative actions (symbolic acts seen as instrumental), Antiquity (connections to the past), Authority (specified and often supernatural), and Context (set-aside from everyday, intended for a particular purpose) (see Table 1).

More than expressing meaning, ritual acts are instrumental in bringing social reality into existence. They not only say something, they do something (Austin, 1975; Bell, 1997;

Rappaport, 1999; Searle, 1995; Tambiah, 1985). Words can name a ship, create a knight, unite people in marriage, and impute divine authority to a regular person. Instrumental words, or “performative words”, (Austin), do something to create social realities from human intentions. Tambiah includes actions as performative because special actions can also be instrumental to create social realities and give them weight--even if the actions are symbolic in nature rather than physically causal. Performative words and actions seem to give cultural ideas greater, more certain social weight than ordinary, declarative language can (Rappaport; Searle).

Ritual performatives are invariant and formalized (see Bell, 1997; Rappaport, 1999) and rely on a specific authority and context (Searle, 1995). For example, the words, “I do” (rather than a more ordinary, informal “yes”) and “I now pronounce you husband and wife” (with little variation) are recognized in this culture as creating a marriage when stated in a situation intended as a marriage ceremony by the correct authorities. Invariant, formalized performatives enacted by a special authority in a specified context set realities apart from those derived through mere decision. They add an air of “specialness,” marked by a shared outward demonstration or “proof” of something otherwise nonmaterial.

A promise or social demonstration is not enough; there must be a way to connect those acts to the canonical, to antiquity, “with enduring aspects of nature, society, or cosmos. . . [that] is encoded in apparently invariant aspects of liturgical orders” (Rappaport, 1999, p. 58). Not just anyone can be successful using rituals to create realities. Not just any action, words, or props will be successful. Credibility through special agents of authority or links to the canonical (e.g., tradition, antiquity) is essential as well (Rappaport).

Agents are important, but more than that, special agents. Not just anyone has the authority to preside over a ritual to create a social entity. Authority figures are seen as having a

particular essence that enables them to create something that an ordinary agent could not. It is as if the social goods are protected and more special given that not just anyone can bring them into being and therefore to cause them to cease as well.

The intended context is another important element of the grammar of ritual. Everyone has to agree, to a certain extent, that the ritual is what it is. Pretending to have a marriage ceremony results in something different than really having such a ceremony, even though actions may be the same.

Ritual grammar allows what would otherwise be limited by its psychological basis to claim a higher reality in the world. Through ritual, abstract, nonmaterial ideas can become reality with consequences for human behavior. Ritual substantiates the nonmaterial (Rappaport, 1999). Searle's (1995) shorthand for the process of nonmaterial ideas given reality is: "X is Y in C." "X" explains actions or things in the physical world (e.g., marriage contract, vows) that become "Y," the symbolic, nonmaterial idea as reality (e.g., a marriage) in "C," the intended, culturally-specified context. The human mind extends a special type of reality to social realities created in this way.

## **2.2 Material Transformation**

Ritual is also used to transform material reality. Ritual action can invoke extra-ordinary causal power in ritual transformations. Supernatural powers are often invoked when ordinary causal action is not enough to create the desired circumstances and/or there is a sense of urgency (Boyer, 2001). Ritual is often used for such things as curing persons who are sick, ensuring the procurement of food, or gaining favor with the gods in uncertain circumstances.

Although ritual action implicates extra-ordinary consequences that violate ordinary causal possibility, it has a structure that relies on ordinary causal intuitions. This provides an explanation for why ritual action has a universal underlying structure across cultures (Boyer, 1994, 2001; Lawson & McCauley, 2002). The extra-ordinary acts of ritual are easily understood on the basis of intuitions that are a part of our cognitive structure (Boyer, 2001). Ordinary causality is recruited to form extra-ordinary causal ideas that become elaborated by cultural systems of belief (e.g., Rozin, Markwith, & Stoess, 1997). The causal inferences in ritual are based on a combination of ordinary causal thinking in core domains of thought and special violations to what is possible in a given domain. The violations make them memorable and mark them as extra-ordinary while the intuitive logic makes them credible (Boyer, 1994, 2001).

Lawson & McCauley explain ritual structure as relying on an “action representation system” (1990, 2002, p. 10). Like ordinary causality, the grammatical structures of ritual take into consideration representations of agents, actions (by means of an instrument), and patients. For them, what marks ritual as special, or extra-ordinary in a particular way, is that the agent in this case is assumed to be supernatural. They call this agent a CPS-agent; Culturally Postulated Supernatural-Agent (Lawson & McCauley, 2002, p. 3).

Barrett & Lawson (2001) experimentally examined adult intuitions about ritual to empirically test Lawson & McCauley’s (1990, 2002) theoretical model. They asked participants to rate the effectiveness of variants of novel ritual acts to create a desired consequence. The consequences were non-natural physical events such as “yielding good crops” or “protecting the village from an epidemic.” Participants were given a prototypical ritual with minimal structure including an agent, an action, an instrument and the appearance or absence of “special” markers before each of those categories. They were then then asked about variants to that ritual in terms

of changing the kinds of agents (person, rat, branch) who did the action, the kind of action (blew, kicked), the kind of instruments (dust, feathers) and whether or not there were “special” markers (“special rat” or just “rat”). In other words, participants read a description of a novel ritual and then rated the effectiveness of all of the permutations of variants of that ritual, deciding how much that ritual would work given each permutation.

Results showed that rather than relying on the prototype to determine what would be most effective, participants used intuitions about ritual in general. Their intuitions converged with other participants (even though the ritual was novel) and showed a bias for the importance of intentional agents over particular actions for the ritual’s success. Supernatural agents (“special” agents) were the best predictor of the ritual’s success. In another similar study, Barrett (2002) found that actions were more important than agents if the agent was not omnipotent but agents were more important than actions if the agent was omnipotent. In other words, participants recognized that effective magical transformation of the physical world requires some kind of special power, entailed in special agents or special actions.

The strange actions of ritual rely on their “action representation system” (Lawson & McCauley, 2002, p. 10) about ordinary causality, that is taken for granted just like inferences within core domains of thought (Boyer, 2001). Just as one does not have to understand physics to predict an object thrown up into the air will return to the earth, one does not have to understand the underlying mechanism of the ritual action to infer that the result will occur. It is assumed that it will. But even as ritual relies on ordinary causal models, it also violates them in particular ways, marking the possibility to transcend ordinary causality, as in the case of the importance of supernatural agents. Ritual actions also differ from ordinary action in at least two important ways. First, the actions often have little to do with the actual consequence. Sprinkling water on a

baby is symbolic of purification, but it does not clean the baby in an ordinary sense. Second, the logic of the mechanism of transformation often cannot be ascertained. (Boyer. 2001).

Boyer (2001) argues that the grammatical elements of ritual are grounded in cognitive structures that are evolutionary linked with survival, such as an urgency around purity over pollution and invariant rules to be followed to avert danger. He describes a grammatical scheme that converges with that by social transformation theorists. Agents have a specific role to play, a special place is utilized, actions are performed in a special manner, special objects are used and cannot be substituted for other objects, and there is a script of ordered actions (see Table 1).

### **2.3 An Overarching Framework**

Developmental questions can be formulated with these two theoretical strands. If the grammar of ritual action is universal and the causal logic is based on ordinary causal models, children's understanding of ritual should show a similar progression to the ordinary concepts that support grammar and the ordinary causal inferences that support the causal logic. Children would need to understand the concepts of authority, for instance, and the importance of canonical connections. They also need to understand the limits to ordinary causality to know or how it may be transcended. If ritual grammar adds weight and/or cues the supernatural, children's understanding would be based on an understanding of this type of transcendence of ordinary causality. The next section will review the child development literature relevant, within this framework, to their understanding of ritual.

## **2.4 Child Development Literature**

For ritual understanding of social transformations, children need a background understanding of ordinary intentional action, which ritual action both draws from and stands out against. They would have to recognize “special” grammatical markers that seem to be present in ritual actions. In addition, they must have the capacity to realize that nonmaterial social things exist in the world--things like conventions, social laws, and social facts-- that transcend individual intentions. For ritual understanding of magical transformations, children must be able to understand ordinary causality in the physical and biological domains and the role of agents and special markers that allow for unique causal consequences.

Empirical work has not addressed children’s understanding of ritual grammar and causality specifically, yet a growing literature addresses children’s developing understanding of social realities, intentionality, and extra-ordinary causality. These literatures are reviewed below.

### **2.4.1 Social domain knowledge**

Children’s inferences about the social world have been shown to rely on domain-rich knowledge much like that of naïve physics, psychology, and biology (Hirschfeld, 1995, 2001). Social domain knowledge has unique constraints and assumptions that allow children to make correct intuitive distinctions about the social nature, as distinct from the biological nature, of novel groups of persons (Hirschfeld, 2001). A distinctive characteristic of social realities is their dual subjective and objective natures. They are creations of the human mind that hold relatively objective status. Psychological entities, such as thoughts, wishes, and desires are distinctively

subjective or intentional; physical and biological entities are objective and material. Social realities originate from intentional means, yet exist transpersonally as objective, nonmaterial entities outside of individual subjects.

