

## Young Children Infer Psychological Ownership from Stewardship

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Please see [osf.io/e82bp/](https://osf.io/e82bp/) for stimuli and data from all experiments. None of the experiments were pre-registered.

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### **Abstract**

Although people take care of their own possessions, they also engage in stewardship and take care of things they do not own. Here, we examine what young children infer when they observe stewardship behavior of an object. Through four experiments on predominantly middle-class Canadian children (total  $N = 350$ , 168 girls and 182 boys from a predominantly White and middle-class region), we find that children as young as four or five infer feelings of ownership from stewardship behaviors, and distinguish between psychological and legal ownership. They also understand that psychological and legal ownership are independent as one can exist without the other, and children as young as 3 may link stewardship with welfare concerns. We also suggest that while stewardship has been shown to be a consequence of psychological ownership, it is also likely to be an antecedent. As future stewards of our resources, young children's understanding of the link between psychological ownership and stewardship links directly to sustainability concerns. We contribute theoretically both to the child development and the psychological ownership literatures.

**Keywords:** stewardship, psychological ownership, prosocial behavior, perceived ownership.

## Young Children Infer Psychological Ownership from Stewardship

It often pays to maintain and take care of your possessions. For example, if you stopped watering your office plant, it would become less pleasant to look at, and would eventually die. So when people take care of their own property, some of their motives are straightforward. But people also take care of things they do not actually own—a form of altruism sometimes termed stewardship (Worrell & Appleby, 2000). For example, they voluntarily clean litter from parks, and take care of vacationing neighbors' homes and pets. Although people showing stewardship take care of things they do not legally own, stewardship may nonetheless involve *psychological* ownership—the feeling that something is “mine” (Morewedge, 2021; Pierce et al., 2001). For example, people may feel motivated to clean litter from a public park not just to improve their own use of it, but also because they feel as though it is theirs.

Here, we examine whether young children link stewardship with psychological ownership (also termed “feelings of ownership”). Investigating this question will be informative about children's understanding of the psychological side of ownership. Although much research has examined the development of the psychology of ownership (see Nancekivell et al., 2019 for a recent overview), we still know little about how children think about people's feelings of ownership. Our investigation may also be informative about children's understanding of altruism and helping. Infants and toddlers are motivated to help others (e.g., Dahl & Brownell, 2019; Dunfield & Kuhlmeier, 2013; Warneken, 2018) and preschoolers have beliefs about when people are obligated to help (for a review see Dahl, 2020). The present research might show that children link helpful acts of stewardship with the mental state of psychological ownership.

### Psychological Ownership and Stewardship

Research on adults suggests that psychological ownership can result in stewardship behaviors. When adults feel ownership over a natural resource (e.g., a park or a lake), they are more likely to report feeling responsible to take care of it and to protect it. This relationship between psychological ownership and stewardship has been found in field studies and observations of actual behavior (Peck et al., 2021) and in hypothetical vignettes (Preston & Gelman, 2020). For example, kayakers' feelings of ownership were increased for a lake by having them invest themselves in thinking of a nickname for the lake. Subsequently, those kayakers who felt more ownership were more likely to exhibit effortful stewardship of picking up planted trash in the lake.

This previous research examined stewardship as an outcome or effect of psychological ownership. Earlier theoretical proposals also posited this causal direction (Pierce et al., 2001, 2003). We suggest that the relationship between psychological ownership and stewardship is likely bidirectional. One major antecedent of psychological ownership is investing of the self into an item (e.g., Pierce et al., 2001, 2003; Van Dyne & Pierce 2004). For example, voting on the design of a T-shirt increases consumers' feelings of ownership for it even if they do not buy it (Fuchs et al., 2010); likewise customizing a folder with their own design increases their feelings of ownership (Kirk et al., 2018). However, stewardship behaviors may *themselves* be a form of investing the self. For example, caring for a plant by watering it and moving it into the sunlight involves investing time and effort much as does laboring on it in other ways. Hence, stewardship may be both an outcome of psychological ownership, and a cause of it.

## Ownership in Children

It is unknown whether young children link psychological ownership with stewardship. Young children know much about ownership and it has widespread effects on their thoughts and actions. For example, young children are often successful in inferring and keeping track of who items belong to (e.g., Blake & Harris, 2009; Espinosa & Starmans, 2020; McDermott & Noles, 2018), and considerations of ownership impact children's actions towards objects (e.g., Davoodi et al., 2020; Kanngiesser et al., 2020) and intellectual property, their protests of others' actions (Rossano et al., 2011; Schmidt et al., 2013), and their moral and social judgments about both physical and intellectual property (e.g., Gelman et al., 2018; Shaw & Olson, 2015; Stonehouse & Friedman, 2021). Most of this work, though, touches on children's understanding of legal or actual ownership. But as we have seen, this is different than psychological ownership. People can feel as though a park is theirs, while understanding it does not actually belong to them.

