

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

US Children and adults infer higher past rule-breaking, but lower present rule-breaking, in the presence of formal rules

Permalink

<https://escholarship.org/uc/item/72s9h312>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 48(0)

Authors

Hok, Hannah

Saxe, Rebecca

Thomas, Ashley J

Publication Date

2026

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

US Children and adults infer higher past rule-breaking, but lower present rule-breaking, in the presence of formal rules

Hannah Hok^{1,2} (hok@mit.edu), and Rebecca Saxe¹ (saxe@mit.edu), Ashley J. Thomas² (athomas@g.harvard.edu)

¹Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, MA 02139

²Department of Psychology, Harvard University, Cambridge, MA 02138

Abstract

Formal rules can influence behavior by deterring rule-breaking or broadening knowledge, but may also reveal why a rule was created in the first place. Across three experiments, we investigated whether adults and children use the presence of a written rule to infer past and present rule-breaking. Adults reliably inferred that groups with written rules had more rule-breaking in the past (Study 1) and, in some contexts, expected less rule-breaking in the present (Study 2). By late childhood (ages 8-11), children showed increasingly adult-like inferences when rules were concrete and familiar (Study 2). Younger children (ages 5-7) additionally were able to make this inference (Study 3). Together, these findings suggest that by middle childhood, children treat formal rules as historical evidence about past rule-breaking. These results shed light on the developmental origins of reasoning about formal rules and their informational value.

Keywords: rules, norms, formality, coordination, intuitive theory

Introduction

Rules serve multiple functions in human social life. At a basic level, rules prescribe how people ought to behave, coordinating expectations and reducing conflict. Beyond this prescriptive role, however, rules are also social artifacts: they are products of past collective decisions, shaped by histories of behavior. As a result, the mere existence of a rule can reveal information about the prevalence of rule-breaking in a given society. The current paper examines what descriptive information adults and children infer from the mere presence of formal rules.

Formalized rules, rules that are written or codified, are particularly rich cues. Unlike informal expectations, formal rules are explicit, durable, and publicly visible. Formal rules have been theorized to be more preventive than informal norms: people report they are more likely to comply with written rules compared to unwritten rules both when they are hypothetical and when people are reporting their actual rule-following behavior (Borri et al., 2018). Formality is also thought to increase attention and perceived legitimacy (Daston, 2022; DeHart-Davis, 2008; DeHart-Davis et al., 2013). Finally, recent work has suggested that people believe that formal rules emerge to address several challenges of social coordination: rule defiance, lack of rule knowledge, and costly rule-breaking (Hok et al., 2025). For these reasons, formal rules may be commonly assumed to reduce violations.

However, formal rules may also be interpreted as evidence about what has happened in the past. For example, consider

prohibitive labels on Tide Pod packaging (a popular detergent in the United States), which explicitly state that the pods may be harmful if “put in mouth or swallowed”. One risk of these labels is that they imply, to readers who may not have yet considered the possibility, that a significant number of people *did* ingest Tide Pods in the past. These inferences highlight how formalized rules can (inadvertently) reveal descriptive information about the history of rule-breaking or compliance.

Previous research demonstrates that communicating norms can inadvertently reveal information about the prevalence of behavior, a phenomenon sometimes described as normative leakage. Classic work by Cialdini and colleagues distinguishes between injunctive norms (what people *ought* to do) and descriptive norms (what people *actually* do, Cialdini et al., 1990, 2006). Descriptive norm information strongly shapes judgments and behavior: when individuals learn that many others engage in a behavior, they become more likely to do so themselves. Communicating an injunctive norm against a behaviour draws attention to the descriptive frequency of that behaviour. Thus messages that emphasize that a behavior is prohibited may simultaneously imply that the behavior occurs often enough to warrant mention. The result is that formalizing explicit rules can backfire, by suggesting that violations of that rule were common enough to require a rule.

In all, the presence of a formal rule may carry contradictory implications. On the one hand, rules are recognized as preventive: mechanisms designed to regulate behavior and reduce violations going forward. So, a group with an explicit rule against a violation should contain fewer such violations. On the other hand, people may recognize rules as reactive, created in response to frequent violations. So, a group with an explicit rule may contain or have contained more such violations.

