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Is Mind-Reading Involved in Ownership Judgments?

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Abstract

How do people determine who owns what? While existing research has identified a number of psychological and behavioral sources of ownership judgments, the role of mental state attribution has received less attention. We conducted three online experiments ($N = 1246$) examining if ownership judgments rely on mind-reading: the capacity to infer others' intentions, beliefs, and knowledge states. Using vignettes, we tested if ownership judgments are sensitive to variations in contextual cues (Study 1), beliefs about the permissibility of taking items (Study 2), and knowledge about social norms (Study 3). We also tested if the moral aspects of a scenario affect judgments of rightful ownership transfer. Our findings indicate that ownership judgments indeed vary in response to these factors, and that they do not vary on par with moral judgments. These findings are best explained in terms of mind-reading and support the argument that ownership is fundamentally a social phenomenon: not a relationship between people and resources but rather between people about resources.

Keywords: Ownership; Mind-reading; Resource use

1. Introduction

Imagine you enter the kitchen at work, planning to have lunch. You notice a bowl of fruit on the table. Are you allowed to take a piece, or would you be stealing someone else's property? The surroundings might help you decipher the intentions of whoever left the bowl there. Is the bowl placed in the middle of the table next to the salt and pepper or by the side of the table next to a plate with cutlery? Do you consider what the norm is among your colleagues

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when it comes to sharing food? These questions show how complex it can be to attribute ownership and to navigate a social world where resources can be claimed and rights of usage challenged. And yet, we make judgments about ownership every day in many domains of our social interactions and economic decision-making. These judgments concern material items as well as abstract resources, such as thoughts and ideas, public and private places, body parts, family members, or the country of which we are citizens.

In general, ownership judgments have an important function: establishing some kind of agreement, often implicit ones, over the use of resources in a social environment (for an elaboration of the functions of ownership, see, e.g., Friedman, 2025; Hindriks & Guala, 2015). Without agreement about resource use, we would have less short- and long-term predictability in our day-to-day life, social interactions, and economic production. Explaining where stability over resource use comes from is therefore critical to understanding how ownership judgments emerge. We get stability over resource use sometimes by violence and dominance but also by converging on shared expectations that regulate resource use. These shared expectations may emerge in a variety of ways, such as regular habits of use, through kinship, following command in a given social structure, or through being responsible for harmful outcomes of a resource (Hartley, 2019; Palamar & Friedman, 2012; Stonehouse & Friedman, 2022).

Where do ownership judgments come from? Prior research has identified an array of different behavioral and psychological sources. A common behavioral heuristic is first possession, which links first physical contact with a resource to ownership, and emerges early in development (Friedman, 2008; Friedman & Neary, 2009; Nancekivell, Friedman, & Gelman, 2019). Some ownership judgments are grounded in psychological intuitions of fairness and morality (André, Fitouchi, Debove, & Baumard, 2022; Boyer, 2023). Communicative and cooperative cues, when understood as such, often are the basis of ownership judgments (Rossano, Fiedler, & Tomasello, 2015). Following norms and conventions, including legal ones, also guides ownership judgments. Ownership-related norms and institutions tend to vary across cultures, which in turn further shape how we form judgments about ownership, creating remarkable cultural diversity (Bialek, Stefanczyk, Kowal, & Sorokowski, 2024; Espinoza & Barrett, 2023; Gurven, 2004; Hill & Hurtado, 1996; Singh, 2022; Turner, 2017).

Judgments about ownership are plausibly triggered by mind-reading as well: namely, reading communicative cues to infer others' intentions and mental states about the status of resources (Rossano et al., 2015; Scorolli, Borghi, & Tummolini, 2018). However, to our knowledge, few have investigated if ownership judgments flexibly emerge in response to others' mental states. In fact, a sensitivity to others' mental states and a readiness for attributing intentions from contextual cues could explain the remarkable ease with which people infer and interpret arbitrary norms of resource use: People not only represent social norms but represent the relevant norms that others are reasonably expected to hold (Noles & Keil, 2011). Recognizing nuanced aspects of ownership where intention-reading is crucial emerges in early childhood, that is, before much exposure to norms in wider society (Blake & Harris, 2009, 2011; Kanngiesser, Rossano, Zeidler, Haun, & Tomasello, 2019; Li, Qi, Yu, & Zhu, 2018; Li, Shaw, & Olson, 2013; Neary, Friedman, & Burnstein, 2009; Pesowski, Nancekivell, Tasimi, & Friedman, 2022). This is evidence for the argument that ownership judgments emerge from mind-reading too, not just from norm following. Furthermore, experimental work with adults has shown that ownership judgments cannot be reduced to norm following only: Lay intuitions do not always overlap with formal property law, and even straightforward cases of ownership transfer trigger different judgments (DeScioli & Karpoff, 2015; Green & Kugler, 2010; Zhang, Bloom, & Jara-Ettinger, 2024). We investigate how mind-reading processes generate judgments of ownership defined as the exclusive right of usage over a resource. This right could be a temporary one in the case of a train seat or a permanent one in the case of other food and other objects. Mind-reading processes are crucial here because the exclusiveness needs to be recognized and respected by both the owner and others around the owner. In other words, they need to be in agreement over their beliefs about rightful ownership.

Here, we present empirical and theoretical contributions to the study of how ownership judgments depend on mind-reading. First, in three online behavioral experiments, we investigate whether ownership judgments vary depending on contextual evidence that reveals intentions (Study 1), beliefs about others' intentions (Study 2), and others' knowledge about social norms (Study 3). In each experiment, we asked adult participants to read a short paragraph describing everyday scenarios where a character decides to take an item and then to answer questions about their impressions. Results show that ownership judgments indeed vary depending on these factors. The strategic nature inherent to our experimental designs leads us to conclude that mind-reading processes—representations about others' mental states, including intentions—are the basis of ownership institutions that regulate resource use.

2. Overview of experiments

We conducted three online behavioral experiments. Study 1 investigates if item placement generates different ownership judgments. Study 2 investigates if manipulating information flow about the availability of an item modifies ownership judgments. Study 3 investigates if moral judgments of resource use are sensitive to others' knowledge about norms.

We recruited fluent English-speaking adults from Prolific to participate in a study hosted on Qualtrics for financial compensation. We aimed to recruit 50 participants for each experimental condition. Based on previous pilots, this sample size provided sufficient power and effect size. After giving informed consent, participants were randomly assigned to one of two (in Studies 1 and 2) or one of four (in Study 3) conditions. Participants were recruited for only one condition of each study. Participants had to read a short story describing an everyday situation where a person decides to take an inexpensive item. After reading the story, participants had to answer one question about whether they think taking the item was wrong (wrongness judgment), another question about who owns the item after taking it (ownership attribution), two manipulation checks, and one attention check. Data cleaning and statistical analyses were performed using Stata v18.5 and R. All three experiments had been evaluated and approved by the Psychological Research Ethics Board at the Central European University prior to recruiting participants (PREBO Ref: 2022/18). Except where otherwise stated, all hypotheses and analyses have been preregistered on AsPredicted before data collection. The raw data and the code are available on OSF.

We had the same binary dependent variables in all three experiments. We measured them by asking participants the following two questions after reading the stimuli:

1. Wrongness judgment: Do you think it was wrong to take [item] in this situation? Yes / No
2. Ownership attribution: Who owns [the item] now? The character who took the item/the other character in the scenario

Our experimental design allows us to test the following hypothesized mechanism of ownership attribution: The manipulations in the stimuli trigger a particular attribution of mental states, which then leads to an ownership judgment. We chose wrongness judgments and ownership judgments as our two dependent variables for two reasons. First, they allow us to test the hypothesis that ownership judgments are an expression of fairness judgments, that is, wrongness judgments and ownership judgments are always correlated (e.g., André et al., 2022). Second, the ownership question allows us to test the hypothesis that temporary physical possession of an item is distinct from ownership.