Recent findings show that young children have some understanding of psychological ownership. One series of experiments found that children aged 4-7 distinguish between psychological ownership and legal ownership and anticipate that a person who habitually uses a publicly owned item is likely to have these feelings towards it (Cleroux & Friedman, 2020). This suggests that like adults (Kirk et al., 2018), children can infer ownership, both legal and psychological from observing the actions of others. Other studies suggest young children may link laboring on an object (i.e., investment of self) with psychological ownership. For example, like adults (Norton et al., 2012), children show the IKEA effect and value their creations over other similar items (DeJesus et al., 2019; Marsh et al., 2018; for a recent review see Gelman & Echelbarger, 2019a). None of this work, though, has examined whether children link psychological ownership with stewardship (for related discussion see Gelman & Echelbarger, 2019b).

## The Current Experiments

We investigated whether young children link psychological ownership and stewardship in four experiments. In Experiments 1 and 2, we first examine whether young children aged 4 and older infer that a person who exhibits stewardship behavior will have feelings of ownership or psychological ownership. Young children have detailed knowledge of legal ownership (e.g., Nancekivell et al., 2019), so these experiments also sought to ensure that children distinguish psychological ownership from legal ownership (i.e., a person wrongly believing they own an item). These experiments also investigate the distinction between psychological ownership and *misconceptions* of legal ownership. Psychological ownership makes people *feel* like they own items that are not legally theirs, without necessarily making people falsely claim or believe they have legal ownership—a person who feels as though a park is theirs will not normally claim or believe it actually belongs to them. We wanted to see if children understand this distinction.

Experiment 3 then examines whether young children recognize that a person who fails to show stewardship over an item they legally own is unlikely to have psychological ownership over it. For example, this experiment examined whether children understand that a person who neglected to water a plant may legally own it without feelings as though it belongs to them. Finally, Experiment 4 examines whether children aged 3 and 4 anticipate emotions linked with stewardship and feelings of ownership. Specifically, it tests whether they anticipate that a person who takes care of an item will be happier if it thrives than if it does not appear to benefit from their care.

## Experiment 1: Inferring Psychological and Legal Ownership from Stewardship Method

**Participants.** We tested 120 4-7-year-olds ( $M_{age} = 5;11$ , range = 4;0-7;10, 68 girls and 52 boys). In all experiments, we sought to test 30 children at each age in years (in each between-subjects condition), though as noted below we sometimes failed to reach this target. We based this sample size on previous experiments that used similar designs. In all experiments, the children were individually tested in their daycares and schools, and different children participated in each experiment. The population in the area is predominantly middle-class; approximately 79% of residents are White, and Chinese and South Asians residents are the main visible minorities. These studies were approved by the Office of Research Ethics at the University of Waterloo (Project 30395: Social Understanding in Children).

**Procedure.** Children were told two stories. These were narrated by the experimenter, with accompanying slides shown on a laptop computer; see Figure 1 for a sample scripts and [osf.io/e82bp/](https://osf.io/e82bp/) (Cleroux et al., 2021) for the slides used in all experiments. Both stories were about a child protagonist who takes care of an item they do not own. In the first story, a girl took care of her classroom fish one weekend, feeding it and cleaning its bowl; in the second story, a boy took care of his grandmother's plant one weekend, watering it and putting it in a sunny place.

After each story, children were first asked whether the item belonged to the protagonist (e.g., "Does the fish belong to the girl?"). This is the inference of legal ownership. Next children were asked whether the protagonist felt like the object was theirs (e.g., "Does the girl feel like the fish belongs to her?"), measuring inferences of psychological ownership. Finally, children were asked whether the child would say the object was theirs (e.g., "Would the girl say the fish belongs to her?"). The order of these questions was counterbalanced across participants.

In asking these questions, our aim was to determine whether children differentiate psychological ownership from both legal ownership and from false beliefs of ownership. We anticipated that children could differentiate these questions because the question about legal ownership has been used in prior studies of ownership, and the question about feelings and action predictions are similar to questions used to investigate theory of mind and the appearance-reality distinction in children even younger than our sample (e.g., Lane et al., 2014; Rice et al., 1997; for related discussion and findings see Cleroux & Friedman, 2020).

