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Ownership and Possession Biases: Exploring differences in self-object linking, overvaluation, and object evaluation by self-construal

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Psychological & Brain Sciences

by

Megan Ellen Reed

Committee in charge:

Professor Diane M. Mackie, Chair

Professor Heejung S. Kim

Professor Kyle G. Ratner

Professor Nancy L. Collins

June 2018

The dissertation of Megan Ellen Reed is approved.

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May 2018

Ownership and Possession Biases: Exploring differences in self-object linking, overvaluation, and object evaluation by self-construal

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by

Megan E. Reed

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June 2018

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Nabi, Robin L., Nicholls, Spencer B., Keblusek, Lauren M., Huskey, Richard W., & **Reed, Megan E.** (Under review). When audiences become advocates: Dissonance-driven behavior change through health message posting in social media. *Human Communication Research.*

CONFERENCE PRESENTATIONS

Reed, Megan & Mackie, Diane M. (March 2018). *Ownership and Possession Biases: Exploring Differences in Self-Object Linking, Overvaluation, and Object Evaluation by Cultural Self-Construal.* Poster presented at the 19th Annual Meeting of the Society for Personality and Social Psychology, Atlanta, GA.

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ABSTRACT

Ownership and Possession Biases: Exploring differences in self-object linking, overvaluation, and object evaluation by self-construal

by

Megan Ellen Reed

The studies in this dissertation examine the biases that stem from ownership and whether those biases can be explained by the strength of the association formed between the self and owned object. The role of culture in this process was explored. In Study 1, participants were assigned to either be an *owner* or *buyer* of an object, a journal. *Owners* valued the journal more than *buyers*, but did not otherwise show excessively favorable evaluations. Contrary to expectations, the association between the self and the object was not predictive of the excessive valuation and the process did not vary with cultural self-construal. In Study 2, the journal was modified and described in more independent or interdependent terms, signifying its congruity with more independent and interdependent self-construals, respectively. *Owners* reported both higher values and more positive evaluations than *buyers,* but these biases were again not predicted by the strength of the association between the self and object or influenced by participants' self-construal. Overall, results suggest that the biases that stem from ownership are robust and related, but are not best explained by a self-object association. Implications across types of ownership are discussed.

keywords: ownership, endowment effect, mere ownership effect, self-construal

Ownership and Possession Biases

Westerners cherish their possessions. They attach to their belongings and come to favor them in surprising ways. They tend to demand significantly more to sell an object they own than they would be willing to pay to purchase that same object, also known as the *endowment effect* (Kahneman, Knetsch, & Thaler, 1990; Knetsch, 1989; Thaler, 1980), and have a tendency to objects they own are more attractive than objects they do not, a phenomena known as the *mere ownership effect* (Beggan, 1992). Recently, researchers have suggested that these *possession biases* emerge due to associations formed by ownership (Morewedge, Shu, Gilbert, & Wilson, 2009), whereby people link their selves to their objects (Ye & Gawronski, 2016). If so, these associations might help explain some cultural boundaries on possession biases. Recent studies have shown, for example, that East Asians demonstrate a significantly smaller endowment effect compared to Westerners (Maddux et al., 2010; Gobel, Ong & Harris, 2014). One possible explanation for these findings is that since cultural background impacts construal of the self, it also likely affects the course of ownership and the biases it produces.

This dissertation investigates whether ownership in fact links the self to newly owned objects and whether any linking that occurs affects possession biases in the context of the role of culture. The primary goals of the present research are to: 1) examine how the possession biases, the endowment effect and mere ownership effect, are related; 2) explore how self-object linking relates to possession biases; 3) investigate whether this process varies by self-construal; and 4) test if self-object linking varies based on whether the object is congruent with an individual's self-construal.

Possession biases

The term "possession biases" is employed here to describe two prominent effects: the endowment effect and the mere ownership effect. These effects have been widely studied because of their implications for consumption and financial decisions - markets may be less productive when sellers set unreasonable prices and view their products as excessively positive - yet these biases have only recently been investigated in relation to more fundamental psychological processes.

Endowment effect. The endowment effect is one of the most robust and well-replicated effects in psychology and behavioral economics (Loewenstein & Adler, 1995; Morewedge & Giblin, 2015). The effect, which demonstrates that the value of an object is greater when it is owned than when it is not, has been studied using a number of distinct objects, from mugs and chocolates (Knetsch, 1989), to lottery tickets (Knetsch & Sinden, 1984), basketball tickets (Carmon & Ariely, 2000), and bottles of wine (Van Dijk & Van Knippenberg, 1998). One common feature of many of these studies is that the effect occurs as soon as the object has been endowed, making it difficult for people to part with or sell their belongings. People overvalue objects as soon as they become their possessions. This has led researchers to refer to these patterns as "instant endowment effects" (Kahneman, Knetsch, & Thaler, 1991). These instant ownership situations are distinct from situations where ownership is chosen and selected, which may entail other post-decisional processes (Gawronski, Bodenhausen, & Becker, 2007; Ye & Gawronski, 2016). To eliminate the role of choice in isolating the mechanisms by which ownership affects price evaluations, the current research focuses on instant ownership or endowment situations.

Many paradigms have been developed to test the endowment effect, but one of the most commonly used is the *valuation paradigm* (Morewedge & Giblin, 2015). In the valuation paradigm, half of all participants are endowed with ownership of an object, whereas the other half are assigned the role of buyer. Participants who have been endowed with the object can keep the object or sell the object back to the experimenter. In order to sell the object, the participants must indicate the minimum payment they would be willing to accept. Similarly, the other participants, buyers, are offered a chance to buy the object from the experimenters, and must indicate the amount of money they would be willing to pay to acquire the object. The discrepancy between the sellers and buyers' prices demonstrates the endowment effect. There are several other methods of testing the endowment effect, which are comparable in the results they produce. Kahneman and colleagues (1990) reported that the endowment effect was robust regardless of the paradigms used to assess it.

Loss aversion was initially cited as the cause of the endowment effect (Kahneman and Tversky 1979; Thaler 1980), because giving up an endowed good, even when selling it, is a loss. Kahneman and colleagues claimed that because people are inherently loss averse, an object should be reported as more valuable when one is selling, rather than buying it (Tverskey & Kahneman, 1991). A loss aversion explanation was bolstered by the fact that initial endowment effects in price evaluations were not accompanied by differences in ratings of object attractiveness, leading the authors to conclude that people were not setting high valuations because they viewed their possessions to be particularly special (Kahneman, Knetsch, & Thaler, 1991). More recent work, however, has shown that mere possession can and does lead to more favorable evaluations, which has expanded and corrected the prevailing knowledge regarding possession biases.

Mere ownership effect. The mere ownership effect is the now well-established tendency to evaluate an object more favorably simply because it is owned (Beggan, 1992). For example, in one of the first tests of mere ownership, participants reported that a beverage insulator was more attractive when they owned it, compared to when they did not own it or were evaluating the insulator but owned a different object (Beggan, 1992). Later studies have shown the mere ownership effect to emerge for various non-physical targets as well, such as brands (Kirmani, Sood, & Bridges, 1999), organizations (Van Dyne & Pierce, 2004), and arguments used in debates (De Dreu & van Knippenberg, 2005), which provide evidence of the effect's magnitude.

The measure of the mere ownership effect captures favorable evaluations not specifically tied to any single feature or quality of an object (e.g., "How attractive is the journal?"). It is captured by a four-item questionnaire (Beggan, 1992). The mere ownership effect demonstrates that ownership produces positive evaluative biases as soon as an object is owned.

These mere ownership effects in object evaluations, which occur prior to and independently of any sense that the object might be lost or sold, undermined loss aversion as a primary explanation for possession biases. Instead, ownership has emerged as the primary psychological explanation for the possession biases. Ownership creates a particular relationship between individuals and their possessions. It is an association that can be legal, recognized by society, or psychological, existing primarily in the owner's mind (Pierce, Kostova, & Dirks, 2003). Whereas legal ownership may be assigned in lab settings, possession biases stem from the *feeling* that the object is 'MINE' and is the subjective experience that accounts for evaluative biases (Beggan, 1992). It is unlikely for possession

biases to occur when an owner does not *perceive* herself as connected to her object through ownership. Psychological ownership is now regarded as the primary psychological explanation for the endowment effect (Morewedge et al., 2009; Shu & Peck, 2011). In the current studies, ownership refers to a state where both legal and psychological ownership co-occur. However, it is psychological ownership that is assumed to drive possession biases.

An associative approach to ownership

How does ownership impact evaluations and the perceived value of a possession? Beggan (1992) proposed that owners recognize the association between one's self and an owned object and that this association has multiple consequences for perceptions of the object. In order to better understand the influence of ownership on possession biases, scholars have recently taken up this associative idea, examining the extent to which owners link their selves to owned objects (Ye & Gawronski, 2016; Gawronski et al., 2007). Their work provides a deeper understanding of how the self can connect to external objects and how such connections may possibly extend to possession biases. Gawronski and colleagues considered an associative network model appropriate for framing their theorizing because ownership is frequently described as a meaningful connection or association between an owner and possession. The associative network model proposes that nodes, or stored information, are linked via associations, which allow activation to spread from one node to another during memory retrieval (Greenwald et al., 2002). Gawronski and colleagues (2007; 2016) proposed that an individual's associative network should form a new association in response to acquiring a new possession. This association is what allows for the transfer of properties from the self onto an owned object, much as Beggan (1992) proposed.

Ye and Gawronski (2016) used *implicit self-object linking* to describe how ownership forms a mental association between the self and object. More specifically, implicit self-object *linking* is "the behavioral phenomenon of automatically connecting the self and a given object on an implicit measure" (p. 73, Ye & Gawronski, 2016). In a series of studies, sequential priming procedures and implicit association tests were used to measure self-object linking in a variety of ownership situations with distinctly positive or negative objects. Ye and Gawronski used both ownership-by-choice and mere-ownership situations with differently valenced objects to examine how implicit self-object linking could vary. This will be discussed in more detail in Study 2.

Ye and Gawronski (2016) investigated implicit self-object linking because of its proposed role in mediating the relationship between ownership and possession effects. Their work provides a clear framework for demonstrating the association formed by ownership and for subsequently testing the source of possession biases. Yet, their (2016) studies did not systematically assess possession effects. The endowment effect was not measured in their work and explicit evaluations were assessed only with objects *chosen* by participants. Ye and Gawronski's goals were focused more on understanding the relationship between ownership and their implicit measure than on investigating downstream consequences, a noteworthy gap in the literature that the current studies address.

The current studies apply an associative approach to possession biases to produce a clearer picture of the underlying psychological processes at work. Both the term "implicit self-object linking" and Ye and Gawronski's method for testing it have been adopted for use in the current studies.

Self-object linking mediates ownership status and possession biases

One of the primary theoretical goals of the current studies is to demonstrate that ownership in fact links the self to newly owned objects and that self-object linking is the psychological mechanism whereby ownership produces possession biases. That is, ownership status produces self-object linking, which in turn produces both the endowment effect and the mere ownership effect, as illustrated in Figure 1. This model is tested in Study 1.

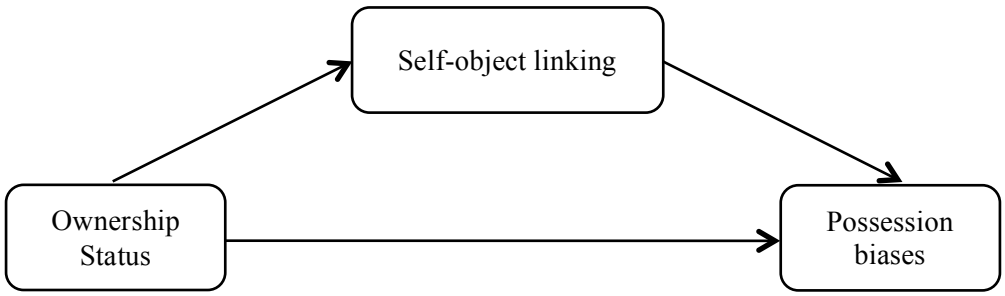

Figure 1. Theoretical model 1: Ownership status impacts possession biases through increased self-object linking.

The role of culture

If, as the associative approach suggests, self-object linking is the mechanism by which ownership translates into possession biases, possession biases themselves should be moderated by factors that influence self-construal. In this regard, cultural differences in self-concept and sources of self-worth have been well documented (Markus & Kitayama, 1991; Heine, Lehman, Markus, & Kitayama, 1999; Endo, Heine, & Lehman, 2000). For example, individuals from individualistic, often Western, societies tend to possess independent self-construals. They tend to view themselves as autonomously motivated and distinct from even close others. Independent self-representations therefore tend to refer to individual's distinct desires, qualities, and traits (e.g., "I am funny"), linking the self (I) to its attributes. In

contrast, individuals from more collectivistic, often East Asian, societies tend to possess interdependent self-construals, which are the product of a cultural emphasis on connectedness and the priority of social relationships. Interdependent individuals see themselves as only a part of a larger social network; the perception of others influences an interdependent individual's own thoughts and actions. Interdependent self-representations are centered on significant relationships and shift with the context and social situation one finds herself in.

Since the self is a necessary component of the *self*-object association formed by ownership, and culture impacts an individual's self-construal, then cultural differences in self-construal should affect possession biases. This has, in fact, been demonstrated, but only with respect to the endowment effect (Maddux et al., 2010; Gobel et al., 2014).

