

Young Children Consider Individual Authority and Collective Agreement When Deciding Who
Can Change Rules

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ABSTRACT

Young children demonstrate awareness of normativity in various domains of social learning. It is unclear, however, whether children recognize that rules can be changed in certain contexts and by certain people or groups. Across three studies, we provided empirical evidence that children consider individual authority and collective agreement when reasoning about who can change rules. In Study 1, children of 4 to 7 years old watched videos of children playing simply sorting and stacking games in groups or alone. Across conditions the group game was initiated 1) by one child, 2) by collaborative agreement, or 3) by an adult authority. In the group games with a rule initiated by one child, children attributed ability to change rules only to that individual and not his/her friends, and mentioned ownership and authority in their explanations. When the rule was initiated collaboratively, older children said that no individual could change the rule, while young children said that either individual could do so. When an adult initiated the rule children stated that only the adult could change it. In contrast, children always endorsed a child's decision to change his own solitary play, and never endorsed any child's ability to change moral and conventional rules in daily life. Age differences corresponded to beliefs about friendship and agreement in peer play (Study 2) and disappeared when the decision process behind and normative force of collaboratively initiated rules was clarified (Study 3). These results show important connections between normativity and considerations of authority and collaboration in early childhood.

Keywords: normative reasoning, social norms, authority, social cognition, collaboration

BIOLOGICAL SKETCH

Xin (Alice) Zhao was born and grew up in Yantai, China, received her B.A. in 2014 from Tsinghua University, Beijing, China. She then started to be a graduate student in Human Development at Cornell. During her time at Cornell, she has been working on children's early social cognitive development.

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The development of human societies has witnessed many examples of changes of rules: advances in human rights lead to changes of human laws; advances in technology lead to changes of rules governing the technology world. Thus, our normative knowledge includes a recognition that rule following is important, and also an appreciation of cases in which rules can (and may need to) be changed. The development of the former type of knowledge has been investigated extensively in young children, but little attention has been paid to the latter. The aim of the current study is to investigate how children reason about changes of rules.

Interest in the origins of children's understanding of rules and norms dates back to Piaget, who interviewed children about how they view rules in marble games (Piaget, 1965). Piaget identified the tension that children at times treat rules as fixed and inalterable, while at other times view rules as flexible and alterable based on mutual agreement. This "fixed vs. flexible" tension can also be seen in the way children respond to social norms and rules in the current literature.

The idea that young children at times view rules as inalterable has empirical support from numerous studies showing the early emergence of norm sensitivity in young children's reasoning about artifact usage, social norms, moral rules (e.g., Diesendruck & Markson, 2011; Casler & Kelemen, 2005; Diesendruck, Markson, & Bloom, 2003; Kalish & Shiverick, 2004; Schmidt, Rakoczy, & Tomasello, 2012; Smetana & Braeges, 1990; Smetana, 1981). For example, in observational studies of family interactions, toddlers talk about permissibility of actions, use social rules to explain and justify their behaviors, and protest against others' rule violations in their interactions with parents and siblings (Dunn & Munn, 1985, 1987; Nucci & Nucci, 1982).

Even in laboratory settings, children follow and enforce arbitrary rules immediately after being introduced to them (Rakoczy, Brosche, Warneken, & Tomasello, 2009; Rakoczy, Warneken, & Tomasello, 2008; Rakoczy, 2008; Wyman, Rakoczy, & Tomasello, 2009; Keupp, Behne, & Rokoczy, 2013). In seminal work by Rakoczy and colleagues, after being taught by the experimenter how to play a game with a novel rule, 3-year-olds later spontaneously protested and criticized a new agent (a puppet) who joined and played the same game in a different way. Similar results were found even when the experimenter did not use any language (e.g. labeling, “this is daxing”) or teaching behaviors (e.g. addressing the children) to indicate the presence of a rule (Schmidt, Butler, Heinz, & Tomasello, 2016).

These studies lend support to the idea that young children view rules as fixed, and also perhaps suggest that they see rules as inalterable. However, it should be noted that these studies all involve receiving information about rules from adult authorities (e.g., parents, teachers or experimenters), where children have little authority over the rules. Indeed, young children distinguish between contexts where parents and teachers are legitimate authorities regulating rules (e.g. in the case of moral rules), and contexts where they have personal authority or autonomy to make their own decisions (Laupa & Turiel, 1993; Nucci & Weber 1995). At around the same age, children can reason that even a child has authority over things they own, and that authority enables them to make decisions about who can possess an object and who determines what the object is for (Friedman & Neary, 2008; Nancekivell, Van de Vondervoort, & Friedman, 2013; Nancekivell & Friedman, 2014). Thus, one of the aims of our study is to empirically investigate whether children consider issues of authority when deciding who can change rules.

There are a few previous studies that have asked children questions about changes to rules (Nucci & Nucci, 1982; Turiel, 1998; Davidson, Turiel, Black, 1983; Nucci, 1981; Hollos,

Leis, & Turiel, 1986). These studies focus on the distinction between moral rules, which pertain to violations of common good, justice and others' wellbeing (e.g., harming and not sharing), and conventional rules, which are arbitrarily decided by social groups (e.g. what to wear and where to sit). These distinctions influence how young children judge rule violations in terms of seriousness, contingency and generalizability; they rate conventional transgressions as less serious, more contingent on the presence or absence of authority and less generalizable across different contexts than moral transgressions. When asked in these contexts to evaluate acceptance of rule change in general (e.g. "Is it all right to change the rule?") or rule change by the authority figure (e.g. "Is it okay if the teacher wants to let the kids do something different from the rule?") or rule change by group consensus (e.g. "Is it all right to abolish the rule by group consensus?"), children starting from 5 years old were more likely to say that it is okay to change conventional rules (e.g. sitting at a designated place, wearing a certain color of clothes) than moral rules (fairness or harm). However, when asked about children's own authority to change rules (e.g. "Could the children get the rule changed?"), most children answered "no" to both conventional and moral rules.

These examples show that children can, in principle, reason about changes to rules. But, because the rules in question were outside of the scope of children's authority (e.g. within the personal domain, or in cases of child ownership), our question of whether children ever believe that a child ever has authority to change the rules remains open. To find the right scenarios – cases in which there is a clear need for a rule, and not just a personal preference, and an opportunity for children to create these rules, we chose rules created for peer play.

In peer games, sometimes rules could be created (or initiated) by an individual child (i.e. a child "authority"), but also in many cases, rules for peer play emerge from some collective

agreement of all participating children. Research on children's collaborative behaviors has shown that young children appreciate and honor joint commitments and collaboration, and they value the importance of collective agreement in establishing collaborative rules (e.g., Warneken, Gräfenhain, & Tomasello, 2012; Schmidt, Rakoczy, Mietzsch, & Tomasello, 2016). Recent studies have also investigated collaborative contexts without the presence of any traditional authority figures (Göckeritz, Schmidt, & Tomasello, 2014; Köymen et al., 2014). These studies find that 5-year-olds can spontaneously engage in collaborative rule creation and negotiation, and they honor their commitment to arbitrary rules created through this collaborative process. Studies have also revealed developmental changes in children's experience and understanding of peer relationships in early and middle childhood (Canary, Cupach, & Messman, 1995; Shantz & Hartup, 1995). Thus, another aim of the current study is to investigate how children in this age range reason about who can change rules created by collective agreement.

