Young children's creation and transmission of social norms

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A B S T R A C T

Children's lives are governed by social norms. Since Piaget, however, it has been assumed that they understand very little about how norms work. Recent studies in which children enforce social norms indicate a richer understanding, but children are still relating to pre-existing adult norms. In this study, triads of 5-year-olds worked on an instrumental task without adult guidance. Children spontaneously created social norms regarding how the game "should" be played. They transmitted these with special force (using more generic and objective language) to novices, suggesting that young children understand to some degree, the conventional nature and special force of social norms in binding all who would participate.

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Children are born into societies structured by social norms. These mutually accepted behavioral standards of a group are so powerful that group members must either conform to them or risk being punished or ostracized. Early on, young children begin conforming to behavioral rules issued by adults, but it is unclear whether they understand these directives as simply the wishes of a single person or rather, in some cases at least, as a single person's expression of group agreements regarding proper behavior.

The seminal work in this regard is Piaget's (1932) study of moral judgment. He observed how Swiss children learn and understand the rules of games, such as marbles, handed down among children without adult interference. Based mainly on verbal interviews and naturalistic observations, Piaget depicts preschool and early school age children as heteronomous – they believe rules to be part of an

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external, physical reality. They conform to these rules as they are handed down by authorities and consider them to be "sacred and untouchable." Any modification to them would be wrong, even if accepted by general opinion. Only from around 10 years of age do children become autonomous and allow changes to rules by common agreement.

Other ways of assessing children's judgments, however, reveal that they are more accomplished in their understanding of social norms than Piaget believed. For example, Nucci and Turiel (1978) observed children's natural interactions in preschools and found that they reacted quite differently to normative breaches that involved harm, compared to breaches that were merely conventional. Similarly, Turiel (1983) found that 3–4-year-olds already understand moral and conventional norms differently, such that they regard transgressions of moral norms as more serious, less relative to social context, and less contingent on the presence of a rule, compared to transgressions of conventional norms (see also Smetana, 1981). Other research has focused on children's intuitions about moral and group-related issues, for instance, how these interact and how they are related to prejudice and intergroup attitudes in development (see Rutland, Killen, & Abrams, 2010, for a review).

More recent studies have sought ways other than verbal interviews and naturalistic observations to assess children's understanding of social norms, for example, by putting them directly in interactive situations with norm transgressors. For example, within a novel game-playing context, Rakoczy, Warneken, and Tomasello (2008) found that 3-year-olds, and to some extent even 2-year-olds, overtly express their understanding of the normative structure of conventional games by protesting against the transgressions of third parties, using normative language. This finding reveals that very young children understand conventional norms as not just applying when they themselves are affected. Rather, they understand them in a more agent-neutral way as general, normatively structured, rule-governed forms of action (Rakoczy, Hamann, Warneken, & Tomasello, 2010).

Importantly, children apply social norms in the form of game rules in this agent-neutral way even when the adult who introduces the game does not use any normative or pedagogical language at any time and rather is only incidentally observed performing intentional, game-like actions in a deliberate (and seemingly knowledgeable) way (Rakoczy et al., 2010; Rakoczy & Tomasello, 2007; Schmidt, Rakoczy, & Tomasello, 2011). This finding emphasizes how readily young children infer normativity when witnessing an authority or expert of their culture, enabling them to learn how group members behave and even how they ought to behave (Over & Carpenter, 2012). Assessing children's normative protest has also been extended to recent studies on overimitation, showing that 3 and 5-year-olds view unnecessary actions performed by an adult as normative (Kenward, 2012; Kenward, Karlsson, & Persson, 2011).

Moreover, in their third-party enforcement of conventional norms, preschool children still respect the distinction between moral norms, which apply to all people, and conventional norms that apply to in-group members only (Schmidt, Rakoczy, & Tomasello, 2012). Perhaps most impressive, in the context of pretense, 3-year-olds even understand that conventional norms are based on something like "agreements" that cannot be altered without a change in agreement. Thus they protest when someone treats an object declared to be a pretend sandwich as if it were a pretend bar of soap (Wyman, Rakoczy, & Tomasello, 2009). When children enforce conventional norms on others from a third party stance, it suggests that their protest is not out of a concern for themselves; rather they view the norm as something to be obeyed by all (Rakoczy & Schmidt, 2013; Schmidt & Tomasello, 2012). Third-party protest also demonstrates at least some understanding of the origins of social norms in the common agreements of group members or other individuals, as the child has no personal interest – just an interest as a group member – in its being followed.

Taken together, these recent studies demonstrate that young children's normative protest is based on a normative understanding. Children's appropriate use of normative vocabulary (e.g., wrong/right, must, ought) in these studies can be taken as an especially clear indicator of normative understanding. Other forms of protest such as imperative or descriptive protest (e.g., "Don't do it!") are more ambiguous as they might merely express an individual's personal preference as opposed to a normative expectation. More generally, use of normative language can be seen as a tool to express reigning social norms within a group and is therefore a powerful instrument to generate pressure to conform to the expectations of a group.

Norms apply to all group members or participants of a practice alike (Rakoczy & Schmidt, 2013). Thus the most unambiguous way to express such a social fact is to use *generic* normative language (e.g., "That's how *one* must do it"). Generic statements carry special weight and guide learning about the social world, for instance by leading children to make generalizations even in the face of contradictory evidence and also to infer essentialist features for social categories from generic language (Chambers, Graham, & Turner, 2008; Cimpian & Markman, 2011; Rhodes, Leslie, & Tworek, 2012). Therefore, the combination of generic and normative statements represents an especially powerful linguistic device. It should be found in the context of children's creation and, especially, transmission, of social norms, if children understand these norms as valid and binding for anyone who participates in a social practice.

