Control it and it is yours: Children's reasoning about the ownership of living things

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ABSTRACT

One of the hallmarks of ownership is the right to control one's property. Living beings pose an interesting puzzle for ownership, since they have some capacity to decide what happens to themselves—they can direct their own motion, pursue their own goals, and make their own decisions. Recent work has shown that adults consider this autonomy to be the key factor in determining whether a human (or human-like) being can be owned. However, little is known about how children reason about the ownership of living beings. Across three experiments we show that children (ages 4–7) use principles of control and autonomy to reason about the ownership of familiar and novel animals. At all ages tested, children were more likely to say that a typically wild animal (e.g., a bear) was owned if a homeowner had controlled its movements by putting it in a cage, rather than simply standing near it in their yard (Experiment 1). Children also used this cue of control to predict whether novel animals were owned (Experiment 2) — and for these unfamiliar animals, the effect of control was even larger. Finally, Experiment 3 found that children's judgments were not specifically driven by the use of a cage to control the animal, but also extended to animals that inherently had the ability to escape (e.g., fly or jump). These autonomous animals were judged as non-owned, while those that could not escape were judged as owned. The use of these principles was evident at all ages, but became stronger with age, particularly when considering novel animals. These are the first studies, to our knowledge, to investigate the development of reasoning about the ownership of animals, and they suggest that, like adults, children consider autonomy an essential factor in the ownership of living things.

1. Introduction

In Yann Martel's novel Life of Pi, 16-year-old Pi Patel survives a shipwreck, and spends seven months adrift in a lifeboat on the Pacific Ocean. He has few possessions: a whistle, some floatation devices, some rope, some plastic containers, and the fish he manages to catch for food. And, it turns out, a Bengal tiger named Richard Parker, who saved himself from the wreckage by jumping aboard. Yet, while it's obvious that Pi is the owner of all of his meager possessions, including the live fish he catches, it seems ludicrous to suggest that he also owns the snarling 450-pound tiger sharing his boat.

These ownership judgments are intuitive, but the principles that lead us to these conclusions are not obvious. This is in part because the factors determining ownership are not visible or concrete: one cannot tell by looking at an object who owns it, whether it is owned by anyone, or who will be permitted to use it, and for what purpose. Here we explore the interesting question of what factors we attend to when determining whether something is owned, and in particular, what factors are relevant to the ownership of living things.

Like Pi, almost all of the inanimate objects we see around us are owned, or can easily become owned. But this becomes more complicated when considering living beings. Human beings are not typically able to be owned by others, while many animals are; we own pets, service animals, zoo animals, farm animals, and more. Animals can be ridden, bred, caged, sold to others, and used for our own purposes, much as we use other objects we own. However, alongside our farms and zoos and doghouses there are forests and savannahs and city streets that contain billions of animals that are not owned by anyone. Sometimes members of the very same species live side by side, some owned, and some unowned, like the owned lab rats kept in carefully cleaned cages, looking down on their non-owned brethren running skittishly into dark corners (Herzog, 1988).

Judgments about the ownership of living things are interesting for at least three reasons. First, variation in judgments about the ownership of animals suggests constraints on which things people can own, and limits on people's ownership behaviors. Hence, understanding this
variation will be informative about the psychology of ownership more generally.

Second, living things have, to some degree or other, minds. Thus, the question of whether a living thing can be owned may depend on how we perceive its mental capacities, and how these capacities relate to an entity's moral rights and responsibilities (Gray, Gray, & Wegner, 2007). Understanding the factors that lead us to judge that a living being is owned by another can thus be informative about the mental and physical attributes that are relevant to moral standing, bringing together three broad areas of research: ownership, moral psychology, and mind perception.

