Young children’s understanding of ownership rights for newly made objects

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ABSTRACT

Young children often use simple rules of thumb to infer ownership of objects, but do they also understand ownership rights? We investigated whether 2- and 3-year-olds would react to violations of ownership rights in the context of newly made objects. In Experiment 1, children protested and made spontaneous reference to ownership when a puppet took away the child’s object, but protested little when a third party’s objects were at stake. Yet, 3-year-olds attributed ownership to the third party when asked ownership questions. Children’s ownership claims were due to the effort invested in making new things, as they rarely used ownership protest after having handled raw materials (Experiment 2). Two- and 3-year-olds thus showed an appreciation of ownership rights for their own newly made objects. While 3-year-olds understood third party ownership, they may have lacked the motivation to intervene in ownership rights violations involving a third party.

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1. Introduction

In Western culture, the concept of ownership significantly affects people’s thoughts and behavior toward objects in their possession (Constable, Kritikos, & Bayliss, 2011; Cunningham, Turk, Macdonald, & Neil Macrae, 2008). Property ownership is also a social institution deeply engrained in the structure of human societies. It can be described as a triadic relationship between a person, another person and
an entity which is mediated by different rights and duties (Christman, 1994). Ownership rights may include, for example, the right to exclusively use one’s property or the right to exclude others from using it (Snare, 1972). Ownership is thus a complex concept to acquire, requiring the ability to identify relationships between people and their property and knowledge of social conventions regulating the use of one’s own and others’ property. Developmental studies have established that young children learn ownership relationships and infer ownership (Blake & Harris, 2011; Friedman & Neary, 2008), but there is still a conspicuous gap in our understanding of how cognitive development changes children’s appreciation of ownership rights (Rossano, Rakoczy, & Tomasello, 2011).

Infants begin to show an understanding of ownership relationships between 1.5 and 2 years of age when they first use possessive pronouns like “mine” and “yours” (Hay, 2006; Tomasello, 1998) and identify owners of familiar objects such as their mother’s toothbrush (Fasig, 2000). From two years of age children infer ownership of unfamiliar objects based on first possession, attributing ownership to the person who possessed an object first (Friedman & Neary, 2008). At 2.5 years of age they are able to learn ownership relationships between out of view objects and their owners (Blake & Harris, 2011). These abilities become more refined at three years of age, when children use object history to infer ownership (Friedman, Van de Vondervoort, Defeyter, & Neary, 2013; Gelman, Manczak, & Noles, 2012) and apply ownership rules such as ascribing ownership to a person who grants/denies permission to use an object (Neary, Friedman, & Burnstein, 2009) or who invested effort in making a new object (Kanngiesser, Gjersoe, & Hood, 2010). Yet, not until four years of age do children prioritize verbal ownership statements over physical possession of objects (Blake, Ganea, & Harris, 2012). Taken together, these findings suggest that children’s understanding of ownership relationships manifests at 2 years of age and becomes more sophisticated during the preschool years.

Relating owners to their property, however, is only one ability necessary for developing a concept of ownership. Few studies have directly investigated at what age children start to appreciate the normative implications of ownership, i.e., that it is associated with certain rights that are respected and reinforced by a community. By age two children frequently defend their possessions (or possessions they were told were theirs) against take-over attempts by others (Eisenberg-Berg, Haake, & Bartlett, 1981; Hay & Ross, 1982) and begin to show respect for others’ ownership of objects (Ross, 1996), providing some evidence for an early understanding of an owner’s exclusive access to his or her property. In contrast, studies presenting children with third party ownership stories have shown that it is not until age 4–5 that children appreciate different ownership rights (Kim & Kalish, 2009) or differentiate between legitimate (gift giving) and illegitimate (stealing) transfers of ownership (Blake & Harris, 2009). Yet, more recently, Rossano and colleagues (2011) demonstrated that 2- and 3-year-olds protested against property rights violations when their own property was at stake, but that only 3-year-olds also interfered when a third party’s ownership rights were violated. This suggests that by age 3 children are already aware of the normative structure of some rights for personal property, i.e., that property rights do not apply only to one’s own possessions but to others’ possessions, too. Yet, it is unclear whether young children’s appreciation of ownership rights extends beyond the realm of personal property such as clothing, where ownership is already established and potentially very salient. Specifically, we were interested in studying whether children would show awareness of ownership rights for newly created objects.