We know that children are beginning to distinguish the existence of social realities in the preschool years (Hirschfeld, 2001). Even by the age of 3-years, children appear to understand that social kinds of things are different than physical and psychological kinds. Not only do they know that real physical entities are different than those that are psychological and only imagined (Wellman & Estes, 1986), they also know that matters of personal choice (what one likes to wear) are different than matters of social convention (that one is supposed to wear clothes), and different still from moral laws (Tisak, 1995; Turiel, 1983). By age 3, children make distinctions between moral and conventional laws (Turiel, 1983). Conventions are seen as subjective, based on particular cultural rules, and subject to change given other rules and beliefs. Moral laws, on the other hand, are seen as objective, based on transcendental principles of well-being and harm, therefore not subject to change given rules or beliefs to the contrary. Children believe that authority figures such as school principals can make rules allowing children to come to school without clothes, but cannot make rules allowing children to hit one another (Turiel; 1983).

An understanding of distinctions between the objective and subjective nature of epistemological truth, however, appears to be a later development (see Kalish, 1997). In the case of intentionally created categories, children can understand distinctions about objective and subjective natures of what is “right” or “good” (value distinctions) before they can understand those distinctions about what is “real” (truth distinctions). For example, children’s understanding about the subjective and objective nature of social laws such as etiquette and gender roles have been examined to assess their beliefs about the origin of intentionally created categories.

Preschool age children seem to view social laws such as etiquette and masculine gender roles (although not feminine gender roles) as objective facts (Levy, Taylor, & Gelman, 1995). They stated that it was not possible for protagonists to transgress against them. Preschool children treated those social laws objectively like the moral and physical laws presented. Eight-year old children, like adults, understood the subjective nature of social laws as distinct from the objective nature of moral and physical laws.

Children, however, were more discriminating in their explanations about why one could not transgress physical or social laws (Kalish, 1998). They denied that both physical and social laws could be violated. But by late preschool age, children stated causes for why physical laws could not be violated (e.g., “He’s not tall enough to reach the ceiling,” p. 709) and reasons for why physical laws cannot be violated (e.g., “He would ruin his shoes [if you wear them in the bathtub],” p. 709). It was not clear, however, whether children judged impossibility (“can’t” transgress) as a value or as a fact (Kalish). Further studies addressed this question by asking children about the ability of a disobedient child, who wants to transgress (value: good or bad intentions), and about an ignorant child, who does not know that it is wrong to transgress (fact: possibility/impossibility), to do so. Children’s responses showed the same patterns as before: causes were given for physical law, reasons for social laws.

Five-year olds then, are beginning to understand something of the distinctive nature of social laws. They are real enough to affect our behavior (we cannot transgress against them), but the explanations are rationally rather than physically derived. Despite this early understanding, it is not until somewhat later that children come to fully appreciate the role of human intention for the creation of conventions (Kalish, 1997). It is not until early school-age that children have been shown to view intentional stipulations, such as conventions created through decision, as “truth”

(Homer, Brockmeier, Kamawar, & Olson, 2001; Kalish et al., 2000). Two studies examined children's understanding of the epistemological reality of names: One examined children's understanding of the reality of a name change through decision (Kalish et al.), the other their nominalist understanding in terms of objects (Homer, et al). Children are beginning to make distinctions about epistemological truth by age 4 years, but a firm understanding that looks like adult distinctions does not occur until early school-age (Homer et al.; Levy et al., 1995; Kalish, 1998; Kalish et al.).

Initially, children adopt a more "objectivist" view. For example, while preschool children realize that things can be called different names, they continue to believe that the original name would be the right one (Homer et al., 2001). When asked about the creation of new social conventions (e.g., changing the name or ownership of a paper doll) Kalish et al. (2000) found that children younger than 6- or 7-years recognized that one would behave as if the convention had changed ("call her by the new name"), but still claimed that the original name would be the real one.

Kalish et al. (2000) examined whether children thought a convention could not only be changed, but if the change becomes "real" through decision. In other words, they examined children's understanding of a mind to world transformation of social reality. They tested what children understand about the possibility of changing human-created conventions through decision. They compared the act of "deciding" with the act of "pretending" in terms of changing a name or the ownership of a paper doll for each participant. The method for name change and ownership were identical in structure. Three questions assessed children's understanding about the new state of reality (e.g., for the new name) in terms of: (a) behavioral consequences ("what will we say?"), (b) reality ("what about really?"), and (c) representation of reality (is a third party

right or wrong when stating the changed or original state) (p. 1298). Although 3-year olds stated that the changed reality would have behavioral consequences for the decide condition (i.e., we would call her by the new name), it was not until age 6- to 7-years that children stated that the convention created through decision actually changed (the doll's name for real). Pretending was not found to change reality at any age.

Homer et al. (2001) tested what children understood about the conventional nature of names for animate and inanimate objects and proper names. They assessed children's understanding of the origin of names (e.g., "How did dogs get their names?"), and their changeability in terms of (a) a "standard change" (e.g., "Could dogs be called cats?") and (b) a "modified change" (e.g., "When dogs were first discovered, could they be called plaps?") (p. 11). By age 8-years, children understood that names are conventions that are created through intentional means. Younger children's responses showed an objective bias for names. This pattern was not straightforward, however. Children showed an earlier understanding of the subjective nature of proper names and invented names than for familiar objects (like dogs). Adult participants sometimes stated that one could not change the name of familiar objects. Their reasons, however, were practically-based, with explanations about hindering communication: "I guess philosophically you could, but no one would understand you" (p. 22).

Once children begin to understand the role of human intention for the creation of social realities in the early school age years, they also begin to understand that social categories are relative and flexible (Kalish, 1998; Levy et al., 1995). Against the tendency toward diminished objective status, ritual may serve as a way to add weight to social realities, helping to uphold a social order. The current literature, however, does not distinguish decisions and agreement from ritual action.

## 2.4.2 Extra-ordinary causality

Core domain knowledge, in psychology, biology, and physics, lends cognitive economy to children's understanding of novel information (see Wellman & Gelman, 1997). Knowledge is constrained, within domain, to what kinds of causality are possible and to what kinds of entities (or events) are possible as a consequence. Children understand quite early, for instance, that mental events such as thoughts cannot have physical consequences, but can affect other mental events such as beliefs and feelings (Woolley, 2000). More recently other domains, such as the social domain (e.g., Hirschfeld, 1995, 2001) have been recognized since they too have unique constraints of causal possibility.

Extra-ordinary causality, as found in ritual acts, is based on an understanding of ordinary social causality such as intentional agents and actions (Barrett & Lawson, 2001). Beginning in infancy, children begin to discriminate between animate, intentional agents and inanimate objects that do not have intention (Wellman & Gelman, 1997). In the preschool years, children begin to understand that desires, beliefs, and knowledge affect behavior in predictable ways (Wellman & Gelman). They also understand that some agents have the authority to complete particular actions, while other agents lack the authority to be successful in that domain (e.g., Laupa, Turiel, & Cowan, 1999).

In the preschool years children are beginning to understand extra-ordinary causality that violates the boundaries of domain knowledge. Preschool children are beginning to understand extra-ordinary intentional actions in the case of wishing, prayer (Woolley, 2000), and magic (Rosengren & Hickling, 2000). Between the ages of 4- to 5- years children view wishing as having extra-ordinary causal power and regard "magic" as a plausible, separate category to

explain extra-ordinary actions. An understanding of prayer also begins in the preschool years, but unlike the efficacy of wishing that wanes by late preschool age, prayer is thought to become more effective as children get older (Woolley 2000).

Along with extra-ordinary domains of causality, an understanding of the boundaries for the authority of agents who can do extra-ordinary versus only ordinary things is developing at this preschool age. Three to six year old children distinguished between God's and mother's ability to be omniscient in a false belief task (Barrett, Richert, & Driesenga, 2001). Although the understanding of mother's limits to omniscience, present at early ages, increased with age, a belief in God's omniscience remained the same. Similarly, while 2 1/2 -year olds show little distinction between the authority of parents and the authority of magicians to successfully perform magical acts, preschool children make clear distinctions (Rosengren & Hickling, 2000).

### **2.4.3 Ordinary knowledge that may support grammatical understanding of ritual**

It is important to examine particular elements of ritual grammar to determine possible age-related changes. For example, 3-year old children distinguish limits to authority depending on individuals, roles, and situations. Yet an understanding of the weight of antiquity may develop when children have a better appreciation of the significance of time. For example, Jacobs & Johnson (2001) found that 4- to 5-year old children could understand the value of objects that have connections with other people (such as one belonging to a grandmother or famous person), but did not understand the value of an object based on its connection with age (such as a very old violin) until age 6- to 7-years.

### 3. STATEMENT OF THE PROBLEM

#### 3.1. Rationale

An understanding of ritual is an important part of meaningful cultural participation. In the social domain, ritual acts create important transformations, imputing more weight to those realities than is possible through mere decision (Rappaport, 1999). In the material domains, ritual acts create transformations that also seemingly transcend reality, by going beyond what is possible in times of urgency (Boyer, 2001). In any case, ritual action is structured by a universal grammar (Bell, 1997) that marks it as extra-ordinary, even as it relies on understanding of ordinary action (Barrett & Lawson, 2001). On this account, a general, intuitive understanding of action and causality lays the foundation for a universal capacity to distinguish special functions of ritual action. In the following study, children's foundational understanding of ritual will be examined by testing their capacity to distinguish grammatical elements of ritual in novel contexts where the objective is either a social or material transformation.