On rare occasions, children did not answer a test question or said, "I don't know". When this happened, the experimenter prompted them by asking, "What do you think?" If the child still did not respond, the experimenter repeated the story and questions a second time. This experiment was not pre-registered, nor were those subsequent.

## Results and Discussion

Data from all experiments were analyzed using generalized estimating equations (GEE) models. Experiment 1 to 3 used models for binary logistic data, where answers to the yes/no questions were coded 1 for "yes" responses, and 0 for "no responses"; in Experiment 4, the model was for ordinal logistic data. All experiments used independent correlation matrixes. Using GEEs avoids the need to average responses across trials, increasing power. However, to visualize the results, we showed individual children's scores in some figures by averaging across repeated measure trials. In each analysis, age-in months was centered and entered as a continuous predictor. The complete data from all experiments is available online at [osf.io/e82bp/](https://osf.io/e82bp/) (Cleroux et al., 2021).

A GEE model examined whether children's affirmative responses were predicted by judgment (legal ownership, psychological ownership, beliefs of ownership) and age. The model

revealed a main effect of judgment,  $Wald \chi^2(2) = 76.22, p < .001$ , qualified by an interaction with age,  $Wald \chi^2(2) = 23.60, p < .001$ ; see Figure 1. The main effect of age was not significant,  $Wald \chi^2(1) = 3.04, p = .081$ .

The main effect of judgment resulted because children were overall more likely to infer psychological ownership than beliefs of ownership and actual legal ownership, and also more likely to attribute psychological ownership than legal ownership, all  $ps < .001$  (Bonferroni corrected). The interaction between judgment and age resulted because although these differences remained significant at each age in years, all  $ps \leq .003$ , the difference between attributions of feelings and beliefs of ownership was not significant in 4-year-olds,  $p = .863$ . The interaction also resulted because older children were more likely than younger ones to affirm the child had psychological ownership,  $Wald \chi^2(1) = 7.10, p = .008$ , but less likely to affirm the child legally owned the item,  $Wald \chi^2(1) = 8.24, p = .004$ ; judgments that the child would say they owned the item did not change with age,  $Wald \chi^2(1) = 2.39, p = .122$ .

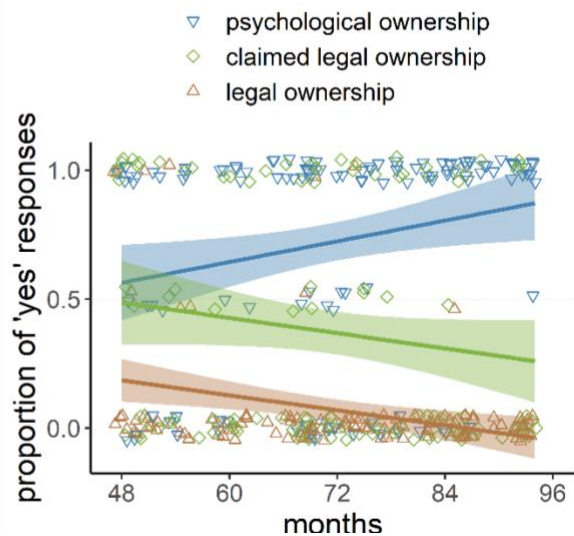
**Figure 1**

Experiment 1. Sample Story (left) and Scatterplot (right) of Children's Attributions

Look, here is a girl at school and here is the class fish. The teacher says she can take the fish home for the weekend.

So, the girl takes the fish home, she feeds it and cleans the fishbowl. I have some questions for you:

*Does the fish belong to the girl?*  
*Does the girl feel like the fish belongs to her?*  
*Would the girl say the fish belongs to her?*



*Note.* The scatterplot shows attributions of psychological ownership, claimed legal ownership, and legal ownership. Points are jittered to avoid overlaps; colored bands show 95% confidence intervals.

In sum, children at all ages differentiated psychological ownership from actual ownership, and children aged 5 and older differentiated psychological ownership from beliefs of ownership. Overall, the gap between children's judgments of psychological ownership and legal ownership suggest that children link psychological ownership with stewardship. However, this conclusion is tentative, as children might have responded identically even if each protagonist had not taken care of the item.