In the current study, therefore, we specified and varied how rules were initiated, and asked children to reason about who can change rules. We propose that children consider individual authority and collective agreement in their reasoning about who has the authority to change rules. We chose to study children ages 4 through 7, as this is period in which children's normative reasoning as well as understanding of collaboration and peer relationships undergo important developments (e.g. Köymen et al., 2014; Davidson et al., 1983; Canary et al., 1995). Specifically, the studies reviewed above suggest three hypotheses: First, it is reasonable to expect that children do not believe they have the authority to change adult-initiated rules, arbitrary or otherwise. Second, since children participate in rule creation themselves and value individual authority, they may, by extension reason that only children who are the creators of rules have the authority to change them. Finally, since children appreciate and honor joint

commitment and agreement in collaborative contexts, perhaps they require consensus for rule changes, especially if rules are initiated by collaborative agreement.

In Study 1, we showed young children videos of a group of three children playing a sorting game with an arbitrary novel rule and asked them a series of questions geared toward investigating whether they thought the rules could change and who could change them. Our main comparisons of interest came from manipulating how rules were initiated. Our main conditions of interest were contexts in which children generated the rules themselves, rather than being given rules by an adult authority. In one context (Child Rule condition), one individual child initiated the rule at the beginning of the game. In another (Collaborative Rule condition) one child announced the rule, but waited for other players to show agreement. Each time we asked whether the focal child could change the rule, and also whether one of the other players could change the rule.

As a contrasting case, we included a third condition where the rule was initiated by an adult authority figure (Mom Rule condition). Again, we asked whether any of the children could change the rule and whether the “mom” could change the rule. As an additional contrast between child-initiated rules and rules initiated by authority figures, all children also heard a short series of vignettes at the end of the study about moral and conventional norms (school norm, moral norm, and artifact norm). These conditions resemble some of the cases in social domain research reviewed above (e.g. Davidson et al., 1983) where children do not typically have authority. We asked children whether the child featured in each vignette could change each of these rules. We expected, based on prior research, that children do not believe they have the authority to change these adult-initiated or pre-existing rules.

One final contrast, again across all participants, was a solitary context in which one child was playing alone and initiating the game by him/herself. This context resembles some cases in prior work where children face simple choice based on a personal preference (Chernyak & Kushnir, 2013; Chernyak, Kushnir, Sullivan & Wang, 2013; Kushnir, Gopnik, Chernyak, Seiver, & Wellman, 2015; Nucci & Weber, 1995). So we expect children to treat the arbitrary game as a personal preference rather than a set of rules, thus they should reason that the individual playing the game has the freedom to change the game at will. This condition also serves as a check for potential “no” biases in responses.

Study 1

In Study 1, we investigated children’s reasoning about who can change rules of peer game under various contexts. Our task began with children viewing videos of other children playing games. We varied the contexts and processes of how the rules of the games were initiated. Our focal conditions were the group games, initiated (between participants) by an individual child, by collaborative agreement, or by adult authority. Each participant also saw the solitary play video (Alone condition, order counterbalanced). The video task was followed by a questionnaire, where we interviewed children regarding whether they believed children could change norms in daily life (school norm, moral norm and artifact norm).

Method

Participants.

Seventy-nine children aged 4-7 years old ($M = 5.74$, $SD = 1.09$, $range = 4.00 - 7.82$, 48 girls and 31 boys) participated. Participants were recruited from preschools, afterschool programs or museums in a small university town, and were predominantly middle to high-SES

European Americans. Two additional children participated but were replaced because of experimenter error. All parents provided written informed consent.

Materials.

The materials included 8 videos showing children playing games and a questionnaire with 3 vignettes. The videos were filmed with children slightly older than the study participants (9- to 10-year-olds) chosen because they were able to act consistently across videos. Half of the videos featured boys, and the other half featured girls. Two videos were of a boy/girl playing a stacking game alone (*Alone Video*), while six videos showed three boys/girls playing a sorting game together (*Child Rule*, *Collaborative Rule*, *Mom Rule*). The gender of the characters was counterbalanced across participants and evenly split by gender of participant; if participants saw the girls together, they saw the boy alone, and vice versa. The alone videos were about 20 seconds each, and the group videos were about 34 seconds each.

Procedure.

All children were interviewed in a quiet corner or a separate room at the local schools or the museum. The interview consisted of two parts: a video task and a questionnaire. All participants completed the video task first, followed by the questionnaire.

Video task. Each child was shown two videos (order counterbalanced). Children were randomly assigned to view one of the three group videos (*Child Rule*, *Collaborative Rule*, *Mom Rule*) where three children were playing a sorting game (sorting balls with different colored stickers into different baskets) together. Each child also saw the *Alone Video* where one child was playing a stacking game (stacking blocks of a certain color into a tower and keeping blocks of the other color flat) alone. We used two distinct but similar games in the *Alone Video* and group videos to ensure that that children would not get confused. Also, the stacking game and the

sorting game are quite similar in nature, in that the rules of both game involve arbitrarily doing one thing for blocks/balls of one color and doing the other thing for the other color. The natures of the rule changing are also similar enough, which both involve doing the opposite for each color (see details below).

Child Rule. Before showing the video, the experimenter pointed to each of the characters in the video and introduced their names, and said, “They are friends and they are going to play a game together.” Then she pointed to the child in the middle and said “John/Sophie has a rule for this game. Let’s see what rule John/Sophie has for this game.” Then the experimenter played the video. Figure 1 demonstrated the screenshots of the videos. In the video, the three characters sat in a triangle facing each other, and on the table there were with balls labeled with either yellow or blue stickers. The child sitting in the middle said, “I have a rule for this game. Blue stickers, here; yellow stickers, here. Let’s play together.” Then the three children played together according to the rule and finished sorting the balls.