Maddux and colleagues (2010) investigated cultural differences in the endowment effect using a variety of Chinese, Japanese, and Canadian samples. They found significantly smaller endowment effects in East Asians and participants with experimentally manipulated interdependent self-construals, as compared to Westerners or participants with experimentally manipulated independent self-construals. Maddux and colleagues (2010) argued that their findings reflected distinct cultural tendencies towards self-enhancement; Westerners with independent mindsets tend to self-enhance, whereas East Asians with interdependent mindsets do not (Heine, 2005). East Asians should therefore be less likely to demonstrate over-valuation for objects associated with the self. In the authors' test of this self-enhancement hypothesis, Canadian and Japanese participants were "primed" to either associate their selves with the object or not by either writing about how a mug was important and held personal meaning or by writing about how the mug was unimportant and without

personal meaning. Maddux and colleagues proposed that Japanese sellers would not set significantly higher prices than buyers would be willing to pay in either priming condition, whereas Canadian sellers would set higher prices only when the object was associated with the self. This was true for Canadian participants. However, contrary to expectations, while Japanese participants did not demonstrate the endowment effect when primed with object association, they did show a marginal endowment effect when primed with no object association. This result was not well explained. The authors offered a single, unsatisfying explanation for the counterintuitive finding: "cultural differences in self-enhancement and self-criticism" (p. 1914, Maddux et al., 2010). Thus although Maddux and colleagues demonstrated a cultural difference in the endowment effect, such that those with interdependent rather than independent self construals showed a reduced possession bias, evidence for the mechanism underlying the effect was not clear.

Gobel and colleagues (2014) extended this work by demonstrating that cultural differences in the endowment effect can differ depending on social context. In their studies, both Malaysian participants and Asian participants in Great Britain were less likely to exhibit the endowment effect in public, as compared to private settings. East Asians were more likely to show the endowment effect when imagining using a mug in a private setting, a home office, as compared to imagining using a mug in a public setting, an open office. The authors proposed that their results were the product of East Asians' malleable and context-dependent self-concept. Yet, independent and interdependent self-construals were not measured, so it is unclear whether private contexts are somehow unique for East Asians, or if instead the description of the private context inadvertently reduced participants' interdependent construals and produced behaviors consistent with independent mindsets.

Previous research has demonstrated that it is possible to shift cultural self-construal since independent and interdependent self-construals can coexist and differ in proportion within individuals (Kagitcibasi, 2005; Santamaría, Manuel, Hansen, & Ruiz, 2010). Gobel and colleagues' work replicates the earlier finding that East Asians are less likely to display the endowment effect but only in a context in which their interdependent self-construal was activated. Once again, however, there was no clear evidence for this preferred explanation.

Maddux et al. (2010) and Gobel et al. (2014) are the only empirical investigations of cultural differences in the endowment effect to date. Whether culture also impacts the mere ownership effect is still unknown. Both these sets of studies converge on the idea that differences in self-construal (assuming that the cultural groups tested differ on this dimension) influence price valuations of owned compared to non-owned objects, but neither provided compelling evidence of the psychological mechanism underlying these differences.

A primary goal of the current studies is to demonstrate that differences in self-object linking that arise because of difference in self-construal will also produce differences in possession biases. First, both Study 1 and Study 2 will test the hypothesis that participants with more a independent rather than interdependent self-construal will show more possession biases than those with a more interdependent self–construal, a hypothesis consistent with the reduced endowment effect among Asian participants.

These studies will explore the way in which self-construals might influence the impact of ownership on possession biases through self-object linking. If biased valuations and evaluations result from an association formed between individuals and an owned object, there are two possible explanations that may explain how and why individuals with interdependent mindsets do not exhibit the same biases. Individuals with more

interdependent self-construals may simply not form an association between the self and owned object, which would therefore eliminate self-object linking producing possession biases (see Figure 2).

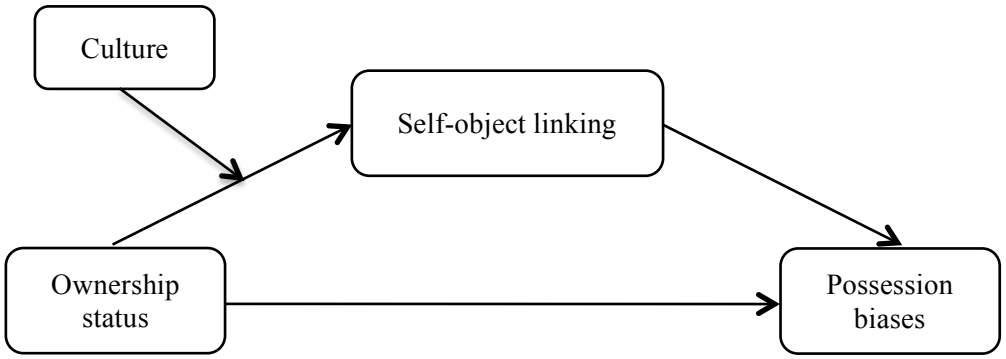

Figure 2. Theoretical model 2: Ownership status impacts possession biases through increased self-object linking. Culture moderates the relationship between ownership status and self-object linking.

If, however, the self-object association is universally formed in ownership situations, then it is possible that endowment effect or evaluative differences are the result of culture moderating the relationship between self-object linking and the possession biases. Individuals with more interdependent self-construals may not display biases even though they have high levels of linking, tendency that may reflect their lack of self-enhancement (Heine, 2005). This dissertation will test this alternative hypothesis that all *owners* will show increased self-object linking, but that linking will translate to possession biases only for more independent individuals (see Figure 3).

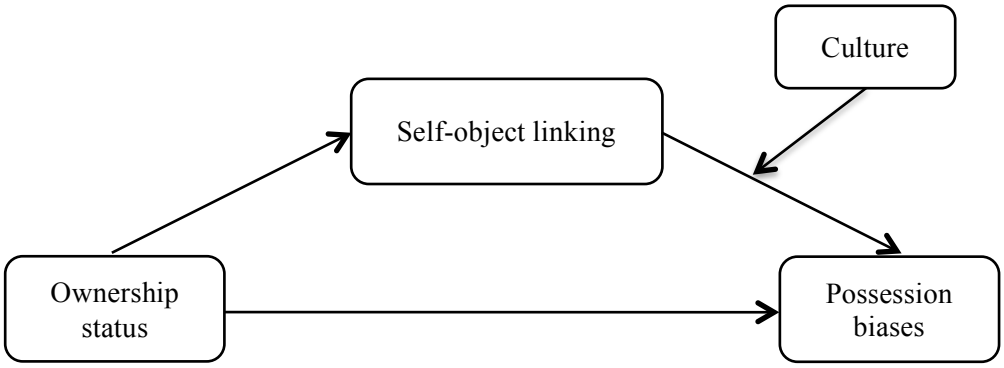

Figure 3. Alternative theoretical model: Ownership status impacts possession biases through increased self-object linking. Culture moderates the relationship between self-object linking and possession biases.

Overview

The goals of the current research are to 1) examine how the possession biases are related; 2) explore how self-object linking relates to possession biases; 3) investigate whether this process varies by self-construal; and 4) assess how the process varies based on object congruity. Goals 1-3 will be tested in Study 1 and Study 2. Goal 4 will only be tested in Study 2.

Hypotheses. Ownership is expected to predict possession biases such as the endowment effect and mere ownership effect via self-object linking. It is expected that we will find a reduced endowment effect and mere ownership effect for individuals with more interdependent self-construals. It is proposed that this reduced effect is the result of differences in self-object linking. For more independent individuals, ownership should create a stronger association between the self and object. More interdependent individuals are not expected to show this same pattern, with interdependent *owners* linking at the same rate as interdependent *buyers*. Self-object linking should then predict possession biases equally across cultures. In Study 2, manipulating the object to make it more congruent with an

interdependent self-construal should restore the reduced endowment effect for interdependent participants. A greater degree of object congruity should enhance self-object linking for all participants, which will again predict the possession biases.

Study 1

Study 1 served several purposes. First, it intended to replicate findings that showed owners generate higher prices for owned objects and report more favorable evaluations of owned objects.

These two possession biases are tested together for the first time in Study 1. A second goal of the study is therefore to understand their association and test whether the endowment effect and mere ownership effect are positively related.

The third goal of the study was to investigate self-object linking and understanding its role in producing the endowment effect and mere ownership effect. Study 1 first attempted to replicate the effect of ownership on self-object linking and show that people were more likely to link their self to owned objects. Next, and most theoretically important, Study 1 explored whether self-object linking mediates the effect of ownership on the endowment effect and mere ownership effect.

The fourth goal of Study 1 was to replicate the cultural difference in the endowment effect. The study extended previous findings by using self-construal, rather than cultural groups, to test the prediction that interdependence is the cause of the reduced endowment effect. Study 1 further assessed whether the mere ownership effect was affected by self-construal in the same way as the endowment effect.

The fifth goal of Study 1 was to test how self-construal interacts with the ownership process to produce possession biases. Do only individuals with independent self-construals

link their selves to objects they own? Or might *all* people link their selves to owned objects, but self-object linking only predicts possession biases for independent individuals?

To summarize, we hypothesized that we would replicate previous findings and demonstrate that ownership increases 1) endowment effect prices, and 2) mere ownership evaluations. We also predicted that the measures of the 3) endowment effect and mere ownership effect are positively correlated. Further, we expected to replicate that 4) self-object linking occurs more strongly for owners. We hypothesized that self-object linking predicted both the 5) endowment effect and 6) mere ownership effect. Further self-object linking was expected to mediate the relations between ownership and the 7) endowment effect and 8) mere ownership effect.

We expected that we would 9) explain previously found cultural differences in the endowment effect by demonstrating a larger effect for individuals with more independent self-construals and a reduced endowment effect for individuals with more interdependent self-construals. We anticipated that 10) mere ownership evaluations would be affected in the same way, with more interdependent individuals showing a reduced effect compared to more interdependent individuals. It was further hypothesized that 11) more independent individuals would show greater self-object linking overall, and additionally that 12) more independent *owners* would show much greater linking than independent *buyers*, whereas more interdependent individuals would show less of a difference in self-object linking by ownership status. Alternatively, if linking did not differ by self-construal, then we anticipated that greater levels of linking would predict 13) greater endowment effect prices and 14) mere ownership effect evaluations for more independent self-construals, but not for more interdependent self-construals.

Finally, we expected the entire model to fit together such that ownership status would predict 15) endowment effect prices and 16) mere ownership prices through self-object linking, with self-construal moderating the relation between ownership and self-object linking. Alternatively, we predicted that ownership status would predict 17) endowment effect prices and 18) mere ownership prices through self-object linking, with self-construal moderating the relation between self-object linking and the possession biases.

Method

Design and participants. Study 1 experimentally manipulated ownership (Ownership status: *owner* vs. *buyer*) in a between subjects design. A total of 242 participants were recruited from UC Santa Barbara's Psychological and Brain Sciences Subject Pool and completed the study for research course credit. Four participants were excluded from all analyses due to incomplete data. The average age of participants was 18.93 years old (*SD* = 2.16). This sample was 32.2% European American, 20.9% Asian or Asian American, 28.9% Latinx or Hispanic, 5% African American or Black, and 13% other or multiple ethnicities. The sample was 56.9% female.

A priori power analysis conducted using G*Power 3.1 (Faul et al., 2009) suggested that a sample size of around 223 participants would be sufficient to detect relatively small (f^2 = .05) interaction effects of ownership and self-construal on endowment effect values and mere ownership evaluations with a power of .80 and an alpha value of .05[1]. The sample collected at UCSB exceeded the suggested N of 223.

Procedure. Participants entered the lab in groups of up to 3. Each participant was directed to his or her own computer cubicle, informed that the study consisted of a series of

[1] Accounting for IAT block order and the order of possession biases. F^2 calculated as $r^2/1-r^2$ based on Maddux et al.'s (2010) paper where η^2 ranged from .04 to .06.

tasks related to how people evaluate objects, and told he or she would receive monetary compensation for the study (which, although untrue, was necessary for the endowment effect procedure). Participants were then randomly assigned to one of two ownership conditions. Next, they completed the mediator measure, an IAT assessing self-object linking, followed by the dependent measures: measures of the endowment effect and mere ownership effect. Participants next completed a measure of psychological ownership, which acted as a manipulation check, before completing the self-construal measure, additional manipulation checks, and reporting their demographics. Finally, participants were debriefed, thanked, and everyone received the object from the ownership manipulation, regardless of their assigned ownership condition.

Ownership manipulation. Participants underwent an ownership manipulation adapted from Ye and Gawronski (Study 1; 2016). At the start of the experiment, participants were informed on the computer that they would evaluate an object, a journal, during the experiment. They were told that there were several types of journals that they could be assigned to evaluate. Participants then saw images of two journals, one blue and one green, side by side on the computer screen. The left and right positions of the two journals were randomized. The computer program then randomly assigned half of the participants to be *owners* of the blue journal, whereas the other half were assigned to be *buyers* of the blue journal. *Owners* were informed they would evaluate their assigned journal and receive their assigned journal to take home at the end of the study. *Buyers*, on the other hand, were told that they would simply evaluate their assigned journal. Participants were then asked to quietly inform the experimenter which journal they were assigned. To reinforce the

manipulation, the experimenter told *owners* that the journal would be set aside for them to pick up at the end of the study.

Mediator variable.