Finally, this investigation might help illuminate why intuitions about the ownership of animals sometimes differ across societies. While the laws in most countries consider animals to be movable property (Francione, 1995), there has been a movement in the last few decades to consider whether some animals should be considered “persons”, and thus granted greater moral rights, including the right to freedom (Francione, 1995; Regan, 1983; Singer, 1975). Some countries now recognize great apes and cetaceans as having personhood and rights (Germany guarantees animal rights in constitution, 2002; Dolphins deserve same rights as humans, say scientists, 2012), but these disputes are often controversial, and hinge on arguments about what mental and physical capacities should be seen as relevant to questions of ownership. Thus, a better understanding of the psychological factors underlying the ownership of living things will help inform these difficult debates.

Much of the research to date on ownership reasoning has looked at the developmental origins of judgments about the ownership of objects (for an excellent review, see Hood, 2019). Even very young children use sophisticated principles to determine who owns an object, and what special rights ownership gives an owner. For example, children as young as 2 years old reason that the first person known to physically possess an object is likely to be its owner (Friedman & Neary, 2008). By age three, children infer that an object belongs to a person who decides whether others can use it (Neary, Friedman, & Burnstein, 2009), and can track identical-looking objects based on who they belong to (Gelman, Manczak, & Noles, 2012). And at least by age 7, children judge that agents can own things, while inanimate objects cannot (Noles, Keil, Bloom, & Gelman, 2012).

Children also understand that ownership affects what you can do with an object. By age three, children understand, in some contexts, that owners can transfer ownership of an object to another person (Kanngiesser, Gjerse, & Hood, 2010; Kim & Kalish, 2009), although they sometimes have difficulty grasping the full implications of these transfers (Blake & Harris, 2009; Friedman & Neary, 2008). Preschoolers also understand that owners are uniquely entitled to use their property, while others need to ask permission before using it (Neary et al., 2009). By age three, children will stand up for the right of an owner to decide what happens to their objects, protesting against someone attempting to steal or throw away the property of another (Rossano, Rakoczy, & Tomasello, 2011; Schmidt, Rakoczy, & Tomasello, 2013). Children at this age will even prioritize owners’ right to control their property above the needs of others, judging, for example, that the owner of a pen should get it back even if the current user needs it more (Neary & Friedman, 2014).

Thus, children can reason well about who owns a given object and what owners can do with their objects. However, a lesser explored topic—and one particularly relevant to the question of animal ownership—is how we determine whether an object is owned. These judgments can be independent from judgments about who owns an object; one might judge that the beach chairs on the beach are owned by someone, even if there is no one nearby to link them to. Likewise, one might assume that the shells on the beach are not owned by anyone at all. Knowing whether an object is owned also provides information about how you might come to own it yourself. An un-owned object like a shell can become yours simply by picking it up and putting it in your pocket. However, if you were to pick up a beach chair and take it with you, this would not cause you to become the owner, because the chair already has an owner who has not agreed to transfer it to you. This raises the question of whether children understand that some objects are not owned at all. And, if so, what factors guide their judgments as to whether a given object is owned?

In one recent study exploring this, Neary, Van de Vondervoort, and Friedman (2012) found that 3- to 4-year-old children expected that familiar and unfamiliar human-made artifacts were owned, but natural kind objects such as rocks and trees were not owned. This suggests that children at this age understand that some objects are unowned, and also that they can reason about whether objects are likely to be owned without knowing that the object is owned by any one person in particular. Similarly, 6- to 8-year-old children judge that ideas are owned, but don’t think anyone owns a common word (Shaw, Li, & Olson, 2012).

However, all the studies reviewed so far were restricted to the ownership of artifacts and natural kind objects. Yet by far the most studied natural kind, and the one that children are likely most familiar with (Gelman, 2003; Gelman & Markman, 1987), is animals. There is reason to think that children might think differently about the ownership of animals than of natural kind objects, since many of the animals children encounter are in fact owned by people. Although there has been little work examining children’s judgments about whether living or animate beings can be owned, and what factors are relevant to their ownership, we do know something about how adults reason about these issues. Starmans and Friedman (2016) investigated the role of factors such as intelligence, emotional capacity, reflection and self-awareness, and autonomy in adults’ judgments of whether adult humans, robots, aliens, and other creatures could be owned. Of all these capacities, the only one that consistently affected adults’ judgments was autonomy—the ability to decide for oneself and resist the instructions of others. For example, adults view a robot that makes decisions for itself as less ownable than one compelled to carry out others’ commands. This autonomy principle also extends to considering whether an adult human might ever be ownable. People judge that an adult who suffers from a medical condition that renders him incapable of making his own decisions, or of resisting his own desires or the instructions of others, is more ownable than a typical adult, and that an adult who willingly sells himself into slavery is owned by the purchaser.