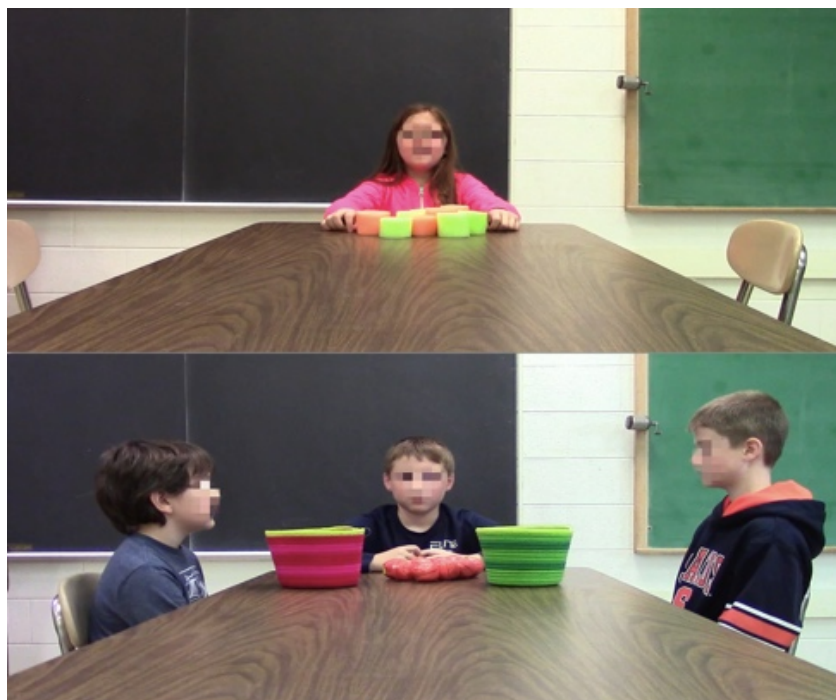


Figure 1. Screenshots of the videos used in the video task (above: Alone Video; bottom: Group Video). The child seated in the middle (center child) voiced the rule in both Child and Collaborative Rule conditions, and was the target of one rule-changing question. One of the children seated to one side (non-center child) was the target of the second rule-changing question (half of the participants were asked about the left non-center child, half about the right).

Collaborative Rule. The procedure was similar to the Child rule condition except that the experimenter introduced the video by saying, “They are going to make up a rule for this game together.” In the video, the center child proposed the rule, “Let’s make up a rule for this game together, blue stickers, here; yellow stickers, here” then looked at the other two children for agreement. One at a time each of the other two children made eye contact and nodded to the center child, indicating agreement, before they began the game. We used this type of silent “assent” rather than having all three children converse and decide collectively (e.g., Köymen et al., 2014) in order to keep the videos as similar as possible across conditions.

Mom Rule. The participant was told, “John’s mom has a rule for this game.” In the video, a woman walked in the screen and made eye contact with the children and said, “I have a rule for this game” then stated the same rule as in the other two conditions: “blue stickers, here; yellow stickers, here.” Immediately after the mom left, the children began playing, in exactly the same way as the other two group conditions.

Dependent measures. After showing each video, the experimenter asked the participants if they remembered the rule mentioned in the video to make sure that they were paying attention and understood the video. If the participant did not answer correctly, the video was shown again. Children correctly recalled the rule of the game 93.5% of the time after viewing the video the first time. Remaining participants correctly recalled the rule after viewing the video a second

time. After that, the participants were asked two critical questions (order counterbalanced). One about the center child (the one who had voiced the rule in both the Child and Collaborative Rule conditions): “Now John/Sophie wants to change the rule of this game. He/She wants the rule to be that yellow stickers here and blue stickers here (switching the places putting the color of the stickers). Can John/Sophie just change the rule?” The other question regards one of the other two children seated to one of the sides of the table (non-center child): “Now Andy/Julia wants to change the rule of this game. Can he/she just change the rule?” In the mom rule condition, in addition to the two questions about the center child and one of the non-center children, the experimenter also asked whether the mom could change the rule if she wanted. The participants were also asked “why” after the yes/no responses.

Alone Video. Before showing the Alone Video, the experimenter first said, “This is John/Sophie. John/Sophie is playing alone. He/She has a rule for this game. Let’s see what rule he/she has for this game.” In the video, there were red and green blocks on the table. The child said, “I have a rule for this game. Red ones make a tower; green ones stay flat.” Then the child finished playing with the blocks according to the rule. After viewing the video, participants were asked whether the child could change the rule if he/she wanted (the rule change was to stack the green blocks instead).

Questionnaire. After the video task, all participants were also read a questionnaire consisting of 3 items in the following general format:

“There is a rule at Lily’s school. The rule is that kids all sit in red chairs during lunch. Lily always follows this rule and sits in the red chair during lunch. But now, Lily wants to change the rule. She wants the rule to be that kids all sit in green chairs during lunch. Can Lily just change the rule at school? Why/Why not?”

We included three items: school norm, moral norm, artifact norm. In *School norm*, the character in the story wants to change an arbitrary rule at school (i.e. sitting in red chairs during lunch) to a different arbitrary rule (i.e. sitting in green chairs during lunch). In *Moral norm*, the character in the story wants to change a moral norm (i.e. sharing candies with siblings) to an immoral norm (i.e. not sharing candies with siblings). In *Artifact norm*, the character in the story wants to change a known artifact convention (i.e. using an umbrella when it is raining) to an unconventional rule (i.e. using a bucket when it is raining). The orders of the three items were fully counterbalanced across participants.

Coding.

For each question, participants were given a score of “0” if they answered “no” and “1” if they answered “yes”. The first author and a research assistant coded participants’ responses. Reliability between coders was 99.08%. The discrepancies were resolved through discussion by the first author and the research assistant.

Participants’ explanatory responses were coded as *Authority*, *Internal*, *Agreement* or *Other*. The *Authority* category included any references to authority status (e.g., “she’s the boss”), or possession and ownership of the rule (e.g., “it’s her game”) that justify for changing (or not changing) the rules. Internal answers referred to mental factors internal to the agent that justify the responses. Examples included “she wants to change it.” Agreement answers included any references to other players in the game (e.g. “she has to ask the friends”). Answers that could not fall into any of the categories were coded as *Other*. The first author and one research assistant coded by this coding scheme. Reliability between coders for qualitative explanations was 92.93%, Kappa = .89. The discrepancies were resolved through discussion by the first author and the research assistant.

Results

Figure 2 demonstrated the proportion of “yes” responses to each rule-changing question in each condition. We used an alpha level of .05 for all statistical tests. We first ran two analyses to check for effects of order, gender of the participants, and the correspondence between gender of participants and gender of the characters in the video (i.e. gender-matching). First, for children’s responses to the rule-changing questions in the group videos, we performed a mixed model logistic regression utilizing a generalized estimating equation (GEE) predicting their Yes/No responses to each question, with order of the video (Alone video first or Group video first), order of the questions (center child first or non-center child first), gender of participants and gender-matching (gender matches or not matches) as predictors. This analysis revealed no effects of any of the predictors, p ’s = n.s. Second, for children’s responses to the Alone Video, we performed a binomial logistic regression predicting their responses with order of the video (Alone video first or Group video first), gender of participants and gender-matching (gender matches or not matches) as predictors. This analysis revealed no effects of any of the predictors, p ’s = n.s. Thus, we combined the data of different orders and genders together in the following analyses.

In order to examine whether children’s responses to the rule-changing questions vary by condition of the group videos and target person of the rule-changing questions, a 3 (Condition: Child Rule, Collaborative Rule, Mom Rule) X 4 (Target of Question: Alone child, Center child, Non-center child, Mom) mixed model logistic regression utilizing GEE was performed, with Condition being a between subject factor, Target of Question being a within subject factor, and Age as a covariate. We found a marginal main effect of Condition, Wald $\chi^2(2, N = 79) = 5.85$, p

= .05, a significant main effect of Target of Question Wald $\chi^2(3, N = 79) = 33.99, p < .001$, and a significant Condition X Target of Question interaction, Wald $\chi^2(4, N = 79) = 14.69, p = .005$.