To our knowledge, no prior work has asked whether and when children recognize either of these implications of a formalized rule. From related work, it seems likely that by elementary school, children can reason about the deterrent effects of formal rules, and thus may predict that groups with formal rules are less likely to contain violations. Prior work shows that children have intuitive theories about norms and their enforcement, including expectations about punishment and deterrence (Lee & Warneken, 2022; Marshall et al., 2022; Rakoczy et al., 2009; Schmidt & Tomasello, 2012; Schmidt & Rakoczy, 2023). By the age of 6- to 7-years, children be-

lieve punishment will deter future rule-breaking. However, it is not until 8, that most children say that they would rather live in fictional worlds with punishment, presumably because they reason that punishment will be better for broader social functioning (Bregant et al., 2016). Children also use descriptive information to learn about what is normatively right and wrong: they use a legitimate (but not illegitimate) authority's punishment in order to determine that an action is morally wrong to do (Lee et al., 2024). Together, this work suggests that children do not just learn rules, they also use them to infer the underlying norms, values, and social expectations that govern behavior.

However, it is far less clear whether or when children might recognize the opposite descriptive norm implied by injunctive rules. Testing whether children infer that a society with a formal rule like contained rule breakers has both practical and theoretical implications. Practically, adults who are teaching children formal rules need to know whether doing so risks backfiring by implying the opposite descriptive norm. Theoretically, recent work suggests that from middle childhood, children are actively reasoning about punishment, group structures, and decision-making processes, suggesting they have rich intuitive theories about the tools for social coordination. If children infer past violations from the presence of a rule, this would suggest that they are reasoning backward from institutional structure to the social problems that may have produced it. Such an inference would provide evidence that children's theories of rules include not only what rules do, but why rules come to exist in the first place.

In the present work, we investigate whether adults and children treat the presence of formal rules as informative about past and present behavior. Across three experiments, participants evaluated groups that had or did not have a formalized rule, operationalized as a publicly posted sign. While many formal rules are not continuously visible (e.g., laws codified in documents), public signage provides a clear and ecologically valid instance of explicit rule communication. As such, our findings speak most directly to how observers interpret visible, public rule artifacts. We asked whether the existence of a formal rule leads observers to infer greater rule-breaking in the past, reduced rule-breaking in the present, or both. By comparing judgments across age groups and rule types, we test whether developmental differences reflect limitations in reasoning or qualitatively different conceptions of the causes and consequences of formal rules.

Experiment 1

Experiment 1 tested whether children, ages 8 to 11 years, and adults infer rule-breaking from the mere presence of a posted formal rule. Specifically, we tested whether observers treat a written rule as implying more past rule-breaking, less present rule-breaking, or both.

We tested 8- to 11-year old children because at this age, children possess two capacities that are plausibly required to draw such inferences. First, prior work suggests that by this

age, children understand the deterrent function of rules and punishment: they recognize that sanctions and explicit prohibitions are intended to reduce future wrongdoing (Bregant et al., 2016; Marshall et al., 2022). Second, children in this age range reliably reason about temporal distinctions such as past versus present events (Amidon & Carey, 1972), suggesting that they should be able to understand questions about the past and future. On the other hand, children at this age have only limited experience of social groups with different formal written rules, and very little experience creating or enforcing such rules.

In this study, we used a nonsense word for the prohibited action ("No daxing"). We did so because people have strong expectations about how common or unethical familiar violations may be. Using a novel word mitigates these priors, isolating inferences about the presence of the sign rather than from assumptions about the violation itself.

Methods

Adult ($N = 60$) and child ($N = 60$) participants heard a story about two groups, Circles (living in Circletown) and Squares (living in Squareville), represented by cartoon characters. Both groups were prohibited from engaging in a behavior called "Daxing". Although both groups knew that daxing was bad, only one group had a sign formalizing the rule against Daxing. Participants identified (1) which group had an individual who daxed today (present), and (2) which group had a lot of daxing happen last year, before the sign existed (past). Participants selected the group with a sign (formal rule) or the group without a sign (no formal rule). The order of the dependent measures was counterbalanced across participants, along with the side of the screen (left or right) where the sign was displayed. We hypothesized that both adults and children would say that the group with the formal sign had more past rule-breaking behavior, but less present rule-breaking behavior. All data, materials, and pre-registrations here (<https://tinyurl.com/yj8637ft0>).

