Children Apply Principles of Physical Ownership to Ideas

Alex Shaw, Vivian Li, Kristina R. Olson

Department of Psychology, Yale University

Received 26 October 2011; received in revised form 5 February 2012; accepted 28 February 2012

Abstract

Adults apply ownership not only to objects but also to ideas. But do people come to apply principles of ownership to ideas because of being taught about intellectual property and copyrights? Here, we investigate whether children apply rules from physical property ownership to ideas. Studies 1a and 1b show that children (6–8 years old) determine ownership of both objects and ideas based on who first establishes possession of the object or idea. Study 2 shows that children use another principle of object ownership, control of permission—an ability to restrict others’ access to the entity in question—to determine idea ownership. In Study 3, we replicate these findings with different idea types. In Study 4, we determine that children will not apply ownership to every entity, demonstrating that they do not apply ownership to a common word. Taken together, these results suggest that, like adults, children as young as 6 years old apply rules from ownership not only to objects but to ideas as well.

Keywords: Ownership; First possession; Control of permission; Intellectual property; Property; Ideas

Ideas—creative products of the mind—play a major role in every facet of people’s lives: from the practical technologies that make life easier to the fantastical fictional stories that make life more enjoyable; ideas are everywhere. In modern cultures, people feel a sense of ownership over not only their physical but also their intellectual property—stealing, sharing, buying, selling, and trading both objects and ideas on a daily basis. Indeed, the use of the word property for both objects (physical property) and ideas (intellectual property) highlights the importance of ownership in both domains. When conflict over ownership rights occurs, for example, adults use similar principles for both objects and ideas to determine the rightful owner. Are these overlaps between object and idea ownership merely coincidental, or is ownership applied to ideas as it is to objects? The current
research begins to answer this question by investigating ownership of objects (physical property) and ideas (intellectual property) in children. By examining whether children apply rules from physical ownership to ideas, we can gain some insight into whether children feel a sense of ownership over ideas, informing our understanding of how ownership functions more generally.

Children begin to apply concepts of object ownership early in life and form even more sophisticated ownership concepts with age (Fasig, 2000; Hay, 2006; Hook, 1993). By the time children are 2 years old, they begin to understand fairly nuanced distinctions between possession and ownership (Friedman & Neary, 2008). For example, children realize that although possession and ownership often overlap, one can possess an object by holding it without actually owning it (Hay, Nash, & Pedersen, 1983; Kim & Kalish, 2009; Ross, 1996; Weigel, 1984). Three-year-old children not only recognize the primacy of ownership over mere possession but make inferences about ownership based on the first possession heuristic—believing that, all else equal, the first person seen possessing an object is probably the owner (Friedman, 2008). Three-year-old children also negatively evaluate those who throw away others’ property (Rossano, Rakoczy, & Tomasello, 2011). By the time children are 4 years old, they understand that if someone controls another person’s use of an object that person is probably the owner (Neary, Friedman, & Burnstein, 2009); and as children grow older, they begin to understand transfers of ownership such as giving and buying as well as things that do not legitimately transfer ownership such as stealing (Blake & Harris, 2009; Hook, 1993; Kim & Kalish, 2009; Smetana, 1981).

Considerably less is known, however, about children’s understanding of idea ownership. Adults live in a world surrounded by ideas and dislike those who use or claim other people’s ideas without giving credit—with informal norms and formal laws explicitly forbidding taking others’ ideas without permission (Mandel, 2006; Park, 2003). Certainly, there is anecdotal evidence that children apply ownership to ideas, and some researchers have observed a few isolated incidents of children objecting to someone else saying “their” nursery rhyme (Isaacs, 1933). Recently, Olson and Shaw (2011) demonstrated that 6-year-old, but not 4-year-old, children respond negatively to those who take others’ ideas, that is, those who plagiarize. These evaluations of plagiarizers provide indirect evidence that children think of ideas as being owned. However, children may also react negatively to plagiarizers because they think that plagiarizers are uncreative, which would not require that children think of ideas as owned. What evidence would support the notion that children apply ownership to ideas?

One strategy for determining whether children think of ideas as owned would be to explore whether children apply the same rules of object ownership to ideas: If children think about ideas as being owned, then they should determine who owns an idea by using the same rules and principles they do when determining object ownership. In the current studies, we investigate three rules of ownership that psychologists (Blake & Harris, 2009; Neary et al., 2009; Newman, 1978), legal scholars (Bentham, 1970; Cohen, 1954; Merrill, 1998; Stake, 2004), and theorists (Gintis, 2007; Snare, 1972) have identified as important for ownership: first possession, non-transfer of ownership via theft, and control of permission.
In Study 1a, we investigate whether children use the first possession heuristic for both objects and ideas by presenting them with vignettes that ask them to determine whether ownership is conferred by who first pursues an entity or by who first possesses it. In Study 1b, we again explore the first possession heuristic and investigate whether children understand that, like objects, ideas cannot be legitimately transferred via theft. Then, in Study 2, we investigate whether children apply another ownership rule—control of permission—to ideas. In Study 3, we examine whether the effects from Studies 1a, 1b, and 2 generalize to different types of ideas while controlling for possible confounds from those studies. In Study 4, we investigate whether children and adults apply principles of ownership to all entities or if they only apply ownership to certain types of ideas.