Children have some understanding of the unique value of creations like pictures. Five- to 6-year-olds (but not 3- to 4-year-olds) evaluate a person negatively that intentionally copied someone else’s picture (Olson & Shaw, 2011) and three-year-olds protest when a puppet tries to destroy a picture someone has just drawn (Vaish, Missana, & Tomasello, 2011). Furthermore, Kanngiesser and colleagues (2010) showed that 3- and 4-year-olds transfer ownership of an object from a previous owner to someone who has changed it into a new object. While these findings provide some preliminary evidence that children may attribute ownership rights to creators of new objects, none of the preceding studies directly addressed this question. Rather, they focused on children’s understanding of ownership of ideas (Olson & Shaw, 2011), their reactions to moral violations (Vaish et al., 2011), or asked children direct ownership questions and thus potentially cued them into thinking about ownership (Kanngiesser et al., 2010).

To study young children’s understanding of people’s ownership rights for newly made objects, we adapted a (spontaneous) protest paradigm previously used to investigate children’s awareness of
norms (Rakoczy, Warneken, & Tomasello, 2008; Rossano et al., 2011; Vaish et al., 2011). As Rossano and colleagues (2011) had found that 2-year-olds were only aware of ownership rights for their own property but 3-year-olds showed an awareness of the normative implications of ownership rights, our study included 2- and 3-year-olds.

Children participated in a game with a puppet and another person, in which each participant made a new object. The puppet then tried to keep all newly made objects to itself. We measured children’s reactions to the puppet’s behavior. We predicted that if children associate certain rights with newly created objects (i.e., the right to exclude others from taking/using it), they would protest against the puppet’s attempts to keep their objects. Moreover, if children understood ownership over newly made objects in a normative way they would extend their protest to the third party’s artwork. We expected children to protest very little against the puppet’s legitimate attempt to keep its own objects. To supplement the protest data with a more direct measure of children’s ownership judgments, we asked children at the end of the session to indicate who would get to keep the different objects.

2. Experiment 1

2.1. Method

2.1.1. Participants

Twenty-four 2-year-olds (Mean ± SD 31 ± 4 months, range 25–35 months, 11 female) and twenty-five 3-year-olds (Mean ± SD 42 ± 4 months, range 36–48 months, 15 female) took part. Six additional 2-year-olds and four additional 3-year-olds were excluded because they did not want to make a picture/play-dough shape (two 2-year-olds, three 3-year-olds), were reluctant to interact with the puppet (one 3-year-old) or because their parents interfered with the experiment (four 2-year-olds). All children were recruited from a medium-sized British city and came predominantly from Caucasian, middle-class families. They were tested individually in a laboratory setting. Some younger children sat on the parent’s lap.

2.1.2. Procedure

The experimenter (E1) first familiarized the child with a panda hand-puppet manipulated by a second experimenter (E2). All parties sat at a table with a tin box that contained different craft-making materials. The box with the materials was left on the table throughout the session to convey to children that the materials were part of the general set-up and did not belong to anyone in particular. In addition, the puppet put its own box on the table, stressing that it always kept its things in the box, to establish the puppet’s ownership of the box and its contents.

The procedure was divided into three phases: a warm-up phase, a test phase and an ownership question phase.

Warm-up phase: Children experienced two warm-up trials to determine whether they would in principle be willing to correct the puppet if it made a mistake. In each warm-up trial, the child had 30 sec to correct an instrumental mistake. For example, the puppet showed the child a small cup, stated that it would have a cup of tea and started drinking from the cup upside down. E1 turned away for the entire trial, so that children would directly address the puppet with their corrections. Children who did not correct the puppet were encouraged by E1 to do so.

Test phase: In the test phase, the child experienced two activities in which new things were created; one involving paper as material and the other play-dough. In each case, the child, the puppet and E1 worked simultaneously to create new objects. Once they had finished, the puppet tried to keep either its own object (baseline condition), the child’s object (child condition) or E1’s object (third party condition). The order of conditions within an activity (i.e., the order in which the puppet tried to keep the different objects), as well as the order of the two activities were counterbalanced.