Results

We conducted binomial tests to compare responses (1 = selecting the group with a formal rule) to each question against chance (50%). Adults reported that the group with a formal rule was more likely to contain past rule-breaking behavior (47/60, 78%, $p < .001$, 95%CI[0.66, 0.88]) but not less likely to contain present rule breaking (29/60, 48%, $p = .897$, 95%CI[0.35, 0.62]). By contrast, children reported that both groups were equally likely to contain past rule-breaking behavior (35/60, 58% chose the group with the formal rule, $p = .245$, 95%CI[0.45, 0.71]), but children said that the group with a formal rule was less likely to contain present rule-breaking behavior (14/60, 23%, $p < .001$, 95%CI[0.13, 0.36]). Finally, a binomial logistic regression was conducted to examine the effects of age group (Adults vs. Kids) and Time (Past vs. Present) on response choice, as well as their interaction. Children were significantly less likely than adults to choose a the group with a

formal rule for any rule-breaking, ($\beta = -0.95$, $z = -2.32$, $p = .02$). The group with a formal rule was also less likely to be selected for the Present rule-breaking overall, ($\beta = -1.35$, $z = -3.30$, $p < .009$). The interaction between age group and question type was not significant, ($\beta = -0.17$, $z = -0.31$, $p = .76$).

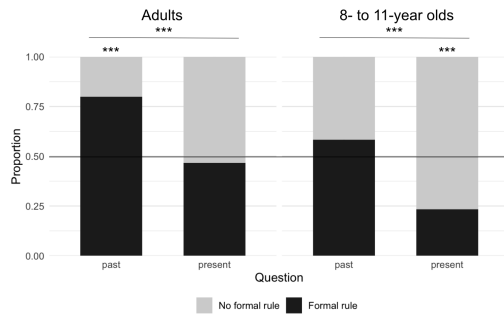


Figure 1: Proportion of adult and children's selection of group with or without a formal rule for past rule-breaking behavior and present rule-breaking behavior.

Discussion

Experiment 1 revealed differences in how adults and children interpret the presence of formal rules. When asked about past rule-breaking, adults were significantly more likely to select the group with a formal rule. However, diverging from our predictions, when asked about present rule-breaking, adults' responses did not differ significantly from chance. For children, the results revealed a different (and in some ways, reverse) pattern of inferences compared to adults. Children did not reliably infer that the presence of a formalized rule signals higher levels of past rule violations (they did not differ from chance). When asked about present rule-breaking behavior, children were significantly less likely to select the group with a formalized rule. However, the difference across the two conditions were similar across age groups, all participants more likely to choose the group with the formal rule when answering about the past compared to the present.

These findings raise questions about the underlying processes driving children's responses. It seems unlikely that children struggled with causality or temporality, given their age and prior literature (e.g., (Amidon & Carey, 1972)). Likewise, it seems unlikely that children cannot reason about the function of rules. Instead, it may be that adults and children have different inferences about formal rules and what they are for. Adults may infer that people *make* rules in response to violations. Children, on the other-hand, may think primarily about the function of the rule as deterrence in rule-breaking.

Alternatively, it may be that the behavior used in Experiment 1 was too abstract, and children did not infer past violations because they were more uncertain about the plausibility or meaning of the behavior itself. If children lack stable expectations about how likely daxing is to occur, they may struggle to use the presence of a formal rule to reason

backward in time. On this account, children's responses may reflect task-specific uncertainty rather than a fundamentally different understanding of rule formalization.

Experiment 2 was designed to distinguish between these possibilities by testing whether children's inferences change when rules involve familiar or intuitively interpretable behaviors rather than a novel action.