1. Study 1a

In Study 1a, we investigated whether children think of ideas as being owned by testing whether they would apply one rule of ownership—first possession—to ideas. Researchers from diverse fields such as economics (Gintis, 2007), legal studies (Dukeminier, Krier, Alexander, & Schill, 2006; Stake, 2004), biology (Brosnan, 2011; Maynard Smith & Parker, 1976), and psychology (DeScioli & Wilson, 2011; Friedman, 2008; Newman, 1978; Ramsey, 2001) have all argued or provided evidence in favor of the idea that first possession is an important principle of ownership. Indeed, references to first possession being used to settle ownership disputes dates back at least as far as the Talmud (Herzog, 1930). Some researchers have suggested that a precursor to ownership akin to the first possession heuristic is present in some animal species, and thus may be a hallmark of ownership that allows organisms to form simple ownership concepts (Gintis, 2007; Stake, 2004). Previous research suggests that both children and adults use the first possession heuristic to adjudicate conflicts over object ownership. Friedman and Neary (2008), for example, demonstrated that by the time children are 3 years old, they will infer that the person who first possessed an object owns it, even if another actor later possesses it. Friedman (2008) presented adults with a stricter test of first possession. Adults read a vignette involving two men who were fishing, one who was the first pursuer (the person who first tried to catch the fish) and one who was the first possessor (the person who caught it); adults believed that the first possessor, not the first pursuer, owned the fish. Would children apply this first possession heuristic to ideas?

We presented children (aged 6 to 8 years old) and adults with vignettes similar to Friedman (2008) to determine whether they would endorse that ownership is determined by first possession, not first pursuit, for objects and ideas. We selected this age group of children because what little work has been done on children’s understanding of ideas has suggested that it is not until about 6 years of age that children have much of an understanding of ideas (Olson & Shaw, 2011). Olson and Shaw (2011) showed that children at this age responded negatively to plagiarism, but 3- to 4-year-old children did not, suggesting this age would be the appropriate group to focus on. We also tested adults to compare their results to the results of children as adults have considerably more exposure to legal precedent, and
because no previous research, to our knowledge, has asked whether adults ascribe ownership to ideas in the types of vignettes we used here.

1.1. Methods

1.1.1. Participants

Participants included twenty 6- to 8-year-olds ($M = 7$ years, 7 months, $SD = 10.5$ months; 8 female) and 20 adults ($M = 36$ years, $SD = 13.5$ years). Child participants were recruited through a database of families who had agreed to participate in developmental research or were tested in local schools. Adult participants were recruited through the crowd-sourcing site Mechanical Turk, which has been demonstrated to yield reliable data (Buhrmester, Kwang, & Gosling, 2011).

1.1.2. Stimuli

Object Condition: Bob is fishing and has been trying to catch a big fish for a while. David sees this, casts his fishing line toward the fish, and catches it. Who owns the fish? Bob, David, or both? (adapted from Friedman, 2008).

Idea Condition: Zack has been trying to solve a really hard math problem but has not come up with a solution. Steven hears Zack talk about the problem and comes up with a solution. Who owns the solution to the math problem? Zack, Steven, or both? (For adults the word “proof” was used rather than “problem.”)

1.1.3. Procedure

The adults were presented with these vignettes online and could answer the question after the vignette by clicking one of the character’s names or the word “both.” The order of the vignettes, but not the presentation of the names, was counterbalanced for adults (“both” always appeared as the final option). For the children, an experimenter read the vignettes aloud and participants were asked to indicate who they believed owned the object or idea: the first pursuer (in the above, Bob and Zack), the first possessor (David and Steven), or both of them. During each vignette, the experimenter pointed at paper dolls corresponding to the characters’ names to help the children follow the vignettes. The order of the vignettes and the order in which the characters’ names appeared in the question were counterbalanced for children (“both” always appeared as the final option).

1.2. Results

1.2.1. Adults

A chi-squared goodness-of-fit test on the Object Condition revealed that adults thought that the first possessor ($n = 20$), not the first pursuer ($n = 0$) or both individuals ($n = 0$), owned the fish, $\chi^2 (2, n = 20) = 40.00, p < .001$. We additionally conducted binomial tests on the pair-wise comparisons and found that adults assigned ownership to the first possessor over the first pursuer and over both, both $ps < .001$. 
A chi-squared goodness-of-fit test on the Idea Condition revealed that adults also thought that the person who first ‘possessed’ the idea \((n = 18)\), not the first pursuer \((n = 0)\) or both individuals \((n = 2)\), owned the math solution, \(\chi^2 (2, n = 20) = 29.2, p < .001\). We additionally conducted binomial tests on the pair-wise comparisons and found that adults thought the first possessor owned the math solution more often than the first pursuer and both, both \(ps < .001\).

1.2.2. Children

A chi-squared goodness-of-fit test on the Object Condition revealed that children thought that the first possessor \((n = 16)\), not the first pursuer \((n = 2)\) or both individuals \((n = 2)\), owned the fish, \(\chi^2 (2, n = 20) = 19.6, p < .001\). We additionally conducted binomial tests on the pair-wise comparisons and found that children assigned ownership to the first possessor over the first pursuer \((p < .001)\) and over both \((p < .001)\).

A chi-squared goodness-of-fit test on the Idea Condition revealed that children also thought that the first possessor \((n = 13)\), not the first pursuer \((n = 4)\) or both \((n = 3)\), owned the math solution, \(\chi^2 (2, n = 20) = 9.1, p = .011\). We conducted additional binomial tests on the pair-wise comparisons and found that children assigned ownership to the first possessor over the first pursuer, \(p = .049\), and the first possessor over both, \(p = .021\).