As enlightening as all the studies described above are regarding children's understanding of social norms, they all involve an authority (adult or older child) as the source of social norms' peculiar force in human affairs. From this perspective, it might be said that what Piaget found was that young children doubted their own ability to change adults' (or older children's) rules, whereas Turiel (1983) and colleagues found that children were much more sanguine about the ability of adults to change adults' rules (Nobes, 1999). As long as we only observe children's comprehension of pre-existing norms, we lack a complete picture of their conception of social norms. It is important, therefore, to look at children's own creation of social norms and to supplement existing studies in which children do not really know the source of the norms they are encountering with studies in which they have the opportunity, first, to create new norms and rules themselves, and then to apply those self-created rules to others. Once they are on their own and there is no authority around, young children might well be able to find their own ways to organize themselves, as characterized by Ostrom (2000) for adults: "Increasing authority of individuals to devise their own rules may well result in processes that allow social norms to evolve and thereby increase the probability of individuals better solving collective action problems" (p. 154).

There are almost no studies of young children creating social norms or rules outside of adult influence. Merei (1949) found that 3–6-year-olds within three to six meetings in the same room with the same toys seemed to form something like "traditions" so strong that even very dominant, older children could not counter these traditions upon entering the group at a later time. But the very cursory descriptions (and lack of statistical analysis) of children's behavior in this study leave open the question of whether the behavioral traditions and preferences children developed were viewed as anything like agent-neutral social norms with normative force over all in the group. In a similar vein, Nobes (1999) provided triads of 5–7-year-olds with a variety of different materials and instructed them to build a bridge. He found that children invented their own rules regarding how to build a bridge, which they expressed in the form of "decrees;" i.e., non-negotiable statements of rules. When the experienced children were paired with novice children, the decrees doubled in number. These findings provide insight into children's use of certain forms of language to achieve coordination. However, this largely qualitative observational work does not resolve the issue of how much normativity underlies children's utterances and actions in such contexts.

A recent promising line of research uses the paradigm of open diffusion studies to investigate children's transmission of instrumental knowledge from peer to peer (Whiten & Flynn, 2010). In one study, Flynn and Whiten (2010) found that 3-year-olds are influenced by processes of conformity to their peers that override their individually acquired instrumental knowledge regarding retrieving a reward from a box. Children's transmission of instrumental knowledge is thus shaped by social processes of conformity. However, as there were no measures of normativity (e.g., normative language) it remains unclear in what sense children viewed the use of certain techniques as normative.

To our knowledge, there is no systematic empirical research on young children creating their own social norms, and especially their use of normative language to generate, transmit, and enforce these norms. In the present study, therefore, young children were placed in a situation with a common goal without any authority telling them what to do or what is right or wrong. Two situational elements were included that are central to norm emergence. First, goal achievement was impossible for a single child; children were thus interdependent. In this sense, we adopt the view that social norms or conventions that emerge in this context are solutions to a coordinative problem with multiple equilibria (Bicchieri, 2006; Lewis, 1969) and thereby provide an opportunity for participants of this social system to develop mutual expectations (Turiel, 1983). Second, as repetition is essential to norm formation
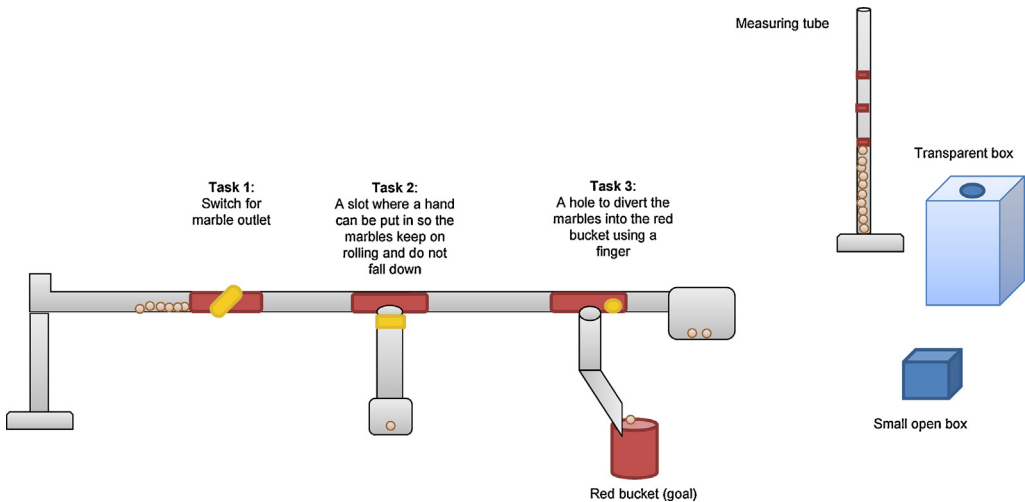
Fig. 1. Setup of the marble run and the different task locations.

(Gersick & Hackman, 1990; Guala & Mittone, 2010), this interactive situation was repeated over several days with the same children in order to encourage efforts at coordination via norms. We thus sought to decouple children's social coordination from their usual tendencies to seek out adults' norms (Kalish & Cornelius, 2007; Schmidt et al., 2011) and thereby investigate whether young children are capable of coordinating themselves by creating their own social norms. The use of normative language would be a strong indicator of norm creation, suggesting that children view their way of playing a game not just as a personal preference, but as something that others should conform to as well. Thus, as children created their own rules of playing and coordinating with each other, we expected them to use normative language, especially when coordination is required, i.e., when novices enter the game and need to be instructed. Of particular importance is children's use of generic normative language as it reveals a normative understanding beyond the present situation and refers to more than single individuals. If children conceive of their created norms as valid and binding for others in agent-neutral ways, they should make use of generic normative language, particularly in the context of transmitting norms to novices.