Thus, when considering whether humans and human-like entities can be owned, adults seem to consider the entity’s intrinsic capacity for autonomy to be a key factor. The legal scholar Steven Wise agrees. In his book wrestling with issues surrounding animal rights (Wise, 2002), Wise drew on studies of animal behavior and cognition to develop a scale for rating different species according to the cognitive abilities most relevant to basic legal rights—a scale he called the “Autonomy Scale”. The central role of autonomy also makes sense given how we reason about the ownership rights afforded to the owners of objects. Both adults and children reason that owners get to decide what happens to their property (Hoffman, McCabe, Shachat, & Smith, 1994; Kim & Kalish, 2009; Neary & Friedman, 2013, 2014; Oxoby & Spraggon, 2008; Rossano et al., 2011; Schmidt et al., 2013). But animate beings are unique in that they have some capacity to decide what happens to themselves—they can direct their own motion, pursue their own goals, and be responsible for their own decisions. Humans, and human-like entities, are seen as having especially high levels of this kind of agency (Gray et al., 2007), and this may conflict with ownership rights to such an extent that it renders such entities non-ownable.

However, this doesn’t quite solve the problem of why Pi doesn’t own Richard Parker. Tigers can, in principle, be owned—they don’t have intrinsic autonomy, or at least, they don’t have enough of it to prevent ownership, as evidenced by the many zoos and circuses that seem to count tigers among their possessions. To fill this gap, we suggest that the intrinsic autonomy principle described above (Starmans & Friedman, 2016) has a corollary in an extrinsic autonomy principle—that is, alongside the question of whether an entity has some capacity to make its own decisions, there is an additional question of
whether that entity is prevented from doing so, and is therefore under the control of someone else. We should stress that we do not believe that this kind of control is sufficient for ownership, for animals or anything else. If a thief steals your car and your dog, they have control over them. Yet, they do not own them (despite their control) and you still own them (despite your lack of control). Likewise, if someone kidnaps your brother, they do not own him, despite their control over his actions. However, our proposal is that, as with objects (Furby, 1978; Scorolli, Borghi, & Tummolini, 2018) when considering the ownership of living things, exerting control over an entity, and thus extrinsically decreasing its autonomy, is an important cue to whether you own the entity.

Thus, non-human animals represent a theoretically interesting middle ground between humans and objects. They have some capacity for autonomy, and many animals live their entire lives completely autonomously from humans. However, humans are also often able to subvert the autonomy of animals, and adults consider many animals to be owned by humans. This flexibility, and the capacity for both autonomous and controlled lives, allows us to examine the extent to which children reason about the ownership of living things based on principles of autonomy and control. Thus, in the current studies, we sought to ask children about the very same animals in either autonomous or controlled situations, to investigate the specific role that autonomy and control play in children’s ownership judgments. We predicted that 1) children are more likely to perceive physical control over an animal as a sign of ownership than an animal simply being on one’s territory, and 2) animals with greater physical autonomy are less likely to be owned than animals with less physical autonomy.

2. Experiment 1

In Experiment 1, we tested the hypothesis that humans exerting physical control over familiar animals by restricting their freedom of movement (i.e., putting them in cages) would lead children to judge the animal as owned, while the mere presence of these animals in a human’s backyard would not. This is a strong test of the centrality of control and autonomy to the ownership of living things because children as young as three years old judge that people own objects that are on their property, even if they didn’t intend to acquire these objects, and even if they are unaware of their presence (Goulding & Friedman, 2018). However, by age 4, children also take into account the history of the object, and how it arrived on the property, and thus may consider this for animals as well.

