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Do Infants Prefer Owners over Thieves?

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Abstract

Normative concerns for ownership fundamentally regulate social interaction regarding resources in humans, but little is known about origins of ownership inferences and evaluations in earliest human development. Here, we ask if normative evaluations of ownership respect are rooted in an early-developing protomoral dispreference for those who violate ownership. Across two studies ($N = 66$) infants saw puppet shows where an owner was approached by a non-owner who attempted to take the owner's resource. Infants were subsequently allowed to choose between the two puppets. We controlled for the dominance implications of the outcomes of resource competition by systematically varying whether the non-owner or owner prevailed in attaining the resource. Both studies yielded clear Bayesian evidence that infants did not preferentially reach towards either the owner or ownership violator. These results suggest that infants do not hold strong negative evaluations of those who violate ownership.

Keywords: ownership, possession, conceptual development, cognitive development

Introduction

Ownership is a fundamentally normative concept: *Owning* an object implies the right to use, to grant permission to use, or to give away an object. Mere physical possession is neither a sufficient, nor necessary condition: One may possess a stolen object without owning it, and one may own an object that someone else has stolen from them. That is, while possession denotes a relation between an object and an agent, ownership implies a specific kind of relationship between agents over an object: the agreement or social contract that an agent has rights to use and control it. As such, ownership is central in regulating the coordination over resources in humans.

This normative and evaluative nature of ownership manifests across human development: In a large-scale ethnographic review of 60 well-documented small-scale societies, spanning all continents, (almost) uniformly positive descriptions of ownership respect were found in the majority of societies studied (Curry et al., 2019). In addition, young children are not only able to *infer* who is the owner of an object—on the basis of a range of cues including prior possession (Blake & Harris, 2009; Friedman & Neary, 2008; Gelman et al., 2012, 2016) and invested effort in creating an object (Kanngiesser et al., 2010)—but they also use this conceptual knowledge when evaluating social situations: For example, 3-year-olds assert that owners have priority in conflicts over resources (Neary & Friedman, 2014), protest when the ownership rights of third-parties are violated (Rossano et al., 2011), and protest when someone interferes with an owner's right to grant another permission to use an object (Schmidt et al., 2013).

A key theoretical question about the nature of these ownership intuitions and evaluations concerns whether they originate from evolved, innate predispositions (cf. Boyer, 2023; Fonn et al., 2023; Nancekivell et al., 2019) or are instances of conventional rules that may vary across cultures and historical time. Some comparative and developmental evidence supports the latter proposal: First, both 2- and 3-year-olds protest when their own ownership rights are violated, but only 3-year-olds protest when someone violates the ownership of *another* agent (Rossano et al., 2011). Next, 4-year-old German children appear to respect ownership, retrieving only the objects they have worked to produce in an experimental game, whereas great apes frequently monopolize the resources produced by their co-player (Kanngiesser et al., 2020). Finally, in a cross-cultural study employing a similar experimental game where dyads of

children were to extract resources, researchers also observed substantial cross-cultural variation in children's respect for their partners possessions in a condition where the partner was absent (Kanngiesser et al., 2019). It is thus possible that respecting ownership and enforcing ownership norms require the same species-typical capacities for shared ("we respect each other's possessions") and ultimately collective intentionality ("ownership should be respected") that likely underpin conventional norms in humans, and which develop gradually from children's second year of life (cf. Rakoczy & Schmidt, 2013).

However, even if the sensitivity to social conventions might *support* mature human ownership behavior, the ownership norms that children enforce and adhere to might still build on core sociomoral evaluations that even preverbal infants possess. A host of sociomoral preferences have been documented among human infants, including preferences for those who distribute resources impartially (e.g., Geraci & Surian, 2011) and those who punish over those who help wrongdoers (Hamlin et al., 2011; Kanakogi et al., 2017). Indeed, early work by Hamlin and colleagues (2011) suggested that stealing is evaluated proto-morally among 8-month-old insofar as they preferred a puppet who stole a dropped ball from a previous hinderer, but preferred a puppet who returned a ball to the previous helper. Not only does the early emergence of these sociomoral preferences indicate that they are not conventionally grounded, they are likely also adaptive given that they direct infants towards potentially cooperative individuals and help infants avoid those who might harm them by stealing from them (cf. Woo et al., 2022). *Ceteris paribus*, it might be adaptive to avoid, avoid cooperating, and seize cooperation with those who do not respect ownership, given the potential costs of losing resources or territory to them (cf. Boyer, 2022). If so, a sociomoral dispreference for ownership violators might be rooted already in preverbal infancy.