In addition, participants had to answer two questions that aim to check that they have understood the intentions and beliefs of the characters in the stimuli:

1. Manipulation Check 1: What do you think [the character who takes the item] believes: [Other people in the scenario] want to share [item]/[Other people in the scenario] do not want to share [item].
2. Manipulation Check 2: What do you think [first possessor] intended to do: [First possessor] intended to keep using [item]/[First possessor] intended to stop using [item].

Study-specific details (hypotheses, materials, results) are presented in the following sections.

3. Study 1

3.1. Hypothesis

Are people sensitive to subtle variations in contextual cues when they infer that a resource is owned? Do they read intentions and make normative judgments on the basis of such cues? We investigate these questions in Study 1. Using a 2×1 design, we test the effect of small contextual variations on (1) whether taking an item is judged to be wrong and (2) whether ownership is transferred. We vary the description of how an item is placed. We hypothesize that differences in item placement trigger different interpretations of the scenario, which leads participants to make different moral and ownership judgments.

3.2. Materials

We designed three scenarios. Each participant read only one. Each scenario describes an ordinary situation where a character takes an inexpensive item. We chose inexpensive

Table 1
Manipulations in Conditions 1 and 2 in Study 1

Scenario	Manipulation in Experimental Condition	Manipulation in Control Condition
1: Newspaper on the train	The other passenger got off the train and left the newspaper on his seat.	The other passenger gets up from his seat, leaving all of his belongings, including the newspaper, behind.
2: Strawberries in the office kitchen	When Sarah enters the kitchen, she sees a bowl of strawberries in the middle of the table, next to the salt and pepper.	When Sarah enters the kitchen, she sees a bowl of strawberries by the side of the table, next to a cell phone.
3: Books	The other customer places the book Maya is interested in on the shelf, next to a stack of books.	Eventually, the other customer places the book Maya is interested in in the shopping basket, next to a stack of books.

everyday items to try to isolate the effect of contextual cues from other potential effects, such as the value or the rarity of the item. We manipulated the description of how the item is placed.

In Scenario 1 (“Newspaper on the train”), participants read the following text:

Hans is taking the train to travel from Manchester to Birmingham. He usually likes to catch up on some reading when he is on the train. He spots another passenger reading the latest issue of *The Financial Times*, which raises his interest.	
Condition 1 (experimental condition)	*Condition 2 (control condition)*
After some time, the other passenger got off the train and left the newspaper on his seat.	After some time, the other passenger gets up from his seat, leaving all of his belongings, including the newspaper, behind.
Hans takes the newspaper.	

After reading the text, participants had to answer the following questions:

1. Do you think it was wrong to take the newspaper in this situation? Yes/No
2. Who do you think owns the newspaper now? Hans/The other passenger
3. What do you think Hans believes? The other passenger wants to get rid of the newspaper/The other passenger wants to keep the newspaper
4. What do you think the other passenger intended to do? The other passenger intended to get rid of the newspaper/The other passenger intended to keep the newspaper

In this scenario, we manipulate if the newspaper is left on the seat with nothing else (experimental condition) or next to personal belongings (control condition). In both conditions, Hans takes the newspaper after observing the other passenger read the newspaper and leave the seat.

Table 1 summarizes the manipulations in all three scenarios, and the Appendix in the Supporting Information contains the full materials.

Table 2
Do you think it was wrong to take the item? ($n = 307$)

Condition	Yes (%)	Yes (n)
Experimental condition	16.45%	25
Control condition	70.32%	109

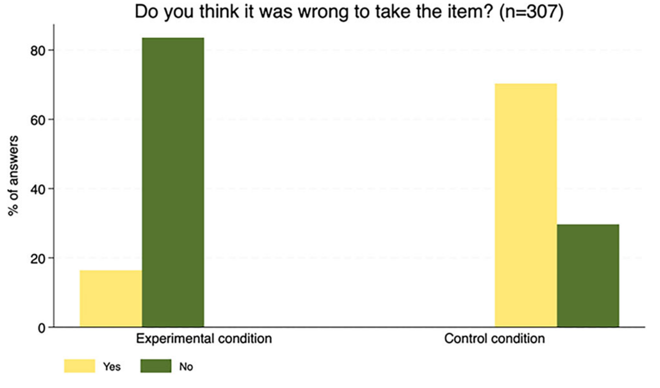

Fig. 1. % of "yes" and "no" participant answers to the wrongness judgment question (Do you think it was wrong to take the item?, $n = 307$) across the two conditions and three scenarios.

3.3. Sample

$N = 307$, 45% female, $M_{age} = 37$. Geographic distribution: 58% UK, 19% EU, 14% Africa (South Africa), 8% US&Canada.

3.4. Results

We compiled the final dataset by pooling all data from all the scenarios together. We ran a chi-square test and a logistic regression for the two dependent variables separately. We coded participants' answers as 1 if they answered "yes," and 0 if they answered "no" in the wrongness judgments, and 1 if they chose "the main character," and 0 if they chose "the other character" in ownership attribution. We added additional categorical variables for condition and scenario to the logistic regression model.

3.4.1. Wrongness judgment

Table 2 and Fig. 1 describe the data by summarizing the frequency and ratio of "yes" answers across the two conditions.

Significantly more participants found that taking the item is wrong in the control condition (70.32%) than in the experimental condition (16.45%; $\chi^2(1) = 90.5609$, $p < .001$, Cramér's V = 0.5431).

We ran a logistic regression to see what increases the probability of a wrongness judgment. The logistic regression output reveals a significant and positive odds ratio for the

Regression Output 1
Logistic regression where the dependent variable is the wrongness judgments pooled together from all scenarios and conditions (0 = not wrong, 1 = wrong). Condition and scenario are categorical variables taking the value 2 and 3, respectively.

Wrongness Judgment	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence Interval]	
Condition	84.14998	88.39774	4.22	0.000	10.73705	659.5123
Scenario	2.881375	1.571337	1.94	0.052	0.9894712	8.390667
Condition:						
Control condition	1	(omitted)				
Scenario:						
Scenario 2	9.118118	5.670976	3.55	0.000	2.69466	30.85365
Scenario 3	1	(omitted)				
Condition # Scenario Interaction Term:						
Control condition#Scenario 2	0.0461361	.0522265	−2.72	0.007	0.0050173	0.424238
Control condition#Scenario 3	0.3406616	0.4038704	−0.91	0.364	0.0333567	3.479067
Constant	0.0000809	0.0002064	−3.69	0.000	5.43e-07	0.0120372

Note. Condition = 2 and Scenario = 3 omitted because of collinearity. Constant estimates baseline odds. Number of observations = 307, Wald chi2(5) = 65.66, Prob > chi2 = 0.0000, Pseudo R^2 = 0.2935, log pseudo-likelihood = −148.59578.

Table 3
Who owns the item now? (n=307)

Condition	Main Character (%)	Other Character (%)	Main Character (n)	Other Character (n)
Experimental condition	69.74%	30.26	106	46
Control condition	38.06%	61.94	59	96

condition variable (odds ratio = 84.14998; $p < .001$; robust std. err. = 88.39774; $z = 4.22$; 95% CI [10.73705, 659.5123]). The odds ratio for Scenario 2 is also significant (odds ratio = 9.118118; $p < .001$; robust std. err. = 5.670976; $z = 3.55$; 95% Confidence Interval [2.694669; 30.85365]), indicating that the effect is stronger in Scenario 2 than in Scenarios 1 and 3. The full regression output can be found Regression Output 1.