1. Method

1.1. Participants

Fifty-four 5-year-olds (27 females, M_{age} = 5–2, age range: 4–11 to 5–9 years) from a mid-size German city participated. Children were tested as triads in their day care center. Participants were from mixed socioeconomic background and native German speakers. The inclusion criterion for triads was to win at least one reward (i.e., collecting 10 of 20 marbles) within seven trials on the first day of testing. Three triads did not meet this criterion and were excluded from the final sample.

1.2. Materials

Children were presented with a marble run made of three interconnected PVC tubes, which were held up by three wooden stands at a height of 90 cm in the beginning of the marble run and then steadily declining. Altogether, the marble run was about four meters long and comprised three task locations (see Fig. 1).

The beginning of the marble run consisted of a plexiglass tube which visibly stored 20 wooden marbles. This tube had an opening through which the marbles were filled in and a rotary switch that

released one or two marbles at a time depending on the speed of turning (i.e., task 1). In the middle of the marble run, a hole was cut into the bottom side of the tube and another tube was vertically attached to it, such that the marbles fell down into a transparent container where they were not accessible. In this vertical tube was another hole that allowed children to put one hand through in order to form a bridge for the marbles to keep on rolling (task 2). Close to the end was a small tube attached sideways to the marble run. By putting a finger through a hole next to this additional tube, the marbles could be directed through the tube to roll out of the marble run into a red plastic bucket positioned beneath it (task 3). If this task was not performed, the marbles rolled on into another transparent box at the end of the marble run, where they were not accessible. Each of the crucial task locations was highlighted with yellow foil to direct children's attention to them.

Also included was a long vertical plexiglass tube (called "measuring tube") where the marbles could be collected. (The two additional boxes were not used in this study.) The tube was marked with three red stripes indicating the amount of rewards (stickers, balloons etc.) children could win. If they successfully collected all the 20 marbles children would win three rewards each; if they collected 17–19 marbles, they would win two rewards each and if they collected 10–16 marbles, they would win one reward each; if the children had less than 10 marbles, they did not win anything. Due to the length of the marble run and the distances between the task locations, the children were dependent on one another to succeed. Only if each child occupied one of the task locations was it possible to win rewards.

1.3. Design and procedure

On each of three testing days, triads of children participated in seven consecutive trials. The maximum interval between testing days was seven days, but almost all groups were tested on consecutive days or with an interval of two days. Three children of the same gender were randomly chosen to form a triad with the constraints that children would be available for testing on all planned testing days and that groups were not composed of best friends (as reported by teachers).

The children were taken to a separate testing room, where the marble run was set up but covered with sheets. A camera in a corner of the room filmed the activity. One experimenter (E1) took the triad into the room and played two collaborative warm-up games. The first warm-up game was to transport a ball on a triangular sheet to a bucket and the second was to get a small ball out of a plastic container by pulling three strings simultaneously. No normative language was used by the experimenters for the whole duration of the experiment to minimize the influence of authority on the children.

When the children successfully finished both warm-up games, E1 directed the children's attention to the marble run and uncovered it. Crucially, E1 only told children that the goal of the game was to get the marbles into the red bucket and thereby win rewards. However, E1 pretended to be naïve as to the operation of the marble run and encouraged the children to figure that out on their own by directing their attention to the yellow parts of the marble run.

E1 then told the children they could start playing and left the room. E1 and another experimenter (E2) monitored the children via a small screen connected to the camera inside the room. The trial was finished when the children had rolled all 20 marbles through the marble run. Either the children went to get the experimenter or if the children waited, E1 came in and asked if they had finished; if so, she looked at the measuring tube with the children and reviewed how many rewards they had won. Children were then led outside the room to collect their rewards from E2 while E1 reset the marble run to its initial state. Children were then asked if they wanted to play again; in total, seven trials were played in this way.

On the second day of testing the same children were asked if they wanted to play again and without further instruction they were led into the same room with the same setup of the marble run and played again for seven trials. On the third day of testing we split up the original triad and randomly chose two naïve children, who had not been exposed to the marble run before, for each of the original children to play with. We refer to original participants as "experts" and the new children as "novices". The experts and novices received no instruction and were led into the testing room with the words:

"Here is a marble run with which you can win rewards". Consequently, experts and novices were left unaware of each other's status. However, we cannot rule out the possibility that children noticed during previous testing days who had taken part in the experiment before; therefore some novices might have known that the expert had already played. On day 3, children again played for seven trials. Due to timing issues, one triad could only be tested for four trials on day 3 and another one only completed five trials on day 3 and then dropped out.

1.4. Coding

Video recordings of all sessions were transcribed using the CHAT format from the CHILDES Project (MacWhinney, 2000). Each utterance was coded for the use of normative language for which we developed our own coding scheme (Appendix A).

Each utterance received one of the following main codes: normative, imperative, descriptive, interjection, or irrelevant. An utterance was coded as normative if it clearly revealed that children were referring to a normative dimension by using the German equivalents of the following normative vocabulary: must, ought, may, right/wrong, good/bad; e.g., "You must put the marble in here". When an utterance referred to an object or a situation instead of a person, there were further signal words for normativity: belong, go, count; e.g., "The marble goes in here", "That's not how it goes". Finally, we included a very common (German) phrase to be also coded as normative: "That's how one does it." If an utterance did not include these signal words/phrases it was not coded as normative.