Yet, little is known about how human infants represent and evaluate ownership. However, studies suggest that infants and toddlers readily represent the *possession* of objects, as demonstrated by systematic expectations about how resources should be distributed (e.g., Geraci & Surian, 2011; Sloane et al., 2012; Ziv & Sommerville, 2016), and expectations about who should prevail in resource conflict (Gazes et al., 2017; Mascaro & Csibra, 2012). Infants also represent *taking* as clearly distinct from giving events (Tatone et al., 2015, 2021). Finally, infants in their first year of life use the possessive pronoun *mine* to infer the references of utterances, even when the objects in question were only previously possessed by the speakers (Saylor et al., 2011).

Together, this evidence indicates that infants appear to possess some necessary building blocks for representing and evaluating ownership, but it remains unknown if they make inferences and evaluations solely about its key normative aspects: For example, even if infants understand that taking entails a change in possession, they do not necessarily expect others to refrain from taking (i.e., *respecting* ownership) and they do not necessarily evaluate taking in a negative manner.

Precisely because ownership is a fundamentally normative concept, one way to investigate the origins of human ownership psychology is by assessing infants' sociomoral evaluative preferences: Do infants *avoid* those who violate ownership and instead prefer owners already within their first year of life? Building on previous research documenting that (a) children infer ownership from first possession at least from their second year of life (e.g., Blake & Harris, 2009; Friedman & Neary, 2008; Gelman et al., 2012, 2016), and (b) that infants represent social dominance (Thomsen et al., 2011), including when predicting and evaluating the outcomes of resource conflict (Gazes et al., 2017; Mascaro & Csibra, 2012; Thomas & Sarnecka, 2019), we presented infants with puppet shows depicting a dyadic tug-of-war over an object which was previously possessed by one of the parties. We then tested whether infants would preferentially reach towards the first possessor (the "owner") or the one who did not possess the resource from the beginning (the "ownership violator"). If infants, like children, infer ownership from first possession with its downstream normative effects, then they should prefer the owner over the ownership violator here.

Finally, since violating ownership and prevailing in resource conflict cue dominance (Mascaro & Csibra, 2012), and because prior work has reported that infants hold sociomoral preferences for those who defer over those who prevail in zero-sum conflict (Thomas & Sarnecka, 2019), we experimentally disentangled the effects of ownership violation from dominance. We did so by testing both infants' preferences in the case of a *successful* ownership violation (non-owner prevails in taking the resource, Study 1), and an *unsuccessful* ownership violation (owner prevails and keeps the resource, Study 2).

Study 1

To test if infants prefer an owner over one who violates ownership, we presented infants with a puppet show where one agent attempted, and succeeded, in taking an object from its owner.

Method

Participants 34 10–13-month-old infants ($M = 11.54$, $SD = .90$, 19 girls) participated in the study. Six additional infants were tested but not included, due to fussing out during familiarization or before a choice was made ($n = 3$), for choosing both puppets simultaneously ($n = 1$), or due to experimenter or technical errors ($n = 2$). Participants were recruited from a database of parents who had stated their interest in participating in research on social development, and infants were tested in a university laboratory in a large Norwegian city.

The sample size was determined using a Bayesian stopping rule. According to this stopping rule, we would include at

Possession familiarization, studies 1–2



Conflict familiarization, non-owner prevails, study 1



Conflict familiarization, owner prevails, study 2

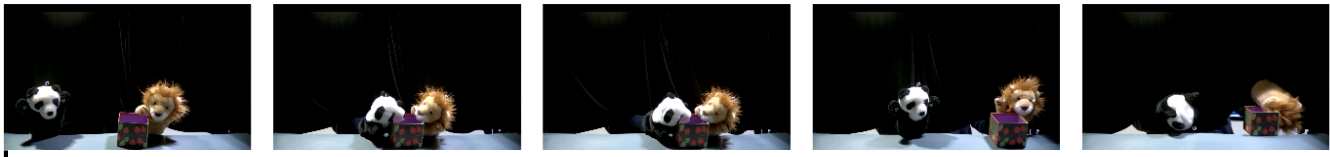


Figure 1: Schematic depiction of the puppet plays used across the two studies

least 32 participants and continue in fully counterbalanced increments until there was at least moderate ($BF > 3$) support either in favor of the experimental hypothesis that infants would choose either of the puppets more often than chance, or in favor of the null hypothesis that infants' preferences did *not* differ from chance. For all Bayesian analyses we used default priors in the statistical software JASP (JASP Team, 2024). The stopping criterion was reached at 32 participants, but two additional participants were tested by accident and were thus included in the sample.