1.2.3. Adults and children

We conducted McNemar tests on the within-participant responses to the Object versus Idea vignettes (we dichotomized the data by coding responses as either being in line with the hypothesis [first possessor] or not). The McNemar tests revealed that the distribution of answers did not differ between the Object and Idea vignettes for the adults, \(p = .500\), or the children, \(p = .453\); see Fig. 1. Chi-squared tests comparing children’s and adults’ responses to the Object and Idea conditions revealed modest differences between children’s and adults’ responses in the Object Condition, \(\chi^2 (2, n = 40) = 4.44, p = .108\), and the Idea Condition, \(\chi^2 (2, n = 40) = 5.01, p = .082\), with adults being marginally more likely to award ownership to the first possessor. The marginally larger number of adults answering that the first possessor was the owner suggests that adults were slightly more likely to use the principle of first possession; however, both groups showed the same overall pattern.

1.3. Discussion

These results suggest that like adults, children by age 6 years use first possession to determine object ownership (Friedman & Neary, 2008) even when pitted against the first pursuit; in addition, children use this same rule for determining ownership for ideas. These results support the notion that children apply principles of ownership to ideas. Children could have thought that the first pursuer or that both individuals owned the entity in question (fish or math solution) but instead applied the abstract principle of ownership to ideas in addition to objects.

Due to the specific nature of these vignettes, however, children could be using first possession and last possession as a rule—as the first possessor in Study 1a also ended up with
the object or idea. Therefore, in Study 1b, we controlled for this potential confound by ensuring the first possessor did not possess the object at the end of the vignettes.

2. Study 1b

In Study 1b, we explored whether children understand that idea ownership cannot be legitimately transferred through theft, a rule previous research suggests applies to objects (Blake & Harris, 2009). We did this by modifying the vignettes to have an individual steal the entity (fish or math solution) from the first possessor. This manipulation had the ancillary benefit of controlling for a concern from Study 1a; by having the entity stolen from the first possessor, we could ensure that the first possessor would no longer be the last possessor.

2.1. Methods

2.1.1. Participants

Participants included twenty 6- to 8-year-olds ($M = 7$ years, 2 months, $SD = 12$ months; 9 female) and 20 adults ($M = 34$ years, $SD = 13$). Participants were recruited in the same manner as in Study 1a.

2.1.2. Stimuli

Object Condition: Jon is fishing and has been trying to catch a big fish for a while and catches it. When Jon isn’t looking, Paul takes the fish. Who owns the fish? Jon, Paul, or both?
Idea Condition: Adam has been trying to solve a really hard math problem and comes up with a solution. Tim hears Adam talk about the problem and steals it by telling other people the solution. Who owns the solution to the math problem? Adam, Tim, or both?

In the scenarios above, the first possessors were Jon and Adam; the last possessors were Paul and Tim.

2.1.3. Procedure

The procedure was the same as in Study 1a for adults and children.

2.2. Results

2.2.1. Adults

A chi-squared goodness-of-fit test on the Object Condition revealed that adults thought that the first possessor \((n = 20)\), not the last possessor \((n = 0)\) or both individuals \((n = 0)\), owned the fish, \(\chi^2 (2, n = 20) = 40.00, p < .001\). We additionally conducted binomial tests on the pair-wise comparisons and found that adults assigned ownership to the first possessor over the last possessor and over both individuals, both \(ps < .001\). A chi-squared goodness-of-fit test on the Idea Condition revealed that adults also thought that the first possessor \((n = 17)\), not the last possessor \((n = 1)\) or both individuals \((n = 2)\), owned the math solution, \(\chi^2 (2, n = 20) = 24.1, p < .001\). We additionally conducted binomial tests on the pair-wise comparisons and found that adults thought the first possessor owned the math solution more often than the first pursuer and both, both \(ps < .001\).

2.2.2. Children

A chi-squared goodness-of-fit test on the Object Condition revealed that children thought that the first possessor \((n = 19)\), not last possessor \((n = 1)\) or both individuals \((n = 0)\),
owned the fish, $\chi^2 (2, n = 20) = 34.3, p < .001$. We additionally conducted binomial tests on the pair-wise comparisons and found that children assigned ownership to the first possessor over the last possessor $p < .001$ and the first possessor over both $p < .001$.

A chi-squared goodness-of-fit test on the Idea Condition revealed that children also thought that the first possessor ($n = 14$), not the last possessor ($n = 3$) or both individuals ($n = 3$), owned the math solution, $\chi^2 (2, n = 20) = 12.1, p = .002$; see Fig. 2. We additionally conducted binomial tests on the pair-wise comparisons and found that children assigned ownership to the first possessor over the last possessor, $p = .013$, and the first possessor over both, $p = .013$.

2.2.3. Adults and children

We then conducted McNemar tests on the within-participant responses to the Object versus Idea vignettes (we dichotomized the data by coding responses as either being in line with the hypothesis [first possessor] or not). The McNemar tests revealed that the distribution of answers did not differ between the Object and Idea vignettes for the adults $p = .250$, but did differ for the children, with children using first possession more for objects than ideas, $p = .031$. Additionally, chi-squared tests comparing children’s and adults’ responses to the Object and Idea conditions revealed that children and adults did not differ in their responses, $p > .40$.