Self-object linking. Participants next completed an implicit association test (IAT) adapted from Ye and Gawronski (Studies 2-5), which assessed self-object linking, to show the extent to which the ownership manipulation resulted in the journal being closely associated with the self. The IAT was described as a test of attention and reaction time. Participants were told the task used images of the journals to reduce the total number of stimuli they encountered. Participants were instructed to press a key on either the left (*D*) or right (*K*) of the keyboard to categorize words and pictures. The images of the two journals (blue and green journals) and words that relate to either the self (i.e., *self, me, I, mine, my*) or to others (i.e., *other, them, their, they, it*) were used as target stimuli in the IAT. The IAT contained five blocks of trials that varied by targets and number of trials. See Appendix 1 for screenshot examples of the IAT.

The first block, the *initial target-concept discrimination task*, consisted of 20 trials that required participants to categorize images of the blue and green journal. Each image appeared as a 400-pixel x 300-pixel target in the center of the screen for 10 randomly ordered trials. The words “blue journal” and “green journal" appeared on either the top right or top left of the screen. Participants were instructed to select the left key (*D*) or right key (*K*) to indicate that the image in the center of the screen matched either the category blue journal or green journal category above. Participants were instructed to select the key representing the correct category as quickly as possible.

The second block, the *attribute discrimination task*, consisted of 20 trials where

participants had to categorize words as “self” or “other” related. The categories “self” and “other” appeared on the upper corners of the screen for all trials in the block. One word appeared in the center of the screen at a time. Participants were instructed to respond with the left key (*D*) when they saw a self-related word and with the right key (*K*) when they saw an other-related word. Each of the five self words and five other words appeared twice.

The third block, the *initial combined task*, consisted of 60 trials with “blue journal or self” and “green journal or other” as combined category labels on the upper corners of the screen. The blue and green journal pictures were each the central target 15 times and each of the self or other words were the target three times. There was a brief break after 20 trials before participants finished the last 40 trials in the third block, as per convention. The initial 20 trials have often been considered practice and the subsequent 40 considered critical trials, however, all 60 will be combined and analyzed following modern guidelines (Greenwald, Nosek, & Banaji, 2003).

The fourth block, the *reversed target-concept discrimination task*, consisted of 20 trials that required participants to categorize images of the blue and green journal again. This time, however, the keys associated with each image were reversed from the first block since the categories at the top of the screen, “blue journal” and “green journal,” swapped positions. In these trials participants associate the journal with the other side of the screen, in preparation for the fifth block when the pairing of the journal and “self” or “other” category also reversed.

Finally, the fifth block, the *reverse combined task*, consisted of 60 trials with “green journal or self” and “blue journal or other” as combined category labels. The journal images were each targets 15 times and the words were each targets three times. There was a brief

break after the first twenty trials, for participants to rest between the practice and critical trials. As with the third block, however, all 60 trials will be included in analyses.

The order of the blocks was counterbalanced between subjects. Half of the participants were assigned to have the blue journal mapped with "self" in the first combined block, whereas half of the participants were assigned to have the blue journal mapped with "self" in the second combined block.

Dependent variables.

Following the IAT, participants completed the endowment effect and mere ownership measures. Since no previous research has assessed both measures together, and since it is not known whether one bias affects the other, the order of the possession biases measures was counterbalanced. Half of the participants completed the endowment effect measure first, followed by the mere ownership scale, whereas the other half of participants completed the mere ownership scale first, followed by the endowment effect measure.

Assessment of endowment effect. The presence of an endowment effect was assessed using a multiple price list (MPL) procedure, a paradigm adopted from Kahneman and colleagues (1990). Prior to the task, participants were reminded that they would receive monetary compensation at the end of the study. They were told that the compensation would be $8, which could be used during the task.

At the beginning of the task, *owners* learned they had the choice to sell their journal to the experimenter, which would increase their compensation. For *buyers,* the task began with an explanation that they would have an opportunity to buy the journal using their compensation for the study. Participants were told they would need to make a series of decisions to determine if the experimenter would *sell/buy* the journal *to/from* them. They

would see a list of prices and had to decide whether they would rather *sell/keep the journal* or *buy/not buy the journal* at each price. They were told the computer would randomly choose one price at the end of the study. Their decision for that price would determine their outcome, whether they *sell/keep the journal* or *buy/not buy the journal*.

Before seeing the actual prices, participants were asked to consider what would be their minimum price for *selling/buying* the journal. *Owners* were told to select "no" for all prices below the minimum and "yes" for all prices above that minimum. *Buyers* were told to select "yes" for all prices below the minimum and "no" for all prices above that minimum. Participants then saw an example of this task and were asked what the outcome would be if the computer chose one specific price.

Once participants understood the task, they made their decisions. They were presented with a table that listed nine rows, from "[Sell/Buy] journal for $0" to "[Sell/Buy] journal for $8" in dollar increments, with options to select "Yes" or "No" for each row (see Appendix 2 for example). For *owners*, the value they are willing to accept for the journal is the point at which they change from "no" to "yes", whereas for *buyers*, the value they are willing to pay for the journal is the point at which they switch from "yes" to "no."

Assessment of mere ownership effect. The mere ownership effect was assessed with four items adopted from Beggan (1992). The items were, "Overall, how favorable is the journal?"; "How attractive is the journal?"; "How much do you like the journal?"; and "How much would you like to receive the journal as a gift?". The items assessed participants' explicit favorable evaluations of the journal using a 7-point Likert scale. See Appendix 3.

Moderator variable.

Self-construal. Interdependent and independent self-construals were measured with Singelis' (1994) 30-item self-construal scale. All items used a 7-point Likert scale and were scored to create a measure of Independence, Interdependence, and a difference score (created according to Singelis' code book as Independence minus Interdependence), which captures the relative differences between the two dimensions. See Appendix 4.

Manipulation checks and demographic variables.

Check on the effectiveness of the ownership manipulation. Participants completed a measure of psychological ownership to verify that *owners* reported greater feelings of ownership than *buyers* did. Three items were used to evaluate psychological ownership (Shu & Peck, 2011). Participants responded to the items, "I feel like this is MY journal"; "I feel a very high degree of personal ownership over this journal"; and "I feel like I own this journal" using a 7-point Likert scale. See Appendix 5.

To further assess the success of the manipulation, participants reported which journal they were assigned and whether they were assigned the journal they preferred. See Appendix 6.

Background variables. Finally, demographic variables were collected, including gender, ethnicity, and age. See Appendix 6.

Results

Manipulation checks.

Tests were conducted to verify the success of ownership manipulation. No participants were excluded from analyses based on these checks.

Effectiveness of ownership manipulation. An ANOVA was run to test the success of the ownership manipulation and verify that *owners* felt greater psychological ownership over the journal than *buyers* did. Participants' responses to the three psychological ownership items were combined into a single composite score (Cronbach's $\alpha = .94$). A 2 (Ownership status: *owners* vs. *buyers*) x 2 (Bias order: endowment effect (EE) first vs. mere ownership (MO) first) mixed-model ANOVA was then run on the composite.

Results indicated a significant main effect of ownership, $F(1,234) = 18.70$, $p < .001$, $\eta^2 = .07$. As expected, *owners* felt more psychological ownership over the journal ($M = 3.49$, $SE = 0.13$) than *buyers* ($M = 2.69$, $SE = 0.13$). There was also a main effect of bias order, which revealed that completing MO first ($M = 3.34$, $SE = 0.13$) increased participants' feelings of psychological ownership, compared to completing EE first ($M = 2.84$, $SE = 0.13$), $F(1,234) = 7.23$, $p = .008$, $\eta^2 = .03$. There was no significant interaction between ownership and bias order.

The results indicated the ownership manipulation was successful, since *owners* reported greater psychological ownership of the journal than *buyers*. Additionally, participants' felt greater feelings of ownership over the journal when they completed the mere ownership measure prior to the endowment effect procedure.

Participants were also asked at the end of the study which journal they were assigned. 100% of participants correctly reported that they were assigned the blue journal. Participants were further asked whether they were assigned the journal they like best, to ensure that participants were not dissatisfied with the blue journal. 64.3% of participants (153 out of 238) reported that they were assigned the journal they liked best, 25.2% of participants reported they had no preference (60 out of 238), and 10.5% reported that they wanted to be

assigned the other journal (25 out of 238). A chi-square test of independence was performed to check whether *buyers* were more likely to be dissatisfied with their journal assignment. The relationship was not significant, X^2 (2, N = 238) = 5.31, p = .070. Both *owners* and *buyers* were equally likely to report they were assigned the journal they liked best, had no preference, or wanted the other journal.

Effect of ownership on possession biases.

Analyses were conducted to confirm that ownership induced the endowment effect (H_1) and mere ownership effects (H_2).

Endowment effect. Participants' valuation of the journal was determined as the point at which they went from selecting "no, they were not willing to sell" to "yes, they were willing to sell" (or "yes" to "no" for buyers). 4 participants moved between "yes" and "no" at several points during the price list procedure and were therefore excluded from all analyses on the endowment effect. *Buyers'* prices for the journal ranged from \$0-8, whereas owners' prices ranged from \$1-8.[2]

The resulting values from the endowment effect procedure were submitted to a 2 (Ownership status: *owners* vs. *buyers*) x 2 (Bias order: endowment effect (EE) first vs. mere ownership (MO) first) mixed-model ANOVA. Ownership had a significant effect on the price participants were willing to buy (M = 2.87, SE = 0.16) or sell (M = 4.28, SE = 0.16) the blue journal for, F(1,230) = 37.20, p < .001, η^2 = .14. The sample thus demonstrated the endowment effect. The order in which measures were assessed also had a significant impact

[2] Prior to making their price decisions, participants completed a check of their understanding of the endowment effect procedure. 95.8% of participants answered this check correctly.
To further assess participants' understanding of the task, participants were explicitly asked to report how well they understood the procedure at the end of the experiment. An independent-samples t-test tested whether participants' understanding of the task differed by ownership status. Results showed that *owners* (M = 6.35, SD = 0.77) and *buyers* (M = 6.21, SD = 0.99) did not differ in their understanding of the procedure, t(236) = -1.24, p = .217, 95% CI [-0.37, 0.08]. Both groups strongly agreed that they understood the task.

on participants' valuations, with those who completed the mere ownership measure first (MO first (M = 3.84, SE = 0.16) pricing the journal higher than those who completed EE first (M = 3.31, SE = 0.16), $F(1,230) = 5.22$, $p = .023$, $\eta^2 = .02$. Finally, the interaction between ownership and bias order was not significant.

Consistent with H_1, these results show a significant endowment effect, revealed by the significant gap between *owners* and *buyers'* prices. Independent from the main effect of ownership, completing the mere ownership scale first increased both *owners* and *buyers'* valuation of the blue journal.

Mere ownership. The mere ownership measure was found to be highly reliable (4 items; Cronbach's $\alpha = .88$) and was converted into a single composite score. The composite was subjected to a 2 (Ownership status: *owners* vs. *buyers*) x 2 (Bias order: endowment effect (EE) first vs. mere ownership (MO) first) mixed-model ANOVA. Results revealed there was no significant main effect of ownership on participants' evaluations from the mere ownership scale. There was, however, a main effect of bias order, $F(1,234) = 16.27$, $p < .001$, $\eta^2 = .07$. Participants who completed MO first (M = 4.59, SE = 0.17) had more positive evaluations than those who completed EE first (M = 3.90, SE = 0.17). There was no significant interaction between ownership and bias order.

The results revealed a failure of the ownership manipulation to produce the mere ownership effect, in contrast with H_2.

Relation between possession biases.

Correlation between possession biases. As expected per H_3, the possession biases, endowment effect and mere ownership, were positively correlated with each other, $r = .23$, $p < .001$.

Effect of ownership on mediator variable.

Next, a mixed-model ANOVA was conducted to test H_4, the prediction that the manipulation would produce greater self-object linking for *owners*, compared to *buyers*.

Self-object linking. The response latency data collected from the IAT were used to create a measure of self-object linking, which was calculated using the D-600 algorithm (Greenwald et al., 2003). According to this procedure, latencies from incorrect responses were replaced with the mean value of all correct responses within a given block plus an error penalty of 600 ms. No participant had latencies below 300 ms on more than 10% of the trials. Two difference scores were calculated for each participant, one from practice trials and one from the critical trials previously described as the sub-blocks of the combined blocks. Following Greenwald and colleagues' (2003) recommendation, the two scores were combined into a single IAT score (Cronbach's $\alpha = .63$). The resulting score represents the difference between congruent (self paired with blue journal, other paired with green journal) and incongruent (self paired with green journal, other paired with blue journal) response times. Higher scores therefore represent greater linking of the self with the assigned blue journal.

The self-object linking scores were submitted to a 2 (Ownership status: *owners* vs. *buyers*) x 2 (IAT block order: self paired with blue journal (compatible) first vs. self paired with green journal (incompatible) first) mixed-model ANOVA. Results revealed no significant main effect of ownership status. There was, however, a significant main effect of IAT block order, $F(1,234) = 33.83$, $p < .001$, $\eta^2 = .13$, which replicated the established finding that linking is greater when participants complete compatible blocks first ($M = 0.39$,

SE = 0.03), compared to incompatible blocks first (*M* = 0.14, *SE* = 0.03). There was no significant interaction between ownership status and IAT block order on self-object linking.

To further assess how the ownership conditions affected participants' linking, *owners'* and *buyers'* linking scores were submitted to one-sample t-tests that compared the means to 0, the midpoint representing equal association of "self" with both the blue and green journal. Both *owners'* (*M* = 0.27, *SD* = 0.36), $t(120) = 8.30$, $p < .001$, 95% CI [0.21,0.34], and *buyers'* (*M* = 0.26, *SD* = 0.33), $t(116) = 8.70$, $p < .001$, 95% CI [0.20,0.32], mean linking scores were significantly greater than 0.