Each activity started with E1 giving the respective materials (play-dough or paper) to the child, the puppet and herself and encouraging everyone to make something. After approximately 1 min, E1 asked everyone to put their artwork in the middle of the table. E1 then turned away and the puppet pointed at one of the objects and said: “I really like this one. I will keep it and put it in my box and I will never give it back.” After a few seconds, the puppet repeated that it wanted to keep the object
and slowly started to put it in its box. The puppet then proceeded to the next object and repeated this procedure until it had tried to keep all the objects on the table. If children protested against the puppet's behavior, the puppet stopped and asked what they should do with the object.

Ownership question phase: After the test phase all pictures and play-dough shapes (6 items in total) were placed back in the middle of the table and E1 asked the child who would get to keep the different objects, pointing to one object after the other. Children who did not reply were encouraged to point to one of the three possible owners (the child, the puppet, or E1). Children were then allowed to take the objects home that they had assigned to themselves or, alternatively, were given objects by E1.

2.1.3. Data coding

Children's responses were transcribed verbatim and coded. Children's responses to the puppet's instrumental mistakes in the warm-up phase were coded as "physical protest" if children corrected the puppet non-verbally and as "verbal protest" if children corrected the puppet verbally.

We distinguished three different levels of protest in the test phase: (a) "physical protest" if children protested non-verbally by taking an object away from the puppet and possessing the object for at least 10 s; (b) "simple (verbal) protest" if children protested verbally but without reference to possession or ownership (e.g., "No," "Don't do it," "I really like this one.", or "I want to take it home."); (c) "ownership protest" if children referred to the possession or ownership of the object in question (e.g., "This is mine," "It is hers," or "No, you can't keep my one."). If children showed different levels of protest, the highest level of protest was scored. In the ownership question phase, we scored whether children attributed ownership to the person who had made the object. We scored children's first response and treated pointing and verbal responses the same.

Data were coded by the first author and another coder. Inter-rater agreement on warm-up protest, $\kappa = .92$, on protest behavior in the test phase, $\kappa = .73$, and on ownership answers, $\kappa = .85$. All cases in which the two primary coders disagreed were moderated by a third coder. All data analyses were performed on the moderated data set.

2.1.4. Data analysis

We calculated a combined protest score across the two activities for each condition coding protest as ‘1’ and no protest as ‘0’ (minimum score = 0, maximum score = 2). Similarly, we used children's responses in the ownership question phase to calculate an ownership score for each creator. We coded “1” if a child assigned ownership of the picture or play-dough shape to the respective creator and “0” if not and summed the responses for pictures and play-dough shapes (minimum score = 0, maximum score = 2). We compared children's ownership scores in the ownership question phase to chance (33% correct).1

All data were analyzed using non-parametric statistics as data violated assumptions of normality. $p$-Values of Wilcoxon post hoc tests were adjusted using the Holm–Bonferroni method (Holm, 1979) to account for multiple testing and are reported as “$p_{\text{Holm}}$”. All reported results are based on two-tailed tests.

2.2. Results and discussion

2.2.1. Warm-up phase

The majority of children (71% of two-year-olds and 73% of three-year olds) protested at least once during the warm-up phase, and most children who protested used verbal protest at least once (two-year-olds: 65% verbal protest; three-year-olds: 78% verbal protest). The two age groups did not differ significantly in the number of children protesting, $\chi^2(1, N = 49) = 0.01, p > .999$, nor in the number

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1 One arrives at the same chance scores irrespective of whether one assumes (1) that children keep track of their attributions and e.g. only assign one picture to each person sequentially, or (2) that children do not keep track of their attributions and e.g. may assign more than one picture to one person. In case 1, there exist $2! = 6$ possible sequences to assign 3 pictures to 3 people, one of which will result in 100% correct attributions, 3 of which will result in 33% attributions, and 2 of which will result in 0% correct attributions, which overall results in 33% accurate responses by chance. In case 2, each attribution has 1/3 probability to be assigned to the correct person, yielding 33% accurate responses by chance.
using verbal protest, \( \chi^2(1, N = 35) = 0.73, p = .471 \). There was no significant correlation between protest behavior during the warm-up phase and protest behavior during the test phase for 2-year-olds \( r = .239, N = 24, p = .261 \) or 3-year olds \( r = .124, N = 25, p = .554 \); Spearman correlations).