2.3. Discussion

As in Study 1a, children and adults applied the first possession heuristic to objects and ideas; they also understood that ownership is not transferred when an object or idea is stolen. Additionally, and unlike Study 1a, here we found that more children used the ownership principle in the domain of objects than did for ideas. This could suggest that ownership is easier for children to apply to objects, or that some small percentage of children were confused by the idea we chose. Despite this difference, children used ownership principles for both objects and ideas at above chance levels, suggesting that there is overlap in the principles children use for assigning ownership to objects and ideas.

3. Study 2

In Studies 1a and 1b, we examined the first possession heuristic, but the first possession heuristic is just one rule that children and adults use to assign ownership. Another important rule used to assign ownership to objects that may also be applicable to idea ownership is control of permission—the right to exclude others from using an entity (Demsetz, 1967). The law clearly allows individuals the right to deny others the use of their physical property (Demsetz, 1967) and the Supreme Court has stated in several decisions that the right to exclude others is one of the most important rights associated with property (for review, see Merrill, 1998). Further, theorists have argued that without the right to exclude others from use, property or ownership would be very different (Snare, 1972). Some have even
suggested that ownership itself would not make sense without the right to exclude (Bentham, 1970; Cohen, 1954; Merrill, 1998). Indeed, if everyone could use all types of property without restriction, then ownership would be meaningless (Merrill, 1998). Thus, control of permission appears to be an important principle for physical property.

In addition to legal scholars, young children use control of permission in their ownership decisions for physical property. Even young children will exclude others from using physical property that is theirs (Ross, 1996) and infer ownership of physical objects based on the owner’s ability to exclude others from using them (Neary et al., 2009). It is an open question if children and adults think that individuals should have the right to exclude others from infringing on their intellectual property and whether they would use the right to exclude to determine who owns an idea. Although not exactly parallel to the right to exclude in physical ownership, copyright laws in the United States allow individuals to exclude others from using or expanding upon their intellectual property (Newman, 2011). Therefore, the law seems to conclude that the right to exclude applies to both objects and ideas. It is possible that children and adults would infer that when a person can exclude others from using an idea, that person must be the owner of the idea. We test this possibility here.

3.1. Method

3.1.1. Participants

Participants included eighty 6- to 8-year-olds, 40 in the Permission Condition ($M = 7$ years, 1.5 months, $SD = 7$ months; 20 female) and 40 in the No Permission Condition ($M = 7$ years, 4.5 months, $SD = 10$ months; 22 female). Participants also included 40 adults, 20 in the Permission Condition ($M = 34$ years, 8 months, $SD = 15$ years; 15 female) and 20 in the No Permission Condition ($M = 33$ years, 6 months, $SD = 11$ years; 16 female). Participants were recruited the same way as in Study 1a.

3.1.2. Stimuli

Children in the Permission Condition heard this vignette: Molly wants to change the ending of a story. She asks Rachel, “Can I change the ending of the story?” Rachel says, “No, because I won’t let you.” Who owns the story? (adapted from Neary et al., 2009).

Children in the No Permission Condition heard the same vignette except that the last line was “No, because it’s lunchtime.” Who owns the story? (adapted from Neary et al., 2009).

In the Permission Condition children may infer that Rachel, the denier, owns the story because she has control over how the story can be changed, rather than Molly, the asker. However, children should not make the same inference in the No Permission Condition, because here Rachel, still the denier, does not assert her control over the story and instead mentions a practical (time) constraint that would prevent Molly from changing the story.

3.1.3. Procedure

The procedure for Study 2 was similar to Studies 1a and 1b: Children were told a vignette with dolls representing the characters in the vignettes while adults read vignettes via Mechanical Turk. However, children and adults were no longer given the “both” option.
We removed the “both” option because few participants chose it in previous studies, and we were concerned that its inclusion was inflating our statistical results. Finally, the vignette comparisons were now done between subjects to remove any possible demand characteristics that may have been present in the previous within-participant studies.

3.2. Results

3.2.1. Adults

A binomial test on the Permission Condition revealed that adults thought that the denier \((n = 19)\), not the asker \((n = 1)\), owned the story, \(p < .001\). A binomial test on the No Permission Condition revealed that adults showed no preference for choosing the denier \((n = 11)\) over the asker \((n = 9)\) as owner of the story, \(p = .824\). Importantly, a chi-squared test on the Permission and No Permission Condition revealed that adults were more likely to say that the denier owned the object in the Permission Condition than in the No Permission Condition, \(\chi^2 (1, n = 40) = 6.533, p = .011\).

3.2.2. Children

A binomial test on the Permission Condition revealed that children thought that the denier \((n = 32)\), not the asker \((n = 8)\), owned the story, \(p < .001\). A binomial test on the No Permission Condition revealed that children showed no preference for choosing the denier \((n = 22)\) over the asker \((n = 18)\) as owner of the story, \(p = .636\). Notably, a chi-squared test on the Permission and No Permission Condition revealed that children were more likely to believe that the denier owned the object in the Permission Condition than in the No Permission Condition, \(\chi^2 (1, n = 80) = 4.615, p = .032\).

3.2.3. Adults and children

Chi-squared tests comparing children’s and adults’ responses to the Permission and No Permission Conditions revealed that children and adults treated the two conditions the same: the Permission Condition \(\chi^2 (1, n = 60) = 1.32, p = .250\); No Permission Condition \(\chi^2 (1, n = 60) = 0, p = 1.00\); see Fig. 3.