2.1. Method

2.1.1. Participants

We tested 94 children aged 5 to 8 years at a local science museum (47 5-to-6-year-olds, 38% female, mean age = 71.4 months; 47 7-to-8-year-olds, 49% female, mean age = 95.6 months). A further 10 children were tested, but excluded for incorrectly answering two or more of the four warm up questions (9), or for experimenter error (1).

We did not collect specific demographic data for Experiment 1. The city population we sampled is estimated to be comprised of the following ethnic groups: 50% White, 12.7% East Asian, 12.3% South Asian, 8.5% Black, 7% Southeast Asian, 2.8% Latin American, 2% West Asian, 1.1% Arab, 0.7% Aboriginal, 1.5% two or more races (Statistics Canada, 2016 Census of Population). Demographic data collected for Experiment 3 suggests that our participants are fairly representative of this diversity.

2.1.2. Materials and procedure

Children were initially told the activity would involve questions about owning things, and were then asked: “Do you know what it means to own something? It means that you have it and it belongs to you. For example, I own this computer. What is something that you own?” (modeled on Noles & Gelman, 2014). If the child did not provide an answer that was easily identifiable as property, they were asked a follow-up question: “Can you tell me something else that you own? Do you own any toys?” All children provided a reasonable answer after the second question.

Children were then shown a series of images of two different adults standing in their backyards. They were told that there were different things in each person’s backyard, and that their task was to judge whether the person owned each thing. Children first completed four warm-up trials about inanimate objects that were sitting in the adult’s backyard. Two of these objects (lawn mower, flowers) were described as “just sitting there”, and two (frisbee, ball) were described as having “accidentally flown into” the person's backyard from the neighbor's yard. Children who answered two or more of these warmup questions incorrectly were excluded from analysis. See Supplementary Material for the full script for all studies.

Children then viewed eight test trials, each depicting one of two adults (one male, one female) with an animal in their backyard. Individual animals appeared alongside the adults either free-standing, or contained in cages (see Fig. 1) and the children were asked whether the adult owned the animals. The animals were eight familiar species that are typically non-domesticated (bear, blue jay, deer, fox, owl, rabbit, raccoon, and wolf). We chose to use non-domesticated animals to avoid leading children to think that the animals were obviously house pets. Children first viewed four animals in the backyard of one adult, followed by four animals in the backyard of the other adult. Each block of four images contained two caged animals and two free-standing animals. The order of the blocks was counterbalanced, and children were randomly assigned to one of two orders in which each animal species appear as caged in one order and free-standing in the other, to control for any effect of species driving children’s ownership ratings. For each trial, the experimenter described the animal as either...
2.1.3. Results and discussion

Because each participant contributed a dichotomous response on eight consecutive trials, we conducted a binary logistic Generalized Estimating Equation (GEE) to examine children’s ownership judgments, with Control (high/low) as a within-subjects factor and Age Group (5-6 and 7-8) as a between-subjects factor.

As predicted, this analysis revealed a main effect of Control, \(\chi^2(1) = 51.18, p < .001\), with children endorsing ownership more often when animals were caged than when they were not (see Fig. 2). There was also a main effect of Age Group, \(\chi^2(1) = 11.86, p = .001\), with younger children endorsing ownership overall more often than older children. There was also a significant interaction between Control and Age Group, \(\chi^2(1) = 7.15, p = .008\). To examine this, we analysed responses for each age group separately.

At all ages, children’s judgments about whether an animal was owned depended on whether the animal was controlled (i.e., in a cage). Younger children judged that caged animals were owned on 54% of trials (\(M = 2.17/4\)), and that free-standing animals were owned on 18% of trials (\(M = .72/4\)), \(\chi^2(1) = 19.64, p < .001\), odds ratio: 3.90, 95% CI: 2.14 to 7.12. This effect was even larger in older children, who judged that caged animals were owned on 43% of trials (\(M = 1.70/4\)), \(\chi^2(1) = 32.43, p < .001\), odds ratio: 19.8, 95% CI: 7.09 to 55.32.