By the preschool years children have a sophisticated understanding about intentionality of agents and social actions as well as a sophisticated inferences system about causal events in the material domains (Wellman & Gelman, 1997). They are also beginning to understand extraordinary events that violate ordinary causality yet have a unique logic such as wishes, prayer, (Woolley, 2000) and magic (Rosengren & Hickling, 2000). Preschool children are sorting out what is possible within domains; what is ordinary action and what is magic. It is not until the early school years, however, that children begin to understand intentional acts such as deciding as able to create cultural entities that not only have behavioral consequences (such as conventions), but "truth" consequences as well (Kalish et al., 2000). Further, although preschool

children can understand the relative value of some objects (Jacobs & Johnson, 2001) and the relative objective nature of what is good (Tisak, 1995; Turiel, 1983), no research has yet examined children's understanding of ritual action as it serves to substantiate abstract social entities or transform material reality.

### **3.2. Research questions**

1. At what age do children recognize the grammar of ritual?
2. Are there differences between understanding social and material rituals?
3. Are there differences between ritual grammar elements in terms of developmental progression of understanding (i.e., are some understood before others)?
4. What explanations do children offer for why ritual grammar is necessary? Do they understand the weight or cueing of the supernatural that ritual grammar is purported to provide?
5. What is the role of prior experience in children's understanding of ritual grammar?

### **3.3. Research Design**

A novel situation, set in children's culture, was chosen to examine children's intuitions about ritual grammar and causality. Children were told a story about storybook children who wanted to recreate a secret children's club—the Tiger Tribe—that one of their great, great grandfathers had started when he was a child. Questions centered around the participant helping the storybook children find the best ritual to recreate this Tiger Tribe. The situation provides a means of testing

children's understanding of ritual well-formedness in a novel case, mirroring early language studies examining children's intuition about the grammar of language.

Two age groups were chosen to examine the origin and developmental progression of an understanding of ritual. A younger age group of 5- to 6-year olds and an older age group of 8- to 9-year olds were chosen to reflect developmental transitions found in relevant developmental literature. While five year olds understand something about magic as a separate category (non-ordinary), it is not until age 7- to 8-years that children understand the role of human intention in the creation of social reality. Pilot data using the method of the current study supported this prediction. A sample of adults was included to provide an endpoint comparison.

The development of children's understanding of ritual grammar and ritual causality was investigated in both social and material conditions. Condition I assessed ritual understanding for a social transformation. Children were asked to help story-book children create a suitable ritual that would serve to initiate them into membership in a secret kids' club, the Tiger Tribe. Condition II assessed ritual understanding for a material transformation. It was structured exactly like Condition I, except that children were asked to help create a ritual that would turn them into real tigers in the context of the Tiger Tribe. After listening to the story, participants were asked five questions about the ceremony that corresponded to five ritual grammar elements (see Table 2). These elements serve to give special power and weight to ritual acts as compared to ordinary acts.

Interviews with children included three tasks. Task 1 tested whether children could recognize the ritual element from two competing non-ritual, yet competing, alternatives as the most suitable for the objective. Children provided explanations for all responses. In Task 2, children were asked to select any number of the five ritual grammar elements they judged to be

necessary to cause the ritual’s intended consequence. In Task 3, children were asked questions to understand what this story and subsequent tasks reminded them of in their prior experience (e.g., “Have you even heard about, read about, or seen anything like this before?”). Finally, a parent rating of the child’s experience with ritual and ceremony was collected as part of the parental consent form to get a separate measure of children’s prior experience. Data was statistically and/or descriptively analyzed for comparisons between age groups, conditions, and ritual grammar elements.

**Table 2: Ritual Grammar Elements**

	<b>Theoretical Definition</b>	<b>Operational Definition</b>
<b>Antiquity</b>	Connection with the canonical or original objects	Replicas of original uniforms
<b>Performative Words</b>	Words that are instrumental in action	Instrumental declaration of new truth
<b>Performative Action</b>	Invariable action sequence	Order and choice of events determined
<b>Authority</b>	Specific person with power or status to carry out ritual	Child with essence based on his history
<b>Context</b>	Intended atmosphere with non-ordinary character	Set aside place that is related to the ritual

### **3.4. Predictions**

If children’s understanding of ritual rests on their understanding of causation in the social and material world (i.e., social domain and biological and physical domains respectively), then children’s understanding about ritual grammar and causality will follow a developmental

trajectory whereby some elements are understood earlier than others, depending on which underlying concepts children understand. Further, certain domains will be understood earlier than others. Specifically, 5- to 6-year old children should be able to distinguish important causal elements within the material domains but not the social domain. Rather than a complete understanding of ritual at a particular age, children may understand ritual as far as they understand the underlying concepts and causal inference structures that underlie ritual action. By 8- to 9-years, children should understand all of the grammatical elements and, perhaps, important causal distinctions in material and social domains. With age, children's explanations should reflect an understanding of the weight and/or supernatural cueing provided by ritual grammar elements. Finally, if children's understanding is based on intuitions recruited from ordinary causality, their experience, as measured by connections children make to their prior experience and parent's rating of children's prior experience, should not be related their performance in Task 1 and 2.

## **4. METHOD**

### **4.1 Participants**

Fifty-seven children ages 5-to 6-years (N=32; mean=5.94 years; range=5.3 to 6.8 years) and 8- to 9-years (N=25; mean age=8.87; range=8.1 to 9.8 years) from the Pittsburgh area were recruited from local schools. Participants were randomly assigned to either the social condition (N=16, younger; N=13, older) or material condition (N=16, younger; N=12, older). Gender balance within each age group and condition was approximately equal. Preliminary analyses showed no gender differences for children's ability to recognize ritual grammar in this context so boys and girls responses were analyzed together. A sample of undergraduate students (N=18; 10 in the social condition and 8 in the material condition) were recruited from two adolescent development courses. Adult responses were provided for descriptive comparison and not included in statistical analyses.

### **4.2 Procedure**

Children were interviewed individually. Children were told a story about a secret club (tiger tribe) and then asked to help the storybook children create a suitable ceremony to either become real tiger tribe members for the social condition or to turn into real tigers in the context of the tiger tribe for the material condition. The complete story and interview questions for Task 1 are presented in the Appendix. The story was about the secret tiger tribe that one of the boy's great-great grandfather started a long time ago with his friends. The boy, Tommy, and his best friend,

decide to learn about and start the Tiger Tribe again with their friends. In the story, the friends learn about the secret tribe, but they do not learn how to make the ceremony to create the social or material transformations. The participants are asked to help the storybook children find the best way to do it. The social condition examined children's understanding of ritual grammar and causation in a social transformation (initiation into tribe membership). The material condition examined children's understanding of ritual grammar and causation (turning into real tigers in the context of the tiger tribe). Each of the three tasks and the parent rating of prior experience are described below.

Adult interviews included the exact same story and questions as children heard, but in a different format. Adults read the story and questions themselves in a questionnaire format and wrote their responses to the questions. They were told that this was the interview that was used to examine children's understanding of ritual and ceremonies and an adult comparison was needed. The parent rating of prior experience was not replicated for adults.

#### **4.2.1 Task 1: Ritual Grammar Recognition**

Participants were asked to help the kids in the story decide the best way to make the ceremony to become "real member of the tiger tribe" (social condition) or "real tigers" (material condition). They were asked questions to assess understanding along five separate aspects of ritual grammar: antiquity, performative words, performative actions, authority, and context. Table 2 (see previous chapter) lists definitions for these five ritual grammar elements. Participants were told three answer choices for each question. Questions were formatted with a forced choice between three ideas storybook children had come up with as the best way to create the ceremony. Participants were asked to choose which idea they thought is the best one for a successful transformation.

Answer choices consisted of one ritual response and two non-ritual, competing alternatives. Ritual responses captured the “special” nature of ritual grammar (e.g., adding weight or cueing the supernatural). Non-ritual, competing alternative responses were relevant for the story, but ordinary in nature. Children were asked to explain their responses.

#### **4.2.2 Task 2: Essential Ritual Elements**

Task 2 assessed children’s understanding of causal domain differences between the social and material conditions. Children were asked to choose the essential elements for the ritual above in order to make it effective. Children were shown five cards each with a pictorial representation corresponding to the five ritual elements they were introduced to in Task 1. Ritual grammar elements were introduced to children in the following way to link them to the story: “uniforms the kids will wear” (antiquity), “words the kids will say”, “actions the kids will do” (performative actions), “specific person who will be in charge” (authority), and “place where they will have the ceremony” (context). Children were reminded of the elements and how they are discussed in the story (e.g., “We talked about ‘words’--what the kids would say in the ceremony to turn them into real members of the tiger tribe. . .”).