3.3. Discussion

In Study 2, we found that adults and 6- to 8-year-old children used control of permission, another rule for assigning ownership, not just for objects as previous research had shown (Neary et al., 2009) but ideas as well. These results support the notion that children think about ideas as being owned since they apply the same rules to decide who owns both objects and ideas.

4. Study 3

In Study 3, we address three potential problems with the previous studies. First, in our previous studies we asked children “who owns” the entity in question. It is possible that
children only treated ideas as owned because they were primed to think about ownership by the use of the word “owns.” To control for this confound in Study 3, we instead asked “whose is it” as this has been used by previous research on object ownership (Friedman & Neary, 2008) and was thought to be less likely to prime ownership concepts. If priming with ownership was causing children to treat ideas with principles of ownership in our previous experiments, then we should no longer observe this overlap in Study 3.

Second, we used more closely matched vignettes that included different types of ideas. In Studies 1a and 1b, we used a math solution, which is not a prototypical idea. In Study 2, we used a story; however, children could have thought of the story as a physical storybook, rather than the content of the story. Thus, in Study 3, we used jokes and songs, which are more commonly thought of as ideas than math problems and do not typically have physical manifestations. Finally, the object and idea vignettes were more closely matched to one another by using the same words when possible.

4.1. Method

4.1.1. Participants

Participants included forty 6- to 8-year-olds (M = 7 years, 2.5 months, SD = 9 months; 22 female). Participants were recruited the same way as in Study 1a. As the adults and children did not differ in their pattern of results in the previous studies, we did not include adults here.

4.1.2. Procedure

The procedure was similar to the previous studies (children were read vignettes with dolls) except the vignettes were more closely matched to each other (e.g., we used the word take for both Theft vignettes) and included jokes and songs. A total of six vignettes were
included to test the three rules (first possession, transfer of ownership through theft, and control of permission) for both objects and ideas. Each child received one of each of the three rules either in condition 1 (First Possession Object, Permission Idea, and Theft Idea) or condition 2 (First Possession Idea, Permission Object, and Theft Object). We presented children with one object and one idea in the two first possession related cases (First Possession and Theft vignettes) to avoid children hearing both versions of the object first possession or both versions of the idea first possession vignettes; these vignettes were very similar to each other and we did not want to bias children’s responding. The order of the vignettes in each condition was counterbalanced. One other difference was that instead of asking, ‘‘Who owns X?’’ we asked children, ‘‘Whose X is it?’’ We did this to avoid priming children to think about ownership. Full vignettes are available in Appendix A.

5. Results and discussion

A binomial test on the First Possession Object Condition revealed that children thought the object belonged to the first possessor (n = 16), not the first pursuer (n = 4), p = .012. This was also true for the First Possession Idea Condition, with children thinking that the first possessor (n = 17), not the first pursuer (n = 3), p = .003, owned the object. A chi-squared test revealed that there was no difference between the First Possession Object and Idea conditions, χ² (1, n = 40) = .17, p = .678. These results support the findings from Study 1a, which demonstrated that children use first possession to assign ownership to both objects and ideas.

A binomial test on the Theft Object Condition revealed that children thought the object belonged to the first possessor (n = 19), not the last possessor (n = 1), p < .001. This was also true for the Theft Idea Condition, with children thinking that the first possessor (n = 17), not the last possessor (n = 3), owned the object, p = .003. A chi-squared test revealed that there was no difference between the Theft Object and Idea conditions, χ² (1, n = 40) = .28, p = .598. These results support the findings from Study 1b, which demonstrated that children understand that ownership cannot be legitimately transferred through theft.

A binomial test on the Permission Object Condition revealed that children thought the object belonged to the denier (n = 16), not the asker (n = 4), p = .003. Children in the Permission Idea Condition also thought that the denier (n = 15), not the asker (n = 5), p = .041, owned the object. A chi-squared test revealed that there was no difference between the Permission Object and Idea conditions, χ² (1, n = 40) = .14, p = .705. These results support the findings from Study 2, which demonstrated that children infer ownership based on who can control whether others use an entity—irrespective of it being an object or an idea; see Fig. 4.

In this study, we obtained results that converged with those from Studies 1a, 1b, and 2 using different idea types and without using the word “owned” in the questions asked. These results suggest that children apply some rules of ownership to ideas. However, would children just blindly apply these principles to any entity, such as a common word?
In Study 4, we investigated whether children will apply ownership to all entities or only to things that adults would intuitively apply ownership to. In the previous studies, we found that children applied ownership to ideas. However, it is possible that our method biased children to apply concepts of ownership to entities they do not normally think of as owned by forcing children to pick between two individuals. To examine this possibility, we again investigated the principle of first possession using the same vignette from Study 3, but added two changes that would allow us to determine if children really think certain ideas, such as songs, are owned. First, we added the option of choosing ‘’Neither’’ so that children would not be forced to say that one of the two individuals owned the entity in question. If the results from the previous experiments are really about ownership, then children should not choose ‘’Neither’’ as an option here. Additionally, we added a vignette involving ownership of something that we expected at least adults would not think of as owned—the word dog. If our methods biased children and adults toward applying ownership, then we should observe the same pattern of results for a common word. However, we predicted that children and adults would not use first possession to determine ownership of a common word.