An utterance coded as imperative had to have the standard grammatical structure of an imperative, e.g., "Give me the marble" or it could also be an imperative without a verb, e.g., "Not this way." Although normative utterances do have an imperative dimension, and imperative utterances can have a normative dimension, we were strict in distinguishing them by the conservative criterion of the presence of normative signal words. Our reasoning behind this distinction is that simple imperatives are set in the current situation and convey an expectation of one person to another, whereas utterances that include normative words like "must" or "ought" already go beyond the dyadic scope of imperatives and reflect more general expectations. Therefore, "You must put the marble in there" reveals a more normative and abstract level of expectations than "Put the marble in there."

Each normative, imperative, or descriptive utterance was given a further code indicating whether the utterance referred to an object or a person, as determined by what the subject of the sentence was. A normative or descriptive utterance was also coded as generic or concrete, i.e., if it was related to objects or persons only within the current situation (e.g., "You must put the marble here") or if it referred to something more general, detached from the here and now of the situation (e.g., "Marbles always go here"). An imperative utterance is inherently concrete and always refers to someone or something in the current situation; therefore there were no generic imperatives. Additional supplementary codes marked an utterance as coordinative, teaching, or related to permission (Appendix A).

Of special interest were coordinative utterances. These were marked by an interpersonal reference, i.e., when children talked to each other about tasks or behaviors relating to the marble run that did not solely concern their own current tasks (e.g., "I like turning the switch.") but related to other children's behaviors (e.g., "Can I turn the switch now?") and served to coordinate their actions. These utterances occur, for example, when a child teaches another child how to perform a task or tells a child to move to another task.

Finally, an utterance was considered irrelevant if it did not refer to play with the marble run in any way. Short exclamations like "Hey" or "Cool" were coded as interjections. If an utterance was incomplete and the gist of it was absolutely unclear it was not coded and, together with interjections and irrelevant utterances, excluded from analyses. Of all the 14,562 utterances transcribed, 1231 were coded as irrelevant, 2577 as interjections and 1140 did not receive a main code as they were incomplete or acoustically not understandable. As these utterances were excluded from the data, 9614 utterances remained to be analyzed (6364 descriptive; 2516 imperative; 734 normative).

About 16% of the data were coded by a second independent coder who was blind to the hypotheses of the study. Cohen's kappa was $\kappa = .81$ for the main coding category, $\kappa = .83$ for reference (object/person) and $\kappa = .75$ for scope (generic/concrete).

2. Results

2.1. Task difficulty

We aimed for an intermediate level of difficulty in operating the marble run as this would be most motivating for the children to continue playing over several trials and days. As an indicator of how difficult it was to initially figure out how the marble run works, we examined how many trials it took the groups to successfully get at least one marble into the red bucket on their first day of testing: Three of six triads did so on their second trial, two on their third trial, and one on their fifth trial.

Examination of success rate in winning one reward (i.e., getting 10 of 20 marbles) on the first day showed two groups succeeded on their third trial, one group each on their fourth and fifth trial, and two groups on their seventh trial. On average, triads retrieved 8.07 (SD = 6.49) marbles per trial on their first day, 13.83 (SD = 3.85) on their second day and 9.46 (SD = 5.7) on their third day (when playing with the novices), confirming that the task was indeed of an intermediate difficulty level.

Regarding task locations, the switch was the simplest task as it was intuitively easy to handle and there was no possibility of making a mistake or losing marbles. In order to estimate how difficult the other two task locations were, we calculated how many marbles were lost at either location on the second day. Across all groups an average of 1.98 (SD = 2.93) marbles were lost per trial at task 2, whereas 4.19 (SD = 2.83) marbles were lost per trial at task 3, suggesting that the third task was more difficult than the second task.

2.2. Comparison of Children's Utterances across Days and Trials

2.2.1. Normative language as a function of day and trial

The most convincing evidence for children going beyond individual preferences for certain actions when coordinating with each other is their use of normative language. Therefore, we first looked at the number of normative utterances that occurred across days and trials. We hypothesized children would use normative language to coordinate with one another, especially on day 3 when experts introduced novices to the game and therefore coordination demands were increased.

We ran a Generalized Linear Mixed Model (GLMM; Baayen, 2008) using R (version 2.15.0; R-Development-Core-Team, 2012) including the random effects speaker, original group of the speaker (i.e., the specific expert group and all three expert-novice groups that originated from this same expert group), actual group of the speaker (i.e., the specific triad), and the particular trial in which the utterance occurred.

We conducted a preliminary GLMM including the random effects from above and only gender as a fixed effect. We compared the fit of this model to the fit of a reduced model not including gender but all random effects using a likelihood ratio test (Dobson, 2002). The response variable was an utterance either being normative or non-normative. No main effect of gender appeared (χ^2 = 2.13, df = 1, p = .14); therefore data were collapsed across gender in subsequent analyses.

In the main analysis, we included the same random effects as well as the fixed effects of day (three levels), reference (object/person), role (expert/novice), trial number, and the interaction between day and trial number and the interaction of day and reference and role and reference. For testing each of these effects, the fit of the full model was compared to that of a reduced model not comprising the effect of interest but all other effects present in the full model using a likelihood ratio test.

Results revealed a significant main effect of day (χ^2 = 16.70, df = 6, p < .05) indicating that children's use of normative language differed significantly as a function of day: On day 3, when the novices entered the scene, children used more normative language than on the other two days. Additionally, children's use of normative language peaked on the first trial of day 1 (the first contact with the marble run) and day 3 (the introduction of novices to the marble run) and then declined over the course of trials, whereas day 2 showed a consistently low level (see Fig. 2).

Furthermore, a main effect for reference was revealed, such that children used much more normative utterances referring to persons as compared to objects (χ^2 = 174.53, df = 4, p < .01). The factor of role was also significant, with experts using more normative utterances than novices (χ^2 = 8.60, df = 2, p < .05). Finally, a significant interaction effect was found for role and reference, such that experts used proportionally even more normative utterances on persons compared to novices (χ^2 = 6.97, df = 1, p < .01).