To address this concern, the stories in the next experiment featured two characters—one who takes care of the item, and another character who merely looks at it. The next experiment also attempted to probe attributions of beliefs of ownership more directly—we replaced the questions about whether each character would say the object is theirs with question about whether each character thought it was theirs. Because 4-year-olds in Experiment 1 did not

differentiate psychological ownership from beliefs of ownership (i.e., as indexed by why the character would say), we restricted participants to children aged 5-7 years.

## Experiment 2: Inferences from Stewardship vs Merely Observing

### Method

**Participants.** We tested 74 5-7-year-olds ( $M_{age} = 6;3$ , range = 5;0-7;10, 32 girls and 42 boys). There were 30 5-year-olds, 29 6-year-olds, and 15 7-year-olds; although we had initially hoped to test 30 children per age in years, we accidentally neglected to test one 6-year-old, and were unable to recruit enough 7-year-olds.

**Procedure.** Children again heard two stories, each about two characters and an item that did not belong to either of them; see Figure 2 for a sample story. In the first story, one girl took care of the classroom fish each day (feeding it and cleaning its bowl) and another girl looked at it each day. In the second story, one boy took care of grandma's plant each day (i.e., watering it and putting it in a sunny place), and another boy looked at it each day. The testing script explicitly mentioned that the item did not belong (legally) to the two characters, and included a comprehension question to confirm children understood this; children who responded incorrectly were corrected.

After each story, children were asked about each character's feelings of ownership (e.g., "Does this girl *feel like* the fish belongs to her?") and false beliefs of ownership (e.g., "Does this girl *think* the fish belongs to her?"). Both questions were first asked about the character on the left side of the screen, and then about the character on the right side. Across participants, we counterbalanced whether the character who cared for the item was on the left or the right, and which question was asked first.

### Results and Discussion

A GEE model examined whether children's affirmative responses were predicted by judgment (psychological ownership, beliefs of legal ownership), character (cares for, looks at), and age. The model revealed a main effect of character,  $Wald \chi^2(1) = 27.67, p < .001$ , which resulted because children were overall more likely to attribute psychological ownership and beliefs of ownership to the character who cared for the item than to the character who merely looked at it; see Figure 2. There was also a main effect of age,  $Wald \chi^2(1) = 6.96, p = .008$ , as older children were overall more likely than young children to infer psychological ownership and beliefs of ownership. The analysis revealed no effect of judgment and no significant interactions,  $ps \geq .195$ .

These findings suggest that children do link psychological ownership with stewardship, as children were more likely to attribute these feelings to the character who took care of the item than to the character who just looked at the item. In contrast with the first experiment, though, children were as likely to infer psychological ownership and false beliefs of ownership. This difference across the experiments probably resulted because different test questions were used to probe children's attributions of beliefs of ownership. In the General Discussion we consider implications of these findings.

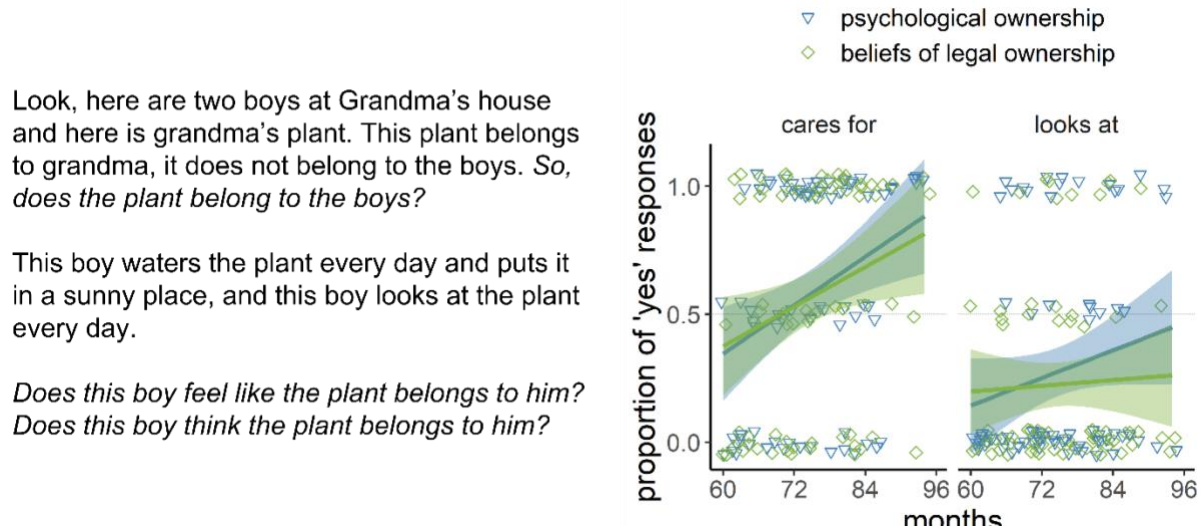
The remaining experiments sought to further probe children's understanding of stewardship and psychological ownership. The studies so far suggest that children recognize that people can have psychological ownership for items they do not own. The next experiment investigated whether children might recognize the reverse situation, where a person lacks psychological ownership for items that do belong to them. Specifically, we investigated whether children will *deny* psychological ownership to individuals who neglect their possessions and fail