Both groups associated the self more with the blue than the green journal, but results did not support H_4 since *owners* did not associate the self with the blue journal more than *buyers* did.

Relation between mediator and possession biases.

Analyses next assessed whether self-object linking predicted possession biases and explained favorable valuations (H_5) and evaluations of the assigned blue journal (H_6). For complete means and correlations between variables, see Table 1.

Table 1.
Summary of correlations, means, and standard deviations.

	1	2	3	4
Psychological Ownership	-			
Endowment Effect Values	.31***	-		
Mere Ownership Evaluations	.50***	.23***	-	
Self-Object Linking	.06	.01	.14*	-
Mean	3.09	3.58	4.24	0.27
SD	1.50	1.92	1.36	0.34

Note. *$p < .05$, **$p < .01$, ***$p < .001$

Self-object linking predicting endowment effect values. A hierarchical linear regression tested whether self-object linking significantly predicted participants' valuation of

the blue journal. First, ownership status, IAT block order, and order of possession biases were controlled for in step 1, $R^2 = .16$, $F(3,230) = 14.48$, $p < .001$. Next, self-object linking was added, which was not significant, $\Delta R^2 = .00$, $F(1,229) = 0.08$, $p = .778$. Contrary to H_5, greater self-object linking did not increase participants' price decisions for the journal. Only the controlled variables of ownership status and bias order affected journal prices. For complete results, see Table 2.

Table 2.
Summary of hierarchical regression analyses predicting endowment effect prices from self-object linking

Variable	B	SE B	β	t	p
Step 1					
Ownership Status	1.41	.23	.37***	6.09	.00
IAT Block Order	-.25	.23	-.07	-1.07	.29
Bias Order	.52	.23	.14*	2.24	.03
Step 2					
Self-Object Linking	-.10	.36	-.02	-.28	.78

Note. Step 1: $R^2 = .16$ ($p < .001$). Step 2: $\Delta R^2 = .00$.
IAT block order coded as 0 = Compatible first, 1 = Incompatible first.
Bias order coded as 0 = EE first, 1 = MO first.
Ownership status coded as 0 = Buyer, 1 = Owner.
*$p < .05$, **$p < .01$, ***$p \leq .001$

Self-object linking predicting mere ownership. A hierarchical linear regression was conducted to test whether self-object linking significantly predicted participants' mere ownership composite scores. First, ownership status, IAT block order, and order of possession biases were controlled for in step 1, $R^2 = .08$, $F(3,234) = 6.45$, $p < .001$. Then self-object linking was added in step 2, which was significant, $\Delta R^2 = .02$, $F(1,233) = 3.97$, $p = .047$. Consistent with H_6, greater self-object linking was positively associated with participants' evaluations of the journal. The order in which participants completed the measures of possession biases also significantly influenced their evaluations. For complete results, see Table 3.

Table 3.
Summary of hierarchical regression analyses predicting mere ownership evaluations from self-object linking

Variable	B	SE B	β	t	p
Step 1					
Ownership Status	.15	.17	.05	.85	.39
IAT Block Order	-.25	.17	-.09	-1.47	.14
Bias Order	.69	.17	.25***	4.02	.00
Step 2					
Self-Object Linking	.53	.27	.13*	1.99	.05

Note. Step 1: $R^2 = .08$ ($p < .001$). Step 2: $\Delta R^2 = .02$ ($p = .047$).
IAT Block order coded as 0 = Compatible first, 1 = Incompatible first.
Bias order coded as 0 = EE first, 1 = MO first.
Ownership status coded as 0 = Buyer, 1 = Owner.
*$p < .05$, **$p < .01$, ***$p \leq .001$

Self-object linking as a mediator.

Mediation models using the SPSS macro, PROCESS 3.0 (Model 4; Hayes, 2018) tested whether self-object linking mediated the relation between ownership status and the endowment effect (H_7) and ownership and the mere ownership effect (H_8). The conditional indirect effects across both models were calculated using 5,000 bootstrapping samples, generating confidence intervals of the bias-corrected bootstrap type.

Mediation of effect of ownership on endowment effect values by self-object linking.

The first mediation model examined whether any effect of ownership on the endowment effect occurred because ownership status predicted self-object linking (Mediator; path a), which, in turn, predicted endowment effect values (Y variable; path b). IAT block order and bias order were included in the model as covariates. Results showed the total effect of ownership status on endowment effect values was significant (path c, $B = 1.41$, $p = .00$). As predicted and shown earlier, *owners* generated higher prices than *buyers*. Ownership status, however, did not significantly affect self-object linking (path a, $B = 0.01$, $p = .783$). *Owners* did not show greater self-object linking. Self-object linking was not significantly

related to the prices generated from the endowment effect procedure (path b, B = -0.10, p = .778). Path c', the direct effect of ownership status on endowment effect prices, was in fact unchanged (path c', B = 1.41, p < .001) even when the indirect effect of self-object linking was included. Further, the indirect effect of ownership status on the endowment effect value was not significant within a 95% CI (-0.00, 95% CI: -0.04, 0.03). See Figure 4.

These results did not support H_7. Self-object linking did not mediate the relation between ownership and the endowment effect. Ownership status was associated with values generated by the endowment effect procedure, but self-object linking was not associated with either ownership status or journal prices and did not mediate their relationship.

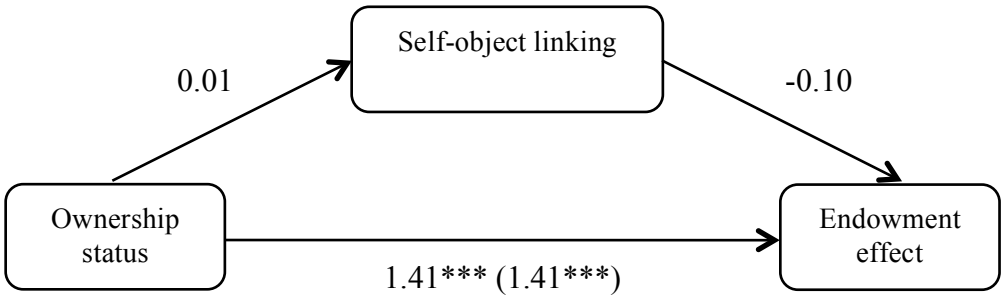

Figure 4.
Mediation of effect of ownership on endowment effect values by self-object linking.
Note. Ownership coded buyer = 0, owner = 1.
*p < .05, **p < .01, ***p ≤ .001

Mediation of effect of ownership on mere ownership evaluations by self-object linking. An identical analysis examined whether any effect of ownership on mere ownership biases occurred because ownership status predicted self-object linking (Mediator; path a), which, in turn, would predict mere ownership (Y variable; path b). Results showed the total effect of ownership status on mere ownership evaluations was not significant (path c, B =

0.15, $p = .394$). As shown earlier, *owners* did not report more positive evaluations than *buyers*. Further, ownership status again did not significantly affect self-object linking (path a, $B = 0.01$, $p = .835$). There was, however, a significant relation between self-object linking and evaluations (path b, $B = 0.53$, $p = .047$). Greater linking was related to more positive evaluations from the mere ownership scale. Path c', the direct effect of ownership status on evaluations, was not significant (path c', $B = 0.14$, $p = .407$). Further, the indirect effect of ownership status on evaluations was not significant within a 95% CI (0.00, 95% CI: -0.03, 0.04). See Figure 5.

Despite the fact that self-object linking was positively related to mere ownership evaluations, ownership status did not influence evaluations, so unsurprisingly, self-object linking did not appear to mediate the relation between ownership and mere ownership evaluations. These results did not support H_8.

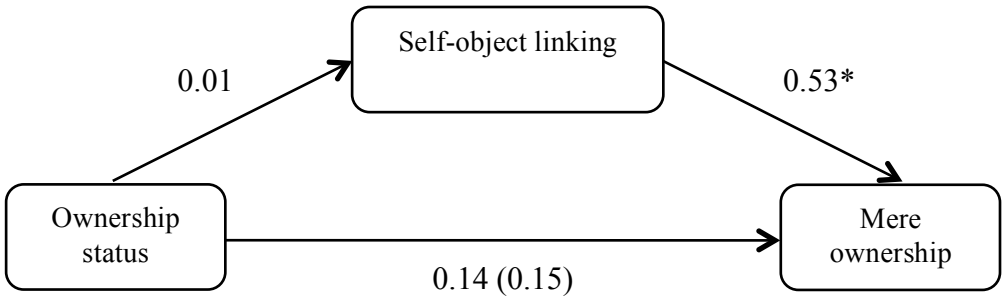

Figure 5.
Mediation of effect of ownership on mere ownership evaluations by self-object linking.
Note. Ownership coded buyer = 0, owner = 1.
*$p < .05$, **$p < .01$, ***$p \leq .001$

Self-construal.

Participants' responses on the self-construal scale were aggregated into two composites: Independence (IND; 15 items; Cronbach's $\alpha = .78$) and Interdependence (INT; 15 items; Cronbach's $\alpha = .76$). Independence and Interdependence are positively correlated,

$r(238) = .15$, $p = .022$. These two composites were used to create a difference score (IND – INT) reflecting whether participants have a more Independent or Interdependent self-construal (Singelis, 1994). A score of 0 therefore indicates equal Independence and Interdependence.[3]

Effect of ownership and self-construal on possession biases.

Analyses were conducted to test the predictions that more interdependent self-construals were associated with reduced endowment effects (H_9) and mere ownership effects (H_{10}).

Endowment effect by ownership and self-construal. A multiple regression analysis using the SPSS macro, PROCESS 3.0 (Model 1; Hayes, 2018) tested the hypothesis that self-construal moderated the relation between ownership status (0 = *buyer*, 1 = *owner*) and the endowment effect (H_9).

In the first step, ownership, self-construal, and the order of possession biases accounted for a significant amount of variance in journal prices from the endowment effect procedure, $R^2 = .16$, $F(4,229) = 11.22$, $p < .001$.[4] However, there was not a significant association between self-construal and journal prices ($B = -0.28$, $p = .118$).

Including the interaction between ownership and self-construal in the second step of the regression explained 0% of the variation in journal valuations, $\Delta R^2 = .00$, $F(1,229) = 0.61$, $p = .436$. For both more interdependent ($B = 1.20$, $t = 3.64$, $p < .001$) and more

[3] Mean IND-INT difference scores significantly varied by ethnicity, $F(4,233) = 2.72$, $p = .031$ (European American (N = 76) $M = 0.18$, $SD = 0.90$; Asian/Asian American (N = 50) $M = -0.18$, $SD = 0.84$; Latinx (N = 69) $M = 0.18$, $SD = 0.74$; African American (N = 12) $M = 0.59$, $SD = 1.18$; Other/Multiple (N = 31) $M = 0.17$, $SD = 0.83$). Consistent with previous research, Asian/Asian Americans were more interdependent than other cultural groups.

[4] As previously reported, there was a significant association between ownership and journal values ($B = 1.39$, $p < .001$), with *owners* generating higher values. The order of possession biases again significantly influenced journal values ($B = 0.52$, $p = .028$). Completing MO first increased participants' price decisions compared to completing EE first.

independent individuals ($B = 1.57$, $t = 4.70$, $p < .001$) moving from buyer to owner was significantly related to pricing the journal higher. Contrary to H_9, self-construal did not significantly moderate the relation between ownership and endowment effect values. The endowment effect was found for both more interdependent and more independent individuals.[5]

Mere ownership effect by ownership and self-construal. A multiple regression analysis was conducted using the SPSS macro, PROCESS 3.0 (Model 1; Hayes, 2018) tested the hypothesis that self-construal moderated the relation between ownership status and the mere ownership (H_{10}).

In the first step, ownership, self-construal, and the order of possession biases accounted for a significant amount of variance in the mere ownership scores, $R^2 = .07$, $F(4,233) = 4.62$, $p = .001$. There was not a significant association between self-construal and mere ownership evaluations ($B = -0.15$, $p = .242$).[6]

Next, adding the interaction between ownership and self-construal explained 0% of the variation in journal evaluations, $\Delta R^2 = .00$, $F(1,233) = 0.34$, $p = .563$. For both more interdependent ($B = 0.03$, $t = 0.13$, $p = .895$) and more independent individuals ($B = 0.24$, $t = 0.95$, $p = .341$) moving from buyer to owner was not significantly related to journal

[5] A 2 (ownership: *buyers* vs. *owners*) x 2 (culture: European American vs. Asian/Asian American) ANCOVA with bias order as a covariate tested whether we replicated the reduced endowment effect for Asians. Results showed main effects of ownership and culture (with Asians producing higher values), but no significant interaction between the two. Results failed to replicate the findings of Maddux et al. (2010) and Gobel et al. (2014).

[6] There was also not a significant association between ownership and journal evaluations ($B = 0.13$, $p = .437$), as shown in the 2x2 ANOVA. Only the order of the possession biases significantly predicted mere ownership evaluations ($B = 0.69$, $p < .001$), with completing MO first leading to more positive evaluations.

evaluations. Results did not support H_{10}. Self-construal was not a significant moderator of the mere ownership effect.[7]

Effect of ownership and self-construal on self-object linking.