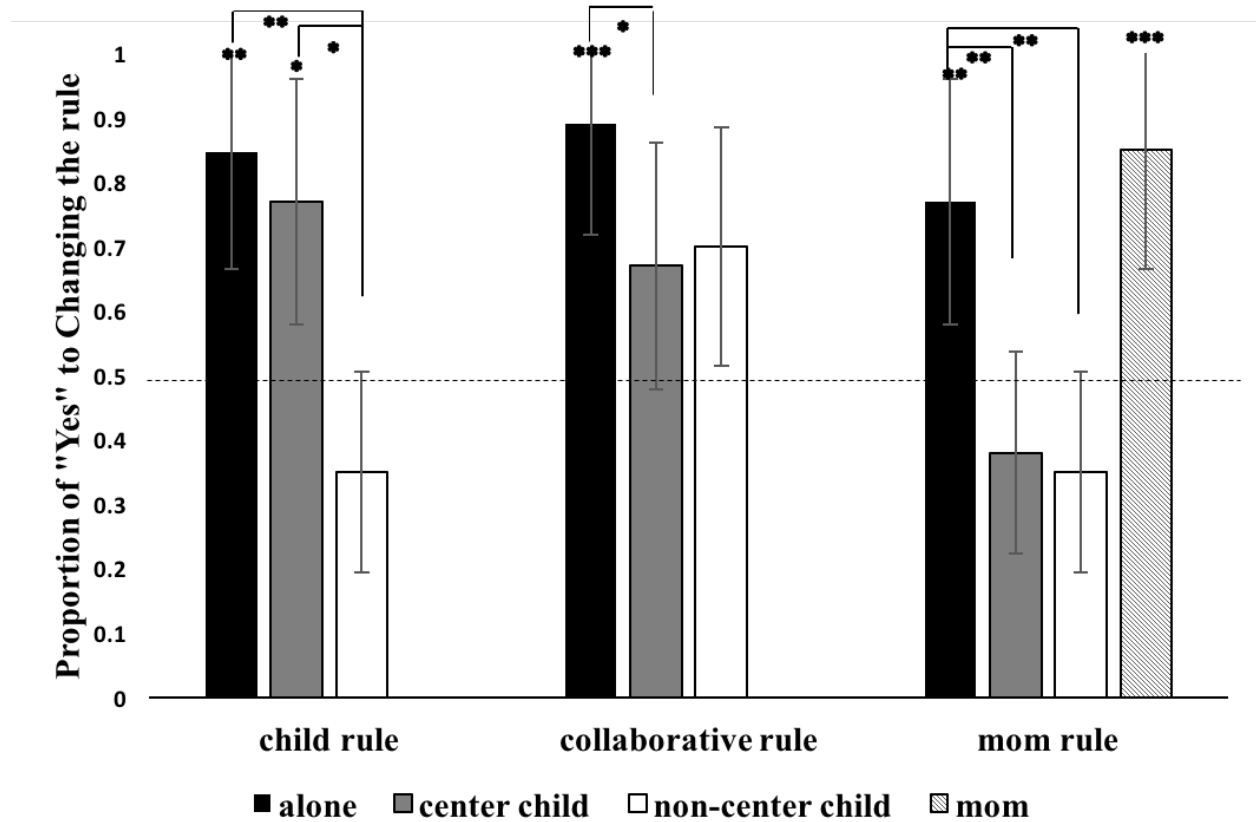


Figure 2. Proportion of “yes” responses to the rule changing questions in each condition (bars represent 95% confidence intervals for each mean; asterisks indicate a significant difference from chance: (*) $p < .05$, (**) $p < .01$, (***) $p < .001$, using Binomial tests).

To further examine the interaction, three separate GEE models predicting Yes/No responses to rule-changing questions from Target of Question and Age were run separately for each condition. In the *Child Rule* condition, there was a significant main effect of Target of Question, Wald $\chi^2(2, N = 26) = 13.14, p = .001$, and no significant age effect, $p = \text{n.s.}$ Follow-up Binomial tests and comparison revealed that the significant majority (77%) of the children

answered that the child who initiated the rule (center child) could change the rule (Binomial $p = .01$). Only 35% of the participants answered that the child who did not initiate the rule (non-center child) could change the rule, which was not significantly different from chance (Binomial $p = n.s$). A McNemar's test revealed that children were significantly more likely to say that the child who initiated the rule could change it than the child who did not initiate it ($p = .003$). We compared this with their responses to the Alone Video. An overwhelming majority (85%) of the participants answered that the child playing alone could change the rule (Binomial $p = .001$). McNemar's tests revealed that children were significantly more likely to say that the child playing alone could change the rule than the child who did not initiate the rule in the group ($p = .001$), but not significantly different from the child initiating the rule in the group ($p = n.s$). There was no age effect on any question in this condition (p 's = n.s).

In the *Collaborative Rule* condition, the logistic GEE showed a significant main effect of Target of question, Wald $\chi^2(2, N = 27) = 6.21, p = .045$, and a significant main effect of Age, Wald $\chi^2(1, N = 27) = 6.08, p = .014$. Follow-up Binomial tests and comparison revealed that 67% of the children answered that the center child could change the rule, and 70% of the children said that the non-center child could change the rule of the game, which were not significantly different from chance (Binomial p 's = n.s). A McNemar's test showed no significant difference between their responses to the center child and the non-center child, $p = n.s$. We then compared participants' responses to the collaborative rule video to their responses to the Alone Video. A significant majority of the participants (89%) answered that the child playing alone could change the rule (Binomial $p < .001$). McNemar's tests showed that children were significantly more likely to say that the child playing alone could change the rule than the center child in the group ($p = .031$), but not significantly different from the non-center child in the group ($p = n.s$). To

further explore the age effect, we then ran correlations between age in months and children's responses to each of the two rule-changing questions in the Group video, and found that age in months was negatively correlated with each of them separately (center child: $r = -.62, p = .001$; non-center child: $r = -.27, p = .17$), but the correlation was only significant for center child. This suggests that older children were less likely to say any child could change the rule in the Collaborative Rule condition than younger children, especially regarding the center child.

In the *Mom Rule* condition, we found a significant main effect of Target of question, Wald $\chi^2(3, N = 27) = 20.20, p < .001$, and no significant age effect. Follow-up Binomial tests and comparison revealed that 38% of the participants answered that the center child could change the rule, and 35% answered that the non-center child could change the rule, Binomial p 's = n.s. McNemar's tests showed that children were more likely to say that mom could change the rule than either the center child ($p < .001$) or the non-center child ($p < .001$), but there was no significant difference between their responses to questions about the center child and the non-center child ($p = \text{n.s.}$). We also compared these responses to their responses to the Alone Video. A significant majority (77%) answered that the alone child could just change the rule (Binomial $p = .009$). McNemar's tests showed that children were significantly more likely to say that the child playing alone could change the rule than either the center child ($p = .002$) or the non-center child in the Mom Rule video ($p = .001$). Also, no age effect was found for any question in this condition (p 's = n.s.).