3.4.2. Ownership attribution

Table 3 and Fig. 2 describe the data by summarizing the frequency and ratio of "Main character" and "Other character" answers across the two conditions.

Significantly more people thought that the main character owns the item in the experimental condition (69.74%), compared to the control condition (38.06%; $\chi^2(1) = 30.9672$, $p < .001$, Cramér's V = −0.317).

We ran a logistic regression to see what increases the probability of ownership being attributed to the main character. Here, we recoded participants' answers and created a binary "owner" variable that takes the value of 1 for the main character and the value of

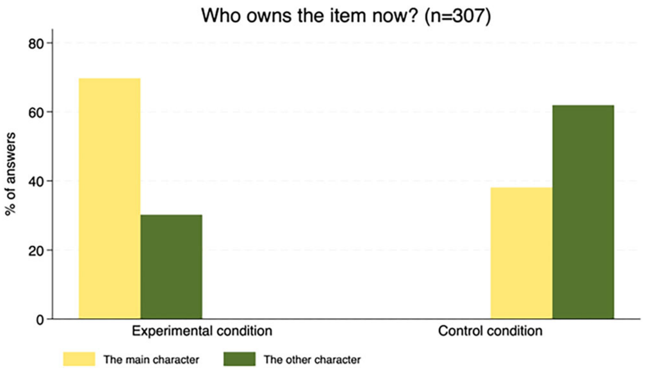

Fig. 2. % of participant answers to the ownership judgment question (Who owns the item now?, $n = 307$) across the two conditions and three scenarios.

Regression Output 2

Logistic regression where the dependent variable is the ownership judgments pooled together from all scenarios and conditions (1 = main character is the owner, 0 = main character is not the owner). Condition and scenario are categorical variables taking the value of 2 and 3, respectively.

Ownership Judgment	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence	Interval]
Condition	12.5	6.250259	5.05	0.000	4.691282	33.30646
Scenario	0.5175492	0.2146666	−1.59	0.112	0.229559	1.166834
Condition:						
Control condition	1	(omitted)				
Scenario:						
Scenario 2	35.35259	18.58378	6.78	0.000	12.61742	99.05397
Scenario 3	1	(omitted)				
Condition # Scenario						
Interaction Term:						
Control condition#Scenario 2	0.1766795	0.1274588	−2.40	0.016	0.0429654	0.7265303
Control condition#Scenario 3	0.96	0.8908261	−0.04	0.965	0.1557414	5.917503
Constant	0.024045	0.0268847	−3.33	0.001	0.0026872	0.2151566

Note: Condition = 2 and scenario = 3 omitted because of collinearity. Constant estimates baseline odds. Number of observations = 307, Wald chi2(5) = 81.42, Prob > chi2 = 0.0000, Pseudo $R^2 = 0.3186$, Log pseudolikelihood = −144.41476.

0 for the other character. This is because we aim to estimate the likelihood of ownership being attributed to the main character. The logistic regression output reveals a significant and positive odds ratio for the condition variable (odds ratio = 12.5; $p < .001$; robust std. err. = 6.250259; $z = 5.05$; 95% CI [4.691282; 33.30646]). The odds ratio for Scenario 2 is also significant (odds ratio = 35.35259; robust std. err. = 18.58378; $p < .001$; $z = 6.78$; 95% CI [12.61742; 99.05397]), indicating that the effect is stronger in Scenario 2 than in Scenarios 1 and 3. The full regression output can be found in Regression Output 2.

Regression Output 3
Logistic regression where the dependent variable is the ownership judgments pooled together from all scenarios and conditions (1 = main character is the owner, 0 = main character is not the owner)

Ownership Judgments	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence	Interval]
Wrongness	6.275185	2.446821	4.71	0.000	2.922307	13.47495
Condition	4.718891	2.613704	2.80	0.005	1.593586	13.97347
Scenario	0.4131706	0.1920569	−1.90	0.057	0.1661344	1.027541
Condition:						
Control condition	1	(omitted)				
Scenario:						
Scenario 2	30.28933	17.01166	6.07	0.000	10.07446	91.06625
Scenario 3	1	(omitted)				
Condition # Scenario Interaction Term:						
Control condition#Scenario 2	0.2831892	0.2153497	−1.66	0.097	0.0637948	1.257096
Control condition#Scenario 3	0.8457964	0.8325063	−0.17	0.865	0.1228681	5.82227
Constant	0.0751931	0.0910125	−2.14	0.033	0.0070129	0.8062297

Note. Wrongness judgments are pooled together from all scenarios and conditions (0 = not wrong, 1 = wrong). Condition and scenario are categorical variables taking 2 and 3 values, respectively. Condition = 2 and scenario = 3 omitted because of collinearity. Constant estimates baseline odds. Number of observations = 307, Wald chi2(5) = 76.50, Prob > chi2 = 0.0000, Pseudo R^2 = 0.3758, Log pseudolikelihood = −132.28433.

3.5. *Does wrongness judgment predict ownership attribution?*

In addition to the above preregistered analyses, we conducted exploratory analyses investigating how wrongness and ownership judgments are linked.

We ran a logistic regression to check if and how a wrongness judgment predicts an ownership judgment, with additional categorical variables for condition and scenario, and an interaction term for the condition and scenario variables. The regression output reveals a significant and positive odds ratio for wrongness judgments (odds ratio = 6.275185; $p < .001$; robust std. err. = 2.446821; $z = 4.71$; 95% CI [2.922307; 13.47495]). The odds ratio for condition is also significant (odds ratio = 4.718891; $p = .005$; robust std. err. = 2.613704; $z = 2.80$; 95% CI [0.1.593586; 13.97347]). Similarly to the other regressions, Scenario 2 seems to drive the effect more than the other two scenarios (odds ratio = 30.28933; $p < .001$; robust std. err. = 17.01166; $z = 6.07$; 95% CI [10.07446; 91.06625]). The full output can be found in Regression Output 3.

3.6. *Discussion*

Our findings show that subtle variations in the description of how an item is placed trigger different moral reactions and interpretations regarding the transfer of ownership. We have also found that moral reactions and ownership judgments are linked. Contextual variations in how an item is placed lead to different ownership judgments through a variation in moral reactions. Effect sizes are medium to large.

In our view, the data are best explained in terms of mind-reading. Variations in item placement convey information about the intentions of "the other character" (see Fig. 4): whether they intend to keep using the item, which maintains their status as owner of the item, or whether they intend to discard the item, which means giving up their ownership. For instance, leaving a newspaper next to one's belongings could plausibly be interpreted as an intention to keep using it. Conversely, leaving the newspaper on the seat without any other belonging next to it could plausibly be interpreted as an intention to give up ownership. This could explain the difference in wrongness judgments: participants thought that it was wrong of the main characters to take the items, given the other characters' intention to keep using them. The same logic applies to explaining the difference in ownership judgments: the manipulations in the control condition convey the intention of the other character to keep using the item in all three scenarios, which means that they own it even if the main character physically takes it. The difference between ownership judgments further indicates that they are not made based on physical possession only: others' mental states and the moral aspects are considered as well.

4. Study 2

4.1. Hypothesis

Here, we investigate if people are sensitive to information asymmetries about intentions with resource use. While in Study 1 the actual intentions of the other character are subtle indications, in Study 2, they are made explicit. We vary if the main character knows about them or not and check if inferences about ownership and its moral judgments change.