Experiment 2

In Experiment 1, adults inferred that formal rules signal prior norm violations, children inferred that formal rules reduce ongoing rule-breaking. One possibility is that these differences reflect genuinely distinct intuitive theories of formal rules. However, a more conservative explanation is that children's performance in Experiment 1 was influenced by the abstract and unfamiliar nature of the prohibited behavior "daxing".

To test this possibility, Experiment 2 examined whether adults' and children's inferences from formal rules depend on the content of the rule itself. We contrasted rules that were intuitively unsurprising (e.g., no running on the stairs) with rules that were more surprising or atypical (e.g., no pooping on the rock). If children's failure to infer past violations in Experiment 1 reflected difficulty reasoning about an unfamiliar action, then providing meaningful rule content may lead children to show more adult-like inferences about past behavior. Alternatively, if children's reasoning reflects a deeper conceptual difference in how rules are interpreted, then the developmental dissociation observed in Experiment 1 should persist even when rule content is familiar.

Additionally, we predicted that rule content would differentially shape inferences about present rule-breaking. For unsurprising rules, which describe behaviors that commonly require regulation, the presence of a sign should primarily be interpreted as reactive evidence of past violations, while simultaneously suggesting that the behavior is now being deterred. In contrast, for surprising rules that prohibit behaviors unlikely to occur (e.g., blowing one's nose near a coffee table), the presence of a sign may itself generate suspicion that the behavior has occurred in the past and is likely to continue in present (else there wouldn't be a need for a sign). In these cases, a formal rule may function less as a deterrent cue and more as evidence that an otherwise implausible behavior has become relevant or problematic. Thus, we predicted an interaction between rule type and time, such that formal rules would differentially inform inferences about past versus present rule-breaking depending on whether the prohibited behavior is intuitively expected or unexpected.

Methods

Similarly to Study 1, adult ($N = 60$) and child ($N = 60$) participants heard a story about two groups, living in different towns. Participants each saw 4 of 8 trials of different rules that we collected from real life. Some rules were unsurprising ("No running on the stairs", "No littering", "No walking on the grass", and "No feeding the animals"), others surprising or unexpected ("No pooping on the rocks", "No standing on

the toilet”, “No throwing rocks at this sign”, and “No blowing your nose near the coffee service area”).

Both groups were prohibited from engaging in these behaviors. Although both groups knew that these behaviors were bad, only one group had a sign formalizing the rule. Participants identified (1) which group had an individual who broke the rule today (present), and (2) which group had a lot of rule breaking happen last year, before the sign existed (past). The order of the dependent measures was counterbalanced across participants, along with the side of the screen (left or right) where the sign was displayed.

Results

Responses were coded as 1 when participants selected the group with the posted sign (i.e., the formal rule) as the group in which rule-breaking occurred, and 0 otherwise. Analyses were conducted separately for adults and older children, followed by a combined analysis testing for age-group differences.

Adults We first conducted planned binomial tests comparing responses against chance (50%) separately for each combination of Rule Type (unsurprising vs. surprising) and Time (past vs. present). Holm corrections were applied across the four planned comparisons. Adults reliably attributed *past* rule-breaking to the group with the formal rule for both unsurprising rules (185/240, 77.1% $p < .001$) and surprising rules (191/240, 79.6%, $p < .001$). In contrast, adults attributed *present* rule-breaking to the formal-rule group substantially less than chance for both unsurprising rules (66/240, 27.5% $p < .001$) and surprising rules (78/240, 32.5%, $p < .001$). We next fit a mixed-effects logistic regression predicting rule-breaking judgments from Rule Type, Time, and their interaction, with a random intercept for participant. The full model provided a significantly better fit than an intercept-only model, $\chi^2(3) = 351.60$, $p < .001$. Consistent with the binomial analyses, the model revealed a strong main effect of Time, such that participants were substantially less likely to select the group with the formal rule when judging present rule-breaking compared to past rule-breaking ($\beta = -3.63$, $SE = 0.31$, $z = -11.63$, $p < .001$). Contrary to our predictions, there was no main effect of Rule Type ($\beta = 0.26$, $SE = 0.29$, $z = 0.87$, $p = .38$), and no interaction between Rule Type and Time ($\beta = 0.17$, $SE = 0.40$, $z = 0.42$, $p = .67$).