2.2.2. Test phase

Children’s overall protest behavior in the test phase is depicted in Fig. 1A. We found no significant effect of age on overall protest behavior in any of the three conditions (baseline: \( Z = -0.44, p = .746 \), child: \( Z = -1.61, p = .120 \); third party: \( Z = -0.68, p = .584 \); Mann–Whitney U-tests) and thus combined the two age groups for subsequent analyses. Protest scores differed significantly across conditions, \( \chi^2(2, N = 49) = 33.93, p < .001 \) (Friedman test). Children protested significantly more often when the puppet tried to take away the child’s objects (child condition) than when the puppet tried to take its own objects (baseline condition), \( Z = -4.63, p_{Holm} < .001 \), or the third party’s, \( Z = -3.74, p_{Holm} < .001 \) (Wilcoxon test). However, there was no significant difference in protest scores between the third party and the baseline condition, \( Z = -1.43, p_{Holm} = .210 \). Two- and 3-year-olds thus spontaneously prevented the puppet from taking their newly created objects; however, children of neither age group intervened on behalf of a third party.

Next, we focused exclusively on children’s spontaneous ownership protest (Fig. 2A). Mann–Whitney tests showed no significant effect of age on ownership protest scores in any condition (baseline: \( Z < 0.001, p > .999 \), child: \( Z = -0.99, p = .432 \), third party: \( Z = -0.04, p > .999 \), so that data were...
again combined for the two age groups. Children’s ownership protest scores differed significantly across conditions, $\chi^2(2, N = 49) = 15.50, p < .001$. Children produced significantly more ownership protest in the child condition than in the baseline condition, $Z = -3.21, p_{Holm} = .003$ (Wilcoxon test). There was no significant difference between any other conditions (child vs. third party: $Z = -2.31, p_{Holm} = .070$; third party vs. baseline: $Z = -2.00, p_{Holm} = .125$). Thus, 2- and 3-year-olds spontaneously referred to the ownership of their new objects when protesting, but very rarely mentioned ownership by a third party.

Taken together, 2- and 3-year-olds protested against a puppet’s attempts to take the child’s newly made objects, explicitly referring to the ownership of their objects. This indicates that children were aware of at least some rights regarding their newly created objects, namely, the right to exclude others from keeping one’s property. However, in contrast to previous studies (Rossano et al., 2011), children did not generalize these rights to third parties. It is possible that these divergent findings indicate a qualitative difference in how children treat a third party’s personal property and a third party’s newly made objects; yet, it is more likely that they are due to subtle methodological variations. Careful examination of Rossano et al.’s data (2011) reveals that the rate of 3-year-olds’ (overall) third party protest was comparable to the third party protest in our experiment (protest rates of about 20%), but that 3-year-olds in our study showed more protest in the baseline condition. These differences in baseline protest could be due to our presenting three different objects (puppet, child, third party) simultaneously during the test phase, while Rossano et al. (2011) presented only one object at the time. Children in our study may thus have been more likely to accidentally protest when the puppet took its own object (baseline condition). In addition, simultaneous presentation may have led children to prioritize intervening for their own objects and to neglect intervening on behalf of the third party.

2.2.3. Ownership question phase

Two- and 3-year-olds’ ownership scores in the three conditions were compared to chance, using exact, two-tailed Wilcoxon tests. Two-year-olds’ ownership scores were significantly above chance for the child’s objects, $Z = -2.71, p = .006$, and the puppet’s objects, $Z = -2.35, p = .018$ (Fig. 3A). However, ownership scores were significantly below chance for the third party’s objects, $Z = -3.53, p < .001$. Two-year-olds’ errors consisted mainly of attributing ownership to themselves (puppet’s object in 23% of cases, third party’s object also in 23% of cases) or to the puppet (child’s object in 23% of cases, third party’s object in 50% of cases). Three-year-olds’ ownership scores, in contrast, were significantly above chance for all three creators (baseline/puppet $Z = -4.07, p < .001$; child $Z = -4.45, p < .001$; third party $Z = -3.24, p = .001$).

In summary, the majority of 2- and 3-year-olds accurately assigned themselves and the puppet ownership of the objects each had created. This is in line with our finding that children protested when
the puppet took the child's objects (a violation of ownership), but protested very little in the case of the puppet's own objects (no violation of ownership). Most 3-year-olds, in contrast to 2-year-olds, also accurately identified the third party as owner of her objects when being asked direct ownership questions. This suggests that 3-year-olds' lack of third party protest could not be attributed to a failure to keep track of the third party's ownership. Rather, it is possible that 3-year-olds may have simply lacked the motivation to prevent the puppet from taking the third party's objects.