Overall, children interpreted a person’s physical control over an animal as evidence that the animal was owned, and this effect increased with age. However, while single-sample one-sample Wilcoxon signed rank tests showed that, as expected, both older and younger children endorsed ownership of free-standing animals at rates below chance, both \(p < .001\), judgments that caged animals were owned were not as high as expected, hovering around chance levels for both age groups, \(p_{5.6} = .413, p_{7.8} = .366\). This might have been due to children’s familiarity with the typically wild, non-owned animals depicted in this study. Children might have had a baseline resistance to the idea that a bear in someone’s backyard was owned, even if it was in a cage.

Indeed, our central hypothesis about the importance of autonomy and control in ownership judgments predicts that if children conceive of wild animals as inherently autonomous, having learned that they typically live on their own without the guardianship of a human, coming and going at will, they might be hesitant to judge them as ownable. This was particularly evident in older children, who were less likely than younger children to say that either caged or free-standing animals were owned, suggesting that increased knowledge of the habits of these species might be contributing to these judgments. Thus, in Experiment 2, we examined ownership judgments of caged vs. free-standing novel animals.

3. Experiment 2

3.1. Method

3.1.1. Participants

We tested 100 children aged 5 to 8 years at a local science museum (50 5-to-6-year-olds, 58% female, mean age = 71.6 months; 50 7-to-8-year-olds, 40% female, mean age = 94.2 months). A further 17 children were tested, but excluded for incorrectly answering two or more of the four warm up questions.

We did not collect specific demographic data for Experiment 2. The city population we sampled is estimated to be comprised of the following ethnic groups: 50% White, 12.7% East Asian, 12.3% South Asian, 8.5% Black, 7% Southeast Asian, 2.8% Latin American, 2% West Asian, 1.1% Arab, 0.7% Aboriginal, 1.5% two or more races (Statistics Canada, 2016 Census of Population). Demographic data collected for Experiment 3 suggests that our participants are fairly representative of this diversity.

3.1.2. Materials and procedure

The design of Experiment 2 was identical to that of Experiment 1, except that the images depicted two adult aliens standing in alien-looking backyards, and eight novel animals (see Fig. 3). The warm up questions contained novel inanimate objects which were again described as either just sitting in the yard, or having accidentally flown in from the neighbor’s yard. As in Experiment 1, children who incorrectly answered two or more of these questions were excluded from analysis.
**4. Results and discussion**

We again conducted a binary logistic Generalized Estimating Equation (GEE) to examine children’s ownership judgments, with Control (high/low) as a within-subjects factor and Age Group (5–6 and 7–8) as a between-subjects factor.

As predicted, this analysis revealed a main effect of Control, \( \chi^2(1) = 52.65, p < .001 \), with children endorsing ownership more often when animals were caged than when they were not (see Fig. 4). There was no main effect of Age Group, \( \chi^2(1) = .45, p = .503 \), however there was a significant interaction between Control and Age Group, \( \chi^2(1) = 10.35, p = .001 \). To examine this, we analysed responses for each age group separately.

At all ages, children’s judgments about whether an animal was owned depended on whether the animal was controlled (i.e., in a cage). Younger children judged that caged animals were owned on 70% of trials \((M = 2.78/4)\), and that free-standing animals were owned on 44% of trials \((M = 1.74/4)\), \( \chi^2(1) = 15.21, p < .001 \), odds ratio: 2.87, 95% CI: 1.69 to 4.87. This effect was again larger in older children, who judged that caged animals were owned on 83% of trials \((M = 3.30/4)\), and that free-standing animals were owned on 24% of trials \((M = .94/4)\), \( \chi^2(1) = 37.47, p < .001 \), odds ratio: 15.3, 95% CI: 6.4 to 36.8.