We assessed whether any influential cases (e.g., specific individuals or groups) were driving the effects of the GLMM by repeatedly comparing the original model with models based on a reduced data set (excluding one child/group/trial one by one). This analysis suggested that there were no particularly influential cases and that our model was fairly stable.

2.2.2. Generic normative language as a function of day and trial

As generic normative utterances demonstrate more powerfully the creation of general agent-neutral social norms, we hypothesized that if children established their own social norms, they would also use these more generic utterances within their repeated interactions, especially on day 3 when novices are introduced and have to be taught about the marble run. We therefore analyzed children's use of generic normative language using a GLMM (analogous to the first analysis) with an utterance being normative *and* generic or not as the response. We found a significant main effect of day (χ^2 = 16.63, df = 6, p < .05) suggesting that children used hardly any generic normative utterances during the first two days of testing, in contrast to day 3 (see Fig. 3): Particularly, in the first trial during the first encounter of the novices with the marble run, the amount of generic normative utterances increased significantly (but only for the experts, not for the novices).

2.2.3. Coordinative language as a function of day and trial

Among utterances previously coded as coordinative, we calculated the proportions taken up by normative, imperative, and descriptive language, thereby gaining a better understanding of the process of coordination and the role of normative language in that coordination over time (see Fig. 4). On day 1, normative utterances started at a relatively high level and then consistently
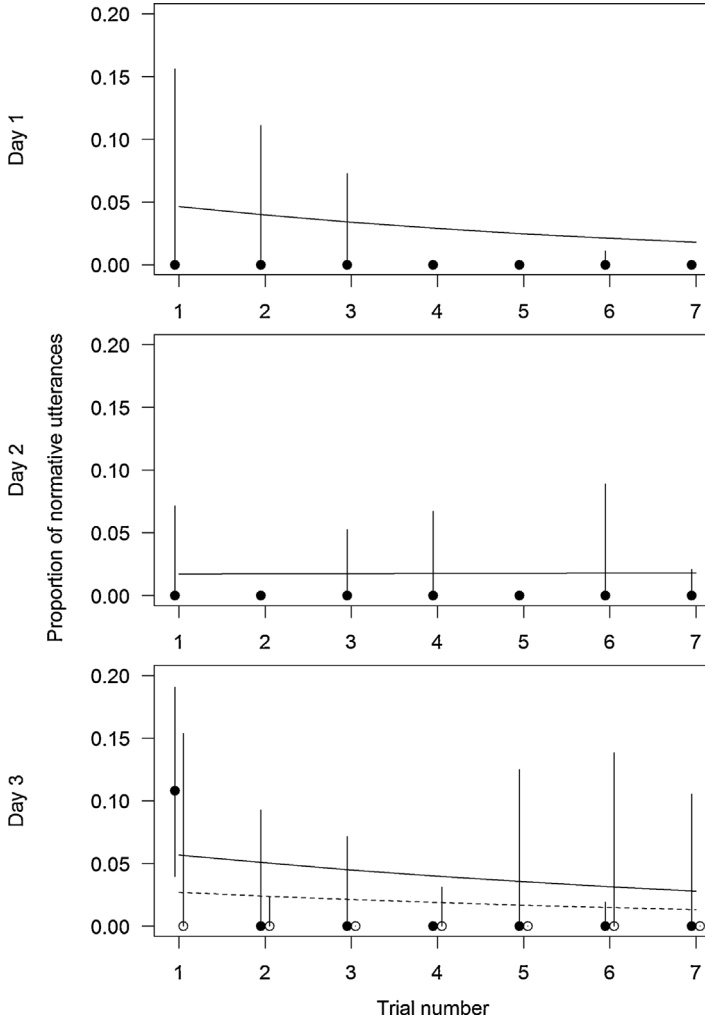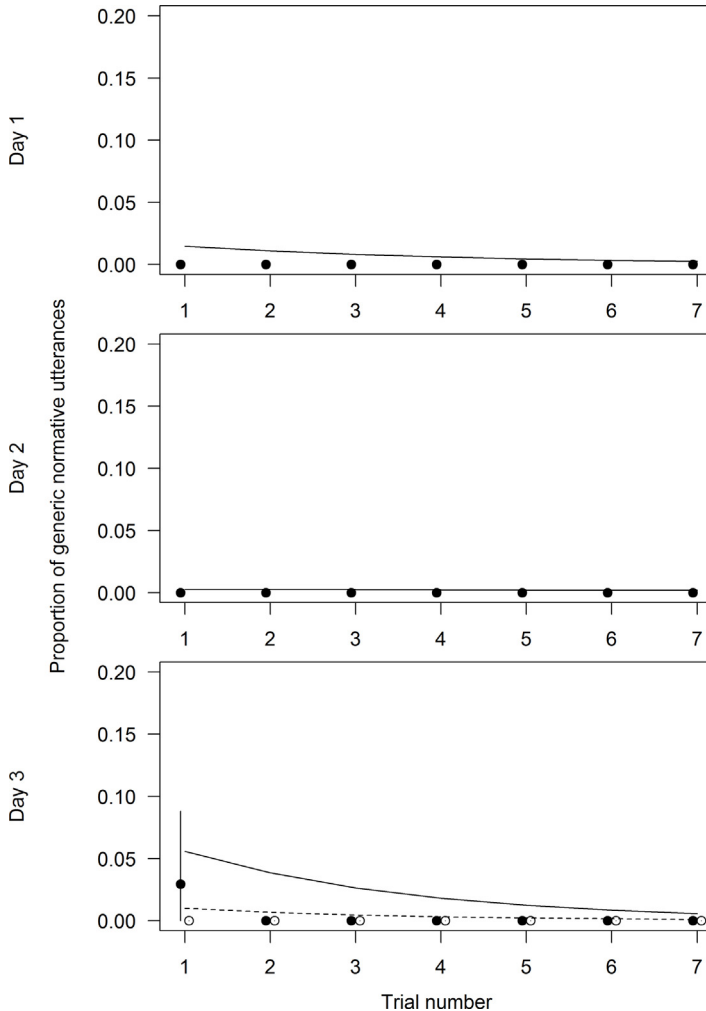
Fig. 2. Median proportions of normative utterances by day and trial number. Lines represent the model predictions and on day 3 the dashed line represents the novices and the continuous line the experts.