Then children were asked three sets of questions with the aim to learn what elements they judged essential to make the ritual successful. First children were asked a warm-up questions: “What do you think is the most important thing to make these children into real tiger tribe members/real tigers?” Children chose one card and were asked to explain why they made that choice. Second children were asked, “Now I want to ask you the opposite thing. Which of these do you think is not important? Which of these can we take away and it will still work; the kids will still become real members of the tiger tribe/real tigers if we take them away. There may be

one, two, three, all, however many.” The elements that are not important will uncover each child’s intuitions for what the essential elements of the ritual are. Children were asked to explain their choices for exclusion. Children were asked, “Are there any others that aren’t important to turn them into real Tiger Tribe members/real tigers or do we need all of the others now?” until they believed they have them all. Finally, children were asked to explain why their remaining choices (i.e., the essential parts of the ritual for effectiveness) are important to make the ceremony work. This final list, of the ritual grammar elements that children thought could not be excluded, provided the responses for what children found most essential.

### **4.2.3 Task 3: Connections to Prior Experience**

Children were asked four open-ended questions about connections to their prior experience (connection questions). Connection questions examined about what, from their prior experience, the story and questions in Tasks 1 and 2 reminded children. This allowed for an understanding of possible frameworks children might have used to help them make decisions in the first two tasks. The four connections questions consisted of one initial questions followed by three prompts. The initial questions asked, “Have you ever heard about, read about, or seen anything like what the kids were doing before?” The three prompts that followed asked children to think about particular contexts: media (“What about on TV, movies, or books?”), family and school (“What about at school or with your family?”), and with friends (“What about with your friends?”). Children’s responses were recorded and coded according to ritual responses, responses about clubs, magical responses, or irrelevant/surface/no responses (see Table 9 in the results chapter).

#### **4.2.4 Parent Rating of Children's Prior Experience**

Parents were asked to rate their child's experience with ritual and ceremonies in a questionnaire attached to the consent form. Eighty-nine percent of the parents completed the questionnaire (84% for younger children; 96% for older children). Parents were asked to rate children's prior experience for how often children have had experiences with ritual and ceremonies on a 5-point rating scale labeled 1 "never," 2 "not very much," 3 "sometimes," 4 "often, and 5 "all the time". There were three questions that mirrored children's connection questions (Task 3). The first question asked how often children had seen or heard about ritual or ceremonies in media (TV, books, movies). The second question how often they have seen their child playact rituals or create rituals and ceremonies with friends. The third question asked how often children experienced rituals and ceremonies at home, church/temple, or at school.

## 5. RESULTS

Data was analyzed to examine age differences, differences between conditions, differences between the five ritual grammar elements, and the role of experience. Task 1 examined these comparisons for children's recognition of ritual grammar and the explanations they provided for their responses. Task 2 examined children's causal understanding of ritual grammar elements by asking which elements they judged essential to make the ritual work for an initiation (social condition) or a magical transformation (material condition). Task 3 examined what children were reminded of in their own experience that perhaps helped provide a framework for their choices in the first two tasks. The parent rating of children's prior experience with ritual and ceremony was used to examine the role of experience for how much children could recognize the ritual of grammar in Task 1. The small adult sample serves as a comparison to children's responses (an end point) as well as a validity check for the methods in the design of the study.

### 5.1 Task 1: Ritual Grammar Recognition

Children's recognition of ritual grammar was analyzed in four steps: a) comparisons between age groups and conditions on children's overall recognition of ritual grammar, b) comparisons with children's overall recognition and parents' rating of ritual experience, c) recognition comparisons across the five ritual element within each condition (social and material), and d) recognition comparisons across each of the five ritual elements between the two conditions. Task 1 scores were calculated by assigning a "1" for selection of the correct ritual element and a "0" for

selecting either of the two non-ritual elements for each of the five ritual grammar element categories. Adult scores will be reported at the end of each section to provide a baseline for comparisons.

### **5.1.1 Comparisons of overall recognition**

A composite Ritual Score was calculated by summing each participant's score (1 or 0) across the five ritual elements. Ritual Scores could range from 0 to 5, providing an overall score of recognition. The actual range of scores was 0 to 4 for younger children and 1 to 5 for older children. A 2 (younger or older age group) X 2 (social or material condition) ANOVA was used to assess possible differences in participants' Ritual Score. There was a main effect for age [ $F(1,53) = 27.46, p < .001$ ]. Older children ( $M = 3.64; SD = 1.08$ ) scored higher than younger children ( $M = 2.03; SD = 1.18$ ). There was no main effect for condition and no significant interaction.

The range of Ritual Scores for the adult sample was 3 to 5 ( $M = 4.28; SD = .83$ ). Fifty percent had a score of 5, 27.8% had a score of 4, and 22.2% had a score of 3.

### **5.1.2 Comparisons of overall recognition and parent rating of experience**

Parent ratings of children's prior experience with ritual and ceremonies were returned by 89% of the children's parents (younger:  $N=27$ ; older:  $N=24$ ). Six parents did not complete the parent rating questions. A composite Parent Rating of Experience Score was calculated by summing the parent rating of their child's experience with ritual across the three questions (media; play with friends; with family at church or temple, home, or at school) they responded to on a 5-point scale

(range of possible scores 1 to 15) from “never” to “all the time”. The actual range of scores was 4 to 13 ( $M = 7.96$ ;  $SD = 1.81$ ). A t-test showed no significant difference between age groups (younger:  $M = 8.00$ ;  $SD = 1.54$ ; older:  $M = 7.92$ ;  $SD = 2.10$ ). Table 3 presents percentages, means, and medians for how often parents chose each rating (1 to 5) for each of the three questions, across age groups. Ratings for “not very much” and “sometimes” were most frequent. Parents most frequently chose the rating was 3 (sometimes) for how often children experience ritual and ceremonies in media (television, books, movies) and for how often they experience them with family, church/temple, or school. No parents chose “never” for how often their child sees rituals or ceremonies in books, television, or movies. A few parents (12%) chose “never” for how often children experience rituals and ceremonies with family, at church or temple, or at school. Parents most frequently chose the rating 2 (not very much) for how often they see rituals or ceremonies in their child’s play with friends. Parents never chose “often” or “all the time” for this category.

**Table 3: Parent Rating of Child’s Prior Experience**  
**Percentages, means, and medians of Parent Rating Across Questions**

	<b>Media</b>	<b>Play with Friends</b>	<b>Family, Church/Temple, School</b>
Never (1)	0%	18%	12%
Not very much (2)	26%	43%	29%
Sometimes (3)	57%	39%	31%
Often (4)	16%	0%	20%
All the time (5)	2%	0%	8%
Mean	2.94	2.22	2.82
Median	3	2	3

Note: Percentages were rounded to the nearest whole number.

A bivariate regression analysis showed that Parent Rating of Experience did not predict the variance in children's Ritual Scores; children's level of experience did not predict their ability to recognize ritual grammar elements.

To further examine the role of prior experience for children's ability to recognize ritual grammar, children were divided into two groups: those who had high ritual grammar recognition (ritual score greater than equal to 3 out of 5) and those who had low ritual grammar recognition (ritual scores less than 3 out of 5). A t-test showed no difference in parent rating score between children who had high ritual grammar recognition (N=29; mean = 8.21; standard deviation = 1.93) and those who had low ritual grammar recognition (N=22; mean = 7.64; standard deviation = 1.62). Children who scored high for ritual grammar recognition did not have Parent Scores of prior experience higher than children who scored low for ritual grammar recognition.

There were no adult sample scores for rating of experience with ritual.

### **5.1.3 Comparisons across five ritual grammar elements within condition**

Judgments about each ritual grammar element were examined within each condition (social and material) separately. First, percentages of how often children chose the ritual response were examined against chance levels of responding. Chance level of responding was 33% for the ritual response (1 ritual response out of 3 total choices). Second, differences between the five ritual grammar elements within age group were examined. Lastly, differences between age groups across the five ritual grammar elements were examined.

### 5.1.3.1 Social Condition

The percentages of children's ritual responses (vs. non-ritual choices) across ritual grammar elements for the social condition by age are shown in Table 4. Adult percentages are included for descriptive comparison only, and were not part of the analyses (except for difference from chance which is reported in the table). Difference from chance was calculated with a series of Chi-square goodness-of-fit analyses. Younger children did not choose the ritual response greater than chance levels on any of the ritual grammar elements. A Cochran Q analysis showed no difference between percentages of ritual responses across the five elements for younger children. Older children chose the ritual response significantly above chance levels of responding for three ritual grammar elements: antiquity (100%), performative words ( $\chi^2 = 20.68, df = 1, p < .001$ ), and context ( $\chi^2 = 15.66, df = 1, p < .001$ ). Percentages for the other two elements--performative action and authority—were not significantly above chance levels of responding. A Cochran Q analysis showed a significant difference between percentages of ritual responses across the five elements for older children [ $Q(df = 4) = 26.46, p < .001$ ].

**Table 4: Social Condition, Task 1**  
**Percentage Ritual Response by age group 1**

	Antiquity	Performative Words	Performative Action	Authority	Context
5-6 YEARS (N=16)	50	38	25	50	38
8-9 YEARS (N=13)	100*	92*	23	54	85*
ADULT (N=10)	100*	80**	70**	80**	90*

\* Significantly above chance levels of responding ( $p < .001$ ).