As another way to look at the Condition X Target of Question interaction, we then compared children's responses to each rule-changing question across three conditions. Three separate binary logistic regressions predicting Yes/No responses from Condition and Age were run separately for each Target of Question. As for the Alone child, there was no significant

effects of Condition or Age, p 's = n.s. As for the center child, there was a significant main effect of Condition, Wald $\chi^2(2, N = 79) = 9.09, p = .01$. Follow-up comparisons revealed that participants in the Child Rule condition were significantly more likely to say that the center child could change the rule than participants in the Mom Rule condition ($\chi^2(1, N = 52) = 7.88, p = .005, d = 0.85$), and participants in the Collaborative Rule condition were significantly more likely to say that the center child could change the rule than participants in the Mom Rule condition ($\chi^2(1, N = 53) = 4.23, p = .04, d = 0.59$). As for the non-center child, there was a significant main effect of Condition, Wald $\chi^2(2, N = 79) = 8.78, p = .01$. Follow-up comparisons revealed that participants in the Collaborative Rule condition were significantly more likely to say that the non-center child could change the rule compared to the participants in the Child Rule condition ($\chi^2(1, N = 53) = 6.80, p = .009, d = 0.77$) and the Mom Rule condition ($\chi^2(1, N = 53) = 6.80, p = .009, d = 0.77$).

We then looked at children's qualitative responses in each condition. In the *Child Rule* condition, the most frequent (40%) explanations children provided to justify that center child could change the rule referred to the authority or possession of the rule (e.g., "she/he's the boss of this game" or "it's her/his game"). Around 20% referred to internal states (e.g., "she/he wants to"), and another 20% referred to agreement (e.g. "she can change if others are okay"). Similarly, the most frequent (50%) explanations participants provided to justify that the non-center child could not change the rule referred to authority or ownership (e.g., "he/she didn't make up the rule" or "she/he's not the boss"), and no one referred to internal states or agreement. In the *Collaborative Rule* condition ($n = 27$), out of all the explanatory responses, only 7% referred to authority or possession, and 13% referred to internal states of the children. Intriguingly, 31% of the explanations referred to agreement among players in the game (e.g. "others might not agree").

We also found age effects in children's qualitative responses in the Collaborative Rule condition that age positively predicted children's references to agreement among players in the game ($r = .66, p < .001$).¹ In the *Mom Rule* condition, the most frequent (54.5%) explanations participants provided to justify that children could not change the rule referred to authority or ownership, and none referred to internal states. Similarly, the most frequent (45%) explanations provided to justify that the mom could change the rule referred to authority or ownership (e.g., "mom is in charge" or "mom made up the rule"). Only 5% referred to internal states, and only 3% referred to agreement.

Questionnaire.

Figure 3 showed the proportion of "yes" responses the participants gave to the rule-changing question in each vignette. Our results are in line with previous findings (e.g. Davidson, et al., 1983) showing that children do not view themselves as having the authority to change pre-existing moral or conventional norms. Binomial tests revealed that a significant minority of the children (33%) answered that the character in the story could change the rule at school ($p = .002$). A significant minority of the children (25%) answered that the character in the story could change the moral rule ($p < .001$). About half of the children (48%) said that the character in the story could change the artifact rule ($p = n.s$). McNemar's tests also revealed that significantly more children answered that the child in the stories could change the artifact rule than the school rule ($p = .013$) or the moral rule ($p < .001$). No correlation with age was found in any of the three stories (p 's = n.s). We also looked at their qualitative explanations. As for school norm, the most frequent explanations (44%) referred to authority (e.g. "the teacher is the boss"). As for

¹ We did not find age effects on qualitative explanations in the Child Rule condition or the Mom Rule condition.

moral norm, the most frequent explanations referred to authority (25%, e.g. “mom makes the rule”) or moral value (24%, e.g. “that’s not fair”). As for artifact norm, the most frequent explanations referred to authority (18%, “her mom might say no”) or internal factors (15%, “she wants to”).

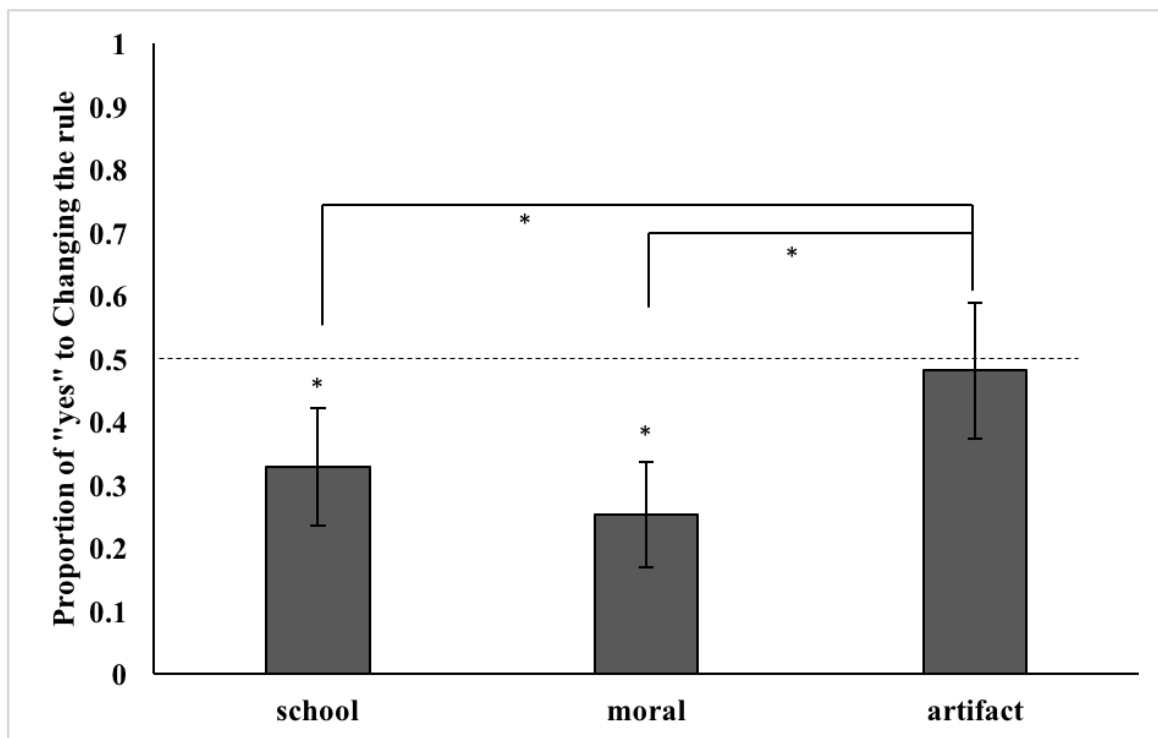


Figure 3. Proportion of “yes” responses to the rule-changing questions for the school norm (from “sitting in red chairs” to “sitting in green chairs”), moral norm (from “sharing with siblings” to “not sharing with siblings”) and artifact norm (from “using an umbrella in rain” to “using a bucket in rain”). Asterisks indicate a significant difference from chance: (*) $p < .05$, (**) $p < .01$, (***) $p < .001$, using Binomial tests.