to show stewardship towards them. Because this next experiment did not probe the distinction between psychological ownership and beliefs of ownership, it again included 4-year-olds.

**Figure 2**

Experiment 2. Sample Story (left) and Scatterplot (right) of Children's Attributions



*Note.* The scatterplot shows attributions of psychological ownership and beliefs of legal ownership. Points are jittered to avoid overlaps; colored bands show 95% confidence intervals.

### Experiment 3: Inferences from Lack of Stewardship

#### Method

**Participants.** We tested 38 4-6-year-olds ( $M_{age} = 5;8$ , range = 4;0-6;11, 21 girls and 17 boys). There were 9 4-year-olds, 11 5-year-olds, and 18 6-year-olds. As before, we had planned to test 30 children at each age in years. However, we were unable to complete data collection because of the COVID pandemic.

**Procedure.** Each child saw four stories, each about a different protagonist and item (plant or fish). The stories varied in a 2x2 within-subjects design manipulating whether the protagonist took care of the item or neglected it, and whether the item belonged to the protagonist or to their school; see Figure 3 for a sample story. Each story explicitly mentioned whether the item belonged to the protagonist, and included a comprehension question to confirm children understood this; children who responded incorrectly were corrected. After each story, children were asked about the protagonist's psychological ownership of the item.

Each of the four stories was conveyed using a single slide. All children saw the slides in the same order (girl with fish, boy with plant, boy with fish, girl with plant), but we randomly assigned each child to one of four counterbalancing groups, which varied in which slide was used to convey each of the four within-subject conditions.

#### Results and Discussion

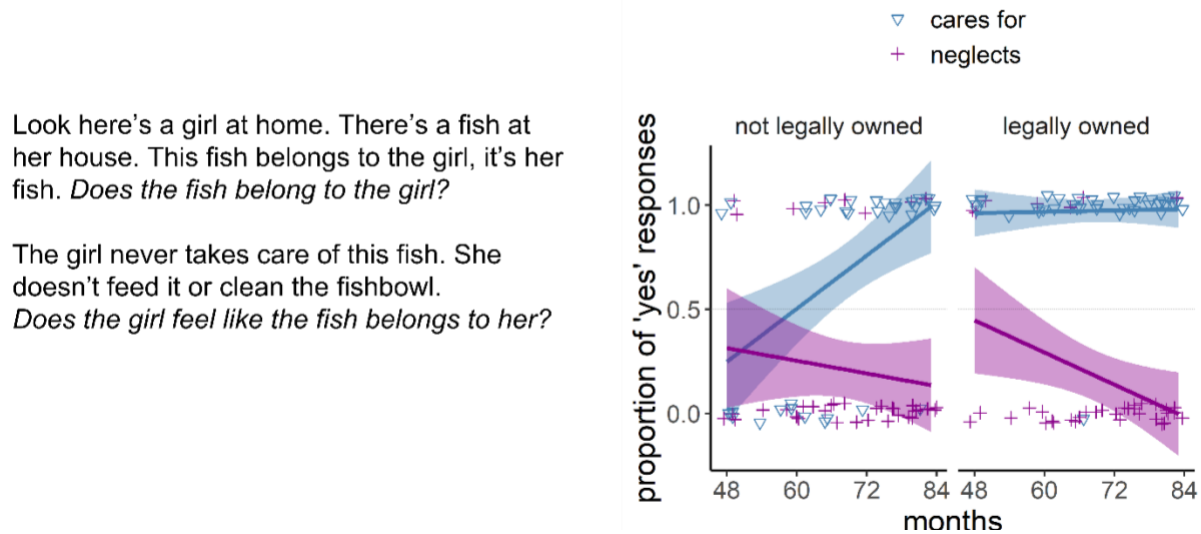
A GEE model examined whether children's affirmative responses were predicted by stewardship (cares for, neglects), ownership (owned, non-owned), and age. The model revealed a main effect of stewardship,  $Wald \chi^2(1) = 36.91$ ,  $p < .001$ , resulting because children were more likely to attribute psychological ownership when the protagonist took care of the item, than when the protagonist neglected it; see Figure 3. There was no main effect of actual legal