6. Study 4

In Study 4, we investigated whether children will apply ownership to all entities or only to things that adults would intuitively apply ownership to. In the previous studies, we found that children applied ownership to ideas. However, it is possible that our method biased children to apply concepts of ownership to entities they do not normally think of as owned by forcing children to pick between two individuals. To examine this possibility, we again investigated the principle of first possession using the same vignette from Study 3, but added two changes that would allow us to determine if children really think certain ideas, such as songs, are owned. First, we added the option of choosing ‘’Neither’’ so that children would not be forced to say that one of the two individuals owned the entity in question. If the results from the previous experiments are really about ownership, then children should not choose ‘’Neither’’ as an option here. Additionally, we added a vignette involving ownership of something that we expected at least adults would not think of as owned—the word dog. If our methods biased children and adults toward applying ownership, then we should observe the same pattern of results for a common word. However, we predicted that children and adults would not use first possession to determine ownership of a common word.

6.1. Method

6.1.1. Participants

Participants included forty 6- to 8- year-olds, 20 in the First Possession Idea Condition ($M = 7$ years, 1 months, $SD = 9.5$ months; 10 female) and 20 in the First Possession Word Condition ($M = 7$ years, 4 months, $SD = 8$ months; 7 female). Participants also included 40 adults, 20 in the First Possession Idea Condition ($M = 39$ years, $SD = 11$ years; 15 female) and 20 in the First Possession Word Condition ($M = 37$ years, $SD = 10.5$ years; 14 female). Participants were recruited the same way as in Study 1a.
6.1.2. Procedure

Children were assigned to the First Possession Idea Condition or the First Possession Word Condition. The procedure for the First Possession Idea Condition was similar to this condition from Study 3. Two changes were made to the vignette. First, when children were asked about ownership, they were given the option of “Neither of them” in addition to the two boys’ names. “Neither of them” was added to ensure that children were not being forced to endorse ownership of a song by picking one of the two boys. If the results of this condition in Study 3 were due to children being forced to apply ownership, then they should answer “Neither of them” in this case. The second change was that the children were now asked “Who owns X?” rather than “Whose X is it?” This was done because the “Whose X is it?” construction sounded odd for the First Possession Word Condition. The First Possession Word Condition was similar to the First Possession Idea Condition except the entity in question was the word dog rather than a song. Adults saw the same vignettes as the children but viewed them on the Mechanical Turk Web site as they had in Studies 1a, 1b, and 2. For full vignettes, see Appendix B.

6.2. Results

6.2.1. Adults

A chi-squared goodness-of-fit test on the First Possession Idea Condition revealed that adults thought that the first possessor (n = 19), not the first pursuer (n = 0) or neither individual (n = 1), owned the song, \( \chi^2 (2, n = 20) = 34.3, p < .001 \). We additionally conducted binomial tests on the pair-wise comparisons and found that adults assigned ownership to the first possessor over the first pursuer and over neither, both ps < .001. A chi-squared goodness-of-fit test on the First Possession Word Condition revealed that adults responded non-randomly, with adults thinking that the first possessor (n = 8) or neither (n = 12) owned the word, but not the first pursuer (n = 0), \( \chi^2 (2, n = 20) = 11.2, p = .003 \). We additionally conducted binomial tests on the pair-wise comparisons and found that adults thought neither
was a better answer than the first pursuer \((p < .001)\), but that they did not favor neither over first possessor \((p = .503)\). We then conducted a 3 × 2 Fisher’s exact test on adults’ responses to the First Possession Idea and First Possession Word conditions (we used Fisher’s exact here because the adult data included two cells with zeros so we could not conduct a chi-squared test) and found that they were more likely to say that the first possessor owned the object in the First Possession Idea Condition as compared with the First Possession Word Condition, \(p < .001\). We additionally conducted a follow-up Yates-corrected chi-square test on the first possessor and neither answer choices and found that adults thought the owner was the first possessor rather than neither more often in the First Possession Idea Condition as compared with the First Possession Word Condition, \(\chi^2 (1, n = 40) = 11.396, p < .001\).

6.2.2. Children
A chi-squared goodness-of-fit test on the First Possession Idea Condition revealed that children thought that the first possessor \((n = 16)\), not the first pursuer \((n = 3)\) or neither individual \((n = 1)\), owned the song, \(\chi^2 (2, n = 20) = 19.9, p < .001\). We additionally conducted binomial tests on the pair-wise comparisons and found that children assigned ownership to the first possessor over the first pursuer \((p = .004)\) and over neither \((p < .001)\). A chi-squared goodness-of-fit test on the First Possession Word Condition revealed that children selected neither \((n = 11)\) and the first possessor \((n = 7)\) over the first pursuer \((n = 2)\), \(\chi^2 (2, n = 20) = 6.10, p = .047\). We additionally conducted binomial tests on the pair-wise comparisons and found that children thought neither was a better answer than the first pursuer \((p = .023)\), but that they did not favor neither over first possessor \((p = .481)\). We then conducted a 3 × 2 Fisher’s exact test on children’s responses to the First Possession Idea and First Possession Word conditions (we used Fisher’s exact here because we also used this with adults and wanted to use the same analysis here, the pattern of results is the same with a Yates-corrected chi-squared test) and found that they were more likely to say that the first possessor owned the object in the First Possession Idea Condition as compared with the First Possession Word Condition, \(p = .001\); see Fig. 5. We additionally conducted a follow-up Yates-corrected chi-square test on the pair-wise comparison and found that children thought the owner was the first possessor rather than neither more often in the First Possession Idea Condition as compared with the First Possession Word Condition \(\chi^2 (1, n = 40) = 9.51, p = .002\).