decreased whereas imperative utterances showed the opposite pattern, increasing over trials. Day 2 showed fairly stable use of the different categories, imperatives being the most frequent and normative and declarative utterances showing relatively low levels. Day 3 revealed on average higher levels of normative utterances compared to the first two days; especially the first trial showed a high amount of normative language which again slightly decreased over trials (similar to day 1). These trends indicate that normative language was mostly used for coordination at the first encounter with the new apparatus and when novices were introduced for the first time. Apart from that, children mostly coordinated by using imperative language.

As our results revealed most interesting trends for normative language on day 1 and day 3, we looked at the specific utterance contents on these two days. On day 1, normative language mainly concerned the goal of the marble run, e.g., restating where the marbles must go (the red bucket) or stating where they have to roll. On day 3, mostly the experts used normative utterances and primarily stated the general rules or assigned and explained tasks to the novices (see Appendix B for examples). In this sense, normative language was used to coordinate and align children on day 1 toward the common goal and on day 3 mainly to teach novices the general rules of operating the marble run and thereby coordinate and direct their behavior to accord with the way the children have played the game before.

These findings illustrate the coordinating role of normative language relative to other types of utterances across days and trials. Normative language peaked when coordination demands were high and was used to set the normative standards and

Fig. 3. Median proportion of generic normative utterances. Lines represent the model predictions and on day 3 the dashed line represents the novices and the continuous line the experts.

expectations of the group. Once these group standards and expectations had been established either among the initial expert group or when encountering novices, coordination was mainly achieved by using imperative language.

2.3. Behavioral observations

Although the marble run task is mechanically rather fixed, we found that children created arbitrary rules within the task, i.e., rules that are not determined by the nature of the apparatus and thus non-instrumental, but rather are creative additions to the game. These instances are suggestive of children not merely focusing on their joint instrumental goal but also creating new social norms within the game. To illustrate, we describe one example of such an arbitrary game rule, although. Note, however, that this is anecdotal evidence and not central to our research questions. Nevertheless, these instances seem well-suited to emphasize the potential of the present approach and to spur further research.

One behavior was particularly interesting due to the arbitrariness it involved. A group of boys came up with the rule that if the marbles did not land in the red bucket directly but fell next to it or jumped out of it, they had to put them back into the beginning of the marble run. This created rule is especially striking since it is potentially harmful to the success of the group in winning rewards (if the marbles are played again, they could be lost). Within their first trial, the children already experienced that the marbles sometimes jumped out of the red bucket, but they still put them into the measuring tube and these marbles were counted for their winnings by the experimenter. This clearly emphasizes the arbitrariness of this behavior; it is potentially
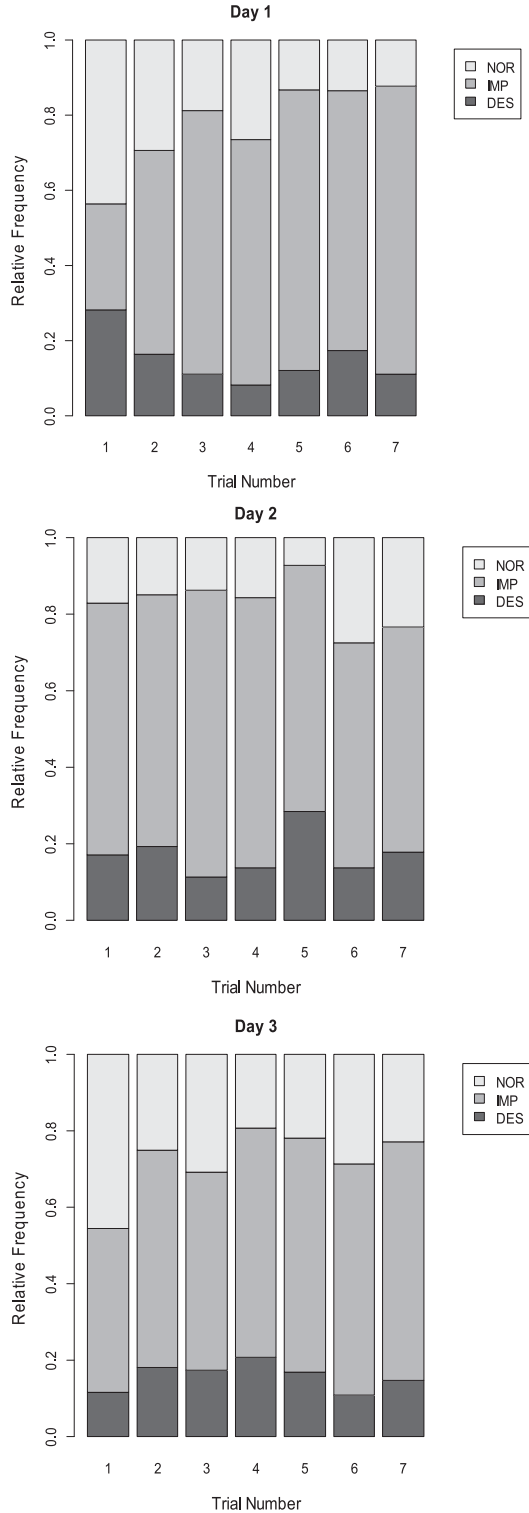
Fig. 4. Subdivision of coordinative language showing the average relative frequencies of normative (NOR), imperative (IMP), and descriptive (DES) utterances within coordinative utterances separate per day and trial.