\*\*Significantly above chance levels of responding ( $p < .05$ ).

While younger children did not recognize the ritual grammar element in any of the elements, older children did for three elements. Older children, however, did not recognize two of the five elements: performative action and authority. The element of performative action was especially low, and children's non-ritual response choices and explanations showed a preference for choice in how to act over prescribed, invariant action sequences. For explanations for authority choices, all of the children who chose one of the non-ritual responses, chose the one: "put everyone's name in a hat and pick one," explaining that this was the best because it was "fair to everyone." A series of Chi-square analyses for each ritual grammar element showed a significant difference between age group percentages for ritual responses for three of the five elements. Older children chose the ritual response more often than younger children for antiquity (Pearson  $\chi^2 = 8.98$ ,  $df = 1$ ,  $p < .01$ ), performative words (Pearson  $\chi^2 = 9.15$ ,  $df = 1$ ,  $p < .01$ ), and context (Pearson  $\chi^2 = 6.56$ ,  $df = 1$ ,  $p < .05$ ).

### 5.1.3.2 Material Condition

The percentages of children's ritual responses (vs. non-ritual choices) across ritual grammar elements for the material condition by age are shown in Table 5. Adult percentages are included for descriptive comparison only, and were not part of the analyses (except for difference from chance which is reported in the table). Difference from chance was calculated with a series of Chi-square goodness-of-fit analyses. Younger children chose the ritual response significantly above chance levels of responding for one of the five ritual grammar elements: context ( $\chi^2 = 12.77$ ,  $df = 1$ ,  $p < .001$ ). Percentages for the other elements were not significantly above chance levels. A Cochran Q analysis showed a significant difference between percentages of ritual responses across the five elements for younger children [ $Q(df = 4) = 11.24$ ,  $p < .05$ ].

Older children chose the ritual response significantly above chance levels of responding for four of the five ritual grammar elements: antiquity ( $\chi^2 = 13.75$ ,  $df = 1$ ,  $p < .001$ ), performative words ( $\chi^2 = 13.75$ ,  $df = 1$ ,  $p < .001$ ), authority ( $\chi^2 = 18.68$ ,  $df = 1$ ,  $p < .001$ ) and context ( $\chi^2 = 13.75$ ,  $df = 1$ ,  $p < .001$ ). The percentage for performative action was not significantly above chance levels of responding. A Cochran Q analysis showed a significant difference between percentages of ritual responses across the five elements for older children [ $Q(df = 4) = 14.55$ ,  $p < .01$ ].

**Table 5: Material Condition, Task 1**  
**Percentage Ritual Response**

	Antiquity	Performative Words	Performative Action	Authority	Context
5-6 YEARS (N=13)	50	25	25	31	75*
8-9 YEARS (N=12)	83*	83*	33	92*	83*
ADULT (N=8)	100*	100*	75**	63	100*

\* Significantly above chance levels of responding ( $p < .001$ ).

\*\*Significantly above chance levels of responding ( $p < .05$ ).

The performative action element ritual response percentage continues to be much lower than other elements for the older children. Although the percentage for adults is not as low as for younger and older children, and it is significantly above chance, it remains lower than most elements (except authority). Again, explanations (even for adults) showed a preference for personal choice over prescribed, invariant actions for everyone.

A series of Chi-square analyses for each ritual grammar element showed a significant difference between age group percentages for ritual responses for two of the five elements. Older children chose the ritual response more often than younger children for performative words (Pearson  $\chi^2 = 9.33$ ,  $df = 1$ ,  $p < .01$ ) and authority (Pearson  $\chi^2 = 10.22$ ,  $df = 1$ ,  $p < .01$ ).

#### **5.1.4 Comparisons across five ritual grammar elements between conditions**

A series of Chi-square analyses for each of the five grammar elements within each age group showed a significant difference between conditions for context for younger children (Pearson  $\chi^2 = 4.57$ ,  $df = 1$ ,  $p < .05$ ) and authority for older children (Pearson  $\chi^2 = 4.43$ ,  $df = 1$ ,  $p < .05$ ). For context, younger children chose the ritual response more often for the material condition (75%) than for the social condition (38%). For authority, older children chose the ritual response more often in the material condition (92%) than in the social condition (54%). In both cases, recognition increased significantly in the material condition. No differences were found for any other ritual grammar elements in either age group. In general responses were similar within age group between the conditions.

#### **5.1.5 Explanations for Task 1**

Children were asked to explain why they chose the response (ritual or non-ritual) for each of the five ritual grammar categories. Only the explanations of participants who chose the ritual response (vs. the two non-ritual responses) were coded. Their explanations were coded as either Ritual (defining or exemplifying ritual grammar or an understanding that something special or non-ordinary needed to be done) or Other. Table 6 shows examples of what was coded as Ritual or Other. Reliability for 26% of the data was obtained by an independent coder. Data points to be analyzed for inter-rater reliability were randomly chosen into one of 20 cells to be representative for age group (younger and older), condition (social and material), and the five ritual grammar

element questions (antiquity, performative words, performative action, authority, context).

Interrater reliability was 90%.

**Table 6: Ritual Response Explanation Codes and Examples**

<b>Element</b>	<b>Codes and Examples</b>
<b>Antiquity</b>	<p><u>Ritual</u>: “that’s the original one,” “a long, long time ago it was them”</p> <p><u>Other</u>: “they know what it would look like,” “it looks nice”</p>
<b>Performative Words</b>	<p><u>Ritual</u>: “it is making it final,” “in ceremonies usually say fancy things”</p> <p><u>Other</u>: “it’s a pretty long word,” welcoming you to the tiger tribe”</p>
<b>Performative Action</b>	<p><u>Ritual</u>: “if not the right way, won’t all be tigers in the same way,” “like a ritual, all in the same way”</p> <p><u>Other</u>: “they’d be doing the same thing so won’t get mixed up,” “all have to be nice”</p>
<b>Authority</b>	<p><u>Ritual</u>: “he already was a tiger/tiger tribe member,” “because his grandfather was a member”</p> <p><u>Other</u>: “because he’s first to discover the tiger tribe,” he knew it first”</p>
<b>Context</b>	<p><u>Ritual</u>: “special ritual place in the forest,” “someplace near the other one [cabin]”)</p> <p><u>Other</u>: “not any distractions, might be birds, but no loud running,” “they can get air”</p>

**Table 7: Ritual Response Explanation Code Percentages, Social Condition**  
**Percentages for Ritual Explanation Codes by age group and ritual grammar element**

	5-6 years	8-9 years	Adult
Antiquity	75	100	80
Performative Words	0	83	100
Performative Action	50	33	71
Authority	75	100	63
Context	33	27	56

Note: Percentages are shown only for participants who chose the ritual response.  
 Percentages are rounded to the nearest whole number.

**Table 8: Ritual Response Explanation Code percentages, Material Condition**  
**Percentages for Ritual Codes by age group and ritual grammar element**

	5-6 years	8-9 years	Adult
Antiquity	13	100	100
Performative Words	0	60	88
Performative Action	0	25	67
Authority	75	64	60
Context	33	30	75

Note: Percentages are shown only for participants who chose the ritual response.  
 Percentages are rounded to the nearest whole number.

Percentages of frequency for how often children’s explanations were coded as Ritual by age group for the social condition are presented in Table 7 and for the material condition in Table 8. Adult percentages are also included for comparison. In general, ritual explanations

increased with age in both conditions. Older children usually had higher percentages than younger children of explanations that defined or exemplified the ritual of grammar.

Two of the elements—antiquity and authority in the social condition--were understood by younger children, older children, and adults with similar frequency (coded as a ritual explanation when children indeed did choose the ritual response for these elements). The ritual grammar elements “authority” and “antiquity” seem to be the first elements children can explain in terms of ritual grammar. Even though younger children did not choose the ritual response above chance levels for authority and antiquity elements, when they did choose the ritual response a high percentage of them gave a ritual explanation for these elements in the social condition.

Performative action was not understood in terms of ritual grammar by younger and older children. Even when participants chose the ritual response in Task 1 for performative action, they rarely or never gave explanations in terms of ritual grammar. Younger children in the social condition, however, gave the ritual response 50% of the time if they chose the ritual response. Although adults did seem to understand performative action in terms of ritual for both conditions, it seems that children did not understand this ritual grammar element even by age 8- to 9-years.

Context was not explained in terms of ritual grammar by any of the participants (younger, older, and adult) very often.

Ritual explanation frequency for older children and adults is similar between the social and material conditions. Older children and adults gave explanations coded as ritual similarly across the five ritual grammar elements. Younger children, however, were more able to give explanations in terms of ritual grammar for some ritual grammar (explanations coded as ritual) in the social condition than they did for the material condition.

## 5.2 Task 2: Essential Ritual Elements

In Task 2, children were asked to choose the essential and nonessential ritual elements. This task was designed to understand if there were causal differences in what children judged as necessary to make the ritual work in the social and material domains and to understand if there were age differences in possible causal judgments. Task 2 scores were calculated by assigning a “1” for each ritual grammar element not excluded (viewed as essential) and a “0” for each one excluded (viewed as nonessential). Children could exclude as many or as few of the five as they wanted. Table 9 shows the percentages of frequency a ritual grammar element was chosen as essential by age group and condition. Adult percentages are presented for comparison but were not included in the analyses.