Material and procedures We presented infants with a short puppet play depicting a resource conflict between the owner and non-owner of a contested object (Figure 1). A standard manual choice (preferential reaching) task probed infants' preferences for the two characters.

Puppet play. Infants first saw two possession familiarization events demonstrating that one puppet was in the possession of an object (a colorful box), whereas another puppet was not. The events began with two puppets, a panda and a lion puppet, appearing simultaneously on stage. One of the puppets then disappeared shortly from the puppet stage, returning to the stage either with a colorful box or emptyhanded. Next, the other puppet disappeared, returning emptyhanded if the other had returned with the colorful box, or vice versa. The puppet possessing the box (*the owner*) and the puppet without the box (*the non-owner*) occupied the same roles in both trials.

Next, infants saw four familiarization events depicting a conflict over the colorful box introduced in the previous familiarization trials. Both puppets appeared on stage simultaneously, the owner with its box and the non-owner empty-handed. The two puppets briefly turned towards each other, before the non-owner started approaching the owner

and its box. The owner and non-owner, both grabbing hold of the box from each their side, started pulling the box back and forth, while a voice exclaimed “No!” (in Norwegian: “Nei!”) each time the box was pulled in either direction. Note that this disembodied voice could not in principle be identified with a specific agent. Finally, the non-owner pulled the box away from the owner. Both puppets disappeared from the stage simultaneously, the non-owner with the box and the owner emptyhanded.

We counterbalanced the relative position of the two puppets, which puppet moved first (disappearing shortly from the stage) during the possession familiarization phase, and which puppet was the owner. The box was always pulled towards the right first. This yielded a total of eight counterbalancing conditions. We used a pre-recorded audio recording, lasting approximately for three minutes, to time the movements and the duration of the puppet play.

Manual choice task. An experimenter unaware of the roles of the two puppets entered the room directly after the puppet play was terminated. The experimenter started the procedure by asking the parent or caregiver holding the infant to close their eyes. Next, the experimenter turned towards the infant at approximately one meter's distance, presenting a wooden tray with the two puppets attached. The position of the puppets on the tray followed their relative position in the puppet play. After making sure that the infant had visually inspected both puppets, the experimenter moved towards the infant with the tray so that the infant could readily grab one of the two puppets. The puppet which the infant touched first was counted as the infant's choice, and a choice had to be made within two minutes from the time where the infant could choose between the puppets. All choices were coded from video recording by two independent raters. Agreement between raters was perfect, weighted $\kappa = 1.00$.

Background information. Given that infants and toddlers possibly learn about ownership through experiences of conflict over possessed objects, we asked parents to provide information about any older siblings that the infants might have. This was coded as a simple yes/no response. We counted siblings younger than 10 years old who lived together with the participating infants.

Results and preliminary discussion

Results yielded no evidence that infants were more likely to choose either of the puppets. 17 (50%) out of 34 infants chose the owner, and this proportion did not differ from chance (binomial test, $p = 1.000$). Indeed, we found positive Bayesian evidence that infants did *not* preferentially choose either the owner or non-owner ($BF_{01} = 4.75$).

We next tested for any moderating effects of gender and age. There was no Bayesian or frequentist support for any age effects on infants' preferences, $b = .007$, Wald's $\chi^2 = .338$, $p = .561$, $OR = 1.007[0.982, 1.033]$, $BF_{01} = 2.38$. Analyses revealed no clear effect of gender, $\chi^2(1, N = 34) = 2.982$, $p = .084$, $\phi = -.296$, $BF_{01} = 0.76$, although boys tended to choose the owner more often than did girls (9/14 boys and 7/19 girls chose the owner).

Only a small sub-set of the participating infants were reported to have older siblings: 8 infants had older siblings, whereas 23 did not. The small sample of infants with older siblings displayed a trend mirroring the results of the entire sample, with 4 out of 8 infants choosing the owner.