ownership,  $Wald \chi^2(1) = 3.01, p = .083$ , or age,  $Wald \chi^2(1) = 0.03, p = .873$ . However, there were three significant 2-way interactions: stewardship x ownership,  $Wald \chi^2(1) = 6.00, p = .014$ ; stewardship x age,  $Wald \chi^2(1) = 8.17, p = .004$ ; and ownership x age,  $Wald \chi^2(1) = 5.96, p = .015$ . The 3-way interaction was not significant,  $Wald \chi^2(1) = 0.42, p = .519$ .

### Figure 3

Experiment 3. Sample Story (left) and Scatterplot (right) of Children's Inferences of Psychological Ownership.



*Note.* Points are jittered to avoid overlaps; colored bands show 95% confidence intervals.

The stewardship x ownership interaction resulted because children were more likely to infer psychological ownership of cared for objects that were owned, rather than non-owned,  $p = .038$ , whereas this difference was not found for neglected objects,  $p > .999$ . Importantly, though, inferences of psychological ownership were greater when items were cared for (i.e., compared when they were neglected) both when the items were legally owned and non-owned, both  $ps < .001$ . The stewardship x age interaction resulted because the effect of stewardship was significant in 5- and 6-year-olds, both  $ps < .001$ , but not in 4-year-olds,  $p = .121$ . In contrast, the ownership x age interaction resulted because legal ownership did not affect 5- and 6-year-olds psychological ownership, both  $ps \geq .472$ , whereas 4-year-olds were more likely to attribute these feelings for owned than non-owned items,  $p = .002$ .

In sum, children were more likely to infer psychological ownership when characters exhibited stewardship behavior than when they did not. This effect of stewardship occurred both for owned and non-owned items. The findings suggest, then, that besides recognizing that non-owners can have feelings of ownership, young children likewise understand that owners may sometime lack these feelings.

One concern, though, is that the small sample size in this experiment was unlikely to provide enough power to detect a 3-way-interaction. In the Supplemental Materials, we therefore report exploratory analyses, where we used a median split to divide children into younger and older groups, and then ran separate stewardship-by-ownership models on each group. These extra analyses suggest the overall analyses may have failed to detect important developmental changes. Specifically, older children's inferences of psychological ownership

may depend only on stewardship and not on legal ownership, whereas younger children's inferences may depend on both factors.

Although further research is needed to corroborate these exploratory findings, they do not undermine the main conclusion from the main analysis. As with that analysis, the exploratory analyses suggest that both younger and older children consider stewardship when inferring psychological ownership, and that children at both ages grasp that legal ownership does not entail psychological ownership—both younger and older children understand that a person can legally own an item without having the feeling of psychological ownership for it. Nonetheless, future research should test whether the main findings replicate if a larger sample is tested.

In our final experiment, we turned to a different issue. When people feel ownership over items, they also often care about the welfare of those items. This point was made by James (1890), who noted that when we incorporate objects into the self, we care about their successes, much as we care about our own successes. To explore whether children might recognize this emotional consequence of psychological ownership, we asked children to judge how a person would feel if an item they took care of either thrived or was not affected by their care.

In this final experiment we tested children aged 3-4 as children at these ages are often able to predict others' emotions (e.g., Wellman & Bartsch, 1988; Wellman & Woolley, 1990), and some prior work found that even toddlers have some ability to predict emotions related to ownership (Pesowski & Friedman, 2015).

#### **Experiment 4: Emotions Tied to Inferences of Stewardship**

##### **Method**

**Participants.** We tested 118 3-4-year-olds ( $M_{age} = 3;11$ , range = 3;0-4;11, 47 girls and 71 boys). There were 58 3-year-olds and 60 4-year-olds. Two other 3-year-olds were tested but did not respond to the test questions.

**Procedure.** Children heard two stories. In each story, a protagonist took care of one of two similar items, which did not belong to the protagonist; see Figure 4 for a sample story. In the first story, a boy took care of one of two plants belonging to his grandma; in the second story, a girl took care of one of two pet fish at school. The testing script explicitly mentioned that the items did not belong to the protagonist, and included a comprehension question to confirm children understood this; children who responded incorrectly were corrected.