Next, a multiple regression analysis tested whether greater relative independence was associated with greater self-object linking (H_{11}) and if self-construal impacted the relationship between ownership status and self-object linking as expected, with more interdependent individuals less affected by ownership status (H_{12}).

In the first step, ownership status, self-construal, and IAT block order accounted for a significant amount of variance in the mere ownership scores, $R^2 = .13$, $F(4,233) = 9.01$, $p < .001$.[8] There was no support for H_{11}, however, since self-construal was not significantly associated with self-object linking ($B = 0.01$, $p = .674$).

The interaction between ownership and self-construal did not account for a significant proportion of the variation in self-object linking, $\Delta R^2 = .01$, $F(1,233) = 1.77$, $p = .185$. For both more interdependent ($B = 0.06$, $t = 0.87$, $p = .387$) and more independent individuals ($B = -0.04$, $t = -0.67$, $p = .501$) moving from buyer to owner was not related significantly greater self-object linking. In contrast to H_{12}, self-construal did not significantly moderate the relation between ownership and self-object linking.

[7] A 2 (ownership: *buyers* vs. *owners*) x 2 (culture: European American vs. Asian/Asian American) ANCOVA with bias order as a covariate tested whether we found a reduced mere ownership effect for Asians. Results showed no main effect of ownership or culture, and no significant interaction between the two. There was not a reduced mere ownership effect for Asians, indicating a failure to replicate Maddux et al. (2010) and Gobel et al., (2014).

[8] Ownership status again did not predict self-object linking ($B = 0.01$, $p = .879$) and IAT block order was the only significant predictor of linking scores ($B = -0.24$, $p < .001$).

Effect of self-object linking and self-construal on possession biases.

Analyses tested the predictions that self-construal moderated the relations between self-object linking and the endowment effect prices (H_{13}) and mere ownership evaluations (H_{14}).

Endowment effect by self-object linking and self-construal. A multiple regression analysis using the SPSS macro, PROCESS 3.0 (Model 1; Hayes, 2018) tested the hypothesis that self-construal moderated the relation between self-object linking and the endowment effect prices (H_{13}).

Self-object linking, self-construal, and the order of possession biases did not account for a significant amount of variance in the endowment effect values, $R^2 = .03$, $F(4,229) = 1.90$, $p = .112$.[9] The interaction between self-object linking and self-construal further did not account for a significant amount of variance in self-object linking, $\Delta R^2 = .00$, $F(1,229) = 0.17$, $p = .684$. Greater linking was not related to higher journal prices for more interdependent ($B = 0.18$, $t = 0.35$, $p = .727$) or more independent ($B = -0.12$, $t = -0.22$, $p = .824$) individuals. Results did not support H_{13}. Self-construal did not significantly moderate the relation between self-object linking and endowment effect prices.

Mere ownership by self-object linking and self-construal. A multiple regression analysis using the SPSS macro, PROCESS 3.0 (Model 1; Hayes, 2018) tested the hypothesis that self-construal moderated the relation between self-object linking and the mere ownership effect (H_{14}).

Self-object linking, self-construal, and the order of possession biases accounted for a significant amount of variance in the mere ownership evaluations, $R^2 = .09$, $F(4,233) = 5.88$,

[9] Self-object linking ($B = 0.03$, $p = .931$) and self-construal ($B = -0.24$, $p = .101$) again did not predict journal values. Bias order was the only significant predictor of the endowment effect prices ($B = 0.53$, $p = .035$).

$p < .001$.[10] However, the interaction between self-object linking and self-construal did not account for a significant amount of variance in self-object linking, $\Delta R^2 = .00$, $F(1,233) = 0.06$, $p = .804$. Higher levels of linking did not predict more positive evaluations for more interdependent ($B = 0.52$, $t = 1.49$, $p = .136$) or more independent ($B = 0.65$, $t = 1.84$, $p = .067$) individuals. These results did not support H_{14}. Self-construal did not significantly moderate the relation between self-object linking and mere ownership evaluations.

Self-object linking mediating the effect of ownership on possession biases, moderated by self-construal.

Moderated mediation models tested whether self-object linking mediated the relation between ownership status and the possession biases (Hypotheses 15-18). Self-construal was tested as a moderator at stage 1 (path a) and at stage 2 (path b). The conditional indirect effects were calculated using 5,000 bootstrapping samples, generating confidence intervals of the bias-corrected bootstrap type.

Mediation of endowment effect values moderated by self-construal at stage 1. A moderated mediation model was run in which self-construal (Mod) moderated the effect of ownership status (X) on self-object linking (Med), which in turn helped predict endowment effect prices (Y), with IAT block order and possession bias order entered as covariates (PROCESS Model 7; Hayes, 2018). Conditional indirect effects were calculated using 5,000 bootstrapping samples.

The moderated mediation through self-object linking was not significant, as the equality of the conditional indirect effects was confirmed (index of moderated mediation, $B =$

[10] Self-object linking ($B = 0.58$, $p = .020$) again predicted evaluations. Self-construal ($B = -0.10$, $p = .317$) was not a significant predictor. Bias order was also a significant predictor of the mere ownership evaluations ($B = 0.72$, $p < .001$).

0.01, *SE* = 0.03, 95% CI [-0.04, 0.08]). Results revealed an insignificant indirect effect of ownership on journal prices through self-object linking for individuals with more interdependent (*B* = -0.01, *SE* = 0.03, 95% CI [-0.09, 0.04]) or more independent self-construals (*B* = 0.01, *SE* = 0.03, 95% CI [-0.04, 0.07]). These results did not support H_{15}.

Mediation of mere ownership evaluations moderated by self-construal at stage 1. A moderated mediation model was run in which self-construal (Mod) moderated the effect of ownership status (X) on self-object linking (Med), which in turn helped predict mere ownership evaluations (Y), with IAT block order and possession bias order entered as covariates (PROCESS Model 7; Hayes, 2018). Conditional indirect effects were calculated using 5,000 bootstrapping samples.

The moderated mediation through self-object linking was not significant, as the equality of the conditional indirect effects was confirmed (index of moderated mediation, *B* = -0.03, *SE* = 0.03, 95% CI [-0.10, 0.02]). Results revealed an insignificant indirect effect of ownership on journal prices through self-object linking for both more interdependent (*B* = 0.03, *SE* = 0.04, 95% CI [-0.04, 0.11]) and more independent participants (*B* = -0.02, *SE* = 0.04, 95% CI [-0.10, 0.04]). These results did not support H_{16}.

Mediation of endowment effect values moderated by self-construal at stage 2. Next, a moderated mediation model tested whether ownership status (X) predicted journal prices from the endowment effect measure (Y) through self-object linking (Med), with self-construal (Mod) moderating the relationship between self-object linking and journal prices (Y) (PROCESS Model 14; Hayes, 2018). IAT block order and bias order were entered as covariates in the model.

The indirect effect of ownership on values from the endowment effect procedure through self-object linking was not significant (index of moderated mediation $B = 0.00$, $SE = 0.02$, 95% CI [-0.03, 0.05]). Results indicated a non-significant indirect effect of ownership on journal prices through self-object linking for more interdependent ($B = 0.00$, $SE = 0.02$, 95% CI [-0.06, 0.04]) and more independent participants ($B = 0.00$, $SE = 0.02$, 95% CI [-0.05, 0.05]). These results did not support H_{17}.

Mediation of endowment effect values moderated by self-construal at stage 2. Finally, a moderated mediation model tested whether ownership status (X) predicted journal evaluations from the mere ownership effect (Y) through self-object linking (Med), with self-construal (Mod) moderating the relationship between self-object linking and evaluations (Y) (PROCESS Model 14; Hayes, 2018). IAT block order and bias order were entered as covariates in the model.

The indirect effect of ownership on evaluations through self-object linking was not significant (index of moderated mediation $B = 0.00$, $SE = 0.01$, 95% CI [-0.02, 0.03]). Results indicated a non-significant indirect effect of ownership on journal prices through self-object linking for more interdependent ($B = 0.00$, $SE = 0.02$, 95% CI [-0.05, 0.05]) and more independent participants ($B = 0.01$, $SE = 0.03$, 95% CI [-0.05, 0.07]). These results did not support H_{18}.

Discussion

Study 1 tested the endowment effect and mere ownership effect and examined whether self-object linking mediated the relation between ownership and those possession biases. The study successfully replicated the endowment effect. *Owners* priced the journal higher than *buyers* did. *Owners* did not, however, report more favorable evaluations of the

journal than *buyers*, indicating a failure to replicate the mere ownership effect. Although ownership did not affect both possession biases in the same way, the two biases were positively associated. As predicted, more positive evaluations of the journal were related to higher valuations.

Study 1 failed to replicate Ye & Gawronski's work demonstrating that ownership increased self-object linking. *Owners* did not show a greater degree of association between the self and owned object than *buyers* showed between the self and assigned object. There was instead a high level of self-object linking across conditions. All participants linked more to the blue than the green journal, perhaps because assignment to a generally positive object, whether or not that assignment included ownership, created a link between the participants and that object. Self-object linking was not affected by the ownership manipulation and was unrelated to the endowment effect, even though the endowment measure did reflect the presence or absence of ownership. It is therefore not surprising that self-object linking did not mediate the relation between ownership status and the endowment effect. Linking did, however, predict mere ownership evaluations. Since mere ownership evaluations were not impacted by ownership, it is again not surprising that self-object linking did not mediate the relationship between ownership status and the mere ownership effect.

Study 1 also tested whether the endowment effect and mere ownership effect varied by self-construal and whether differences in self-object linking explained the variations in possession biases. Self-construal was proposed to explain previously shown cultural differences in the endowment effect, specifically the reduced endowment effect in Asian samples (Maddux et al., 2010; Gobel et al., 2014). Yet Study 1 did not find cultural differences in the endowment effect. Neither self-construal nor cultural group (Asian/Asian

American vs. European American) impacted journal valuations. *Owners* priced the journal higher than *buyers*, regardless of self-construal or cultural background. There was, however, a main effect of culture, which showed that Asians/Asian Americans priced the journal higher than European Americans. So not only was the endowment effect shown for both cultural groups, but Asian/Asian American *owners* and *buyers* valued the journal more highly than European American *owners* and *buyers.* Previous research showed no main effects of cultural background on price decisions (Maddux et al., 2010; Gobel et al., 2014).

The mere ownership effect was also unaffected by self-construal. *Owners* did not evaluate the journal more positively than *buyers* regardless of independence or interdependence. Previous research had not examined whether Asian samples show a reduced mere ownership effect, like the endowment effect, so in Study 1 we also tested the mere ownership results by cultural group. Contrary to what previous research may have suggested (Maddux et al., 2010; Gobel et al., 2014), there was not a reduced mere ownership effect for Asians/Asian Americans compared to European Americans.

There was also no effect of self-construal on self-object linking. Again, all participants showed relatively high linking of the self to the blue journal, which was not reduced for those with a more interdependent self-construal. It is therefore not surprising that there was no support for the model that proposed that self-construal interacted with ownership to impact self-object linking, which in turn mediated the relation between ownership and the possession biases. There were no reduced possession biases or linking to explain for more interdependent individuals. There was also, unsurprisingly, no support for the alternative model that tested whether self-object linking predicted possession biases for

those with more independent self-construals, but was unrelated for more interdependent self-construals.

Thus it appears that self-construal did not interact with ownership or self-object linking to explain the possession biases. The inability to replicate a reduced endowment effect for Asians calls this finding into question. Study 2 will address this issue by providing another test of this idea, assessing again whether more interdependent individuals show a reduced endowment effect, as well as a reduced mere ownership effect, compared to more independent individuals. Study 2 will also manipulate the salient features of the object to create more congruity with individuals' self-construal. This will allow us to test whether a reduced endowment effect can be restored when the owned object is more self-relevant.

Study 1 also showed a significant order effect of the measures of possession biases. Completing the mere ownership measure first increased journal prices, evaluations, and psychological ownership, regardless of participants' ownership status. These results indicate that reporting positive evaluations may play a role in establishing feelings of ownership and enhancing biases. Study 2 will test whether this order effect replicates, or whether it was a chance event.

Study 1 demonstrated the link between the endowment effect and mere ownership effect. It attempted to show the importance of self-object linking in explaining the association between ownership and possession biases, while examining self-construal as a way to understand cultural differences in the endowment effect and investigate variation in self-object linking. Self-object linking was not influenced by the ownership manipulation or self-construal and therefore did not successfully mediate the relation between ownership and

possession biases, which was therefore attempted again in Study 2. Study 2 sought to replicate the endowment effect and mere ownership effect and further examine the role of self-object linking, under conditions more or less conducive to self-linking. By altering the description of the object so that it better fit with an independent or interdependence self construal, we intended to create conditions under which self-linking was much more or less likely to happen, thereby providing a better test of the model.

Study 2

Study 2 was designed to provide additional evidence for the role of self-object linking in ownership and resulting biases. Study 1 demonstrated that ownership status predicted the endowment effect, with *owners* demanding higher prices for owned than for non-owned objects. However, no effect of ownership on the other possession bias, mere ownership effect, occurred. In addition, Study 1 provided no evidence that self-object linking mediated the relation between ownership status and the endowment effect. Study 2 therefore became an opportunity to retest the proposed path of ownership through self-object linking to the endowment effect and mere ownership effect, under conditions that might be more conducive to self-linking as a result of ownership.