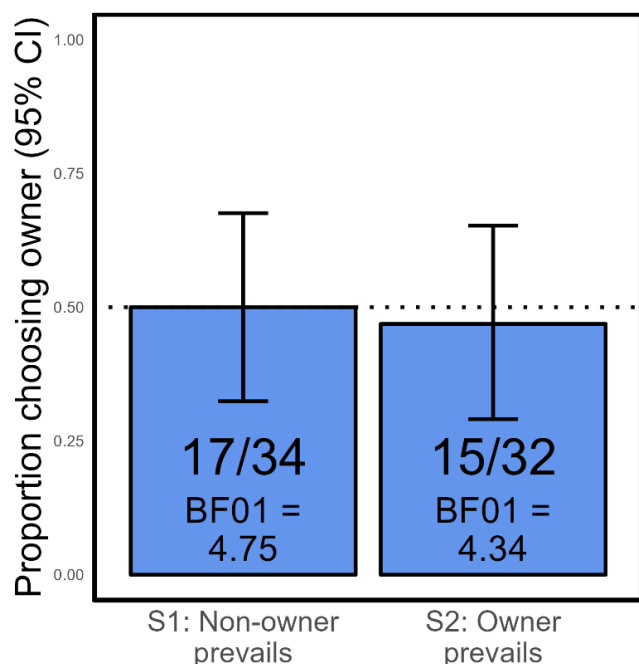


Figure 2: Bar chart depicting the proportion of infants choosing the owner over non-owner across the two studies.

The upper and lower bounds of the error bars represent 95% exact Clopper-Pearson intervals.

Study 2

Study 1 showed that infants did not avoid those who violate ownership when the non-owner succeeded in taking a resource from the owner. It remains possible, however, that infants generally prefer those who *both* owns resources *and* are able to control them, keeping them within their possession. If so, infants should prefer an owner who also successfully defends their resource. To test this prediction, in Study 2 we therefore manipulated the conflict outcome such that the *owner* prevailed in the resource conflict, keeping its possession. Thus, infants chose between an owner who won the resource conflict and a non-owner who lost it.

Method

Participants 32 11–13-month-old infants ($M = 11.11$, $SD = 0.89$, 14 girls) participated in the study. A total of five additional participants were tested but not included in the study for not making a choice or choosing both puppets simultaneously ($n = 4$), or due to experimenter error ($n = 1$). Participant recruitment, the test location, and the Bayesian stopping rule was identical to Study 1.

Material and procedures The materials and procedures were identical to Study 1, with the exception that the owner (instead of the non-owner) prevailed in the conflict, retaining its object.

As in Study 1 choices were coded from video recording by two independent raters. Agreement between raters was near perfect, weighted $\kappa = 0.914$. A third rater unaware of the experimental condition settled two disagreements between the two original raters.

Results and preliminary discussion

15 (46.9%) out of 32 infants chose the owner, and this proportion did not differ significantly from chance (binomial test, $p = .860$). A Bayesian binomial test yielded moderate support ($BF_{01} = 4.34$) in favor of the null hypothesis that infants' preferences for the two characters did not differ from chance.

We further tested for age and gender effects. There was no significant effect of gender on infants' choices, $\chi^2(1, N = 32) = 3.030$, $p = .082$, $\phi = 0.308$. However, a Bayesian contingency tables analysis indicated only slight, anecdotal support in favor of the null hypothesis that there were no gender differences in these preferences, $BF_{01} = 1.29$. The data showed a trend among the boys to choose the non-owner (12 out of 18 boys chose the non-owner), whereas a slight majority of the girls (9 out of 14) chose the owner. Binary logistic regression analyses yielded no evidence of any effect

of age on infants' preferences, $b = .008$, Wald's $\chi^2 = .351$, $p = .553$, $OR = 1.008[0.982, 1.035]$, $BF_{01} = 2.95$.

Finally, infants reported to have older siblings (10 out of the 30 infants for whom parents provided this information) closely resembled the trend of the complete sample, with 4 out of 10 infants choosing the non-owner over the owner.

General discussion

Across two studies we have shown that 10–13-month-old infants do not prefer owners over those who violate ownership. Infants held no systematic preferences for the owner or non-owner regardless of whether the owner or non-owner attained the contested resource. Indeed, we obtained substantial Bayesian evidence favoring the null over the experimental hypothesis in both studies. Finally, we used a well-established manual choice procedure to assess infants' preferences, and the puppet play closely matched previous depictions of resource conflict documented to elicit social expectations and preferences in infants in their first year of life (Gazes et al., 2017; Thomas & Sarnecka, 2019).

Note that previous studies suggest that preverbal infants prefer those who give up and lose a resource conflict over a rattle (Thomas & Sarnecka, 2019), but in the present studies they did not prefer those who lose, involuntarily, a resource conflict over a box: When both parties had tried getting the box, we found that infants neither preferred the owner, nor whoever won or lost this dominance conflict. Preverbal infants also prefer those who defer and yield in the Thomsen et al. (2011) right-of-way dominance paradigm (Thomas & Sarnecka, 2019). In contrast, 21–31-month-olds prefer those for whom others voluntarily defer but *not* those who win by force (Thomas et al., 2018). Together this evidence points to the critical role that deferral before conflicts escalate—a feature of stable dominance hierarchies among many animal species (Thomsen, 2020)—may play in forming rank-based social preferences.