It is plausible that people think it is wrong to take something if one has not been given explicit permission. What if we take something when in principle we are allowed to, but we do not know that we are allowed to? In Study 2, we manipulate the beliefs of the two characters in the scenarios about intentions of resource, and test if this has an effect (1) on whether taking an item is judged to be wrong and (2) whether ownership is judged to be transferred. We vary if information about the availability of an item is known by everyone in the scenario (Condition 1) or not (Condition 2). We hypothesize that manipulating the flow of information about permissions to take a resource triggers different inferences about the moral aspects of the scenario and ownership transfer.

4.2. Materials

We designed three scenarios. Each participant read only one. Each scenario describes an ordinary situation where a character takes an inexpensive item. This is motivated by our attempt to isolate the effect of symmetric information from other confounding factors as much as possible. We manipulated information flow about the availability of the item: In Condition 1, the permission to take the item is shared knowledge among the characters; in Condition 2, the permission to take the item is not shared knowledge. In Scenario 1 ("Newspaper on the train"), participants read the following text:

Hans is taking the train to travel from Manchester to Birmingham. He usually likes to catch up on some reading when he is on the train. He spots another passenger reading the latest issue of *The Financial Times*, which raises his interest.	
Condition 1 (shared knowledge of permission)	*Condition 2 (no shared knowledge of permission)*
Hans overhears the passenger with the newspaper saying goodbye to her friend. In a few minutes, Hans sees her get off the seat.	In a few minutes, Hans sees the other passenger get up from the seat.
The newspaper is on the seat. Hans takes the newspaper.	

After reading the text, participants had to answer the following questions:

1. Do you think it was wrong to take the newspaper in this situation? Yes/No
2. Who do you think owns the newspaper now? Hans/The other passenger
3. What do you think Hans believes? The other passenger wants to get rid of the newspaper/The other passenger wants to keep the newspaper
4. What do you think the other passenger intended to do? The other passenger intended to get rid of the newspaper/The other passenger intended to keep the newspaper

In this scenario, we manipulated shared knowledge by varying information flow. In the "Shared knowledge" condition, Hans overhears the passenger say goodbye to her friend, sees her get off the train, and realizes that the newspaper is left on the seat. In the "No shared knowledge" condition, Hans does not have any information based on which he can infer what the intentions of the passenger may be with the newspaper; he merely observes her getting up and the newspaper being left on the seat. Table 4 summarizes all three scenarios, and the Appendix in the Supporting Information contains the full materials.

4.3. Sample

$N = 310$, 46% female, $M_{age} = 40$, geographic distribution: 79% UK, 9% US&Canada, 4% Africa (South Africa), 4% EU.

4.4. Results

We compiled the final dataset by pooling all data from all the scenarios together. We ran a chi-square test and a logistic regression separately. We coded participants' answers as 1 if they answered "yes" and 0 if they answered "no" in the wrongness judgments, and 1 if they chose "the main character" and 0 if they chose "the other character" in ownership attribution. In the logistic regression, we added additional categorical variables for condition and scenario.

4.4.1. Wrongness judgment

Table 5 and Fig. 3 describe the data by summarizing the frequency and ratio of "yes" answers across the two conditions.

Table 4
Manipulations in Conditions 1 and 2 in Study 2

Scenario	Manipulation in Condition 1 (Shared Knowledge of Permission)	Manipulation in Condition 2 (No Shared Knowledge of Permission)
1: Newspaper on the train	Hans overhears the passenger with the newspaper saying goodbye to her friend. In a few minutes, Hans sees her get off the seat.	In a few minutes, Hans sees the other passenger get up from the seat. The newspaper is on the seat.
2: Strawberries in the office kitchen	Later on, the cleaning staff cleaned up in the kitchen and rearranged items in the fridge. They threw away old food and empty food containers. A sticky note saying "Enjoy!" was left behind on the bowl of strawberries.	Later on, the cleaning staff cleaned up in the kitchen and rearranged items in the fridge. They threw away old food and a sticky note saying "Enjoy!" from the bowl. Empty food containers were left behind in the fridge.
3: Books	Earlier today, Joel posted on social media that he wants to get rid of his collection of books and newspapers. […] Sean has seen and liked this post, too.	Earlier today, Joel posted on social media that he wants to get rid of his collection of books and newspapers. […] Sean has not seen this post because he has deactivated his social media apps.

Table 5
Do you think it was wrong to take the item? ($n = 310$)

Condition	Yes (%)	Yes (n)
Shared knowledge of permission	11.11%	17
No shared knowledge of permission	30.57%	48

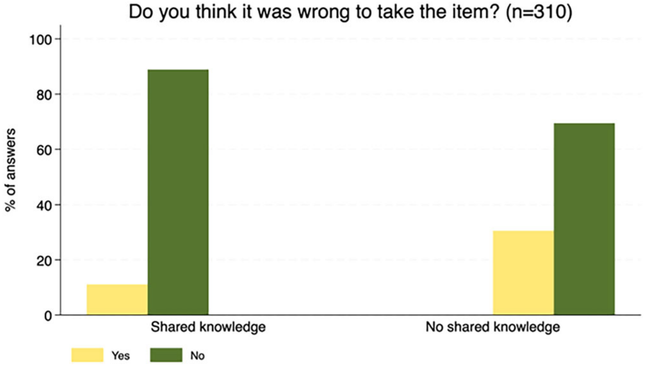

Fig. 3. % of "yes" and "no" participant answers to the wrongness judgment question (Do you think it was wrong to take the item?, $n = 310$) across the two conditions and three scenarios.

Regression Output 4
Logistic regression where the dependent variable is the wrongness judgments pooled together from all scenarios and conditions (0 = not wrong, 1 = wrong). Condition and scenario are categorical variables, taking the values of 2 and 3, respectively.

Wrongness Judgments	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence Interval]	
Condition	2.508772	1.359328	1.70	0.090	0.8674702	7.255507
Scenario	0.9780193	0.3010578	−0.07	0.942	0.5349672	1.788001
Condition						
Control condition	1	(omitted)				
Scenario						
Scenario 2	0.8150161	0.4590301	−0.36	0.716	0.2702438	2.45797
Scenario 3	1	(omitted)				
Condition # Scenario Interaction Term						
Condition 2#Scenario 2	1.544056	1.201132	0.56	0.577	0.3361299	7.09282
Condition 2#Scenario 3	1.759483	1.323475	0.75	0.453	0.4028236	7.6852
Constant	0.0555763	0.0642951	−2.50	0.012	0.0057564	0.5365713

Note. Condition = 2 and scenario = 3 omitted because of collinearity. Constant estimates baseline odds. Number of observations = 310, Wald chi2(5) = 18.14, Prob > chi2 = 0.0028, Pseudo R^2 = 0.0628, log pseudolikelihood = −149.2028.

Table 6
Who owns the item now? (n = 310)

Condition	Main Character (%)	Other Character (%)	Main Character (n)	Other Character (n)
Shared knowledge of permission	67.32%	32.68%	103	50
No shared knowledge of permission	59.87%	40.13%	94	63

Significantly more participants found that taking the item is wrong when the main character does not know that the item is free to take (30.57%), compared to when the main character knows (11.11%, $\chi^2(1) = 17.7115$, $p < .001$, Cramér's V = 0.2390).

We ran a logistic regression to see what increases the probability of a wrongness judgment, but it did not yield any significant odds ratios. The full regression output can be found in Regression Output 4.

4.4.2. *Ownership attribution*

Table 6 and Fig. 4 describe the data by summarizing the frequency and ratio of "main character" and "other character" answers across the two conditions.

Descriptively, a slightly higher proportion of participants thought that the main character owns the item after taking it in the Shared knowledge condition, compared to the No shared knowledge condition. However, this difference is not significant (67.32%, $\chi^2(1) = 1.8554$, $p = .173$, Cramér's V = −0.0774).