**Table 9: Percentage of frequency of elements chosen as essential, Task 2**

	Younger		Older		Adult	
	<u>Social</u> (N=16)	<u>Material</u> (N=16)	<u>Social</u> (N=13)	<u>Material</u> (N=12)	<u>Social</u> (N=10)	<u>Material</u> (N=8)
Antiquity	56	56	39	33	40	38
Performative Words	63	56	85	92	80	88
Performative Action	63	69	23*	75*	90	88
Authority	69	56	77	67	60	75
Context	63	69	77	75	80	63

\*Significant difference between conditions ( $p < .01$ ).

### **5.2.1 Comparisons across five ritual grammar elements between age groups**

A Cochran Q analysis for each of the conditions (social and material) showed no significant differences for the younger age group between the percentages of the five ritual elements. Younger children judged each of the five ritual grammar elements as essential with similar frequency for both conditions. The Cochran Q analysis showed a significant difference for how often children chose the five ritual grammar elements as essential for the social condition, [ $Q(df = 4) = 13.73, p < .01$ ]. Older children chose some of the ritual grammar elements as essential more often than others. They chose performative action as essential with particular infrequency. In the material condition, however, older children showed no differences between the elements. They chose them as essential with similar frequency for the material condition. Adults seem to have chosen the five grammar elements with similar frequency. Perhaps one exception is the relative infrequency for choosing antiquity as essential, which was relatively low for adults in both conditions.

### **5.2.2 Comparisons between age groups within condition**

Comparisons were made for how often each ritual grammar element was chosen as essential between age groups within each condition. A series of Chi-square analyses showed few age differences with two exceptions. In the social condition, younger children chose performative action as essential more often than older children, (Pearson  $\chi^2 = 4.51, df = 1, p < .05$ ). In the material condition, older children chose performative words as essential more often than younger children, (Pearson  $\chi^2 = 4.22, df = 1, p < .05$ ).

### **5.2.3 Comparisons across five ritual grammar elements between conditions**

Comparisons were made for how often each ritual grammar element was chosen as essential between the conditions. In general, there seems to be little difference between conditions. A series of Chi-square analyses for how often each of the five grammar elements were chosen as essential within each age group showed a significant difference between conditions for performative actions as an essential element for older children (Pearson  $\chi^2 = 6.74$ ,  $df = 1$ ,  $p < .01$ ). Older children chose performative action as an essential element more often for the material condition (75%) than for the social condition (23%). No other differences were found for any other ritual grammar elements. There were no significant differences between conditions for younger children. In general there were no differences between conditions with the exception of performative action for older children.

Adults chose performative action as an essential element 90% of the time in the social condition and 88% of the time in the material condition and therefore did not show the difference between conditions for this element seen with older children.

### **5.3 Task 3: Connections to prior experience**

Children were asked what this situation reminded them of in Task 3 to examine the connections they made to their real life experience. There were four questions that asked about connections to prior experience (i.e., what children were reminded of from their prior experience when thinking about the tiger tribe and following questions). The four questions about connections to prior experience (connection questions) included an initial question “Have you ever heard about, read

about, or seen anything like what the [storybook] kids are doing,” followed by three prompts. The prompts probed into specific contexts: media (television, books, movies), family and school, and with friends. Children’s responses were coded to examine what connections, from their prior experience, children made to the story and questions in the interview. See Table 10 for the list of codes and definitions. Reliability for 21% of the children’s responses was obtained by an independent coder. Data points to be analyzed for inter-rater reliability were randomly chosen into one of 16 cells to be representative for age group (younger and older), condition (social and material), and the four questions (initial and three prompts). Inter-rater reliability was 91%.

The data was examined in two ways: a) comparisons for frequency of codes between age groups and conditions across all of the connection questions taken together as composite scores and b) comparisons between age groups and the four connection questions (initial question and three prompts--to understand differences in codes due to “context” (i.e., media, family/school, friends).

**Table 10: Connection to prior experience codes and definitions**

Codes	Definitions
Irrelevant	No response or “I don’t know” OR Irrelevant response OR Surface response related to surface features of the story (e.g., tigers, forest)
Club	Related to clubs or groups (e.g., boy/girl scouts, teams)
Magic	Magical processes (e.g., going back in time, turning into something else)
Ritual	Related to rituals or ceremonies (e.g., baptism, initiation ceremony)

### 5.3.1 Comparisons between the connection codes

Composite Connection Scores were calculated to compare between codes (see Table 10), providing a comparison for the kinds of examples children gave in response to connection questions. The four connection questions (initial question and three prompts) were collapsed into a single score for each code. Children received a score of 0 through 4 (based on summing across the original four questions) for each of the three connection score categories, depending on how many times their response was coded as one of those categories. The codes were reduced into three connection score categories: Irrelevant, Story theme (Club and Magic codes combined), and Ritual to examine how often children gave examples that were either irrelevant, related to the theme of the story (clubs or magic), or were more deeply related to ritual. For example, if a child had an Irrelevant code for two questions, a Story theme for one, and a ritual for the other, they would receive Connection scores of 2 for Irrelevant, 1 for Story theme, and 1 for Ritual.

The means and standard deviations for the three Connection scores are presented in Table 11. Adult means are presented for comparison, but not included in the analyses. Children were rarely reminded of ritual activities from their prior experience. They most often described situations that had surface features of the story, irrelevant responses, or no response at all. Ritual experiences—even in books, movies, and television—were not described very often.

Younger and older children had the highest scores for the Irrelevant code for both conditions. Children had the lowest scores—for the most part—for the ritual code. A 2 (younger or older age group) X 2 (social or material condition) repeated measure ANOVA with the three connection score categories as the within subject variable showed a significant main effect for Connection score category [ $F(2,106) = 208.64, p < .001$ ]. There was a significant difference between the kinds of examples children gave for the connection questions. Post-hoc pairwise

comparisons with Bonferroni corrections showed a significant difference between all three of the codes. There were no main effects for age group or condition. The interaction between age and codes was statistically significant [ $F(2,106) = 14.91, p < .001$ ]. Younger children had more responses coded as Irrelevant than older children but older children had more responses coded as Story theme than younger children. Responses coded as Ritual, however, were equally infrequent for both age groups. Although older children had fewer Irrelevant responses than younger children, this difference was found to be an increase in making connections to the story's theme of clubs and magic, and not making connections to ritual. Older children—like younger children—did not explicitly recognize ritual actions from their prior experience. There were no other significant interactions. Children responded similarly in both conditions.

Adults had the highest scores for the Practical code, the next highest for Irrelevant, and a low score for the Ritual code. Adults, like children, did not make many explicit connections to their prior experience with ritual.

**Table 11: Connection Code Score means and standard deviations**

	Irrelevant	Story theme	Ritual
<u>Social</u>	M	<u>M</u>	<u>M</u>
Younger (N = 16)	3.38 (.72)	.31 (.60)	.31 (.48)
Older (N = 13)	2.62 (.96)	1.31 (.95)	.08 (.28)
Adult (N = 10)	1.50 (1.18)	2.20 (1.03)	.20 (.63)
<u>Material</u>			
Younger (N = 16)	3.62 (.62)	.25 (.45)	.13 (.34)
Older (N = 12)	2.75 (.75)	.92 (.79)	.33 (.65)
Adult (N = 8)	1.13 (1.55)	2.75 (1.49)	.13 (.35)

Note: Standard deviations are shown in parentheses.

### 5.3.2 Comparisons between the connection questions (differences by context)

A comparison of the frequencies of connection codes for children's responses between the four connection questions (initial question and three prompts) provided a way to examine connections by context. In other words, did children make different connections based on what probes were used: unprompted, media (television, books, movies), family/school, or with friends? The four connection codes in Table 10 were used for this analysis (magic and club were not collapsed as in the previous analysis). Table 12 shows the percentages of responses by age group for each of the four Connection codes by each of the four Connection questions. The two conditions were collapsed.

**Table 12: Percentage of Connection Codes by context**

	<u>Irrelevant</u>	<u>Club</u>	<u>Magic</u>	<u>Ritual</u>
<u>Younger (N = 32)</u>				
Initial	88	9	0	3
Media Probe	81	3	9	6
Family/School Probe	78	3	0	19
Friends Probe	72	28	0	0
<u>Older (N = 25)</u>				
Initial	80	16	4	0
Media Probe	76	8	8	8
Family/School Probe	80	16	0	4
Friends Probe	72	28	0	0
<u>Adult (N = 18)</u>				
Initial	17	83	0	0
Media Probe	33	67	0	0
Family/School Probe	39	56	0	6
Friends Probe	61	28	0	11

Younger and older children’s responses were most often coded as Irrelevant across all of the contexts (i.e., the four connection questions). Children’s responses were coded as magical most often in the media context. Ritual responses, although infrequent, were most often seen in the family/school context for younger children and in the media context for older children.