Children Contrary to Study 1, children showed a similar pattern to adults. When evaluating past rule-breaking, children selected the formal-rule group at rates significantly above chance in both the unsurprising condition (81.0%, 192/237), $p < .001$, 95% CI [.75, .85], and the surprising condition (79.9%, 187/234), $p < .001$, 95% CI [.74, .85]. When judging present rule-breaking, children were significantly less likely than chance to select the formal-rule group. In the unsurprising condition, children chose the formal-rule group on 19.4% of trials (46/237), $p < .001$, 95% CI [.14, .25]. Similarly, in the surprising condition, children selected

the formal-rule group on 20.9% of trials (49/234), $p < .001$, 95% CI [.16, .27]. A mixed-effects logistic regression with Rule Type, Time, and their interaction as fixed effects and a random intercept for participant again revealed a strong main effect of Time. Children were significantly less likely to attribute rule-breaking to the group with the formal rule when evaluating present behavior compared to past behavior ($\beta = -3.57$, $SE = 0.28$, $z = -12.67$, $p < .001$). There was no main effect of Rule Type ($\beta = -0.08$, $SE = 0.26$, $z = -0.33$, $p = .74$) and no interaction between Rule Type and Time ($\beta = 0.20$, $SE = 0.36$, $z = 0.55$, $p = .58$).

Comparison Between Adults and Children To directly test for developmental differences, we fit a combined mixed-effects logistic regression including Age Group (adults vs. older children), Rule Type, Time, and all interactions, with a random intercept for participant. The full model significantly outperformed an intercept-only model, $\chi^2(7) = 779.29$, $p < .001$. There was no main effect of Age Group ($\beta = -0.00$, $SE = 0.45$, $z = -0.001$, $p = .999$), no interaction between Age Group and Rule Type ($p = .39$), no interaction between Age Group and Time ($p = .42$), and no three-way interaction between Age Group, Rule Type, and Time ($p = .91$). Together, these findings indicate that adults and older children interpret formal rules in similar ways. Across age groups, posted rules were treated as strong cues of past norm violations, but as evidence against ongoing rule-breaking. Whether a rule was surprising or unsurprising—did not influence these inferences at either age.

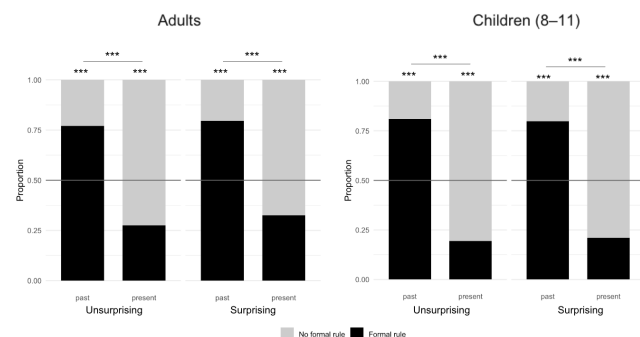


Figure 2: Proportion of adult and children’s selection of group with or without a formal rule for past rule-breaking behavior and present rule-breaking behavior, across unsurprising and surprising rules.

Discussion

Experiment 2 tested whether children’s failure to infer past rule-breaking in Experiment 1 reflected a difference in how they understand formal rules, or instead stemmed from the abstract nature of “daxing”. The results support the latter explanation. When rules involved familiar, interpretable behaviors, older children showed fully adult-like temporal inferences.

Contrary to our predictions, rule type did not moderate

these inferences. Adults and children did not interpret surprising versus unsurprising rules differently when reasoning about past or present rule-breaking. Instead, participants treated the existence of a posted sign as a strong cue of temporal structure regardless of the plausibility of the prohibited behavior itself. That is, once a rule was interpretable, participants consistently inferred that it was created in response to prior violations and that it now functions to deter ongoing behavior.