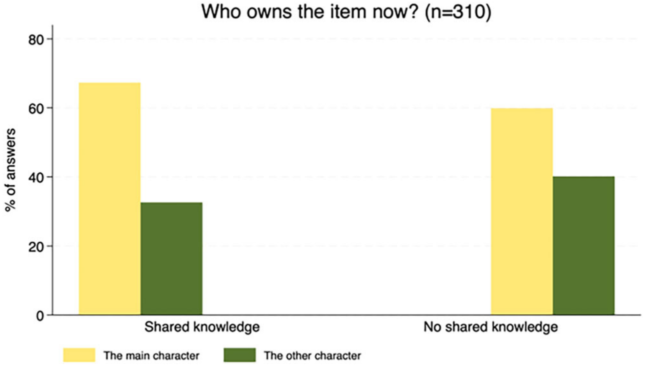

Fig. 4. % of participant answers to the ownership judgment question (Who owns the item now?, $n = 310$) across the two conditions and three scenarios.

We ran a logistic regression to see what increases the probability of ownership attributed to the main character. We created a binary "owner" variable that takes the value of 1 for the main character and the value of 0 for the other character. This is because we aim to estimate the likelihood of ownership being attributed to the main character. The regression output reveals a significant odds ratio for Scenario 2 (odds ratio = 11.88136; $p < .001$; robust std. err. = 5.310048; $z = 5.54$; 95% CI [4.948172; 28.52905]), suggesting that Scenario 2 may drive the effect more than Scenarios 1 and 3. However, the coefficient for the condition variable is not significant, which is neither in favor nor against our hypothesis that information asymmetry is linked to ownership judgments. The full output can be found in Regression Output 5.

4.5. *Does wrongness judgment predict ownership attribution?*

In addition to the above preregistered analyses, we conducted exploratory analyses investigating how wrongness and ownership judgments are linked. We ran a logistic regression to check if wrongness predicts ownership.

The regression output reveals a significant odds ratio for the wrongness judgment (odds ratio = 9.850907; $p < .001$; robust std. err. = 4.077858; $z = 5.53$; 95% CI [4.376378; 22.17367]). The odds ratio for Scenario 2 is also significant (odds ratio = 16.46867; $p < .001$; robust std. err. = 7.578441; $z = 6.09$; 95% CI [6.682799; 40.58436]), as well as the odds ratio for the three scenarios together (odds ratio = 0.3478277; $p < .005$; robust std. err. = 0.1227096; $z = -2.99$; 95% CI [0.1742088; 0.6944776]). The full output can be found in Regression Output 6.

4.6. *Discussion*

Our findings provide some evidence that wrongness judgments and the characters' beliefs are linked: when the main character takes an item not knowing if they have permission to take the item, participants judge it negatively as the result of the chi-square test suggests.

Regression Output 5
Logistic regression where the dependent variable is the ownership judgments pooled together from all scenarios and conditions (1 = main character is the owner, 0 = main character is not the owner). Condition and scenario are categorical variables taking the values of 2 and 3, respectively.

Ownership Judgment	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence Interval]	
Condition	1.526786	0.6543492	0.99	0.323	0.6591291	3.536598
Scenario	0.39678	0.1337351	−2.74	0.006	0.2049517	0.7681538
Condition:						
Control condition	1	(omitted)				
Scenario:						
Scenario 2	11.88136	5.310048	5.54	0.000	4.948172	28.52905
Scenario 3	1	(omitted)				
Condition # Scenario Interaction Term:						
Condition 2#Scenario 2	0.7775589	0.4639006	−0.42	0.673	0.2414886	2.503629
Condition 2#Scenario 3	1.664111	1.396446	0.61	0.544	0.3212866	8.619298
Constant	0.6419447	0.5723472	−0.50	0.619	0.1118357	3.684807

Note. Condition = 2 and scenario = 3 omitted because of collinearity. Constant estimates baseline odds. Number of observations = 310, Wald chi2(5) = 59.88, Prob > chi2 = 0.0000, Pseudo R^2 = 0.2029, Log pseudolikelihood = −162.08423.

However, this result does not prove to be robust when the logistic regression models are run.

Our findings do not provide any clear evidence on the link between ownership judgments and the characters' beliefs, as neither the chi-square test nor the logistic regression yielded any significant results in either direction. We predicted that participants would be sensitive to what the characters believed regarding the permissibility of taking the item and that this sensitivity would translate to a significant difference in wrongness judgments and ownership judgments in the two conditions. Specifically, we predicted that when the main character does not know that they have permission to take the item (in Condition 2), participants would interpret taking the item as a norm violation and therefore judge that ownership of the item is not transferred. Contrary to this, what we observe in the data is that ownership is judged to be transferred in both conditions, despite some differences in wrongness judgments. In other words, many participants plausibly thought that the main characters became the owner of the items when they took them, despite not knowing if they had permission or not. This would in turn suggest that many ownership judgments are made on the basis of temporary possession, separately from the negative moral judgment caused by the information asymmetry. In other words, ownership judgments are sometimes judgments about facts of the matter that specify who has de facto exclusive usage, independently of the processes through which this state was arrived at (cf., Experiment 3 in Zhang et al., 2024).

Regarding the link between wrongness judgments and ownership judgments, we have found a positive and significant relationship. This suggests that wrongness judgments and ownership judgments are positively correlated, but the mechanism is not through information asymmetry.

Regression Output 6
Logistic regression where the dependent variable is the ownership judgments pooled together from all scenarios and conditions (1 = main character is the owner, 0 = main character is not the owner). Condition and scenario are categorical variables, taking the values of 2 and 3, respectively.

Ownership Judgment	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence Interval]	
Wrongness	9.850907	4.077858	5.53	0.000	4.376378	22.17367
Condition	1.136681	0.5630994	0.26	0.796	0.4304899	3.001336
Scenario	0.3478277	0.1227096	−2.99	0.003	0.1742088	0.6944776
Condition:						
Control condition	1	(omitted)				
Scenario:						
Scenario 2	16.46867	7.578441	6.09	0.000	6.682799	40.58436
Scenario 3	1	(omitted)				
Condition # Scenario Interaction Term:						
Condition 2#Scenario 2	0.7640763	0.4948678	−0.42	0.678	0.2147043	2.719148
Condition 2#Scenario 3	1.117429	1.010655	0.12	0.902	0.189825	6.577889
Constant	0.7058774	0.7211474	−0.34	0.733	0.0953046	5.228108

Note. Condition = 2 and scenario = 3 omitted because of collinearity. Constant estimates baseline odds. Number of observations = 310, Wald chi2(6) = 77.91, Prob > chi2 = 0.0000, Pseudo R^2 = 0.2941, Log pseudolikelihood = −143.54586.

5. Study 3

5.1. Hypothesis

Here, we investigate if social norms guide inferences about resource use and its normative aspects, and if this pattern is sensitive to whether or not the norm is common knowledge. Do people rely on social norms when they make inferences and moral judgments about ownership? Do wrongness judgments change if others do not know about the norms? We investigate these questions in Study 3. We employ a 2 × 2 design where we vary if the main characters know the social norm or not and if the main characters' actions comply with or violate the social norm. We predict that taking an item when doing so is a known norm violation will be especially judged to be wrong and the least likely to grant ownership, relative to the other conditions.