6.2.3. Adults and children
Fisher’s exact tests comparing children’s and adults’ responses to the First Possession Idea and First Possession Word conditions revealed no difference in the First Possession Idea, \(p = .231\), and First Possession Word Conditions, \(p = .518\).

6.3. Discussion

These results suggest that children will not apply ownership to just anything; instead, children really do think of ideas (and objects) as owned. If children were just being forced
into using principles of ownership in our previous experiments, we would have observed them using first possession to determine the ownership of a common word. Instead, children were much more likely to choose the first possessor in the First Possession Idea Condition as compared with the First Possession Word Condition. This suggests that children think certain ideas (like songs) are owned, but not other entities (like common words).

The relatively low rate of both adults and children endorsing neither as an option for the common word is likely due to how closely matched the vignettes were. The language of the vignette, specifically the use of the words “came up with,” may have made some children and adults think that the first possessor invented the word dog. However, even with these closely matched vignettes that provided a conservative test of our hypothesis, children and adults used first possession for determining ownership of ideas, but not words.

7. General discussion

Taken together, these studies suggest that children do apply principles of ownership to ideas in addition to objects. In Studies 1a and 1b, children favored first possession over both first pursuit and last possession, respectively, for both objects and ideas. Study 1b further documented children’s understanding that idea ownership, like object ownership (Blake & Harris, 2009), cannot be transferred through theft. Study 2 showed that children also use control of permission for both objects and ideas—that is, they think that someone who can tell someone else not to use one’s object or idea owns the entity in question. In Study 3, we replicated the effects from the previous experiments with more carefully controlled vignettes and with different idea types. In Study 4, we determined that children and adults still use first possession for ideas when they are given an option to say that no one can own an idea, but they do not use first possession to determine ownership of a word. These are the first studies to demonstrate that children and adults apply rules from physical ownership to ideas.

It appears that even children apply ownership to a broader range of entities than just objects, though they do not appear to apply ownership to all possible things. That said, it is unclear what makes children, or people more broadly, believe that something can be owned. Almost all research on ownership has focused exclusively on object ownership (Cram & Ng, 1989; Friedman & Neary, 2008; Newman, 1978; Weigel, 1984), which makes sense since much of ownership involves objects. However, the current results suggest that people’s ownership principles may be triggered by something as abstract as ideas and this is the case by middle childhood. For example, previous research had shown that children respond negatively to plagiarism by age 6 years (Olson & Shaw, 2011). However, this negative response to plagiarism could have been based on children thinking ideas are owned or recognizing that one individual was gaining false reputational credit by taking an idea. The fact that children here apply rules of ownership to ideas provides a more direct demonstration that children think of ideas as owned. If they did not think of ideas as owned, it would be hard to explain why they use the same rules from physical ownership when trying to decide ownership for ideas. Certainly, in combination with the plagiarism results, these
results suggest that, at least by age 6 years old, children have some understanding of idea ownership. This result also suggests that the concept of ownership applies to more than just objects.

Although we have demonstrated children’s application of several principles from object ownership—first possession, non-transfer by theft, and control of permission—to idea ownership, future research is needed to explore whether other rules from object ownership are similarly applied to idea ownership. One principle from object ownership that might apply to ideas is the notion that ownership is determined by the extent to which a person is necessary for obtaining a particular entity (Friedman, 2010). For example, imagine that first pursuer in our fish vignette had harpooned a large fish but someone else swooped in and took the fish. Here, people might say that the person who harpooned the fish is the rightful owner, even though he or she was not the first to physically possess it—because his or her action of harpooning the fish was necessary for possession. Friedman (2010) found that in analogous situations, adults override first possession if it is clear that the first pursuer was plausibly necessary for possession and was very likely to attain the object. The same may be true for ideas. If one person was very close to discovering an invention and someone else swooped in and finished it, people might think that the first pursuer of the idea is the true owner. It is possible that people think of both objects and ideas as already owned when there is a very high probability of imminent possession. Indeed, it is possible that the results we have framed above as first possession are really just examples of participants using the principle of ‘‘necessary for possession.’’

It is currently unclear how children come to develop a sense of ownership over ideas, but there are several possibilities. One possibility is that the rules we examined here just coincidentally apply to both objects and ideas and none of them are connected to the concept of ownership. However, this seems unlikely because we found children using three different ownership principles for both objects and ideas. Another possibility is that children learn to apply ownership principles to objects early in development and later learn to extend this well-formed ownership concept to ideas because of explicit socialization (they are taught that rules like first possession and control of permission apply to ideas). This possibility is consistent with the extant literature, as children have a clear sense of physical property ownership much earlier in development than they have a clear sense of intellectual property ownership (Friedman & Neary, 2008; Ross, 1996; Weigel, 1984). A final possibility is that people have mental systems for ownership (Friedman & Neary, 2008) that are somehow triggered by certain entities and as children develop they begin to realize that ideas (but not other things like words) are such entities, at least in our society. While the current studies cannot differentiate these possibilities, we would like to speculate on how ideas may become linked to ownership in development.