Study 2 additionally examined whether varying properties of the object could impact self-object linking. Research in consumer psychology has demonstrated that individuals identify with brands that match their personal values and characteristics and develop stronger connections when those brands are associated with their ingroup (Sirgy, 1982; Escalas & Bettman, 2005). Advertising is also more effective when it matches individuals' values. For example, appeals emphasizing individualistic benefits are more persuasive to participants in the United States, whereas appeals emphasizing collectivistic benefits are more persuasive to

Chinese participants (Zhang & Neelankavil, 1997). The object and the extent that it is seen as congruous with the self may play a significant role in participants' valuations and appraisals in research on the endowment effect.

Ye and Gawronksi's (2016) work also demonstrated the importance of object properties in self-object linking. The authors proposed that there must be self-object congruity to support the formation of a mental association between the self and newly owned object. In one of their (2016) studies, Western participants were assigned to be owners of one of two photographs before completing a measure of self-object linking. In a positive valence condition, the two photos were of large cats, whereas in a negative valence condition, the two photos were of snakes. The results of the self-object linking measure showed that when the objects were positive, participants associated the owned object with their selves and associated non-owned objects with others. When, however, the objects were negative, there was no effect of ownership. Ye and Gawronski explained that implicit associations between the self and owned objects should only occur in mere ownership when objects are congruous with the self. Congruity was manipulated through valence because, to the extent that self-concepts are typically positive, positively valenced objects matched the valence held for the self and should be congruent with the self.

Positive objects may produce the endowment effect in Westerners because the positive qualities of those goods match individuals' view of their selves as consisting of positive attributes. Study 2 therefore explored the possibility that congruent objects might be more likely to produce self-object linking in owners than non-owners and lead to conditions under which the influence of self-object linking on the endowment effect and mere ownership is more likely to be shown.

Congruity between self and object might also provide an explanation of why Asians have been found to show reduced effects of ownership (Maddux et al., 2010; Gobel et al., 2014). The objects typically used in endowment paradigms (e.g., mugs, chocolate, wine) may not produce the endowment effect for more interdependent participants because they are not congruous with the interdependent self. Individuals with more interdependent self-construals may require owned objects to match their *relational* identities in order to link their selves to those objects. These considerations might also explain why in Study 1 we found no effects of ownership by independent/interdependent self-construal on possession biases or self-object linking: perhaps the journal did not particularly match an independent or interdependent self view, and thus did not create enough of an association between the self and object to mediate the effect of ownership on possession biases. Study 2 therefore also explored the possibility that congruent objects may produce greater self-object linking in owners rather than non-owners. Study 2 thus explored whether the meaning of object can be manipulated to increase self-object linking and therefore subsequent possession biases in people with more interdependent self-construals.

Study 2 changed the description of the object, a journal, to reflect more independent and more interdependent qualities in order to assess whether an object that was more congruous with an independent or interdependent identity would produce an endowment effect or mere ownership effect for more independent or interdependent individuals respectively. Study 2 also included a condition in which the object was described minimally, as in Study 1, to provide an opportunity to replicate Study 1 and provide a baseline to compare with the other two conditions. The theoretical model was altered for Study 2 to include object congruity (see Figure 6).

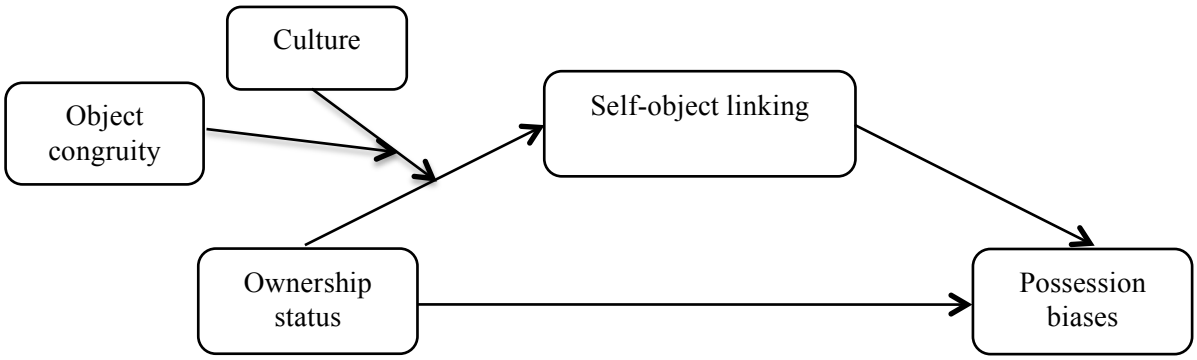

Figure 6. Theoretical model for Study 2: Ownership status impacts possession biases through increased self-object linking. Culture and object congruity moderate the relationship between ownership status and self-object linking.

In addition to the hypotheses from Study 1[11], we additionally hypothesized for Study 2 that the 19) endowment effect and 20) mere ownership effect would be largest when the journal description was congruent with individuals' self-construal. We further predicted that 21) self-object linking should be greater for owners when the journal is congruent with individuals' self-construal. We expected the entire model to fit together such that ownership status would predict 22) endowment effect prices and 23) mere ownership prices through self-object linking, with object meaning interacting with self-construal to moderate the relation between ownership and self-object linking.

Method

Design and participants. Study 2 utilized a 2 (Ownership status: owner vs. buyer) x 3 (Journal description: independent vs. interdependent vs. control) between-subjects design.

[11] Hypotheses 13-14 and 17-18 were not reported again in Study 2. Those alternative hypotheses addressed the possibility that self-construal impacted the relations between self-object and the possession biases, but were not supported in Study 1. With the addition of congruity in Study 2, it was proposed that self-construal and object congruity should impact self-object linking, which should uniformly impact the subsequent biases.

The ownership manipulation from Study 1 was modified for Study 2 to incorporate an additional factor, journal description.

A total of 368 participants were recruited from UC Santa Barbara's Psychological and Brain Sciences Subject Pool and completed the study for research course credit. Four participants had incomplete data and were excluded from all analyses. The average age of the participants was 19.0 years old (*SD* = 1.61). This sample was 35% Caucasian or White, 31.3% Asian or Asian American, 29.7% Latinx or Hispanic, 3.3% African American or Black participants, and 10.4% other or multiple ethnicities. The sample was 69% female.

A priori power analysis conducted using G*Power 3.1 (Faul et al., 2009) suggested that a sample size of around 295 participants would be sufficient to detect relatively small (f^2 = .05) interaction effects of ownership, object meaning, and self-construal on endowment effect values and mere ownership evaluations with a power of .80 and an alpha value of .05. The sample collected at UCSB exceeded the suggested N of 295.

Procedure. The procedure for Study 2 was very similar to Study 1. As in Study 1, participants were informed that would be assigned a journal determined from a set of two possible journals. Participants were again randomly assigned to be either *owners* or *buyers*. *Owners* were told they would receive their journal at the end of the study, whereas *buyers* were told they would simply be making evaluations of the journal. The same journals used in Study 1 were used in Study 2. Study 2, however, varied the descriptions participants read when introduced to their assigned journal.

Manipulation of object congruity. After all participants were assigned the blue journal, they spent a moment reading one of three descriptions: *control*, *independent*, and *interdependent*. The *control description* was designed to replicate Study 1 and did not

include any additional information about the journal. In the *control description* condition, participants were simply asked to take a moment to reflect on the journal before moving on to the next part of the study. The other descriptions also asked participants to reflect on the journal but included explanations of the journal's benefits, which were designed to match independent or interdependent self-construals. The *independent description* read, "This journal has many benefits. It encourages you to express yourself, your feelings, and your experiences. This journal was designed for you to reflect on your personal identity and what makes you stand out." The *interdependent description* informed participants, "This journal has many benefits. It encourages you to better understand close others, their feelings, and their experiences. This journal was designed for you to reflect on your relationships and what makes you belong." These descriptions were designed to represent the features most relevant to independent self-construals (personal attributes), interdependent self-construals (social connections).[12]

Dependent measures. Dependent measures were nearly identical to Study 1: participants completed an IAT assessing self-object linking, measures of possession biases, ownership and value, appraisals of the self, manipulation checks, and demographics. All measures were identical to and in the same order as Study 1, with the exception of a few additional manipulation checks just before the demographics. These new manipulation checks focused on the journal description participants read (see Appendix 6). Participants completed an open-ended question, which asked them to recall "How was the journal

[12] Pilot testing confirmed that the journal described in the *independent description* made participants reflect more on their internal characteristics and personal identity, whereas the *interdependent description* made participants reflect more on their social self and relationships, $t(102) = -2.96$, $p = .004$. The descriptions did not affect the favorability of the journal, $t(102) = 1.34$, $p = .182$, or desirability of the journal, $t(102) = -0.92$, $p = .360$.

described at the beginning of the study?" They also answered two items that asked the extent to which the journal they were assigned "has social/interpersonal benefits" and "has individual/personal benefits," both using a 7-point likert scale. As in Study 1, all participants were debriefed, thanked, and received a journal before leaving the lab.

Results

Manipulation checks.

Analyses confirmed the success of ownership manipulation and effectiveness of the journal descriptions in manipulating the object meaning. As in Study 1, no participants were excluded on the basis of these checks.

Effectiveness of ownership manipulation. A 2 (Ownership status: *owners* vs. *buyers*) x 3 (Journal description: control vs. independent vs. interdependent) x 2 (Bias order: endowment effect (EE) first vs. mere ownership (MO) first) mixed-model ANOVA was conducted on the psychological ownership composite (Cronbach's $\alpha = .92$). As expected, results showed a significant main effect of ownership, $F(1,352) = 49.76$, $p < .001$, $\eta^2 = .12$. *Owners* reported feeling greater psychological ownership over the journal ($M = 3.75$, $SE = 0.11$) than *buyers* ($M = 2.68$, $SE = 0.11$). There was not a significant main effect of journal description. A significant main effect of bias order again revealed that completing MO first ($M = 3.37$, $SE = 0.11$) increased participants' feelings of psychological ownership, compared to completing EE first ($M = 3.05$, $SE = 0.11$), $F(1,352) = 4.59$, $p = .033$, $\eta^2 = .01$. There were no significant interactions.

As in Study 1, the ownership manipulation was successful. *Owners* reported greater psychological ownership than *buyers*. There was an effect of the order of possession biases,

with completing the mere ownership effect first again increasing participants' feelings of psychological ownership.

At the end of the study, 100% of participants correctly reported that they were assigned the blue journal, as in Study 1. When participants were asked whether they were assigned their preferred journal, 61.3% of participants (223 out of 364) further reported that they were assigned the journal they liked best, 23.1% of participants (84 out of 364) reported they had no preference, and 15.7% (57 out of 364) reported that they wanted to be assigned the other journal. A chi-square test of independence was performed to test again whether *buyers* were more likely to be dissatisfied with the blue journal. Results showed the two variables were not significantly related, X^2 (2, N = 364) = 1.81, p = .404. *Owners* were no more likely than *buyers* to report they were assigned the journal they liked best, and *buyers* were no more likely than *owners* to claim they wanted the other journal or had no journal preference.

Effectiveness of object congruity manipulation. Several checks tested the effectiveness of the manipulation of object meaning. Participants responded to an open-ended question, which required them to recall the description they read earlier in the study, and completed two questions that assessed their beliefs that the journals possessed personal or social benefits.

Raters coded participants' responses to an open-ended question at the end of the study, which asked participants to recall how the journal was described. A coding scheme quantified how many participants recalled the personal or social benefits of the journal, as compared to those who described the journal in terms of color only or as a form of compensation. The results of the coding showed that 23.4% of participants used only color

information to describe the journal, reporting, for example, that the journal was simply described as "blue"; 25% of participants recalled the journal was described in terms of personal benefits; 20.1% of participants recalled description of the journal in terms of social benefits; and finally, 31.3% of participants described the journal in other terms, typically either saying they could not recall or that the journal was described only as an object for them to evaluate (see Table 4).

Table 4. Recollection of journal description by condition

	Only color	Personal Benefits	Social Benefits	Other	Total
Control Description	57	1	0	62	120
Independent Description	15	72	8	26	121
Interdependent Description	13	18	65	26	122
Total	85	91	73	114	363

A chi-square test of independence was performed to test whether participants' recollections of the journal description were accurately reported according to the description that they read. Results showed the two variables were indeed significantly related, X^2 (6, N = 363) = 260.28, $p < .001$. Post hoc analyses were conducted using the adjusted residuals and a Bonferroni corrected p value (significance < .004; Garcia-Perez & Nunez-Anton, 2003). Results revealed that participants who read the control description were *more* likely to recall the journal only in terms of color (X^2(1, N = 57) = 57.76, $p < .001$) or other terms (X^2(1, N = 62) = 33.64, $p < .001$), and were *less* likely to describe the journal in terms of personal benefits (X^2(1, N = 1) = 56.25, $p < .001$) or social benefits (X^2(1, N = 0) = 44.89, $p < .001$) than would be expected by chance. Participants who read the independent journal description were *less* likely to recall the journal was described only in terms of color (X^2(1, N = 15) =

12.25, $p < .001$) in terms of social benefits ($X^2(1, N = 8) = 20.25, p < .001$) or in other terms ($X^2(1, N = 26) = 8.41, p < .004$), and *more* likely to describe the journal in terms of personal benefits ($X^2(1, N = 72) = 114.49, p < .001$), than expected by chance. Finally, participants who read the interdependent description were *less* likely to report the journal had been described by color ($X^2(1, N = 13) = 16.81, p < .001$), personal benefits ($X^2(1, N = 18) = 10.24, p = .001$), or in other terms ($X^2(1, N = 26) = 8.41, p < .004$), and *more* likely to recall the journal in terms of social benefits ($X^2(1, N = 65) = 125.44, p < .001$), than would be expected by chance. When asked to recall how the journal was described, participants' comments suggested that, as desired, those in the independent condition were more likely to remember the journal's personal benefits, and those in the interdependent condition were more likely to remember its social benefits, indicating the success of the manipulation.