The finding that 8- to 11-year-olds reliably infer past violations from familiar rules suggests that by middle childhood, children are susceptible to the same 'normative leakage' as adults. By correctly identifying that a sign implies a history of rule-breaking, children may inadvertently learn that a behavior is more prevalent in a specific community than they would have otherwise assumed.

In Experiment 3, we test whether this pattern extends to younger children. If backward inferences about rule formation depend on representational and causal capacities that continue to develop across childhood, then younger children may show a weaker or less consistent tendency to treat formal rules as evidence of past rule-breaking, even when rule content is familiar.

Experiment 3

Experiment 3 tested younger children's interpretations of formal rules. Reasoning about why a formal rule exists requires children to infer the prior social conditions that may have prompted its creation. Because this inference involves reasoning from the presence of a rule to circumstances that are no longer directly observable, it may be easier to reason about a rule's intended function than about the circumstances that led to it.

Experiment 3 tested this possibility by examining younger children's judgments about past and present rule-breaking. If backward inferences about rule formation depend on representational and causal capacities that continue to develop across childhood, then younger children should show reduced sensitivity to formal rules as evidence of past behavior, while continuing to use those same rules to guide predictions about ongoing behavior.

Methods

55 5- to 7-year-old children (pre-registered 60) heard identical stories as in Experiment 2. Younger children saw a shorter set of trials (randomly 4 out of 8) for length of the task.

Results

We first conducted planned binomial tests comparing children's responses against chance (50%) separately for each combination of Rule Type (unsurprising vs. surprising) and Time (past vs. present). Holm corrections were applied across the four planned comparisons.

For unsurprising rules, children selected the formal-rule group significantly more often than chance when judging past rule-breaking (71/111, 64.0%), $p = .004$, 95% CI [.54, .73],

but selected present rule-breaking significantly less often than chance (35/110, 31.8%), $p < .001$, 95% CI [.23, .41]. For surprising rules, children also selected the formal-rule group significantly more often than chance when judging past rule-breaking (81/121, 66.9%), $p < .001$, 95% CI [.58, .75], but significantly less often than chance for present rule-breaking (41/122, 33.6%), $p < .001$, 95% CI [.25, .43].

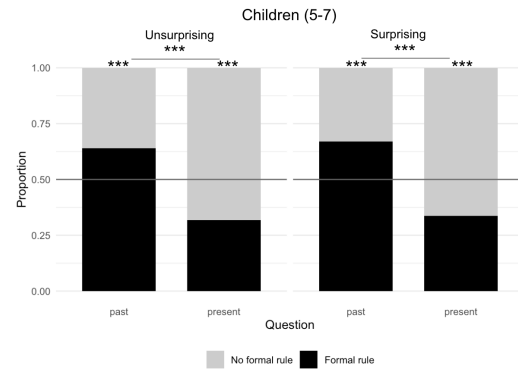


Figure 3: Proportion of children's selection of group with or without a formal rule for past and present rule-breaking behavior.

We next fit a mixed-effects logistic regression predicting rule-breaking judgments from Rule Type, Time, and their interaction, with a random intercept for participant. The full model provided a significantly better fit than an intercept-only model, $\chi^2(3) = 58.85$, $p < .001$. The model revealed a strong main effect of Time: children were significantly less likely to attribute rule-breaking to the group with the formal rule when judging present behavior compared to past behavior ($\beta = -1.60$, $SE = 0.32$, $z = -5.02$, $p < .001$). There was no reliable main effect of Rule Type ($\beta = 0.08$, $SE = 0.31$, $z = 0.26$, $p = .79$), and no reliable interaction between Rule Type and Time ($\beta = -0.04$, $SE = 0.43$, $z = -0.10$, $p = .92$).