harmful and the children experienced that the game could be played without this additional rule. Nevertheless, suddenly, in their fourth trial on day 1, one of the boys protested when one of his teammates collected a marble that had fallen next to the red bucket. He instructed that they would play the marble again. With no objection, the other boys conformed and from there on they consistently showed this behavior every time a marble did not directly land in the red bucket. Even more striking, all of the experts of this group passed this rule on to the respective novices they played with, using normative language. Further examples of arbitrary, non-instrumental game rules that other children invented included, for example, one group who waited until four marbles were in the red bucket before filling them into the measuring tube and another group that waited until all of the marbles were in the red bucket before filling them into the measuring tube instrumental rule choice.

3. Discussion

This study aimed to enhance our understanding of children's normativity by examining 5-year-olds' autonomous creation and transmission of social norms. Engaging in a recurrent and interdependent task, children were capable of creating their own sets of social norms to align their behavior effectively, even when there was no authority who prescribed how they ought to behave or judged their actions. This suggests that children of this age understand major aspects of conventionality, in particular that many social norms are based on agreement. However, children transmitted these stipulated norms to novices in authoritative and inflexible ways (rather than entering a new round of negotiation), much like they apply rules set by adults (Rakoczy et al., 2008). Therefore, once children have (autonomously) settled on how to do things, they attribute some kind of "objective" validity to these self-created norms – an interesting reification of norms and rules (Nobes, 1999; Piaget, 1932).

Besides producing quite efficient rules for coordination, some children in the present study also invented a rather maladaptive rule that hindered their own successful outcome (by putting some marbles back to the beginning). This seemingly odd behavior supports findings by Whiten and Flynn (2010) that children modified a tool use norm into a more complex and less efficient norm. The persistence of such inefficient norms shows the force that is behind them. Once accepted as a general rule, even if it is self-imposed, children are reliable in abiding by it, irrespective of the objective success. Also related is the finding by Kenward (2012) that overimitation of causally unnecessary actions is understood and enforced by children in a normative way. These unnecessary actions can also be considered maladaptive as they are costly in terms of time and energy; yet children insist on their performance by a third party and use normative language to justify this behavior.

In the present study, children predominantly used normative language in particularly demanding situations, when coordination was most required, that is, during their first encounter with the novel task and when playing with naïve peers who needed instruction. Their behavior on these two different occasions suggest that when children interact with each other during a novel task without adult guidance, their initial normative utterances mainly serve to establish a common goal for the group (e.g., "The marbles must go in here"). This normativity in restating the goal might shape a common ground and alignment for future interactions as it ensures that everybody in the group is clear and focused on the goal. However, the highest level of normative utterances occurred when novices joined the game, showing that their coordination and alignment was mainly achieved by applying the force of social norms. On an interesting side note, most of children's normative utterances contained a person as subject ("You must do this"), as opposed to an object ("Marbles go here"), and indeed the experts proportionally used even more of these subject-related normative utterances.

Particularly remarkable is children's use of generic normative utterances that occurred almost exclusively on the third day when novices were introduced to the task. When initially coordinating with each other, experts used generic normative language occasionally among themselves but as they were simultaneously agreeing on ways of playing together they subtly and steadily developed a shared understanding of how they can successfully play together. As Bettenhausen and Murnighan (1985) described regarding the emergence of adults' norms, this might reflect that as shared experiences and successive agreements contribute to a shared understanding of appropriate behavior, expectations about future interactions arise that can gain normative force. In light of these theoretical considerations, the comparably low use of generic normative language within expert groups might be due to a subtle development of shared standards that only surface in the use of normative language when there is a need for explicitly stating them, for instance to naïve children.

Use of generic normative language is also relevant to research on generic language in general. As noted earlier, use of generic language influences understanding of social categories and induces essentialist beliefs about them (Rhodes et al., 2012). The present study adds an important further context in which generic language (with normative force) is used with much influence – when children create and transmit their own social norms. These generic normative utterances thus pronounce an agent-neutral stance of normative expectations. When children mainly use generic normative language with naive children who enter their playing team, we believe that they increase the normative pressure on novice children to conform to the standards of the group by conveying the message that this is simply "the way it must be done" by anybody who wants to play this game.

Above all, it is remarkable that children communicated their autonomously created behavioral regularities using normative utterances (rather than only imperatives or descriptives), since it suggests that they already have some understanding of the coordinating function of social norms to align the behaviors within a group. The fact that normative utterances varied systematically according to the situations the children faced suggests further that children have an idea about the force of social norms. By saying "this is how it goes" instead of "let's do it like this," children are using the power of normative language to align naïve children's behavior. These findings thus show us that children have a relatively profound understanding of normativity and how it is used to coordinate cooperative action.

Overall, our findings suggest that children have a notion of the social origin and force of many types of norms. They invent their own arbitrary norms and pass these on to naïve children using generic normative language, indicating they understand something about the normative force such utterances carry. Otherwise, they could have used descriptive utterances (e.g., "We played like this yesterday; we could play it again like this"), which would have been factually correct but would not have transmitted any pressure to comply. Hence, there is something quite systematic in this emergence of generic normative language on the first encounter with novices, as it effectively aligns these children's behavior.