Discussion

These results provide evidence that even preschoolers understand that children can change rules created for peer play, and that they consider context in which the rule was initiated when decide who can change them. When reasoning about groups of children playing together,

children of 4- to 7 years old took into account how the rules were initiated even though all the other information (e.g., the content of the rule, the participants of the game) were kept constant across contexts. When the rule was initiated by mom, children said that only mom could change the rule of the game, and not any of the children. When the rule was initiated by an individual child, children believed only that child could change the rule, and not his/her playmates. This suggests that children consider individual authority when deciding who can change rules, believing that the initiator of rules also has the authority to change the rules.

Intriguingly, when the rule was made up by collaborative agreement, younger children were more likely to say that any child (especially the child who proposed the rule) could change the rule than older children. Older children also referred more to agreement among players in their explanations. Does this suggest that younger children do not care about agreement among peers when reasoning about changes of collaborative-initiated rules? Previous findings, however, showed that even 3-year-olds value the importance of agreement in establishment of arbitrary social norms and consider a norm as established only under unanimous agreement without any dissents (Schmidt et al., 2016). Therefore, a more likely possibility is that younger children also require agreement to change collaboratively initiated rules, but they are more likely to assume agreement in general than older children. This might be because, as children get older, they accumulate experiences where friends do not necessarily agree (Canary, Cupach, & Messman, 1995; Shantz & Hartup, 1995). In Study 2, we directly investigated this hypothesis by showing the same videos as before and asking children whether the child who proposed the rule would agree when one of the non-center children wanted to change the rule. We contrasted the Collaborative Rule condition (where agreement was central to rule creation) with the Child Rule condition (in which the center child was the authority/rule initiator). Our prediction was that

assumptions of agreement would change with age along the same lines as responses to the rule changing question; older children would be less likely than younger children to assume agreement in the Collaborative Rule condition.

Study 2

The second study focused on the age difference in the Collaborative Rule condition we found in Study 1. We showed children of 4-7 years old either the Collaborative Rule video or the Child Rule video. The stimuli mirrored those of Study 1. Unlike Study 1, children were asked whether the center child would agree with the non-center child when the non-center child wanted to change the rule of the game. Because there was no age effect in the Child Rule condition in Study 1, we included the Child Rule condition as a control where we predicted no age difference also in their endorsement of agreement. We hypothesized that older children should be less likely to endorse agreement than younger children only in the Collaborative Rule condition, but not the Child Rule condition.

Method

Participants.

Fifty-two children aged 4-7 years old ($M = 5.64$, $SD = 1.04$, range = 4.01 – 7.83, 32 girls and 20 boys) participated. Participants were recruited from preschools or museums in a small university town, and were predominantly middle to high-SES European Americans.

Materials.

The materials included the Child Rule video and the Collaborative Rule video, which were the same as those we used in Study 1.

Procedure.

Similar as Study 1, each child completed a video task first, followed by a questionnaire. In the video task, each child was randomly assigned to view either the Child Rule video or the Collaborative Rule video. The procedure was the same as in Study 1, except that we asked a different critical question. After being shown each video and asked the attention check question, the participants were asked, “Now Andy/Julia (one of the non-center children) wants to change the rule of this game. He/She wants the rule to be that yellow stickers here and blue stickers here (switching the places putting the color of the stickers). Would John/Sophie (the center child) agree?” After the video task, participants were given the questionnaire (as a manipulation check) which was the same as in study 1.

Results

Video Task.

We scored children’s responses (“no”, “maybe” or “yes”) to the agreement question as 0, 1, and 2 respectively. We first performed an ordinal regression to examine whether scores were affected by gender of participants and gender-matching. This analysis revealed no effect of gender of participants or gender-matching on children’s responses (p ’s = n.s). Hence, we combined the data of different genders together in the following analyses.

To investigate whether children’s responses to the agreement question vary by Condition and Age, we conducted an ordinal regression predicting children’s scores from Condition (Child Rule, Collaborative Rule), Age and the interaction. We found a marginal main effect of condition effect, Wald $\chi^2(1, N = 52) = 3.76, p = .052$, a significant main effect of Age, Wald $\chi^2(1, N = 52) = 5.17, p = .023$, and a significant interaction of Age X Condition, Wald $\chi^2(1, N = 52) = 4.52, p = .034$. To explore the interaction, two ordinal regressions predicting children’s responses from Age were performed separately for each condition. In *Collaborative Rule*

condition, we found a significant effect of Age, $\chi^2(2, N = 26) = 7.65, p = .022$. As children get older, they were more likely to answer “no”, $B = 1.75, SE = .82, p = .032, 95\% CI = [1.17, 28.62]$. In contrast, in *Child Rule* condition, age has no significant effect on children’s responses, $p = n.s.$

Questionnaire.

Results for the moral and conventional norms questions were similar to Study 1. A significant minority of the children (19%) answered that the character in the story could change the rule at school (Binomial $p < .001$). A significant minority of the children (13%) answered that the character in the story could change the moral rule (Binomial $p < .001$). A significant minority of the children (21%) said that the character in the story could change the artifact rule (Binomial $p < .001$). McNemar’s tests revealed no difference among questions (p ’s = n.s).

Discussion

Consistent to our hypothesis, when the rule was initiated through collaborative agreement, younger children were more likely to say that the center child would agree when one of the non-center children wanted to change the rule than older children. This may be one potential explanation why younger children were more likely to say that any player could change the rule created through collaborative agreement than older children.

Study 3

Our first two studies provided initial support for the prediction that children consider individual authority and collective agreement when reasoning about who can change rules. Although these findings are promising, they also raise several outstanding questions. First, in Study 1, many children in the *Child Rule* condition referred to ownership of the game (e.g. It is his/her game) in their explanations, which prompts the question that whether these children

interpreted our set up in the condition as indicating property “rights” over the objects used in the game, or authority over the rules. Also, the language used when introducing the rule had a stronger connotation of ownership in the Child Rule condition (“I have a rule”) than in the Collaborative Rule condition (“let’s make up a rule”). In study 3, we introduced the scenarios with a clear indication that that the toys belong to no one (e.g. “Sophie/John found these toys in the classroom”). We used the same language (“*decide* a rule”) across conditions to make a clear indication that the rule was created by the individual or group rather than learnt or heard.

Another question remaining from Study 1 was whether children would still be willing to change a rule if there was a stronger indication that the game *should* be played a certain way. In Study 3, we used the deontic modal “*should*” when introducing the rule.