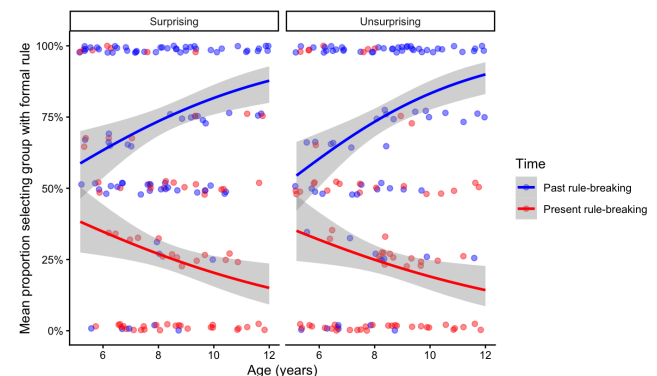


Figure 4: Age trend of children's selection of group with or without a formal rule pooled across S2 and S3. Dots represent proportion across trials within subject.

Discussion

The results of Experiment 3 suggest that younger children (ages 5–7 years) are beginning to infer both the consequences and the social causes of formal rules. Their intuitions reliably increased with age. Interestingly, while reasoning backward from a social artifact to its past cause might intuitively seem like a difficult cognitive task, young children proved surprisingly capable of it. Overall, these data show that children can reason about both the consequences and the causes of formal rules as they first enter elementary school.

General Discussion

Across three experiments, we examined how adults and children interpret the presence of formal rules as information about behavior over time. Although rules are often discussed as mechanisms that regulate or prohibit conduct, the current findings suggest that observers also treat formal rules as clues to past behavior. Their presence can reveal what previously happened in a group, as well as what will happen.

Adults consistently interpreted formal rules as evidence of prior rule-breaking and also tended to infer reduced ongoing rule-breaking in the presence of a rule, particularly when the rule content was interpretable. Children made similar judgments, even from as young as 5- to 7-years old. In Experiment 1, when the prohibited behavior was abstract and unfamiliar, children failed to infer past rule-breaking from the presence of a formal rule, and expected reduced rule-breaking in the present. Experiment 2 demonstrated that this pattern was not due to a fundamental difference in children's understanding of formal rules. When rules involved familiar and interpretable behaviors, older children (ages 8–11 years) showed adult-like temporal inferences, treating formal rules as both evidence of prior violations and cues of present deterrence. Experiment 3 extended these findings to younger children, revealing an already sophisticated intuition that became stronger with age. Importantly these experiments contrasted one group with a formal written rule versus another group with shared knowledge of the same norm, so both adults and children were making inferences specifically from the presence of *written* rules as opposed to rules or norms in general.

Taken together, these results highlight that formal rules carry informational value beyond their prescriptive function, even for children. Written rules and prohibitions may operate as compressed records of prior coordination problems, allowing observers to learn about a group's past without direct experience. Such inferences may play an important role in how individuals navigate unfamiliar institutions and anticipate collective behavior.

Children, like adults, may thus be subject to normative leak (Cialdini, 1990). That is, if a child sees a 'No Littering' sign and infers that 'people used to litter here a lot,' the sign may inadvertently normalize the very behavior it seeks to prevent. This suggests that the 'backfire effects' of public messaging seen in adults could influence even young children, who have

much more limited experience with institutions. Future work should examine whether children who infer high past rule-breaking from a sign are subsequently more likely to engage in that behavior themselves.

This work also contributes to a body of work examining adults' intuitive theories about various aspects of social life: People have rich intuitive theories that lead to inferences and predictions about people's behavior. For example, people have intuitive theories about groups' resource distribution (Nettle & Saxe, 2020), group decision procedures (DeScioli & Bokemper, 2019), punishment (Bregant et al., 2016; Marshall et al., 2022; Radkani et al., 2022), and social structures (Shutts & Kalish, 2021; Zhang et al., 2024). It is important to note that the present studies investigate *intuitions* about formal rules, rather than the actual processes by which rules become formalized. Lay inferences may diverge from the true causal dynamics of institutional change. Nevertheless, these intuitions are psychologically consequential: they shape expectations, guide trust, and influence how individuals interpret and respond to social regulation. Understanding how such inferences develop therefore provides insight into how people come to reason about institutions as meaningful social structures rather than as mere instructions for behavior.