Children were randomly assigned to see the story in one of two between-subjects conditions. In one condition, the cared-for item thrived (i.e., the plant bloomed; the fish grew) and the other item remained as it was. In the other condition, the cared-for item stayed as it was, and the other item thrived instead. Following each story, children were asked how the protagonist felt (e.g., "How does the boy feel?") and responded using a scale showing five faces ranging from very happy to very sad; responses were recoded as values ranging from 2 to -2.

##### **Results and Discussion**

A GEE model examined whether children's emotion ratings were predicted by condition (stewarded thrives, other thrives) and age. The model revealed a main effect of condition,  $Wald \chi^2(1) = 4.68, p = .031$ , resulting because emotion ratings were more positive when the stewarded item thrived than when the other item thrived; see Figure 4. There was also a main effect of age,  $Wald \chi^2(1) = 4.82, p = .028$ , resulting because older children's ratings were more positive overall than those of younger children. However, there was no significant interaction,  $Wald \chi^2(1) = 1.12, p = .289$ .

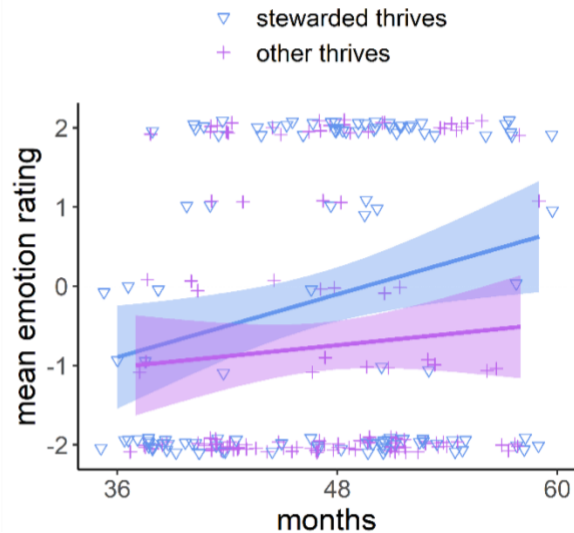
**Figure 4**

Experiment 4. Sample Story (left) and Scatterplot of Emotion Ratings (right).

Look, here are two boys at Grandma's house and here is grandma's plant. This plant belongs to grandma, it does not belong to the boys. So, *does the plant belong to the boys?*

This boy waters the plant every day and puts it in a sunny place, and this boy looks at the plant every day.

*Does this boy feel like the plant belongs to him?*  
*Does this boy think the plant belongs to him?*



*Note.* Emotions ratings ranged from very happy (2) to very sad (-2). Points are jittered to avoid overlaps; colored bands show 95% confidence intervals.

These findings provide preliminary evidence that children as young as 3-4 understand that stewardship is linked with welfare concerns. It is somewhat surprising, though, that children (especially 3-year-olds) predicted that the character would feel relatively sad in both conditions (see Figure 4). Children might have found both outcomes relatively disappointing, as it would have been better if *both* items had thrived.

### General Discussion

Across four experiments, we investigated whether young children link psychological ownership and stewardship. From age 4 or 5, children were more likely to attribute psychological ownership than legal ownership to an agent showing stewardship. From age 5, they understood that psychological ownership does not entail false claims of legal ownership, though they did appear to equate psychological ownership with false beliefs of ownership. Children aged 4 to 6 also understood that legal ownership does not always entail psychological ownership, and children aged 3 and 4 anticipated that a person who takes care of an object will be happier if it thrives compared with if another item thrives instead.

Together, these findings show that with development, children increasingly link psychological ownership with stewardship behaviors and perhaps with concern for others' welfare. Whereas children's understanding of legal ownership has now been studied extensively (e.g., Davoodi et al., 2020; Espinosa & Starman, 2020; Kanngiesser et al., 2019; see Nancekivell et al., 2019 for an overview), less is known about their understanding of psychological ownership. One contribution of our experiments is revealing a novel cue children use to infer psychological ownership. Whereas children in earlier work inferred psychological ownership from habitual use of objects (Cleroux & Friedman, 2020), our findings suggest they also infer it from acts of stewardship.