Although children spontaneously claimed ownership of their newly made objects, it remains unclear whether this was due to the creators' investment of effort or due to the fact that creators had temporarily possessed the objects. To examine effects of short-term possession, we conducted a second experiment, in which children only played with the materials without creating new objects. If children's ownership claims were indeed due to the investment of effort, they should protest less after merely possessing the materials than after transforming them into something new.

3. Experiment 2

In this experiment, 2- and 3-year-olds played with the materials that were used in Experiment 1, but did not make pictures or play-dough shapes. Previous studies have found that young children failed to transfer ownership to a person after that person had briefly played with an object (Kanngiesser et al., 2010), suggesting that short-term possession is not sufficient to transfer ownership. Even though children infer ownership based on first possession in the absence of any other ownership cues (Friedman & Neary, 2008), children do not make these inferences from first possession per se, but only when it is informative about the historical path of possession (Friedman et al., 2013). We thus predicted that children would protest less after playing with the materials than after creating something (Experiment 1) and would attribute ownership randomly in the ownership question phase.

3.1. Method

3.1.1. Participants

Eighteen 2-year-olds (Mean ± SD 28 ± 4 months, range 22–35 months, 8 female) and twenty-one 3-year-olds (Mean ± SD 42 ± 4 months, range 37–48 months, 10 female) took part. They came from the same population as in Experiment 1. Four additional 2-year-olds were excluded because they did not want to play with the materials. Data from one additional 2-year-old could not be used due to video-equipment failure. Children were tested individually in a laboratory (thirteen 2-year-olds, eleven 3-year-olds), in a quiet room in a local nursery (one 2-year-old, four 3-year-olds) and in a curtained-off area in a local science museum (four 2-year-olds, six 3-year-olds). Kruskal–Wallis tests (exact, 2-tailed) revealed no significant difference in overall protest ($\chi^2(2) < 3.54, ps > .171$), ownership protest ($\chi^2(2) < 2.75, ps > .267$) or ownership scores ($\chi^2(2) < 1.84, ps > .425$) across the three locations.

3.1.2. Procedure

The procedure was similar to the procedure in Experiment 1 with the following exceptions. The child, the puppet, and E1 only received materials (a blank piece of paper or some play-dough) and played with them for 1 min, an interval that roughly matched the amount of time that children manipulated materials in Experiment 1. To make playing with the materials more engaging the experimenter suggested different activities (e.g., sliding the paper on the table, bouncing the play-dough on the table), but ensured that all activities would leave the materials unchanged. If children spontaneously started to transform the play-dough, the experimenter asked them not to do it.

3.1.3. Date coding and analysis

Data coding and analysis followed Experiment 1. Inter-observer agreement on warm-up protest, $\kappa = .80$, on protest behavior, $\kappa = .71$, and on ownership answers, $\kappa = .85$. 
3.2. Results and discussion

3.2.1. Warm-up phase

The majority of children (78% of two-year-olds and 76% of three-year-olds) protested at least once during the warm-up phase. Most 3-year-olds who protested used verbal protest at least once (69% of protest), while fewer 2-year-olds protested verbally (29% of protest), a difference that only approached significance, $\chi^2(1, N = 30) = 4.82, p = .066$. Two-year-olds’ protest behavior during the warm-up phase correlated significantly with their protest behavior during the test phase, $r = .520, N = 18, p = .027$, while the correlation for 3-year-olds’ protest behavior only approached significance, $r = .427, N = 21, p = .054$.

3.2.2. Test phase

Overall protest behavior (Fig. 1B) showed no effect of age in any condition (baseline; $Z = -0.09, p > .999$, child; $Z = -0.14, p = .908$, third party; $Z = -0.09, p = .999$). We thus combined the two age groups for subsequent analyses. Protest scores differed significantly across conditions, $\chi^2(2, N = 39) = 11.29, p = .003$ (Friedman test). Children protested significantly more often in the child condition than in the baseline condition, $Z = -2.53, p_{Holm} = .046$, or in the third party condition, $Z = -2.49, p_{Holm} = .035$ (Wilcoxon test). Yet, they showed no significant difference between the third party and the baseline condition, $Z = -0.46, p_{Holm} = .796$. In addition, Mann–Whitney U-tests showed no significant difference in overall protest scores between Experiment 2 and Experiment 1 for any condition (baseline: $Z = -1.29, p = .234$; child: $Z = -1.31, p = .210$; third party: $Z = -0.17, p = .893$). Thus, contrary to our predictions children’s protest did not differ significantly from their protest regarding newly made objects (Experiment 1).