Next, participants' reports of the journal's social benefits were assessed using a one-way ANOVA. Results indicated there was a significant difference between groups, $F(2,363) = 4.68, p = .010$. Post hoc analyses using Tukey's HSD indicated that participants who read the interdependent description ($M = 3.96$, $SE = 0.17$) marginally differed from those who read the control description ($M = 3.46$, $SE = 0.18$), $p = .057$, and did not significantly differ from those in the independent description ($M = 4.09$, $SE = 0.16$), $p = .817$, despite predictions that participants in the interdependent description condition would have reported the journal possessed greater social benefits compared to those in both other conditions. The control description and independent description significantly differed with those in the control description reporting less agreement that the journal possessed social benefits, $p = .011$. Across the three journal description conditions, participants did not strongly believe that the journal had social or interpersonal benefits, with means around or below the midpoint of the

scale. Further, those in the interdependent description condition did not endorse the journal's social benefits more strongly than those in the independent condition, although both reported greater belief than those that read the control description.

A one-way ANOVA tested whether participants' belief that their assigned journal possessed personal benefits varied by the journal description they read. Results revealed a significant difference by journal condition, $F(2,363) = 12.30$, $p < .001$. Post hoc analyses using Tukey's HSD showed that, as predicted, participants in the independent ($M = 5.65$, $SE = 0.11$) significantly differed from those in either the control condition ($M = 4.71$, $SE = 0.17$), $p < .001$, or interdependent condition ($M = 5.16$, $SE = 0.14$), $p = .029$. The control and interdependent description conditions significantly also differed, $p = .044$. Those in the interdependent condition reported their assigned journal had greater personal benefits than those in the control condition. All three groups reported beliefs above the midpoint of the scale, but more agreement from those in the independent condition validated the manipulation and demonstrated that the description led participants to believe the journal provided more personal benefits than either of the other descriptions.

The open-ended manipulation check suggested that participants recalled the journal descriptions accurately. Those in the control condition recalled the journal described as blue, the interdependent journal described in terms of social benefits, and the independent journal in terms of personal benefits. When further asked about the journals, however, the interdependent journal was only seen as possessing marginally greater social benefits than the control and no more social benefits than the independent journal description. The independent journal was seen as possessing greater personal benefits than the journals described in the interdependent or control descriptions. The manipulation appeared to be

successful for the independent journal description, but had more mixed results for the interdependent journal description.

Effect of ownership on possession biases.

A series of mixed-model ANOVAs were conducted to confirm that ownership induced the endowment effect (H_1) and mere ownership measure (H_2).

Endowment effect. As in Study 1, participants' valuation of their assigned journal was calculated from the point they switched between selecting "no" (they were not willing to sell) to "yes" (they were willing to sell; or "yes" to "no" for buyers). 15 participants moved between "yes" and "no" at several points during the price list procedure and were excluded from all analyses on the endowment effect. Both *buyers'* and *owners'* prices ranged from $0-8 dollars.[13]

Participants' valuations of the journal were submitted to a 2 (ownership status: *owners* vs. *buyers*) x 3 (Journal description: control vs. independent vs. interdependent) x 2 (Bias order: endowment effect (EE) first vs. mere ownership (MO) first) mixed-model ANOVA. As predicted, results showed a main effect of ownership on the price participants were willing to buy ($M = 3.32$, $SE = 0.14$) or sell ($M = 4.72$, $SE = 0.14$) the blue journal for, $F(1,337) = 55.26$, $p < .001$, $\eta^2 = .14$, replicating the endowment effect. There was not a main effect of journal description. There was also no effect of bias order, unlike in Study 1. All two-way and three-way interactions were insignificant. As anticipated (H_1), *owners* valued the journal more than *buyers*.

[13] As in Study 1, participants completed a check of their understanding of the endowment effect procedure before made their price decisions. 95.1% of participants answered this check correctly. At the end of the study, participants also explicitly reported how well they understood the task. An independent-samples t-test was assessed whether participants' understanding differed by ownership status. Results revealed that *owners* ($M = 6.31$, $SD = 0.98$) had a greater understanding of the task than *buyers* ($M = 6.11$, $SD = 1.05$), $t(362) = -1.91$, $p = .057$, 95% CI [-0.41, 0.01]. Although there was a marginal difference between the groups, both strongly agreed that they understood the task.

Mere ownership. The mere ownership measure was found to be highly reliable (4 items; Cronbach's $\alpha = .86$) and was converted into a single composite score. The composite was then subjected to a 2 (Ownership status: *owners* vs. *buyers*) x 3 (Journal description: control vs. independent vs. interdependent) x 2 (Bias order: endowment effect (EE) first vs. mere ownership (MO) first) mixed-model ANOVA. Unlike in Study 1, but as predicted, results revealed a significant main effect of ownership status on the mere ownership evaluations, $F(1,352) = 8.85$, $p = .003$, $\eta^2 = .03$ *Owners* evaluated the journal more positively ($M = 4.61$, $SE = 0.09$) than *buyers* ($M = 4.23$, $SE = 0.09$). There was also a significant main effect of journal description, $F(2,352) = 3.01$, $p = .051$, $\eta^2 = .02$. Pairwise comparisons using the Bonferroni correction revealed evaluations were significantly lower for those in the interdependent condition ($M = 4.21$, $SE = 0.11$) compared to the independent description condition ($M = 4.59$, $SE = 0.11$), $p = .051$. There was no significant difference between interdependent and control conditions ($M = 4.46$, $SE = 0.11$), $p = .308$, or independent and control conditions, $p = 1.00$.

There was also a significant main effect of bias order, with participants who completed MO first ($M = 4.75$, $SE = 0.09$) reporting more positive evaluations than those that completed EE first ($M = 4.08$, $SE = 0.09$), $F(1,352) = 26.67$, $p < .001$, $\eta^2 = .07$. There were no significant interactions between the three factors.

Results revealed a significant mere ownership effect in support of H_2. *Owners* reported more favorable evaluations of the journal than *buyers*. There was also an effect of journal description, which showed participants generated less favorable evaluations after reading the interdependent description compared to the independent journal description.

Relation between possession biases.

Correlation between possession biases. The possession biases, endowment effect and mere ownership, were positively correlated with each other, $r = .29$, $p < .001$. This result supports H_3.

Effect of ownership on mediator variable.

The results of the self-object linking measure were next tested to assess whether ownership was associated with greater linking (H_4).

Self-object linking. The response latency data from the IAT were used to create a measure of self-object linking using the D-600 algorithm, as in Study 1 (Greenwald et al., 2003). The two difference scores, from the practice and critical trials, were combined into a single self-object linking score, per Greenwald and colleagues' recommendation (Cronbach's $\alpha = .63$). The score is the difference between congruent (self paired with blue journal, other paired with green journal) and incongruent (self paired with green journal, other paired with blue journal) response times. Higher scores thus represent a greater association of the self with the blue journal.

The self-object linking scores were submitted to a 2 (Ownership status: *owners* vs. *buyers*) x 3 (Journal description: control vs. independent vs. interdependent) x 2 (IAT block order: self paired with blue journal (compatible) first vs. self paired with green journal (incompatible) first) mixed-model ANOVA. Results showed that there was not a significant main effect of ownership status or journal description on self-object linking scores. There was, however, a significant main effect of IAT block order, $F(1,352) = 26.27$, $p < .001$, $\eta^2 = .06$, again replicating the finding that associations are stronger when compatible blocks are completed first ($M = 0.33$, $SE = 0.03$), rather than incompatible blocks first ($M = 0.16$, $SE =$

0.03). There were no significant interactions between ownership, journal description, and IAT block order on self-object linking.

Next, linking scores were submitted to one-sample t-tests that compared the means of *owners* and *buyers'* scores to 0 to test whether participants were significantly linking the self *more* with the blue journal than with the green journal. Results showed both *owners'* (M = 0.25, SD = 0.36; $t(184) = 9.29$, $p < .001$, 95% CI [0.19, 0.30]) and *buyers'* (M = 0.24, SD = 0.34; $t(180) = 9.33$, $p < .001$, 95% CI [0.19, 0.29]) mean linking scores were significantly above 0. Both *owners* and *buyers* associated the self more with the assigned blue journal than the unassigned green journal.

A series of one-sample t-tests were conducted to verify that all three journal descriptions led to a greater association with the self and blue journal. In the t-tests, again, the linking means were compared to 0. The results of the t-tests revealed that those in the control condition (M = 0.22, SD = 0.38; $t(119) = 6.58$, $p < .001$, 95% CI [0.16, 0.29]), independent condition (M = 0.26, SD = 0.33; $t(121) = 8.71$, $p < .001$, 95% CI [0.20, 0.32]), and interdependent condition (M = 0.23, SD = 0.34; $t(121) = 7.63$, $p < .001$, 95% CI [0.17, 0.29]) all exhibited significantly greater linking of the self with the blue journal than with the green journal.

As in Study 1, all participants were more likely to associate the self with the blue rather than the green journal, but contrary to H_4, *owners* did not show greater self-object linking than *buyers*.

Relation between mediator and dependent variables.

Next, analyses examined whether self-object linking predicted journal valuations (H_5) and favorable evaluations (H_6). For complete means and correlations between variables, see Table 5.

Table 5.
Summary of correlations, means, and standard deviations.

	1	2	3	4
Psychological Ownership	-			
Endowment Effect Values	.41***	-		
Mere Ownership Evaluations	.45***	.29***	-	
Self-Object Linking	-.01	-.03	0.06	-
Mean	3.22	3.98	4.38	0.24
SD	1.51	1.99	1.29	0.35

Note. $*p < .05$, $**p < .01$, $***p < .001$

Self-object linking predicting endowment effect values. To test whether self-object linking significantly predicted participants' valuation of the blue journal, a hierarchical linear regression was conducted. First, ownership status, journal description, IAT block order, and the order of possession biases were controlled for in step 1, $R^2 = .14$, $F(4,344) = 13.98$, $p < .001$. Self-object linking was added in step 2, but did not account for a significant change in variance, $\Delta R^2 = .00$, $F(1,343) = 0.80$, $p = .373$. Results did not support H_5. Greater self-object linking did not increase participants' price decisions for the journal, only ownership status affected journal prices.[14] For complete results, see Table 6.

[14] Journal description did not moderate the effect of self-object linking on journal valuations.

Table 6. Summary of hierarchical regression analyses predicting endowment effect prices from self-object linking

Variable	B	SE B	Beta	t	p
Step 1					
Ownership Status	1.48	0.20	.37***	7.41	.000
Description1	0.12	0.25	.03	0.50	.614
Description2	-0.06	0.24	-.01	-0.25	.805
IAT Block Order	-0.15	0.20	-.04	-0.73	.466
Bias Order	-0.05	0.20	-.01	-0.26	.796
Step 2					
Self-Object Linking	-0.28	0.30	-.05	-0.93	.352

Note. Step 1: $R^2 = .14$ ($p < .001$). Step 2: $\Delta R^2 = .00$.
IAT block order coded as 0 = Compatible first, 1 = Incompatible first.
Bias order coded as 0 = EE first, 1 = MO first.
Ownership status coded as 0 = Buyer, 1 = Owner.
Description1 coded as 0 = control & interdep, 1 = indep.
Description2 coded as 0 = control & indep, 1 = interdep
*$p < .05$, **$p < .01$, ***$p < .001$

Self-object linking predicting mere ownership Next, a hierarchical linear regression was conducted to test whether self-object linking significantly predicted participants' evaluations, measured by the mere ownership scale. The manipulated variables of ownership status, journal description, IAT block order, and the order of possession biases were controlled for in step 1, $R^2 = .11$, $F(4,359) = 11.03$, $p < .001$. Self-object linking was added in step 2, but did not account for a significant amount of variance, $\Delta R^2 = .00$, $F(1,358) = 1.18$, $p = .278$. In contrast to H_6, and unlike in Study 1, greater self-object linking was not related to more positive evaluations of the journal.[15] Only the controlled variables of bias order and ownership status affected evaluations. For complete results, see Table 7.

[15] Journal description did not moderate the effect of self-object linking on journal evaluations.

Table 7. Summary of hierarchical regression analyses predicting mere ownership evaluations from self-object linking

Variable	B	SE B	Beta	t	p
Step 1					
Ownership Status	0.44	0.13	.17***	3.41	.001
Description1	0.10	0.16	.04	0.63	.527
Description2	-0.24	0.16	-.09	-1.54	.125
IAT Block Order	0.15	0.13	.06	1.15	.253
Bias Order	0.69	0.13	.27***	5.35	.000
Step 2					
Self-Object Linking	0.19	0.19	.05	1.00	.318

Note. Step 1: $R^2 = .14$ ($p < .001$). Step 2: $\Delta R^2 = .00$.
IAT block order coded as 0 = Compatible first, 1 = Incompatible first.
Bias order coded as 0 = EE first, 1 = MO first.
Ownership status coded as 0 = Buyer, 1 = Owner.
Description1 coded as 0 = control & interdep, 1 = indep.
Description2 coded as 0 = control & indep, 1 = interdep
*$p < .05$, **$p < .01$, ***$p < .001$

Self-object linking as a mediator.