Adults, in contrast, had the relatively highest percentages of club codes. Adults’ club codes for friends was relatively low perhaps partly due to the fact that they were thinking about their

own experiences with friends now rather than kids having clubs together. Although rare, when adults talked about ritual, it was most often in the friend context.

## 6. DISCUSSION

Current thinking about ritual understanding in the creation of social realities (Rappaport, 1999) and the transformation of material reality (Boyer, 1995, 2001; Lawson & McCauley, 1990, 2002) is that ritual has a universal ritual grammar that is based on intuitions about causality and value. In the social domain, ritual is seen as cueing the supernatural or the canonical categories of value, adding weight to the abstract social creation. In the material domains, ritual is seen as cueing the supernatural with violations to ordinary causality on which it's intuitive structure is based. Theory about the ritual creation of social reality and theory about ritual magical transformations come from separate disciplines and research traditions. Yet they have much in common, including the lack of a developmental foundation. This study expands current thinking by integrating ideas from the two, related, but separate literatures, into a general theoretical framework about ritual and by examining these ideas developmentally.

The design for this study allowed for comparisons between age groups to learn at what age children begin to understand ritual grammar, comparisons between social and material rituals to learn how much domain specific intuitive theory about causality may be underlying ritual grammar, and comparisons between ritual grammar elements to learn if some ritual grammar elements are understood earlier in development than others. By choosing a novel situation set in children's culture (a children's secret club), the study was designed to examine children's spontaneous decisions about ritual grammar and causality. In addition, two measures helped to examine possible differences based on children's prior experience with ritual: a parent rating of children's prior experience and an interview with children (connection questions) asking children about what the study situation and questions reminded them. The parent rating of children's

experience with ritual and ceremonies provided a measure to compare children's ritual grammar understanding to examine possible differences with amount of experience. The connection questions examined whether children were explicitly connecting knowledge of ritual from their prior experience to make sense of the study story and questions. An adult sample was included to provide an endpoint comparison, but was not included in the analyses.

The findings are discussed below in terms of universal ritual grammar, domain-specific causal intuitions about ritual grammar, and ritual grammar as a way to add weight and/or cue the supernatural. Finally, limitations are examined and further studies are proposed.

## **6.1 Universal ritual grammar**

Different lines of theory and research, examining the role of ritual in transforming social and material reality, converge in pointing to a universal, intuitive foundation. For social transformations, intuitions serve to give weight to abstract social categories by forming connections special agents and objects, performative words and actions, and an extra-ordinary context set aside from everyday contexts (Rappaport, 1999). For material transformations, intuitions serve to mark violations in causal laws that connect agents, actions and instruments to the supernatural (Boyer, 1995, 2001; Lawson & McCauley, 1990, 2002). The ritual grammar elements chosen for this study reflected the categories from both traditions: antiquity (traditional objects—uniforms--from the past), performative words, performative actions, authority (special agent), and context (place set aside from ordinary places).

The present study documents children's emerging intuitive awareness of the importance of special grammatical elements in novel ritual actions, independent from reported experience

and explicit awareness of ritual kinds of kinds of events. Older children (age 8- to 9-years) exhibited a much more robust understanding of ritual than younger children (age 5- to 6-years). This developing appreciation of ritual elements, however, was not related to parent ratings of children's prior experience with ritual and ceremonies. No difference was found even when children were divided into those who scored high (greater than or equal to 3) or low (less than 3) for the overall recognition of ritual grammar (Ritual Score). In fact, the child with the highest Parent Score (a score of 13) was just average in distinguishing ritual elements (his score was a 3, the mean was 3.64). The other measure of the role of experience—Connection Questions (Task 3)—assessed how often children connected what the storybook children were doing to their own experiences of ritual. The story and questions about the story that comprise Tasks 1 and 2 ask children to create and make judgments about ritual. Yet very few children (and adults) made connections to rituals from their experience. They did not seem to have an explicit model of rituals that they generalized from to make sense of the study situation and Tasks.

Ritual grammar elements were also examined separately to understand if the developmental progression differs between elements. This examination provides evidence to suggest whether children may be developing an intuition for the necessity of ritual grammar rather than merely generalizing from their experience with ritual. For example, if they generalize from their experience, it is more likely that they understand ritual as a whole. If their understanding follows from development within intuitive categories of causal knowledge, they would be more likely to show a different developmental progression between the ritual elements. Three ritual grammar elements that show a difference between elements are authority, antiquity, and context. Authority and antiquity seem to be the first that are understood by children in terms of adding weight or cueing the supernatural though the necessity of “special” actions. Although

younger children did not chose the ritual response for authority and antiquity in Task 1 at high levels, in those cases where they did chose it, their explanations showed a high percentage of ritual grammar understanding in the social condition. The frequency of ritual explanations for younger children in these cases are comparable to older children and adults in the same condition. Finally, context in the material condition was the one ritual grammar element that younger children chose the ritual response above chance levels in Task 1.

It seems that an awareness of the necessity of special actions in order to transcend the limits of ordinary causal assumptions is developing in the early school-age years. There was a developmental progression not related to experience (parent ratings) and not explicitly related to induction from their experience (connection questions). The findings suggest that rather than generalizing from rituals in their personal experience (with media, family, school, etc), children are drawing from intuitions about the “special” qualities of ritual actions. Perhaps when they become aware of the limitations of ordinary actions they recognize the “special” nature of the grammar of ritual as necessary to create a special kind of event.

## **6.2 Domain-specific causal differences in ritual grammar**

Two conditions (social on material) were included in the current study to examine possible domain differences in what participants would judge to be causally necessary for the ritual to work (i.e., make the non-ordinary transformation). If ritual understanding is based on violations to ordinary domain-specific knowledge, the required grammatical elements that are essential to the ritual may vary by domain. For example, a special authority doing performative actions may be essential in the material domain. But perhaps special objects (antiquity),

performative words, and a special context are not as essential to make the material transformation. Those may be more important in the social domain. There were few differences between the domains. Older children's explanations were coded as ritual with similar frequency in both conditions. Adults showed no difference between the conditions for ritual choices and for how often explanations were coded as ritual. Task 2 most directly examines whether there are differences between domains in terms of causality. This task examined what elements participants judged as essential for the ritual to work. Once again, there were few differences between the domains within age group and no differences between the age groups. There was one difference between conditions for the older children: performative action was judged as essential much more often in the material condition than in the social condition. This pattern is what would be predicted if domain-specific knowledge about ordinary causality was driving intuitions about ritual. Adults, however, did not show the same pattern. Adults judged performative action to be essential to a high degree for both the social and material conditions

It seems that causal intuitions supporting ritual intuitions are domain general, Although it might be expected that intuitions about *violations* to ordinary causal assumptions would be particularly salient and easily recruited, this was not the case. Perhaps the important feature of ritual grammar is found in marking the event as different than the ordinary and not necessarily as supernatural which may be more in line with the theoretical model proposed by Rappaport (1999) and Searle (1995) for the creation of important social categories.

### **6.3 Adding weight and/or cueing the supernatural or extra-ordinary**

Explanations children gave for why they chose the ritual response provide a window into the depth of their intuitions about ritual grammar. Children originally had to select the ritual response from competing alternatives. The ritual response was specific to ritual grammar, but the other two choices were relevant, practical, and valuable for other reasons (e.g., putting the names into a hat and picking one is an egalitarian value that most children recognize). There was a developmental progression for how often children's explanations were coded as ritual. Younger children, however, did show high percentages of ritual responses for antiquity and authority in the social condition, showing an emergent sense of the special weight or value of ritual.

A few examples of children's explanations illustrate the ritual versus practical ways children thought about their ritual responses in Task 1. For antiquity, one child explained, "that's the original one" providing a simple example that shows this child's understanding of the importance for tradition in this ritual transformation or having roots with the past, the canonical, or the real. In contrast another child gave a practical response, "it looks nice". For performative words, one child explained, "it just seems actually final, declaring it" while another child said, "welcoming you to the tiger tribe." The first shows an understanding of instrumental language (performative words), the other is a practical, ordinary purpose for the application of language. A ritual response for performative action was, "if not the right way, won't all be tigers in the same way," while a practical contrast was, "they all get to do it together." The former captures the invariable action sequence found in most rituals while the latter is more about the group mentality of the kids. For authority, one child's ritual response was, "he's an actual tiger

member,” describing the essence of Tommy and why he would be the best one to be in charge of the ritual. In contrast, another child’s practical explanation was, “he was the one who finds it first,” eliciting the value of fairness rather than the authority to make the ritual work. For context, one child expressed an understanding of a special, set-aside context for the ritual with, “like near the cabin where it was old. . .by. . .in the forest,” while another child’s practical explanation was, “where tigers live.”

#### **6.4 Implications, limitations, and further studies**

This study is the first to experimentally examine children understanding of ritual grammar. Ritual is a core cultural practice and an important aspect of children’s entry into culture. In the social domain, this informs how children learn cultural practices around the creation of important social realities. In the material domain, this informs how children come to understand the creation of important supernatural realities (as in religion).

There are some limitations to the current study that could be remedied in future research. Those discussed here are developmental progression, ritual grammar element answer choices for Task 1, and the further ways to clarify the role of experience.