One final question concerned the robustness of the rules themselves. We investigated this with two follow-up questions. We asked whether another (new) group of children will also follow the rule created by the children in the video, and we asked whether the “mom” could change the rule which was decided by the children (either individually or collaboratively).

Method

Participants

Forty-four children aged 4-7 years old ($M = 5.79$, $SD = 1.1$, range = 4.07 – 7.45, 20 girls and 24 boys) participated. Participants were recruited from preschools or museums in a small university town, and were predominantly middle to high-SES European Americans. Three additional children participated but were replaced because of experimenter error.

Materials.

The materials included the Child Rule video and the Collaborative Rule video we used in the first two studies. However, we cut the part of the videos where the center child announced “I

have a rule for this game” or “Let’s make up a rule for this game together.” Instead, we used a still picture of the children in the game with a speech bubble representing what the center child said (see procedure for details). The genders of the children in the video were matched with the genders of the participants.

Procedure.

Each child was randomly assigned to view either the Child Rule video or the Collaborative Rule video. The procedure was similar as in Study 1, except for the above-mentioned modifications. Before showing the video, the experimenter showed a still picture of the three children and introduced the characters in the video and said “They are friends and they are going to play together” in both conditions. Then she pointed to the child in the middle, and said “John/Sophie found these toys in the classroom.” In the Child Rule condition, the experimenter continued to say “In this game, John/Sophie is going to *decide* a rule for this game. He/she is going to decide how the game *should* be played.” In the Collaborative Rule condition, the experimenter said “In this game, they are going to *decide* a rule for this game together. They are going to decide how the game *should* be played together.” Then the experimenter said “Let’s see what John/Sophie says, and showed an animation where a speech bubble appeared right above center child saying “I’m going to *decide* a rule for this game. I’m going to decide how the game *should* be played” in the Child Rule condition or “Let’s *decide* a rule for this game together. Let’s decide how the game *should* be played together” in the Collaborative Rule condition. The experimenter also read out the sentences in the speech box as if it was said by the center child in the video. Then the experimenter played the video, where the center child decided the rule “Blue stickers, here; yellow stickers, here. Let’s play together” in the Child Rule condition, or proposed the rule and looked at the two other children for agreement in the

Collaborative Rule condition. In both videos, the three children took turn to sort the balls according the rule. Similar as Study 1, after being shown each video and asked the attention check question, the participants were asked two rule-changing questions (order counterbalanced): one about the center child and one about one of the non-center children. Then they were asked two additional questions: The first question measured whether the center child's mom could change the rule if she wanted. The second question measured whether another group of children would play with the same rule as them. We showed the participants a picture of another three children in the opposite gender and asked "Here are another group of children. They are coming to play with the same toys. Do you think they are going to play with the toys the same way as them or some other way?"

Results

Figure 4 demonstrated the proportion of "yes" responses to each rule-changing question in each condition. We performed a mixed model logistic regression utilizing GEE predicting their Yes/No responses to each question, with order of the questions (center child first vs. non-center child first) and gender of participants as predictors. This analysis revealed no effects of any of the predictors, p 's = n.s. So we combined the data of different genders together in the following analyses.

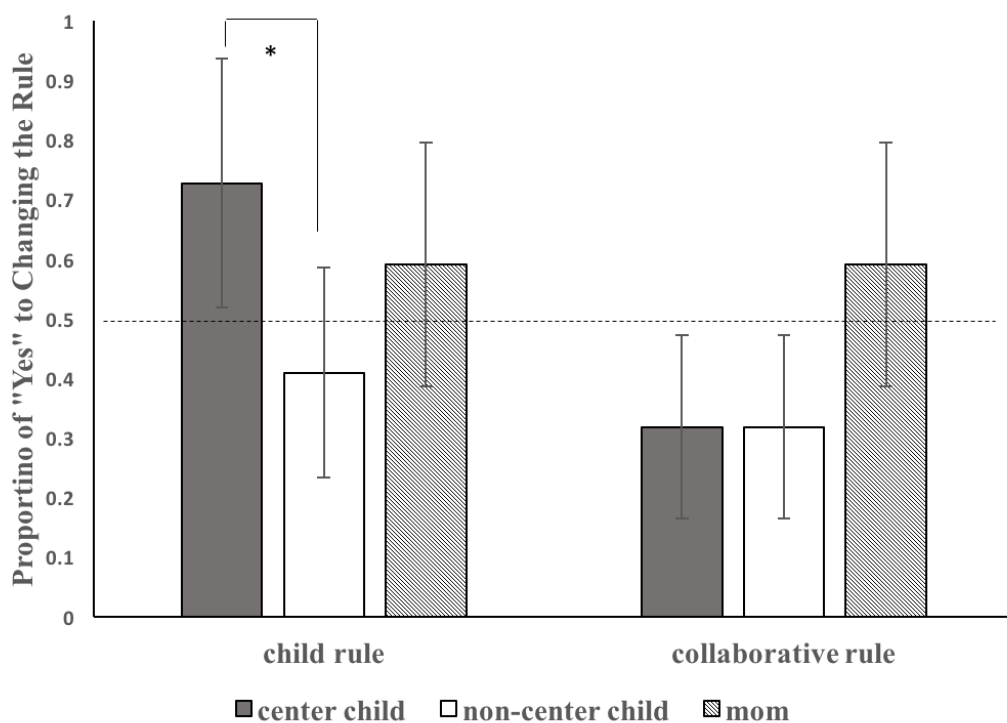


Figure 4. Proportion of “yes” responses to the rule changing questions in each condition (bars represent 95% confidence intervals for each mean; asterisks indicate a significant difference: (*) $p < .05$, (**) $p < .01$, (***) $p < .001$, using McNemar’s tests).

In order to examine the effect of Condition and Target of Question on children’s responses to the rule-changing questions, a 2 (Condition: Child Rule, Collaborative Rule) X 2 (Target of Question: Center child, Non-center child) mixed model logistic regression utilizing GEE was performed, with Condition being a between subject factor, Target of Question being a within subject factor, and Age as a covariate. There were significant main effects of Condition, Wald $\chi^2(1, N = 44) = 4.68, p = .031$, main effect of Target of Question, Wald $\chi^2(1, N = 44) = 4.74, p = .03$, and a significant Condition X Target of Question interaction, Wald $\chi^2(1, N = 44) = 4.80, p = .028$. No age effects were found.

To further examine the interaction, two separate GEE models predicting Yes/No responses to rule-changing questions from Target of Question and Age were run separately for each condition. In the *Child Rule* condition ($n = 22$), there was a significant effect of Target of Question, Wald $\chi^2(1, N = 22) = 8.98, p = .003$, and no age effects. Binomial tests showed that a majority of the participants (73%) answered that the child who decided the rule (center child) could change the rule (Binomial $p = .05$). In contrast, only 41% of the participants answered that the child who did not decide the rule (non-center child) could change the rule (Binomial $p = \text{n.s.}$). A McNemar's test revealed that children were significantly more likely to say that the child who decided the rule could change it than the child who did not decide it ($p = .02$). In the *Collaborative Rule* condition ($n = 22$), a logistic GEE revealed no significant effect of Target of Question or Age, p 's = n.s. Out of all the participants in this condition, 32% answered that the center child could change the rule, and 32% of the participants answered that the non-center child could change the rule, Binomial p 's = n.s.