As also predicted, we saw overall higher rates of ownership endorsement in Experiment 2 than in Experiment 1. Single-sample Wilcoxon signed rank tests showed that both younger and older children now endorsed ownership of caged animals at rates above chance, \( p_{5-6} = .002, p_{7-8} < .001 \). As in Experiment 1, older children did not tend to endorse ownership of free-standing animals, and did so at rates below chance, \( p < .001 \). However, younger children endorsed ownership of free-standing animals at about chance rates in Experiment 2, \( p = .244 \).

By transporting the ownership scenario to an alien world, we attempted to reduce the effect of familiarity and prior knowledge that may have suppressed children’s ownership endorsements. This allowed us to isolate the effect of physically controlling the animals from children’s existing judgments about the animals’ autonomy. The results of Experiment 2 indicate that this was successful, as both age groups endorsed ownership of caged novel animals at rates above chance. For older children, the effect of control was greater when considering novel animals than familiar wild animals, suggesting that in Experiment 1, their use of the control principle was conflicting with their general knowledge of these animals as autonomous. However, for younger children the effect of control was smaller when considering novel animals than familiar wild animals. This was driven by an increased tendency to endorse ownership of free-standing novel animals in an alien backyard, as compared to free-standing wild animals in a human backyard. This suggests that younger children may have more of a default assumption that, if there is no reason to think otherwise (e.g., you don’t already believe that this is likely to be a wild animal), then an animal in one’s backyard may be owned, even if it is not in a cage. Nonetheless, even the youngest children used the principle that a controlled animal was more likely to be owned than an autonomous animal.

**5. Experiment 3**

The results of the previous two experiments suggest that 5-to-8-year-old children use physical control as a cue to the ownership of animals. However, both of these experiments used a cage as a method of control, and so an alternative explanation for these findings might be that children simply associate cages with ownership, and are not reasoning about control and autonomy per se. Another possibility is that children are reasoning that the person (or alien) would have had to interact with the animal in order to put it in a cage. If so, children might have reasoned that touching or interacting with an animal is an indicator of ownership, rather than specifically controlling it. To examine whether children are in fact using broader principles of autonomy and control to reason about ownership, Experiment 3 manipulated control and autonomy through intrinsic features of the animals, rather than with a cage. Novel animals were again depicted in an alien backyard, but this time there was a tall fence encircling the yard. The animals’ autonomy, and thus the alien’s ability to control the animal, was manipulated by describing their ability to escape by jumping or flying over the fence, or their inability to escape. Thus, in Experiment 3, we avoided any implication that the alien had interacted with any of the animals.

**5.1. Method**

**5.1.1. Participants**

We tested 81 children aged 5 to 8 years, either at a local science museum or in a lab setting through a database of local families (40 5-to-6-year-olds, 50% female, mean age = 71.1 months; 41 7-to-8-year-olds, 40% female, mean age = 95.2 months; Caucasian: 25%, South/South-East Asian: 16%, East Asian: 11%, Two or more races: 6%, Black: 4%, Aboriginal: 1%, Latin American: 1%, the remaining 36% did not provide ethnicity information). A further 18 children were tested, but excluded for incorrectly answering two or more of the four warm up questions.

**5.1.2. Materials and procedure**

Experiment 3 used a similar design to Experiment 2, except that the alien backyards were altered to include tall fences (see Fig. 5). The four warm up questions contained the same inanimate objects used in Experiment 2. The test images contained eight new animals, four that had a plausible ability to escape, and four that did not have a plausible ability to escape. All animals were introduced as being “in [the alien’s] backyard”. Animals that could escape were described as having wings and so being able to fly over the fence, or having very long legs, and being able to jump over the fence. Animals that could not escape were described as not being able to fly or jump very high, so they could not get over the fence. In addition to ownership judgments, children were asked to provide reasoning for their judgment after each question.