Much previous research has used a manual choice paradigm (see Hamlin et al., 2007) to suggest that infants, broadly, avoid agents who behave *antisocially* in many different ways, among other things by harming or hindering others or distributing resources unequally between agents (e.g., Geraci & Surian, 2011; Hamlin et al., 2011; Kanakogi et al., 2017; see meta-analysis by Margoni & Surian, 2018). The null results in the present studies suggest that taking others' possessions is perceived and evaluated differently from, for example, hindering someone in attaining their goals or distributing resources unequally.

Notably, in a classic study Hamlin and colleagues (2011) infants saw scenarios where one puppet took and disappeared with a ball which a prosocial or antisocial agent was previously playing with together with a neutral agent. Another puppet then gave the ball back to its previous possessor. When a prosocial agent had been the possessing target of these giving and taking actions, infants robustly chose the *giver* over the *taker* in a manual choice task.

However, when the possessing target had been behaving antisocially previously, infants instead preferred the *taker* over the *giver*. These findings of Hamlin and colleagues (2011) suggest that infants evaluate *taking* as distinct from *giving*. But they also suggest that taking is not always evaluated negatively, insofar that infants preferred taking when it was directed towards the antisocial agent (but note that the effects of taking and giving were not disentangled in this study). The present study further suggests that when infants have no knowledge of the agents' prior social behavior or relationship, the (attempted) taking of an object does not in and of itself elicit any negative social evaluation, even when the object in question was not given up voluntarily by its owner. Together, the present study and prior work (Hamlin et al., 2011) suggest that infants might not hold a *domain-general* dispreference for those who violate ownership, but that evaluations of ownership violations likely come into play in specific social contexts.

Infants' responses in the present study nevertheless contrast with the ownership evaluations made by toddlers and children, who actively use ownership as a basis for evaluating and deciding who should use and control resources (Kangniesser et al., 2019, 2020; Neary & Friedman, 2014; Ross et al., 2015; Rossano et al., 2011; Schmidt et al., 2013). It is thus possible that normative evaluations of ownership develop later in childhood. It is also possible that infants do not possess the conceptual foundations for *representing* ownership in the first place, which would arguably be necessary to hold any social preferences about ownership violations. Indeed, an understanding of ownership has not been directly documented in infants, but are thoroughly demonstrated among preschool children and toddlers (e.g., Blake & Harris, 2009; Friedman & Neary, 2008; Gelman et al., 2012, 2016; Kangniesser et al., 2010).

It is of course also possible that the standard manual choice measure employed here does not capture any ownership-related preferences that infants may have. Indeed, the classic finding that infants preferentially reach towards helpers over hinderers in the hill paradigm (Hamlin et al., 2007) recently failed to replicate in a large-scale study including over 500 infants (Lucca et al., 2025). Note, however, that this failed replication attempt concerns but one of many studies employing the manual choice paradigm across several different social domains (but see also Salvadori et al., 2011), and that meta-analytic evidence suggests that infants prefer and reach towards prosocial over antisocial agents more broadly (Margoni & Surian, 2018). Still, given the current uncertainty surrounding the validity of the manual choice paradigm, future work could assess infants' evaluations of ownership violations in other ways, for example testing if infants associate violations of ownership with negative stimuli, employing habituation or preferential looking based procedures (see e.g., Eason et al., 2024; Pun et al., 2017).

In sum, the present study provides positive Bayesian evidence that preverbal infants do *not* selectively reach for owners over those who violate ownership, suggesting that infants' ownership evaluations may operate differently than

those of older children. Still, this absence of evidence does not rule out that infants would negatively evaluate ownership violations in other, more specified distributive and social contexts. Possession and ownership norms are ubiquitous in human cultures (Curry et al., 2019) and might appear implicitly in many forms of human interactions that infants do evaluate. For instance, the differential evaluation of giving others equal or unequal amounts of resources (e.g., Geraci & Surian, 2011; Sloane et al., 2012; Ziv & Sommerville, 2016) is hard to interpret without some proto-understanding of ownership. The study of the earliest developmental origins of human ownership understanding is still in its initial stages. The present first null findings might guide these efforts by telling researchers where *not* to look.

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