Focusing exclusively on children’s ownership protest (Fig. 2B), no significant effect of age appeared in any condition (baseline $Z < .001, p > .999$, child $Z = -0.11, p > .999$, third party $Z = -0.93, p > .999$). Ownership protest scores did not differ significantly across conditions, $\chi^2(2, N = 39) = 3.00, p = .667$ (Friedman test). In addition, children used significantly less ownership protest in the child condition of Experiment 2 than in the child condition of Experiment 1, $Z = -2.27, p = .030$; none of the other conditions differed significantly between experiments (baseline $Z < .001, p > .999$; third party $Z = -1.12, p = .377$).

These findings indicate that children did not refer to the ownership of the materials they had played with and mostly relied on physical or simple protest. Thus, short-term possession of materials – in contrast to the creation of new objects (Experiment 1) – was not sufficient to induce spontaneous ownership claims. This suggests that children’s ownership claims regarding their newly made objects in Experiment 1 were based on the effort they had invested in making them.

3.2.3. Ownership question phase

In the ownership question phase, 2-year-olds’ ownership scores were significantly above chance for the materials the child had played with, $Z = -2.83, p = .004$ (Fig. 3B); yet, their ownership scores did not differ significantly from chance for the puppet’s materials, $Z = -0.74, p = .509$, or the third party’s materials, $Z = -1.76, p = .093$. Between 31% and 33% of the time across conditions 2-year-olds did not attribute ownership to any of the three possessors. Three-year-olds’ ownership scores, in contrast, were significantly above chance for the puppet’s materials, $Z = -2.13, p = .033$, but did not differ from chance for the child’s materials, $Z = -1.54, p = .134$, or the third party’s materials, $Z = -0.80, p = .424$.

Although no ownership information beyond short-term possession was given to children in Experiment 2, 2-year-olds attributed ownership of the materials they had played with to themselves, while 3-year-olds endorsed the puppet as owner of its materials. Thus, 2- and 3-year-olds attributed ownership non-randomly, with patterns of attributions varying between age groups. It is conceivable that 2-year-olds used their own short-term possession of the materials as a cue to ownership. Three-year-olds, on the other hand, may have used the puppet’s attempts to keep the materials during the test phase as an ownership cue. Importantly, however, ownership attributions differed from those in Experiment 1, in which 3-year-olds attributed ownership to all three creators and 2-year-olds to the puppet and to themselves.
4. General discussion

We investigated whether young children would spontaneously protest against a puppet’s attempt to take away objects the child or a third party had just created. We found that 2- and 3-year-olds protested when their own objects were at stake, making spontaneous references to ownership when protesting (e.g., “Mine.”). Thus, young children do not only appreciate their ownership rights with respect to personal property items (Rossano et al., 2011), but also with respect to newly made objects. Children’s ownership claims regarding their objects were specific to the investment of effort (Kanngiesser et al., 2010), as children who had only played with unchanged materials displayed very little ownership protest. Overall, our results support the view that by three years of age, children not only can connect owners to property (Blake & Harris, 2011; Fasig, 2000; Friedman & Neary, 2008), but also show appreciation of at least some ownership rights (Rossano et al., 2011).

In contrast to other studies, young children in our study intervened little against the puppet’s attempts to keep a third party’s objects. Previously, 3-year-olds were shown to protest against destruction of a third party’s picture (Vaish et al., 2011) and against stealing or discarding a third party’s personal property using procedures that closely resembled ours (Rossano et al., 2011). It is conceivable that 3-year-olds regarded destruction of a third party’s picture a stronger moral violation than theft of a newly made object. Also, children may believe that a third party has stronger ownership rights for personal property such as clothing (Rossano et al., 2011) than for newly made objects. However, most 3-year-olds in our study recognized a third party’s ownership of her newly made objects when they were asked direct ownership questions, suggesting that 3-year-olds may have lacked the motivation rather than the competence to protest against violations of a third party’s ownership rights.