The developmental progression of ritual understanding needs to be examined more fully. The children in the younger age group (5- to 6-years) did understand something of ritual grammar and causality, even though they showed less understanding than older children. Perhaps simplified methods would reveal even earlier understanding. The children in the older age group (8- to 9-years), while showing a robust understanding were not at ceiling and not at adult levels of understanding ritual grammar for all of the elements. An older age group needed to examine

the later transitions in the developmental progression of understanding ritual grammar. It would also be good to show more definitively show how children's developing understanding of ritual elements is tied to actual changes in the development of children's intuitive knowledge. Two of the ritual elements could have different comparison choices for Task 1—context and performative action to help clarify the results. While context was the one ritual grammar element that younger children chose, it is difficult to interpret this finding because their explanations were more often coded as practical rather than indicating a distinct understanding of ritual. To further confound the issue, older children and adults chose the ritual response for context at levels well above chance in both conditions, but their explanations were also most often coded as non-ritual. These results suggest that this item may not distinctly capture the ritual element, defined as “special place, set-aside from everyday or ordinary.” The item in this study asked for a comparison with “in the forest on top of a huge rock” vs. more ordinary choices of “in a kid's backyard” or “at school during recess on the playground.” Explanations for all participants (even adults) were most often coded as practical such as “tigers live in the woods,” “not any distractions,” or “they can get air.” A better task would highlight the non-ordinary nature of the place without confounding the association with tigers. The category of performative actions could also be clarified with different item choices. Other research shows that children's understanding of authority is sensitive to whether the authority is an adult or a child (e.g., Nobes & Pawson, 2003). In this case, the actions were to be decided by children and performed by children. Perhaps, if the actions in the story were to be performed by an adult, or at least suggested by an adult, they would be more likely to think about the causal right way of performing the ritual to make it effective rather than the value of personal choice.

Another limitation is the design could more carefully examine the role of experience. Experience, as measured in this study was not related to children's performance. Perhaps this points to a cultural difference in the United States. There are generally not very many explicit examples of rituals in this culture. The mean parent rating score for children's prior experience was 8 out of a possible 15 and children (and adults) did not make many ritual connections to their prior experience in Task 3. It would be interesting to replicate the study comparing participants in subcultures who use more ritual explicitly and subcultures who do not. Perhaps experience would be more of an influence in children's understanding of ritual grammar. However, it may be that experience alone is not sufficient to raise "ritual" to explicit awareness as a distinct category of action. After all, it is only recently that research and theory has come to distinguish ritual action in this way.

One way to examine the role of experience is cross-culturally: with cultures or subcultures where ritual is salient or not. This could help clarify the impact of intuitive causal theory and experience. It could also clarify why even older children evidenced a grasp of different grammatical elements with only one notable exception—performative action. Children in both age groups, unlike adults, chose the ritual response for performative action less often than expected by chance levels. Their explanations for choosing the ritual response for performative action, when they did indeed choose it, were very rarely or never coded as ritual. The ritual response in this case required selecting an invariant, action sequence as compared to having a personal choice in deciding what actions to do. In this case, children seemed to be drawn to the importance of choice. They often thought it is more meaningful for the storybook children involved to choose the actions that they would like to do. Others thought it was just more important to let kids choose what they would like to do rather than demand something of them. It

seems that for children as old as 9-years, performative action in ritual grammar was not understood. The competing value of “choice” was more salient for them. Perhaps, the cultural value of individual choice outweighs the intuition of a particular right way to do something.

Another way to further examine the role of experience is to creatively replicate this study in a different context from the tiger tribe. Studies could be designed to further discern experience (e.g., familiarity with the ritual context) and the possible differential salience of some grammatical elements in different contexts (e.g., adults vs. children as authority). One possibility, a marriage, is not set in children’s culture (children do not get married), and is something with which children are often familiar.

Finally, a future study should be a quasi-naturalistic study, introducing the situation (such as the tiger tribe) with a group of children and asking them to create the ceremony. In this way one could search for the “grammar” that they spontaneously choose in a simulated context (rather than reflective) and the causal models they may be using to make their decisions about how to transform reality.

## APPENDIX: Tiger Tribe Story and Task 1 questions

### The Story

*Half of the children heard this story about an initiation ceremony into a secret children's club. Half of the children, as a comparison, heard another story, exactly the same, except that instead of only becoming members of the Tiger Tribe, they can also turn into real tigers.*

Let me tell you a story about two kids, Tommy and Alex. They found out about a secret tiger tribe for kids. Tommy's great, great grandfather started it with his friends when he was a child, a long, long time ago. Tommy's great great grandfather and his friends belonged to it and they kept it a secret. The members of this secret Tribe were fierce, brave, and strong like real tigers. They built a secret cabin in the forest and had secret meetings. They had a secret handshake and secret songs they sang.

One day, Tommy was telling Alex about how he was a tribe member of this secret Tiger Tribe because when he was a baby, his grandfather had put him through the ceremony to make him a member of the Tiger Tribe. He didn't remember it, though, because he was just a baby. Alex thought it was really cool.

Alex said, "Wow! We should get our friends together and all become members of the Tiger Tribe. We could have Tiger Tribe meetings and handshakes and songs. We could become fierce and brave and strong like tigers!"

Tommy said, "But there is no Tiger Tribe anymore. They stopped having meetings and doing things together and since it is secret, no one talks about it. I don't know anything about it!"

Alex said, "Maybe we can figure out how to do it!"

So Tommy and Alex went to the library and searched through the oldest books and finally found one about the secret Tiger Tribe. They learned that the members of the tiger tribe wore uniforms that looked like jackets with stripes and carried tiger's teeth in their pockets. But it didn't say anything about what they needed to do to become real members of the Tiger Tribe.

But when Alex and Tommy saw a picture of the secret Tiger Tribe cabin in the forest Alex exclaimed, "I think I know where that is!!! I saw something that looked like that near where I catch frogs with my sister."

So Tommy, Alex, and all their friends went into the forest to the place where Alex thought the secret cabin may be. They found it. It was an old cabin that was falling apart because no one had been there in a very long time. They were a little afraid to go in. One of them peeked in the window and since no one was there, they slowly opened the door and went in.

The kids looked around at all of the old stuff. There was a sign inside that said, “Tiger tribe members are fierce, brave, and strong.” There were pictures of tiger tribe members and other special tiger stuff.

The kids were so excited. They wanted to start a secret tiger tribe and become like tigers. But they still didn’t know how to do it--They didn’t know how to make the ceremony so they could become real Tiger Tribes members. Tommy was just a baby, so too little to remember the ceremony. The book didn’t explain it and there were no clues in the cabin. They had to figure it out themselves.

I want you to help them decide the best way for them to become real members of the Tiger Tribe. I am going to tell you some things they thought might be good, and I want to know which ones you think are the best, okay?

## Questions and Answer Choices

### 1. Antiquity (connections with the past)

First, the kids were trying to decide what to wear for the ceremony to become real Tiger Tribes members.

The kids found a picture of the uniforms the Tiger Tribes members wore for the meetings. One of the kids' mother said she will make uniforms for them. The kids just have to tell her what they want.

One of the kids says she should make uniforms that look exactly like the picture they found in the cabin.

Another kid says she should make uniforms that look like their older brother's uniform for a club at school that he belongs to.

Another kid says she should make uniforms like the picture the kids found in a catalogue of uniforms that they like.

What do you think they should wear? [Repeat choices] Why?

### 2. Performative Words (special language)

The kids were trying to decide what to say in the ceremony to become real Tiger Tribes members.

One of the kids says they should say, "In the name of the Tiger Tribe, I declare you a Tiger Tribes member.

Another kid says they should say, "There is a Tiger Tribe and you can be a Tiger Tribes member."

Another kid says they should say, "You want to be a Tiger Tribes member. Hip Hip Hurray for the Tiger Tribe."

What do you think they should say? [Repeat choices] Why?

### 3. Performative Actions (particular action sequences)

The kids were trying to decide what to do in the ceremony to become real Tiger Tribes members.

One of the kids says all kids should do the same tigerish things all in the same way. For example, they should: First roar, then show their teeth, then crawl like a tiger.

Another kid says all kids should do the same tigerish things, but if they want to do it in a different way, they can. For example: Some crawl first, some roar first, some show their teeth first.

Another kid says all kids should all do tigerish things, but each kid can choose whatever tigerish things he would like to do and the way he would like to do it.

What do you think they should do? [Repeat choices] Why?

#### **4. Authority (essence/role specificity)**

The kids were trying to decide who should be in charge of the ceremony to become real Tiger Tribes members.

One of the kids says it should be Tommy who was made into a Tiger Tribes member when he was a baby.

Another kid says it should be Alex who is the biggest and smartest kid.

Another kid says they should put all the kids names into a hat and pick one to be fair to everyone.

Who do you think should be in charge? [Repeat choices] Why?

#### **5. Context (set-aside from ordinary)**

The kids were trying to decide where to have the ceremony to become real Tiger Tribes members.

One of the kids says they should have the ceremony in the forest on top of a huge rock.

Another kid says they should have the ceremony in one of the kid's backyard.

Another kid says they should have the ceremony at school during recess on the playground.

Where do you think they should plan the ceremony? [Repeat choices]

Why?

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