5.2. Materials

We designed three scenarios. Each participant read only one. Each scenario describes an ordinary situation where a character takes an inexpensive item. We manipulated if the social norm in the scenario about taking an item is known or not and if the social norm is violated or not by the main character. In Scenario 1 ("Train seat in Mebusia"), participants read the following text:

Hans is traveling in Mebusia. He is taking the train to travel from the capital city to the countryside. The train has no stops between the two stations. Hans is looking for a seat next to the window.			
Condition 1 (knowing norm compliance)	*Condition 2 (unknowing norm compliance)*	*Condition 3 (knowing norm violation)*	*Condition 4 (unknowing norm violation)*
Hans is aware that in Mebusia, it is customary to let people wearing green coats take a seat next to the aisle.	Hans is not aware that in Mebusia, it is customary to let people wearing green coats take a seat next to the aisle.	Hans is aware that in Mebusia, it is customary to let people wearing green coats take a seat next to the window.	Hans is not aware that in Mebusia, it is customary to let people wearing green coats take a seat next to the window.
Hans sees a man wearing a green coat approach the compartment where Hans is. Hans takes the window seat.			

After reading the text, participants had to answer the following questions:

1. Do you think it was wrong to take the window seat in this situation? Yes/No
2. Who do you think owns the window seat now? Hans/The man in the green coat
3. What do you think Hans believes? The window seat is for him to take/The window seat is for the man in the green coat to take
4. What do you think the man in the green coat intended to do? The man in the green coat intended to take the window seat/The man in the green coat did not intend to take the window seat

In this scenario, we came up with a fictional country with a fictional and arbitrary norm prescribing a context-dependent behavior. We did this to minimize the influence of participants' prior beliefs and experiences in the real world on their answers. The norm here is letting people with green coats take a seat either by the aisle (in Conditions 1 and 2) or by the window (in Conditions 3 and 4). Hans takes the window seat; therefore, he complies with the norm in Conditions 1 and 2 and violates it in Conditions 3 and 4. We manipulate knowledge by mentioning if Hans is aware of the norm.

Table 7 summarizes all three scenarios, and the Appendix in the Supporting Information contains the full text of each scenario.

5.3. Sample

$N = 629$, 48% female, $M_{age} = 38$, geographic distribution: 51% UK, 22% EU, 11% Africa (South Africa), 9% US&Canada.

5.4. Results

5.4.1. Wrongness judgment

Table 8 and Fig. 5 describe the data by summarizing the frequency and ratio of "yes" answers across the four conditions.

Table 7
Manipulations in Conditions 1, 2, 3 and 4 in Study 3

Scenario	Manipulation in Condition 1 (Knowing Norm Compliance)	Manipulation in Condition 2 (Unknowing Norm Compliance)	Manipulation in Condition 3 (Knowing Norm Violation)	Manipulation in Condition 4 (Unknowing Norm Violation)
1: Train seat in Mebusia	Hans is aware that in Mebusia, it is customary to let people wearing green coats take a seat next to the aisle. […] Hans takes the window seat.	Hans is not aware that in Mebusia, it is customary to let people wearing green coats take a seat next to the aisle. […] Hans takes the window seat.	Hans is aware that in Mebusia, it is customary to let people wearing green coats take a seat next to the window. […] Hans takes the window seat.	Hans is not aware that in Mebusia, it is customary to let people wearing green coats take a seat next to the window. […] Hans takes the window seat.
2: Strawberries in the office kitchen	When they leave fruits in the fridge, others often help themselves to some. Sarah knows this […] She takes a few strawberries and puts them in her own bowl.	When they leave fruits in the fridge, others often help themselves to some. Sarah doesn't know this […] She takes a few strawberries and puts them in her own bowl.	When they leave fruits in the fridge, others rarely help themselves to some. Sarah knows this […] She takes a few strawberries and puts them in her own bowl.	When they leave fruits in the fridge, others rarely help themselves to some. Sarah doesn't know this […] She takes a few strawberries and puts them in her own bowl.
3: Books	Joel puts the "for the library" pile into a blue plastic box and the "for the neighbors" pile into a brown cardboard box. Sean knows this […] Sean takes a book from the brown cardboard box.	Joel puts the "for the library" pile into a blue plastic box and the "for the neighbors" pile into a brown cardboard box. Sean doesn't know this […] Sean takes a book from the brown cardboard box.	Joel puts the "for the neighbors" pile into a blue plastic box and the "for the library" pile into a brown cardboard box. Sean knows this […] Sean takes a book from the brown cardboard box.	Joel puts the "for the neighbors" pile into a blue plastic box, and the "for the library" pile into a brown cardboard box. Sean doesn't know this […] Sean takes a book from the brown cardboard box.

Descriptively, the proportion of participants who found that taking the item is wrong seems highest when doing so is a norm violation and it was done knowingly (66.88%; Condition 3). However, we do not find this pattern in the subsequent inferential tests.

To assess the effect of knowledge on wrongness judgments, we contrasted wrongness judgments in the two knowing conditions (Conditions 1 and 3) against the two unknowing

Table 8
Do you think it was wrong to take the item? ($n = 629$)

Condition	Yes (%)	Yes (n)
Knowing norm compliance	18.24%	29
Unknowing norm compliance	30.13%	47
Knowing norm violation	66.88%	105
Unknowing norm violation	44.59%	70

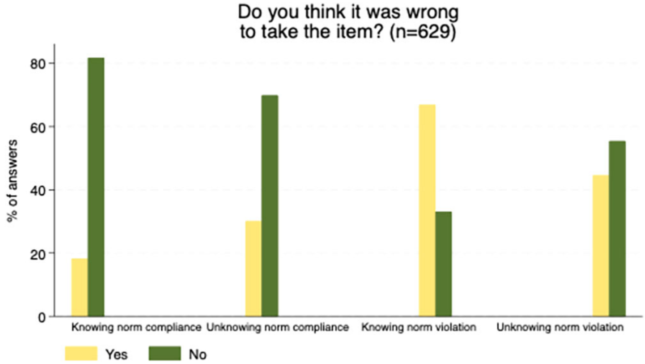

Fig. 5. % of "yes" and "no" participant answers to the wrongness judgment question (Do you think it was wrong to take the item?, $n = 629$) across the four conditions and three scenarios.

conditions (Conditions 2 and 4). We found no significant differences here ($\chi^2(1) = 1.66$, $p = .198$, Cramér's V $= -0.0513$).

This raises the possibility that perhaps participants cared more about the main characters' behavior (compliance vs. violation) when making a normative judgment. To test this, we contrasted wrongness judgments in the two norm compliance conditions (Conditions 1 and 2) against the two norm violation conditions (Conditions 3 and 4). Here, we indeed found significant differences ($\chi^2(1) = 65.5014$, $p < .001$, Cramér's V $= 0.3227$). This could suggest that participants placed more weight on the main characters' behavior and did not see the lack of knowledge as an excuse for norm violation.

We ran a logistic regression to see what increases the probability of a wrongness judgment, with knowledge states and norm compliance as binary fixed effects. Here, we found that both knowledge state (odds ratio $= 2.5693$; $p < .001$; robust std. err. $= 0.5066544$; $z = 4.79$, 95% CI [1.745668; 3.781534]) and norm compliance (odds ratio $= 0.1295545$; $p < .001$; robust std. err. $= 0.0260263$; $z = -10.17$, 95% CI [0.0873884; 0.1920662]) have a positive and significant link to wrongness judgments. The full output can be found in Regression Output 7.

5.4.2. *Ownership attribution*

Table 9 and Fig. 6 describe the data by summarizing the frequency and ratio of "main character" and "other character" answers across the four conditions.

Regression Output 7
Logistic regression where the dependent variable is the wrongness judgments pooled together from all scenarios and conditions (0 = not wrong, 1 = wrong). Knowledge state and norm compliance are categorical variables taking 2 values (1=yes, 0=no), respectively. Scenario is a categorical variable taking 3 values.