**5.1.3. Results and discussion**

We again conducted a binary logistic Generalized Estimating Equation (GEE) to examine children’s ownership judgments, with Control (no escape/escape) as a within-subjects factor and Age Group (5–6 and 7–8) as a between-subjects factor.

As predicted, this analysis revealed a main effect of Control, \( \chi^2(1) = 72.72, p < .001 \), with children endorsing ownership more often when animals could not escape than when they could escape (see Fig. 6). There was no main effect of Age Group, \( \chi^2(1) = .82, p = .365 \).
and no interaction between Control and Age Group, \( \chi^2(1) = 2.48, p = .116 \). As such, we collapsed across age groups for the following analyses.

At all ages, children's judgments about whether an animal was owned depended on whether the animal was controlled (i.e., could escape). Children judged that animals that could not escape were owned on 71% of trials (\( M = 2.85/4 \)), and that animals that could escape were owned on 21% of trials (\( M = .83/4 \)), \( \chi^2(1) = 72.57, p < .001 \), odds ratio: 9.02, 95% CI: 5.43 to 14.95.

Here we saw similarly overall high rates of ownership endorsement as in Experiment 2. Single-sample Wilcoxon signed rank tests showed that children endorsed ownership of animals that could not escape at rates above chance, \( p < .001 \), and were below chance at endorsing ownership of animals that could escape, \( p < .001 \).

These results replicate the effect of control observed in Experiments 1 and 2, and suggest that children do not simply associate cages with ownership, and were not simply inferring that animals that had been touched or interacted with were owned, but instead are reasoning about whether the animal is autonomous, or is under the control of someone else.

6. General discussion

To explore the role of control and autonomy in young children's ownership judgments, we manipulated whether animals were physically controlled by a person (or alien), using either a cage (Experiments 1 and 2) or a fence that they could not jump or fly over (Experiment 3). We found that, across all experiments, children were more likely to rate animals that were physically controlled as owned than animals that were free-standing or animals that could escape over the fence. While this effect was evident even in the youngest children (5–6-year-olds), it became stronger in older children (7–8-year-olds), particularly when considering unfamiliar animals (Experiments 2 and 3). These results suggest that children use a principle of control to inform their judgments about whether an animal is owned.

This is consistent with research findings that adults consider an entity's autonomy to be the most important thing to consider when considering whether the entity is owned (Starmans & Friedman, 2016). In these studies, entities such as adult humans, robots, and aliens were described as having varying levels of intrinsic autonomy (i.e., the capacity to make decisions for themselves and resist the orders of others). Here, we manipulated a closely related factor—the extent to which an entity's autonomy is externally restricted by someone else. These two lines of research share an underlying principle that the ability to decide what happens to oneself conflict with the possibility of being owned by someone else. However, the adult research is focused on whether an entity inherently has this capacity—for example, an adult human seems to have a greater inherent capacity for autonomy than an unsophisticated robot, and adults accordingly judge that it is more possible to own the latter than the former. Our present focus has been the extent to which an entity is prevented from exercising whatever degree of autonomy it possesses—for example, children tended to rate an animal that could fly away over a fence as not owned, while an animal that could not escape over the fence was seen as owned.

These factors are related, but can be pulled apart. For instance, an entity with high levels of intrinsic autonomy (e.g., an adult human) can have this autonomy restricted by another person—if they are put behind bars, for example. Likewise, an entity with low levels of intrinsic autonomy can be left to its own devices—as, for example, an unsophisticated robot left in the woods. The research to date, including the present studies, suggest that both types of autonomy are important to judgments of ownership, but it remains unknown how these factors interact. We suggest that this is an important avenue for future research, and, in particular, the data from both adults and children to date suggest that these two related factors—autonomy and control—may play an important role in how people view the real-world ownership of animals. If people perceive animal minds—or the minds of certain animals—as having an inherent capacity for autonomy, they may object to the externally imposed control entailed by ownership. Conversely, people who assert the right of humans to own animals may perceive less capacity for autonomy in animal minds. It may be helpful for future research to further explore the developmental trajectory of these factors, and particularly to investigate whether they develop in tandem, or whether, for example, children begin to consider autonomy in their ownership judgments by observing whether an animal is free or controlled, and then later consider whether an animal has an inherent capacity for autonomy.