Children may develop a concept of idea ownership through learning that ideas are valuable entities and hence entities that are more likely to be owned. Something in a children’s environment must trigger them to think of ideas as being owned, as it seems implausible that children have an innate predisposition to think of ideas as property. Ownership-related thought may be activated most strongly when an entity in question has some value and is something others might want to have. That is not to say that worthless objects cannot be
However, it might be easier to apply ownership to entities that other individuals want and hence are willing to fight for since ownership will be most relevant in situations of conflict—when one agent wants what another agent has. Under this view, ideas might become subject to rules of ownership because ideas are signals of creativity, prestige, and fitness (Goodenough & Decker, 2009; Miller, 2000), which makes them valuable resources that others want. Once a resource is considered valuable, children might apply ownership rules to that resource.

The value placed on ideas for an individual may be especially strong in Western cultures that place a lot of value on individuality and uniqueness (Goncalo & Staw, 2006; Kagitcibasi, 1997), which might explain the close overlap between physical and intellectual property in the American culture we investigated. In a culture where ideas are not seen as valuable or are thought of more as public goods, for instance, in a more collectivist culture, we might see a reduction in the extent to which children and adults see ideas as owned. Future research will be needed to assess the cultural differences that exist in the application of ownership to ideas.

While our studies demonstrate that children apply rules of ownership to both objects and ideas, there are likely several respects in which object and idea ownership differ. First, reputational concerns are likely to be much more important for idea ownership. A large part of the value of an idea comes from the extent to which it benefits one’s reputation because ideas serve as a signal to one’s prestige and creativity (Bliege & Smith, 2005; Henrich & Gil-White, 2001; Miller, 2000). People may not expect one to credit the source of an object, but they do expect one to cite the source of an idea (Olson, 2009), likely because they recognize the importance of reputational concerns for ideas. Second, ownership of ideas differs from ownership of most objects because multiple parties can use an idea at one time. For example, if one of the authors was giving a talk about the ideas contained in this article, the other authors would not be constrained from simultaneously discussing the ideas with a colleague. This explains why it is perfectly reasonable to use someone’s idea without permission as long as you cite or acknowledge them (Goodenough & Decker, 2009), whereas the same is not true for objects: Using someone else’s laptop without permission is still unacceptable even if one acknowledges that it was taken from that person, in part because using someone else’s laptop precludes the owner from using it. Finally, transfer of ownership may also be unique for ideas. While children clearly understand that one can buy and borrow physical objects (Blake & Harris, 2009; Kim & Kalish, 2009), it is unclear how children and even adults think about similar transfers for ideas; when one buys someone else’s idea, is it acceptable not to give the originator credit?

Our results suggest that children’s understanding of idea ownership is present by middle childhood and merits further investigation. Knowing that children think of ideas as owned surely influences their intuitions about plagiarism and could affect their willingness to share their ideas with others. Indeed, while we have focused on idea *ownership* in children, the seeds of idea *creation* can be seen throughout elementary school science fairs and writing workshops. Understanding how children reason about ownership of ideas can inform our understanding of how to motivate them to create and ultimately pursue their own ideas, as well as develop their unique ideas in collaborations with others.
Note

1. We tested a few younger participants aged 3–5 years old to explore the emergence of these phenomena. However, based on our pilot data, we concluded that children were having difficulty following the vignettes. This made it difficult for us to conclude if the children’s performance was being driven by the fact that they do not apply ownership to ideas or if they simply had trouble keeping track of information in the vignettes.

Acknowledgments

We thank Mike Norton and the Social Cognitive Development Lab for critical discussions on this paper. We also thank Anna Merrill, Nina Slywotzky, Danielle DeLee, Murad Khan, Matt Choy, Zoe Liberman, Emily Bernstein, Tiffany Polk, Christian Ndreko, Jenna Cook, and Winnie Huang who helped to manage the participants in these studies.

References


Appendix A

I am going to tell you some stories about some boys and girls. And I am just going to point to these little dolls. When I am done with the story, you can just point to one of the dolls to answer my question.

Condition 1

Rachel wants to change the end of a joke. She asks Molly, ‘‘Can I change the end of the joke?’’ Molly says, ‘‘No, because I don’t want you to.’’ Whose joke is it? (Permission Idea).

Bob is fishing and has been trying to catch a big fish for a while. David sees this, casts his fishing line toward the fish, and catches it. Whose fish is it? (First Possession Object).

Tim has been trying to make up a song about a rainbow and comes up with a song about a rainbow. Adam sees this and takes it by telling other people he came up with the song. Whose song is it? (Theft Idea).

Condition 2

Sally wants to play with a toy robot. She asks Anne, ‘‘Can I play with the toy robot.’’ Anne says ‘‘No, because I don’t want you to.’’ Whose toy robot is it? (Permission Object).

Steven has been trying to come up with a song about a rainbow but has not come up with a song. Zack sees this and comes up with a song about a rainbow. Whose song about a rainbow is it? (First Possession Idea).

Paul is fishing and has been trying to catch a big fish for a while and catches it. When Paul isn’t looking, Jon takes the fish. Whose fish is it? (Theft Object).

Appendix B

I am going to tell you some stories about some boys and girls. And I am just going to point to these little dolls. When I am done with the story, you can just point to one of the dolls to answer my question or say neither of them. Can you do that?

First Possession Idea

Steven has been trying to come up with a song about a dragon but has not come up with a song. Zack sees this and comes up with a song about a dragon. Who owns the song about a dragon?

First Possession Word

Joe has been trying to come up with a word for an animal that barks but has not come up with the word. Bill sees this and comes up with the word for this, dog. Who owns the word dog?