Wrongness Judgments	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence Interval]	
Knowledge state (y/n)	2.5693	0.5066544	4.79	0.000	1.745668	3.781534
Norm compliance (y/n)	0.1295545	0.0260263	−10.17	0.000	0.0873884	0.1920662
Scenario	1.1711	0.1345123	1.38	0.169	0.9350293	1.466773
Constant	1.04843	0.2758727	0.18	0.857	0.6259838	1.755964

Note. Constant estimates baseline odds. Number of observations = 577, Wald chi2(3) = 108.75, Prob > chi2 = 0.0000, Pseudo $R^2 = 0.1700$, Log pseudolikelihood = −327.91228.

Table 9
Who owns the item now? (n=629)

Condition	Main Character (%)	Other Character (%)	Main Character (n)	Other Character (n)
Knowing norm compliance	71.07%	28.93%	113	46
Unknowing norm compliance	69.23%	30.77%	108	48
Knowing norm violation	80.25%	19.75%	126	31
Unknowing norm violation	45.22%	54.78%	71	86

To assess the effect of knowledge on ownership attribution to the main character, we contrasted ownership judgments in the two knowing conditions (Conditions 1 and 3) against the two unknowing conditions (Conditions 2 and 4). We found a significant difference here ($\chi^2(1)$= 23.9968, $p < .001$, Cramér's V = −0.1953). To assess the effect of behavior on ownership attribution to the main character, we contrasted ownership judgments in the two norm compliance conditions (Conditions 1 and 2) against the two norm violation conditions (Conditions 3 and 4). We found no significant differences here ($\chi^2(1) = 3.8835$, $p = .049$, Cramér's V = −0.0786).

We ran a logistic regression to see what increases the probability of ownership attributed to the main character, with knowledge state and norm compliance as fixed effects. We created a binary "owner" variable that takes the value of 1 for the main character and the value of 0 for the other character. This is because we aim to estimate the likelihood of ownership being attributed to the main character. The logistic regression output reveals a significant odds ratio for the knowledge state variable (odds ratio = 0.4287192; $p < .001$; robust std. err. = 0.0752605; $z = -4.82$; 95% CI [0.3039112; 0.6047822]). The full output can be found in Regression Output 8.

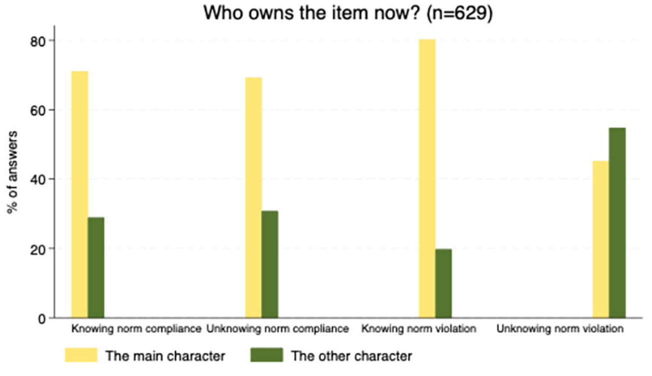

Fig. 6. % of participant answers to the ownership judgment question (Who owns the item now?, $n = 629$). Descriptively, it seems that ownership attribution to the main character is highest in the knowing norm violation condition (Condition 3). This is a controversial finding, which is most likely noise in the data, as this pattern is not found in the subsequent statistical tests.

Regression Output 8

Logistic regression where the dependent variable is the ownership judgments pooled together from all scenarios and conditions (1 = main character is the owner, 0 = main character is not the owner). Knowledge state and norm compliance are categorical variables taking 2 values (1=yes, 0=no). Scenario is a categorical variable taking 3 values.

Ownership Judgments	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence Interval]	
Knowledge state (y/n)	0.4287192	0.0752605	−4.82	0.000	0.3039112	0.6047822
Norm compliance (y/n)	0.7097023	0.123535	−1.97	0.049	0.5045578	0.9982549
Scenario	1.021791	0.1012016	0.22	0.828	0.8415045	1.240704
Constant	0.8491777	0.2048918	−0.68	0.498	0.5291983	1.362632

Note. Constant estimates baseline odds. Number of observations = 577, Wald chi2(3) = 108,75, Prob > chi2 = 0.0000, Pseudo $R^2 = 0.1700$, Log pseudolikelihood = −327.91228.

5.5. *Do wrongness judgments predict ownership?*

In addition to the above preregistered analyses, we conducted exploratory analyses to investigate the links between judgments about wrongness and ownership. We found that the correlation between the two dependent variables is 0.3020. We ran a logistic regression model to check if and how wrongness predicts ownership, in addition to knowledge state and norm compliance.

The regression output reveals a significant odds ratio for wrongness judgment (odds ratio = −4.655634; $p < .001$; robust std. err. = 1.031573; $z = 6.94$; 95% CI [3.01456; 7.1876]). The odds ratio for the knowledge state variable is also significant (odds ratio = 0.3651618; $p < .001$; robust std. err. = 0.0749214; $z = -4.91$; 95% CI [0.2442539; 0.5459202]) but not for norm compliance. The full output can be found in Regression Output 9.

Regression Output 9
Logistic regression where the dependent variable is the ownership judgments pooled together from all scenarios and conditions (1=main character is the owner, 0=main character is not the owner). Wrongness judgments are pooled together from all scenarios and conditions (1=wrong, 0=not wrong). Knowledge state and norm compliance are categorical vairables taking 2 values (1=yes, 0=no), respectively. Scenario is a categorical variable taking 3 values

Ownership Judgments	Odds Ratio	Robust Std. Err.	z	$p > \|z\|$	[95% Confidence Interval]	
Wrongness	4.655634	1.031573	6.94	0.000	3.01456	7.1876
Knowledge state (y/n)	0.3651618	0.0749214	−4.91	0.000	0.2442539	0.5459202
Norm compliance (y/n)	1.0914	0.2252176	0.42	0.672	0.7283383	1.635442
Scenario	0.99951	0.1076461	−0.00	0.996	0.8093077	1.234413
Constant	0.3943074	0.1141662	−3.21	0.001	0.2235535	0.695486

Note. Constant estimates baseline odds. Number of observations = 577, Wald chi2(4) = 60.78, Prob > chi2 = 0.0000, Pseudo $R^2 = 0.1067$, Log pseudolikelihood = −335.88131.

5.6. Discussion

First, we found that when making moral judgments, participants placed more weight on the main character's behavior (norm compliance vs. violation) than on the mental state of the main character (knowing the norm vs. not knowing). This could imply that knowledge states about norms are not relevant factors in making moral judgments about norm violations. Alternatively, it is also possible that participants considered the mental state and condemned the main character for not knowing the norm (see, e.g., Kovacevic et al., 2024). However, when making ownership judgments, the pattern seems to reverse: Mental states seem to play a more significant role than behavior. These results are partially consistent with our predictions. On the one hand, our results indeed show that knowledge about arbitrary norms modulates judgments made about ownership transfer. On the other hand, the mechanism is not likely to be what we hypothesized for two reasons: (1) knowledge states do not seem to affect wrongness judgments, and (2) ownership is transferred even in situations of norm violations. Nevertheless, similarly to findings in Studies 1 and 2, wrongness judgments and ownership judgments are positively correlated.

6. General discussion

6.1. Summary and discussion of Studies 1, 2, and 3

Overall, our findings imply that ownership judgments are not easily reducible to only fairness intuitions, norm following, or physical possession. This is in line with prior findings that emphasize intention-reading in ownership judgments, such as Zhang et al. (2024) and Li et al. (2018), as well as some recent cross-cultural findings that underline the social component of ownership, such as Espinoza and Barrett (2023) and Bialek et al. (2024). Taken together, the three experiments provide evidence that judgments about ownership transfer are sensitive to cues indicative of mental states, whether intentions or beliefs.