Although children's ownership judgments depended at all ages on whether an animal was controlled, the size of this effect was consistently larger for our older age group of children (7- to 8-year-olds). This suggests that the principle that physical control is important for
the ownership of living things is not a naïve view held only by the youngest children, but in fact becomes more pronounced as children get older. One possible reason for this is that younger children are especially sensitive to territory as a cue to ownership rights, and 3-year-olds even judge that if an object has landed in your yard, you own it, regardless of where it came from (Goulding & Friedman, 2018). By the age of four, however, children use an object’s history to guide their judgments of who owns it, and so they do not think, for example, that if a dog drags a ball to someone else’s property, the new person owns it. The current studies used a similar situation as a warm-up question, asking children if a homeowner owned an object that had accidentally flown into his yard from a neighboring yard. Children at all ages almost unanimously denied that the homeowner owned the object (that is, we observed relatively few failures of our warmup questions). However, for these questions, as well as those posed by Goulding and Friedman (2018), children were explicitly told about the history of the object, and presented with a plausible alternate owner (i.e., the neighbor). Conversely, the animal trials in the present study did not include such information, and children were free to guess at the history of the animal, or not to consider it at all. Thus, although the youngest children in our studies were 5 years old, the mere fact that the animals in the current study were presented in someone’s backyard could have pulled these younger children toward the judgment that the land owner also owned the animals.

This tendency was especially evident in the case of unfamiliar animals. Younger children were more likely than older children to judge that free-standing novel animals were owned, while they were actually less likely than older children to judge that free-standing familiar wild animals were owned. This suggests that, along with a general principle that control (and lack of autonomy) is a cue to ownership, younger children’s judgments were affected by both their familiarity with the typical non-owned status of wild animals (Experiment 1), and a general principle that things on someone’s property are typical owned by that person (Experiments 2 and 3). As children get older, these data suggest that they may shift the emphasis placed on each of these principles, and come to view control and autonomy as more central to ownership.

The results of Experiment 3 suggest that the autonomy of animals, and therefore their ownership status, can be limited in different ways depending on their intrinsic characteristics. All animals in this experiment were depicted as free-standing, but some had a capacity to jump or fly, which increased their autonomy, and correspondingly decreased children’s ownership judgments. This suggests that other characteristics of living beings, such as their size and strength, may cause them to seem more difficult to control, and thus more autonomous and less able to be owned. An important consideration, however, is that children were told explicitly about the features of the animals that would enable them to escape, and this may have drawn a greater amount of attention to these features than children would have spontaneously paid. However, since this explicit language was not present in Experiments 1 and 2, it is unlikely to be driving children’s judgments. Nonetheless, it would be interesting for future research to draw children’s attention to a number of characteristics, some relevant to autonomy, and some relevant to other capacities, to explore whether children would spontaneously attend to the autonomy-related features.

Taken together, these findings suggest that children evaluate whether an animal is autonomous or under the control of a person when considering whether it is owned. As young as five years of age, children reason that some animals are not owned by anyone, while those that have their autonomy restricted become owned by the person that is controlling them. These are the first studies, to our knowledge, to investigate the development of reasoning about the ownership of animals, and they suggest that, like adults, children consider autonomy an essential factor in the ownership of living things. Thus, for children and adults alike, the limited intrinsic autonomy of the tiger Richard Parker may mean that he is the kind of being that could be owned by someone, someday. But the three studies above illustrate that his large size and ferocity, and Pi’s resultant inability to physically control him, play an important role in the intuition that Pi does not own him.

CRediT authorship contribution statement

Julia Espinosa: Methodology, Investigation, Writing - original draft. Christina Starmans: Conceptualization, Methodology, Writing - review & editing, Resources, Supervision.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cognition.2020.104319.

References