Children's responses also suggest they view psychological ownership and legal ownership as independent from one another; they recognize that psychological ownership can

arise without legal ownership, and vice-versa. For example, they denied psychological ownership for an agent who neglected to take care of an item, even when the agent legally owned it (though again, this finding should be replicated with a larger sample). It is less clear, though, whether children distinguish psychological ownership from false beliefs about legal ownership. For example, it is unclear whether children can understand that someone feels like a plant is theirs but without believing they really own it. In the first experiment, 5-7-year-olds seemed to recognize this distinction when they attributed psychological ownership to an agent but denied the agent would *claim* to have legal ownership. Yet in the second experiment, children predicted that agents with psychological ownership would *think* they had legal ownership.

We were surprised that children responded differently based on whether they predicted what agents would claim or think. People's claims usually reflect their beliefs, and children's predictions about people's claims and beliefs typically yield similar results in false belief tasks (Wellman et al., 2011). So how can we make sense of children's responses? One explanation is that from age 5, children do differentiate psychological ownership from beliefs of legal ownership. This could be true if the question about what the agent thinks did not capture children's actual understanding. For example, children may have found the question unclear. Indeed, recent work suggests that pragmatic factors may lead children to misattribute false beliefs in tasks where an agent has a belief that is true (Oktay-Gür & Rakoczy, 2017). So, children's performance might be better if they were asked a clearer question. For instance, it might be clearer to ask whether agents knew they did not own each item.

Alternatively, differences between children's responses to the question about what the agents would claim and think could reflect limits in children's understanding. In particular, children might have difficulty understanding that beliefs can conflict with certain kinds of feelings—this difficulty could stem from broader difficulties understanding inner conflicts (for a review see Starmans, 2017). If so, we might expect children to struggle to understand other instances where feelings and thoughts conflict. For example, children might fail to grasp how someone could feel as though a bridge is dangerous, while simultaneously thinking it is safe (Gendler, 2008). One challenge for this account, though, is explaining why children succeeded in predicting that agents would deny legal owning the items.

In our final experiment, children anticipated that an agent would be relatively happier if their stewardship of an item benefitted it, compared with if it did not benefit the item. This finding provides preliminary evidence that young children link stewardship and feelings of ownership with welfare concern. After all, a child who cares for their classroom fish may enjoy taking care of it, but this stewardship also benefits the fish itself, and perhaps the classroom too. Combined with other work, these findings suggest that children may be aware of both positive and negative consequences of psychological ownership. Whereas concerns for welfare are positive, earlier work suggested that children may understand that psychological ownership can lead to a more negative outcome: territorial feelings (Cleroux & Friedman, 2020). In that work, children aged 4 years and older often anticipated that a girl who always uses the same swing at a park would feel as though it is hers, and even 3-year-olds anticipated she would be upset if someone else occupied it. The welfare-based interpretation of our findings is broadly consistent with findings that toddlers and young children show signs of happiness when they follow instructions to engage in costly giving (e.g., Aknin et al., 2012; Aknin et al., 2015) and findings that children are sometimes willing to spontaneously give resources to others in need, even before a request has been made (e.g., Brownell et al., 2013; Dunfield & Kuhlmeier, 2013; for a review, see Warneken, 2018).

However, one limitation of the present work is that they leave some uncertainty about how children viewed the agents' stewardship actions. For example, as acknowledged above, children could have viewed the care as benefitting the direct recipient (e.g., the fish and plant themselves) or as benefitting their actual owners. Also, because stewardship was mostly contrasted with inactivity (e.g., a character who looked at an object instead of taking care of it), there is some possibility that children inferred psychological ownership from physical contact rather than from stewardship *per se*. One reason to doubt, this, though is that prior work found that without habitual or repeated physical use of an object, children do not attribute psychological ownership at high rates. For example, they do not strongly endorse it when an agent physically uses an object for the first time (Cleroux & Friedman, 2020). Even so, for greater clarity it would be helpful to directly contrast stewardship with other physical actions.

Finally, we note that while feelings of ownership have been shown to increase stewardship in adults (Felix & Almaguer, 2019; Jami et al., 2021; Matilainen et al., 2017; Suessenbach & Kamleitner, 2018), the present work raises the possibility that stewardship behaviors are not just a consequence of psychological ownership, but may also be an antecedent or cause of it. Put another way, psychological ownership may motivate people to take care of objects and resources, but these acts of stewardship may themselves increase stewardship. In the present experiments, we gave children information about stewardship behaviors and found that they used this information to infer psychological ownership. This could indicate that children believe stewardship causes these feelings. However, it is also possible that children instead viewed the stewardship behaviors as resulting from psychological ownership. So future work will be needed to examine children's beliefs about causal relations between stewardship and psychological ownership.

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