Fig. 7. Model 1: Ownership judgments depend on wrongness judgments, which are made after a particular inference is made about others' mental states (intentions and beliefs).

In Study 1, our vignettes described subtle contextual variations, which affected ownership judgments and elicited moral reactions. This cannot be easily accounted for by the first possession assumption. Instead, the results plausibly suggest that participants interpreted the contextual variations as intentions to either keep or discard the item.

In Study 2, we manipulated beliefs by varying information asymmetry. This affected wrongness judgments, but it did not significantly affect ownership judgments. What we observe instead is that ownership is transferred after taking the item, even when the main characters are unaware that they have permission to do so.

In Study 3, we came up with arbitrary social norms regulating resource use and varied characters' knowledge and behavior. We found that to make wrongness judgments, behavior (norm compliance or violation) is more relevant than knowledge. This might be because the main character is thought to have the responsibility to know what the norms are, or it might be because the judgment is about the permissibility of the behavior. However, ownership judgments are sensitive to knowledge states. Our post-hoc interpretation of these results is that people ascribe a moral dimension to otherwise arbitrary rules, and norm violation is wrong in and of itself. However, to make judgments about ownership transfer, participants took the main character's perspective.

There is considerable variation in effect sizes. We observe that in the office kitchen scenario (Scenario 2), the effect seems to be stronger than in the other scenarios across all three studies. Although variations in the effect size are expected given the high context sensitivity of our vignettes, a possible explanation is that Scenario 2 takes place in the workplace, where people face repeated interactions with others, which makes the desire to avoid conflict even more important.

6.1.1. Revised theoretical model

Although we initially predicted that when the circumstances of obtaining an item are wrong, ownership is not transferred, we found that ownership judgments do not systematically vary on pair with moral judgments in Studies 2 and 3. However, when looking at the relationship between wrongness judgments and ownership judgments directly, we found that they are indeed strongly and positively linked. We summarize our initial hypotheses and how we revise them with a sketch of Model 1 and 2, depicted by Figures 7 and 8. Model 1 (in Fig. 7) describes our initial hypothesis: that ownership judgments are made following a process where a range of cues, such as the target manipulations in our three experiments, induce the ascription of different mental states, including intentions related to the usage of a particular item. Based on the intentions of the first owner, taking is judged acceptable or not. If it is, ownership is thought to be transferred.

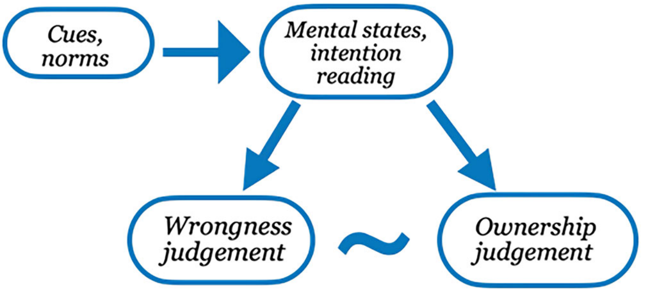

Fig. 8. Model 2: Ownership judgments and wrongness judgments are correlated but are made independently of each other.

However, the findings of Studies 2 and 3 do not unfold following the predictions of Model 1. Model 2 (Fig. 8) summarizes our revised account. While contextual cues trigger mental state attributions, judgments about moral acceptability and ownership transfer appear to be made through parallel processes rather than sequentially, albeit being correlated. This, in turn, means that a particular cue leads us to infer an intention, which leads to a morally condemned action, but ownership is transferred nevertheless.

6.1.2. *Limitations*

Although we gathered some evidence that ownership judgments are sensitive to contextual cues and mental states, some of our predictions were not realized. This is possibly due to different interpretations of our ownership question. "Own" can refer to the specifications of normative institutions that regulate ownership but also to de facto possession. It is hard to tell from our data if and how participants distinguished possession from ownership. There are two potential readings of their responses: One is that they equate physical possession with ownership regardless of other factors in the scenario. Another reading is that physical possession has led to ownership because of those factors. Furthermore, we did not provide a well-grounded explanation of the relationship between wrongness judgments and ownership judgments. While we provide some evidence that mental states affect both, this finding is not robust across all three studies, and alternative driving effects are not easily read from the data.

6.2. *How are ownership judgments formed?*

Ownership attribution involves various psychological processes that cannot be reduced to norm abidance or the first possession heuristic. Our vignettes were highly context-dependent, such as placing fruit next to a commonly used item (salt and pepper) or a privately used item (a cell phone). It is not plausible to have an established social norm for every scenario and context that could possibly arise. For instance, it is implausible to assume that there would be a norm for each and every context that can arise in Study 1. Likewise, heuristics such as first possession cannot explain the fact that in all three studies participants transferred ownership to the main character despite the clear evidence of the presence of a first possessor.

Ownership has been conceptualized as emerging from a distinct cognitive domain (Nancekivell et al., 2019) or from the interaction of the motivation to cooperate or compete with others (Boyer, 2023). Our account shares many of the assumptions of these frameworks, such as "ownership reasoning requires a cognitive system that considers more than perceptual information" (Nancekivell et al., 2019, p. 6), or that both biological and cultural evolution shape ownership judgments (Boyer, 2023). That said, we do not believe that it is necessary to posit distinct cognitive domains to explain the phenomena. Instead, we propose that when attributing ownership, people often take account of others' mental states, specifically intentions and knowledge of norms.

Reading others' intentions is especially relevant to coordination over resource use. Many real-life instances of resource transfer are distinguished by the intentions of the parties involved. Borrowing, gifting, selling, and theft consist of the same action—a resource is exchanged between two people—yet their moral evaluation and consequences differ. We do not expect others to return the resource we have gifted them, but expect it back if we have lent it. This is because we intend the giftee to become the owner of the resource, but in the case of lending, we are still the owner; we have merely allowed someone else to use the resource temporarily. Depending on intentions, we expect money to change hands in some types of interactions but not in others. Violating expectations often comes with serious consequences for our reputation, as theft is morally condemned and punished in most cultures. Given this fundamental and ubiquitous role for tracking intentions, we think the most plausible interpretation of our results is that people infer intentions about usage by using mind-reading to track the common ground based on mutually salient cues.

Mind-reading may be used to avoid social conflicts over resource use. Because people often strongly prefer to avoid conflict, they are motivated to choose a nonviolent outcome in the usage game. There is compelling evidence from cognitive psychology that people start to be sensitive to the others' mental states from a young age and that this sensitivity allows attributing intentions to actions in various domains in childhood and in adulthood (Curry & Chesters, 2012; Kovács, Téglás, & Endress, 2010; O'Grady, Scott-Phillips, Lavelle, & Smith, 2020; Sylwester, Lyons, Buchanan, Nettle, & Roberts, 2012; van der Wel, Sebanz, & Knoblich, 2014). Other work has shown that decision-making processes in dictator and ultimatum games are underpinned by prosocial preferences as well as preferring to avoid reputation costs (e.g., Bicchieri & Xiao, 2009; Nettle et al., 2013; Debove, Baumard, & André, 2016).

6.2.1. Conclusion and future directions

Our research reveals that ownership is not a simple property relationship between person and object but rather a complex social phenomenon emerging from coordination dynamics. The findings suggest that mind-reading capacities play a crucial role in solving ownership attribution problems by enabling individuals to track shared expectations and anticipate others' strategies in resource usage situations. This coordination perspective opens new avenues for understanding how ownership practices evolve and stabilize across cultures and how they interact with other social institutions. Future research might explore how different cultural and historical contexts shape correlation devices people rely on for ownership attribution.

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