In response to ownership questions, 3-year-olds in Experiment 1 assigned ownership of the different newly made objects to all three creators. In Experiment 2, however, 3-year-olds attributed ownership of the materials only to the puppet – possibly using the puppet’s attempts to keep the materials as an ownership cue. This difference in ownership attributions across experiments suggests that 3-year-olds viewed the investment of effort into creating new objects – but not the mere handling of materials – as sufficient for establishing ownership of previously un-owned materials. This finding is in line with previous studies, in which children overrode the ownership of materials in favor of a creator (Kanngiesser et al., 2010).

In contrast, 2-year-olds in Experiment 1 assigned ownership to themselves and to the puppet, while in Experiment 2 they only assigned ownership to themselves. This suggests that 2-year-olds’ ownership responses may have been affected by a bias to primarily assume ownership of objects they have made or handled – particularly in the case of ambiguous materials (Experiment 2). In line with these findings, a recent study by Gelman et al. (2012) found that 2-year-olds traced only ownership of their own objects if identical sets of objects were used, but also encoded others’ ownership if sufficiently distinct object were used. Similarly, other studies have confirmed that 2-year-olds are, in principle, capable of identifying the owners of familiar objects (Fasig, 2000) and can learn ownership of (distinct) objects in the owner’s absence (Blake & Harris, 2011). It is possible that the socially engaging nature of our task and the fact that children had to keep track of three different objects simultaneously imposed a limitation on 2-year-olds’ ability to track ownership. Overall, our finding suggests that 2-year-olds may have a less sophisticated understanding of ownership of newly made objects than 3-year-olds.

The most remarkable finding in our studies is that 3-year-olds are capable of attributing ownership to a third party and yet they seldom intervene when the third party’s possessions are at stake. There are two possible explanations. Three-year-olds’ understanding of the social consequences of ownership (such as violations of ownership rights) may lag behind their ability to track ownership relationships. Two-year-olds track ownership relationships (Fasig, 2000; Hay, 2006), but at age 3 children already interfere in ownership conflicts on behalf of a third party (Rossano et al., 2011). Moreover, 3-year-olds have been found to regularly intervene in a variety of situations involving violations of conventional and moral norms (Rakoczy et al., 2008; Schmidt, Rakoczy, & Tomasello, 2012; Vaish et al., 2011). Our discrepant findings thus may not reflect different developmental trajectories but rather different task demands. While answering ownership questions only requires the child to point to or to name a person, intervention in ownership violations requires an assessment of the social situation and, importantly, a
motivation to act on behalf of a third party. Since objects were presented simultaneously in our study (in contrast to Rossano et al., 2011, who presented objects individually), it is possible that children prioritized their own objects over a third party’s and thus neglected to intervene on her behalf.

Another issue is that children may have claimed ownership of pictures and play-dough shapes because they perceived them as more interesting or more valuable than the raw materials. Studies with adults show that an artist’s effort has an impact on the perceived value of an artwork (Kanngiesser, & Hood, in press; Kruger, Wirtz, van Boven, & Altermatt, 2004). Thus, differences in perceived value or attractiveness may have contributed to differences in ownership claims across the two experiments. However, such differences extended only to the child’s own objects.

Furthermore, children may have shown very little ownership protest in Experiment 2 because the experimenter ostensibly controlled how children played with the materials. Children use control of permission, i.e., allowing or denying someone else use of an object, as a cue to ownership (Neary et al., 2009). However, in the Neary et al. (2009) study one character explicitly asked for permission and a second character granted or denied it, while in our study children never had to ask for permission to play with the materials. More importantly, children in Experiment 2 neither showed ownership protest for the third party nor did they indicate the third party as owner, which strongly suggests that control of the materials cannot account for difference in ownership protest between Experiments 1 and 2.

Finally, children’s emerging understanding of ownership rights for newly made objects could be viewed as part of a developmental process during which children come to understand the normative nature of social rules. In the case of newly made objects, this process may initially be self-centered and only later develop into a full-fledged normative understanding of ownership rights. Recent developmental evidence suggests that normative awareness starts to develop between 2 and 3 years of age (Rakoczy et al., 2008; Rossano et al., 2011), yet it may be constrained to a few highly salient contexts.

Ownership may represent one of the first contexts in which children are exposed to the normative structure of social rules, providing a building block for understanding more complex social institutions later in life (Kalish & Anderson, 2011). By learning to appreciate the intricacies of social institutions such as ownership, children may acquire skills essential for navigating social reality.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at http://dx.doi.org/10.1016/j.cogdev.2013.09.003.

References