A limitation of the present design is the use of forced-choice judgments, which reveal directional inferences but do not estimate perceived prevalence of rule-breaking. Future work using continuous measures (e.g., frequency ratings) would allow for a more precise characterization of how strongly observers infer past violations from formal rules. Additionally, participants may interpret posted signs as evidence in a specific local context, as opposed to a broader group or community. For example, a sign could indicate a particular prohibition in a specific context. Future work could distinguish these interpretations by varying whether rules are framed as applying to a particular place, a particular group, or both.

More broadly, this work suggests that rules carry not just prescriptive information, but descriptive information about the behavior in a group. In this way, formal rules may shape children's social expectations: not only by telling them what is forbidden, but by teaching them what kinds of problems groups face and how communities respond to them.

References

- Amidon, A., & Carey, P. (1972). Why five-year-olds cannot understand before and after. *Journal of Verbal Learning and Verbal Behavior*, 11(4), 417–423.
- Borry, E. L., DeHart-Davis, L., Kaufmann, W., Merritt, C. C., Mohr, Z., & Tummers, L. (2018). Formalization and consistency heighten organizational rule following: Experimental and survey evidence [eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/padm.12407>]. *Public Administration*, 96(2), 368–385.
- Bregant, J., Shaw, A., & Kinzler, K. D. (2016). Intuitive jurisprudence: Early reason-

- ing about the functions of punishment [eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/jels.12130>]. *Journal of Empirical Legal Studies*, 13(4), 693–717.
- Cialdini, R. B., Demaine, L. J., Sagarin, B. J., Barrett, D. W., Rhoads, K., & Winter, P. L. (2006). Managing social norms for persuasive impact. *Social Influence*, 1(1), 3–15.
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58(6), 1015–1026.
- Daston, L. (2022). *Rules: A short history of what we live by*. Princeton university press.
- DeHart-Davis, L. (2008). Green tape: A theory of effective organizational rules. *Journal of Public Administration Research and Theory*, 19(2), 361–384.
- DeHart-Davis, L., Chen, J., & Little, T. D. (2013). Written versus unwritten rules: The role of rule formalization in green tape. *International Public Management Journal*, 16(3), 331–356.
- DeScioli, P., & Bokemper, S. E. (2019). Intuitive political theory: People's judgments about how groups should decide [eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/pops.12528>]. *Political Psychology*, 40(3), 617–636.
- Hok, H., Thomas, A. J., & Saxe, R. (2025). Written in stone: Lay intuitions about the emergence of formal rules. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 47.
- Lee, Y.-e., Radkani, S., & Saxe, R. (2024). Children learn what is right or wrong selectively from a legitimate authority's punishment. *OSF Preprints*.
- Lee, Y.-e., & Warneken, F. (2022). Does third-party punishment in children aim at equality? *Developmental Psychology*, 58(5), 866.
- Marshall, J., Gollwitzer, A., & Bloom, P. (2022). Why do children and adults think other people punish? *Developmental Psychology*, 58(9), 1783–1792.
- Nettle, D., & Saxe, R. (2020). Preferences for redistribution are sensitive to perceived luck, social homogeneity, war and scarcity. *Cognition*, 198, 104234.
- Radkani, S., Tenenbaum, J. B., & Saxe, R. (2022). Modeling punishment as a rational communicative social action. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 44(44).
- Rakoczy, H., Brosche, N., Warneken, F., & Tomasello, M. (2009). Young children's understanding of the context-relativity of normative rules in conventional games [Place: United Kingdom Publisher: British Psychological Society]. *British Journal of Developmental Psychology*, 27(2), 445–456.
- Schmidt, M. F. H., & Tomasello, M. (2012). Young children enforce social norms [Publisher: SAGE Publications Inc]. *Current Directions in Psychological Science*, 21(4), 232–236.
- Schmidt, M. F., & Rakoczy, H. (2023). Children's acquisition and application of norms. *Annual Review of Developmental Psychology*, 5(1), 193–215.
- Shutts, K., & Kalish, C. W. (2021). Intuitive sociology. In *Advances in child development and behavior* (pp. 335–374, Vol. 61). Elsevier.
- Zhang, M. Y., Sullivan, J. N., Markman, E. M., & Roberts, S. O. (2024). Children's structural thinking about social inequities. *Child Development Perspectives*, 18(1), 19–25.