We then looked at their qualitative responses in each condition. Replicating main findings in Study 1, the most frequent (31%) explanations provided in *Child Rule* condition referred to the center child's authority, while the most frequent (43%) explanations provided in the *Collaborative Rule* condition referred to agreement among players.

Regarding whether mom could change the rule, around half of the children (59% in Child rule and 59% in collaborative) said that the mom could change the rule, which were not significantly different from chance, Binomial p 's = n.s. Regarding the scope of the rule, a significant majority (82%) of the children in the Child Rule condition said that the the new group of kids would play by some other rule (Binomial $p = .004$), and 68% of the participating children

in the *Collaborative Rule* said that the new group of kids would play by some other rule (Binomial $p = n.s.$). No age effects were found on any question in this study (p 's = n.s.).

Discussion

Study 3 replicated the findings of Study 1; children again considered individual authority or collective agreement when reasoning about changes of rules for peer play. When the rule was decided by an individual child, they said only this child could change the rule, and not other players or the mom. When the rule was decided by collective agreement, unlike the age difference found in Study 1, younger and older children alike said that rules created collaboratively could not be changed by any child playing the game. We will discuss several possibilities for the difference in General Discussion. Regarding the robustness and scope of the rule, children said that sometimes mom could override rules decided by children and other children would play with the toys by a different rule. These suggest the possibility that the children in our study view the rules specific to a group people in a certain context rather than general norms.

General Discussion

The present findings demonstrated early ontogeny and developmental changes in young children's reasoning about changes of rules. When asked about changing a novel rule made for playing in a peer game, children as young as four years old distinguish a rule decided for one single child and a rule decided for group play. More importantly, for group play, they also distinguish a rule decided by mom, a rule decided by an individual child and a rule decided by collective agreement. When the rule is initiated by one of the players in the game, children believe that only this child can change the rule, but not other players or the mom; while when the rule is initiated through collective agreement among all players, children attribute equal authority

of changing rules to each player. Children's qualitative explanations lend further support to these findings. When the rule of the game was initiated individually (by a child or an adult), children of all ages explained rule changing by making reference to authority ("the boss" or "his game"). Few, if any, explanations referred to authority in the Collaborative Rule condition. Instead, children, especially older ones, made explicit references to the need for agreement. In contrast, children viewed arbitrary rules created for a solitary play as changeable, while adult-initiated rules or pre-existing norms (e.g. school and moral norms) as completely inalterable by children.

Our results complement prior work focused mainly on cases where children do not typically have authority over the rule by showing that children do think they themselves can change rules when provided with some authority to do so. The recognition of *who* has that authority aligns well with existing knowledge in several different areas of research, including children's understanding of authority and ownership, and of collaboration and peer friendships.

First, children's belief that a rule initiated by a single child for group play can only be changed by that child is consistent with previous work on children's understanding of ownership of objects (e.g., Neary & Friedman, 2014). Just like with objects, young children may develop awareness of authority of creation of rules: they think that the person who initiates or decides a rule has the authority to change it, while other people do not have the authority. This reveals that the individual authority over initiating rules warrant the authority to change the rules. Future studies can investigate whether the person who initiates the rule can grant authority to another player to change the rule. For example, if the rule creator (the mom or the center child) gives another person permission to change rules, can this person change the rule?

It is also noteworthy that identifying the individual authority initiating the rules seems to operate as a general principle: that is, it does not depend on whether the authority is a child or a

more traditional authority figure (e.g., mom). This is consistent with previous evidence on that children accept the legitimacy of both adult authority and peer authority (e.g. teacher's helper) in regulating rules (e.g. Laupa, 1994). However, we are not suggesting that there is no difference at all between rules initiated by an adult and rules initiated by an individual child. For example, when the mom (or another adult) and an individual child have conflicting rules, it would be reasonable to expect that children would abide by the mom's rule.

Children's response that any group member has the equal authority to change a collaborative rule is consistent with prior work on children's understanding of joint commitments and collaboration (e.g., Warneken et al., 2012). We found a shifting tendency, with age, to say that no child alone can change a collaboratively agreed upon rule. Findings of Study 2 provided one possible explanation for this developmental change: older children may be less likely to assume agreement among friends. This change is consistent with developments in advanced theory of mind across this age range. For example, it is not until middle childhood that children can both reason about conflicting beliefs among peers, and use their social cognitive skills to resolve disagreements (e.g., Lagattuta et al., 2015; Lagattuta, Sayfan, & Blattman, 2010). This also suggests developmental changes in how children treat others: As children get older, they might be more likely to value others' views as independent of their own, but also understand that changing collaboratively-initiated rules is interdependent and requires all players' opinions². It is important to further explore the experiences with peer negotiation, collaboration, and conflict resolution that give rise to these developmental changes and their potential influence on children's normative reasoning and behaviors.

² We thank the anonymous reviewer for suggesting this point.

However, as we did not replicate the age effect in Study 3, we suggest caution in its interpretation. Results of follow-up questions indicate that most children believed the rule was specific to the game context in the video (that is, other children would play differently). This specificity is consistent with prior work showing that children in this age range view collaboratively initiated rules as joint commitments (e.g. Warneken et al., 2012; Schmidt et al., 2016), rather than general norms which translate to other contexts. Thus, it may be that modifications made in Study 3 to the language of the task made that commitment more salient, leading children to infer that players would have to collectively decide on changes to rules together. This raises interesting questions about what children would think if shown a richer context for how collaborative agreement can be reached, for example through conversation and discussion among peers, whether majority agreement is sufficient or whether all have to agree, and similarly whether discussion or majority agreement could result in a change to a collaboratively initiated rule.

Our findings suggest that even very young children may consider the history of a rule's creation, as well as its purpose, when reasoning about its scope and flexibility. Consistent with Piaget's initial discussion of children's normative knowledge (Piaget, 1965), our results show that the extent to which children consider certain rules to be fixed or flexible depends in interesting ways on what they know about the relationships between those who created the rule and those who follow it. The consideration of individual or collective authority may thus operate, from a young age, as a general principle which factors into children's reasoning about changes of rules. Future studies can investigate the extent to which this principle holds above other considerations, such as the relative social status of the authority, the efficiency of the rule, or the moral status of the rule.

In summary, our results demonstrate that young children understand the importance of following and enforcing rules and norms, but at the same time can also reason about how rules can be changed. Critically, these studies show that children consider the issue of how rules are initiated in deciding whether rules can change and who can change them. Taken together, this study suggests that the important feature of human thinking - that we make rational and flexible inferences about human activities - is present in young children's developing normative knowledge.

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