A further question is which types of norms children were creating in our study. As we have not interviewed the children regarding their perceptions of the severity or context relativity of transgressions of their game rules (Turiel, 1983), we cannot directly answer this question. However, we believe that the structure of the game as a coordination task promotes the emergence of more conventional and coordination norms, rather than moral ones. Nevertheless, issues like turn-taking at certain positions could certainly also pertain to moral issues of fairness. Future work may address this question.

It could be argued that the task we chose was instrumental and did not leave much room for arbitrary conventions but merely allowed for the discovery of mechanic functions and purposes. However, we still found instances of arbitrary rules within this instrumentally limited task, which suggests just how pervasive arbitrary conventions are in human groups. Furthermore, the operation of the marble run was not entirely determined by the material, as shown by children who did find different ways of goal achievement, e.g., by turning up a part of the marble run or using different styles of retrieving the marbles. In future research it might be even more compelling to find evidence of children creating their own constitutive norms as opposed to more regulative norms, which could demonstrate an even deeper understanding of social norms as a part of our institutional reality (Searle, 1995).

Furthermore, it might be argued that children in this study thought they had only discovered prior existing adult norms and were not aware that they invented these themselves. We cannot completely rule out this possibility. However, we tried to eliminate situational factors that might foster this interpretation by having experimenters pretend to be naïve toward the marble run as to avoid implying that there was a "right way" to play with it and even if so, there would be no one around to know about it. Moreover, the children were left on their own and unaware that they were simultaneously being watched while playing; hence, the experimenters were not commenting on or judging the children's behaviors. Instead, they attended only to the outcome by counting the marbles and determining rewards. Children's invention of their own arbitrary norms based on mutual agreement can be seen, for example, in the group that invented the refilling of the marbles. All the boys agreed (by not objecting and behaving accordingly) when one of them determined to play like this and it became a general rule that was passed on. As this behavior is particularly arbitrary, it is highly unlikely that the children believed this rule to be previously established by adults. Additionally, one girl suggested waiting for

four marbles and only then filling them into the measuring tube, but she failed to establish this "rule" because her teammates denied their agreement; consequently, even the girl herself did not pass it on to the novices, which suggests that mutual agreement is necessary for establishment of social norms. However, further investigation is needed regarding agreement as a basis for social norms.

The relatively small number of normative utterances compared to imperative or descriptive utterances might be viewed critically. However, there is no need for constant use of normative language. Children mostly describe to each other what they are doing or what is happening or direct one another imperatively to do things. Nevertheless, these occurrences of normative language are revealing as they show that children view their own created game rules as normative and, most importantly, they will use this normative force to teach other children about their game. Similarly, our sample size is relatively small, which indicates the need for caution in interpreting our data as a general phenomenon. Subsequent research is needed to provide more generalizable support for our findings.

In sum, the present findings suggest that 5-year-old children are not only accomplished normative learners who adhere to and enforce adults' norms; they are also creative inventors of their own social realities and norms. Of course, children have to rely on following authorities to become an accepted member of a cultural group (Odden & Rochat, 2004), but a child's role in establishing and maintaining social and institutional reality might be much more active than previously thought. In some ways, we found indications that children are actually very similar to adults in constructing their own rules, especially when we consider aspects like the necessity for mutual agreements and the use of generic normative language. The normative forces that surround us in daily life already impose themselves upon young children, demonstrating, once more, how fundamental they are to humans' remarkably cooperative ways of living.

Acknowledgments

Appendix A.

Coding categories.

Category	Description	Example
Main categories		
Normative	Occurrence of signal words: must (not), have to, are to, supposed to, should, may, right, wrong	"You are supposed to put the marbles in here."
	Signal words regarding objects: belong, go, come, count	"The marble goes in there."
	Additional phrases:	"That does not count."
	"That is how it goes."	
	"That is how it is done."	
Imperative	Classic imperative form;	"Go there!"
	without a verb;	"Not like this!"
	polite form	"You will/could do this, ok?"
Descriptive	Declarative utterances that are not normative/imperative by category description	"I am rolling the marble now."
		"Why is the marble stuck?"
Interjection	Short exclamations and one-word sentences without a verb	"Hey!", "No!"
		"Attention!"

Appendix A (*Continued*)

Category	Description	Example
Irrelevant	Talk without any relation to playing with the marble run	"I went to the library." "How old are you?"
Subcategories		
Generic	The scope of the utterance refers to more objects/persons than are in the here and now	"One must do it like this." "It needs to be done this way."
Concrete	The scope of the utterance only concerns objects/persons here and now	"You can go there." "This marble goes here."
Object	Utterance refers to an object	"It is my marble."
Person	Utterance refers to a person	"We will win this."
Added categories		
Coordination	When playing together is coordinated by an utterance; when the utterance concerns more than one task location	"You go there and I stay here." "We can switch positions."
Permission	When children show that they claim certain positions/tasks	"May I turn the switch now?" "It is your turn now."
Teaching	When children teach each other	"I show you how this goes."

Appendix B.

Examples of normative utterances only for the first trial on days 1 and 3.

Day	Speaker: Utterance
1	Celina: "That doesn't count."
	Julika: "Look, it must roll this way and then into here."
	Francis: "They are all in the wrong bucket."
	Ben: "You must aim in here."
	Pascal: "What should I do?"
3	Josefa: "One must [put] them in here."
	Josefa: "First, one must [do it] like this."
	Josefa: "You must be here, Mathilda."
	Anna: "One [person] must be there so that it [marble] does not fall down."
	Anna: "And one [person] must always put it in the red bucket."
	Anna: "And one [person] must turn there."
	Annika: "Now, they go back in here [switch]."
	Anna: "No, they go there [measuring tube]."
	Julius: "The hand there in the hole! But do it right!"
	Julius: "And they [marbles] must go here in the red bucket."
	Mia: "They must not fall in here. Because they must go in here."
	Cosette: "It must be kept shut there also."

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