Mediation models tested the hypotheses that self-object linking mediated the relation between ownership status and the endowment effect (H_7) the mere ownership effect (H_8).

Mediation of effect of ownership on endowment effect values by self-object linking. A mediation model using the SPSS macro, PROCESS 3.0 (Model 4; Hayes, 2018) examined whether ownership status predicted self-object linking (Mediator; path a), which, in turn, predicted journal values from the endowment effect procedure (Y variable; path b). Journal description, IAT block order, and bias order were included in the model as covariates. The conditional indirect effects were calculated using 5,000 bootstrapping samples, generating confidence intervals of the bias-corrected bootstrap type.

Results revealed a significant total effect of ownership status on journal values (path c, $B = 1.48$, $p < .001$), with *owners* valuing the journal more than *buyers*. There was not a significant relation between ownership status and self-object linking, however (path a, $B =$

0.01, $p = .772$), and self-object linking was not significantly related to the prices generated from the endowment effect procedure (path b, $B = -0.26$, $p = .373$). The direct effect of ownership status on endowment effect prices remained significant and unchanged (path c', $B = 1.48$, $p < .001$) after including self-object linking. The indirect effect was not significant within a 95% CI (0.00, 95% CI: -0.04, 0.02). These results suggest, in contrast to H_7, that self-object linking did not mediate the relation between ownership and participants' valuations of the journal. See Figure 7.

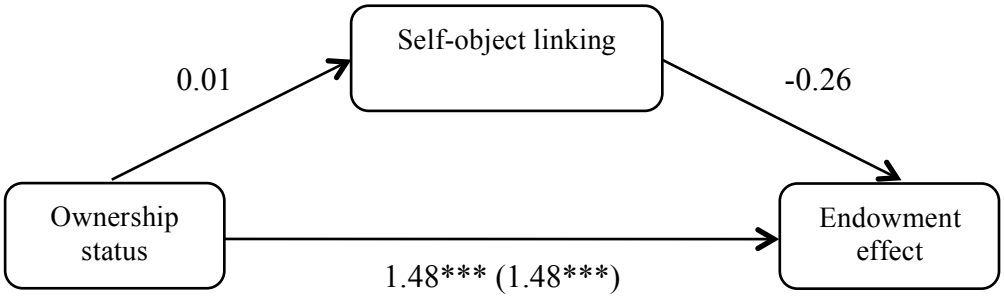

Figure 7.
Mediation of effect of ownership on endowment effect values by self-object linking.
Note. Ownership coded buyer = 0, owner = 1.
*$p < .05$, **$p < .01$, ***$p < .001$

Mediation of effect of ownership on endowment effect values by self-object linking, separated by journal description condition. Additional mediation models examined the mediation path separately for each journal description condition. The models again specified that ownership status predicted self-object linking (Mediator; path a), which, in turn, predicted journal values from the endowment effect procedure (Y variable; path b), using PROCESS 3.0 (Model 4; Hayes, 2018). IAT block order, and bias order were included in the models as covariates. The conditional indirect effects were calculated using 5,000 bootstrapping samples, generating confidence intervals of the bias-corrected bootstrap type.

For those in the control condition, results revealed a significant total effect of ownership status on journal values (path c, $B = 1.55$, $p < .001$), with *owners* valuing the journal more than *buyers*. There was not a significant relation between ownership status and self-object linking, however (path a, $B = -0.05$, $p = .431$), and self-object linking was not significantly related to the prices generated from the endowment effect procedure (path b, $B = -0.56$, $p = .262$). The direct effect of ownership status on endowment effect prices remained significant (path c', $B = 1.52$, $p < .001$) after including self-object linking. The indirect effect was not significant within a 95% CI (0.03, 95% CI: -0.07, 0.18). See Figure 8.

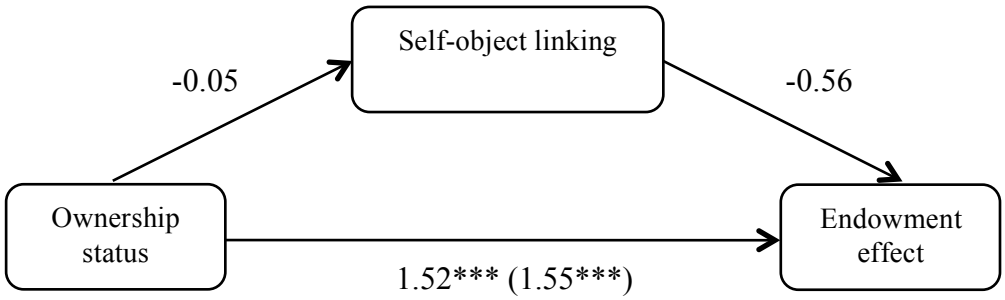

Figure 8.
Mediation of effect of ownership on endowment effect values by self-object linking for those in the control journal condition.
Note. Ownership coded buyer = 0, owner = 1.
*$p < .05$, **$p < .01$, ***$p < .001$

For those in the independent condition, results revealed a significant total effect of ownership status on journal values (path c, $B = 1.69$, $p < .001$), with *owners* valuing the journal more than *buyers*. There was not a significant relation between ownership status and self-object linking, however (path a, $B = 0.04$, $p = .587$), and self-object linking was not significantly related to the prices generated from the endowment effect procedure (path b, B

= -0.19, p = .706). The direct effect of ownership status on endowment effect prices remained significant (path c', B = 1.70, p < .001) after including self-object linking. The indirect effect was not significant within a 95% CI (-0.01, 95% CI: -0.09, 0.09). See Figure 9.

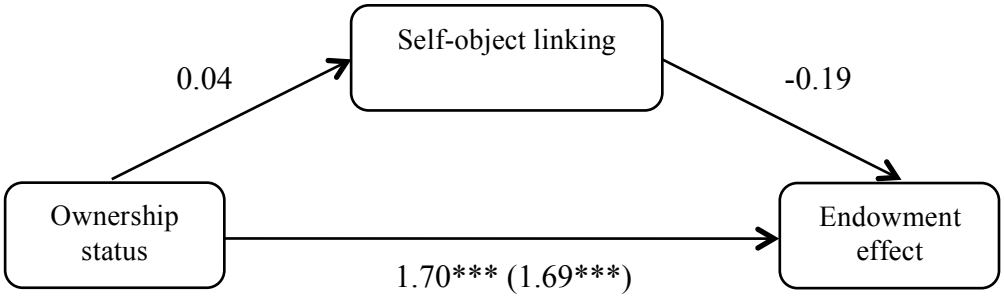

Figure 9.
Mediation of effect of ownership on endowment effect values by self-object linking for those in the independent journal condition.
Note. Ownership coded buyer = 0, owner = 1.
*p < .05, **p < .01, ***p < .001

For those in the interdependent condition, results revealed a significant total effect of ownership status on journal values (path c, B = 1.11, p < .001), with *owners* valuing the journal more than *buyers*. There was not a significant relation between ownership status and self-object linking, however (path a, B = 0.06, p = .315), and self-object linking was not significantly related to the prices generated from the endowment effect procedure (path b, B = 0.03, p = .961). The direct effect of ownership status on endowment effect prices remained significant and unchanged (path c', B = 1.11, p < .001) after including self-object linking. The indirect effect was not significant within a 95% CI (0.00, 95% CI: -0.12, 0.10). See Figure 10.

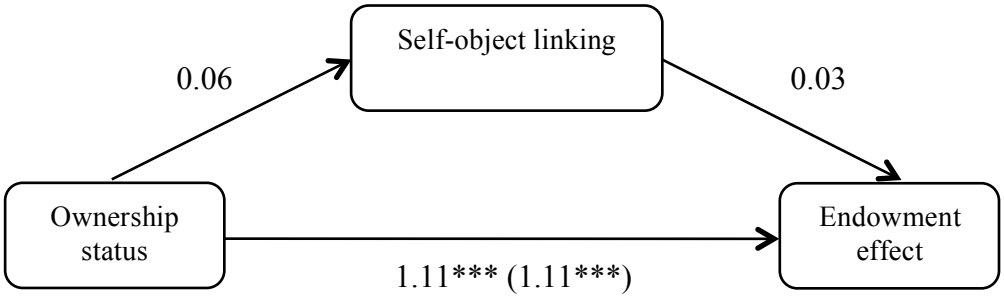

Figure 10.
Mediation of effect of ownership on endowment effect values by self-object linking for those in the interdependent journal condition.
Note. Ownership coded buyer = 0, owner = 1.
*$p < .05$, **$p < .01$, ***$p < .001$

Mediation of effect of ownership on mere ownership evaluations by self-object linking. A second mediation model tested whether ownership status influenced self-object linking (Mediator; path a), and self-object linking predicted mere ownership scores (Y variable; path b). Journal description, IAT block order, and bias order were included in the model as covariates. The model was again run using the SPSS macro, PROCESS 3.0 (Model 4; Hayes, 2018) and conditional indirect effects were calculated using 5,000 bootstrapping samples.

Results revealed a significant total effect of ownership on mere ownership evaluations (path c, $B = 0.44$, $p = .001$). There was not, however, a significant effect of ownership status on self-object linking (path a, $B = 0.01$, $p = .881$), and self-object linking, in turn, did not significantly predict mere ownership scores (path b, $B = 0.21$, $p = .278$). The direct effect of ownership status on mere ownership scores remained significant and unaffected when self-object linking was included as a mediator (path c', $B = 0.44$, $p = .001$). The indirect effect was not significant within a 95% CI (0.00, 95% CI: -0.02, 0.03). This

model did not support H_8: self-object linking did not mediate the effect of ownership on the mere ownership measure. See Figure 11.

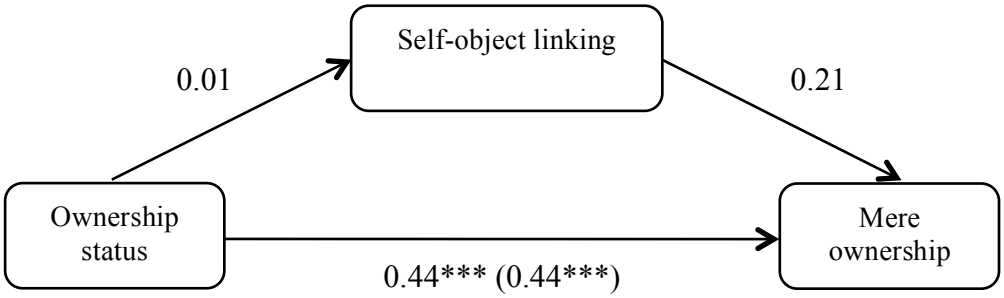

Figure 11.
Mediation of effect of ownership on endowment effect values by self-object linking.
Note. Ownership coded buyer = 0, owner = 1.
*$p < .05$, **$p < .01$, ***$p < .001$

Mediation of effect of ownership on mere ownership evaluations by self-object linking, separated by journal description condition. Additional mediation models examined the mediation path separately for each journal description condition. The models again specified that ownership status predicted self-object linking (Mediator; path a), which, in turn, predicted journal evaluations from the mere ownership scale (Y variable; path b), using PROCESS 3.0 (Model 4; Hayes, 2018). IAT block order, and bias order were included in the model as covariates. The conditional indirect effects were calculated using 5,000 bootstrapping samples, generating confidence intervals of the bias-corrected bootstrap type.

For those in the control condition, results revealed there was not a significant total effect of ownership status on journal evaluations (path c, $B = 0.12$, $p = .578$), with *owners* evaluating the journal more favorably than *buyers*. There was not a significant relation between ownership status and self-object linking, however (path a, $B = -0.05$, $p = .458$), and self-object linking was not significantly related to mere ownership evaluations (path b, $B =$

0.47, p = .113). The direct effect of ownership status on evaluations remained not significant (path c', B = 0.14, p = .504) after including self-object linking. The indirect effect was not significant within a 95% CI (-0.02, 95% CI: -0.11, 0.06). See Figure 12.

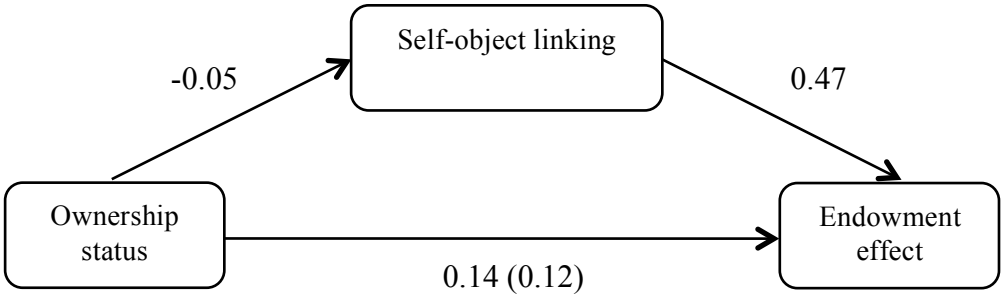

Figure 12.
Mediation of effect of ownership on mere ownership evaluations by self-object linking for those in the control journal condition.
Note. Ownership coded buyer = 0, owner = 1.
*p < .05, **p < .01, ***p < .001

For those in the independent condition, results revealed there was a significant total effect of ownership status on journal evaluations (path c, B = 0.82, p < .001), with *owners* evaluating the journal more favorably than *buyers*. There was not a significant relation between ownership status and self-object linking, however (path a, B = 0.03, p = .641), and self-object linking was not significantly related to mere ownership evaluations (path b, B = -0.46, p = .163). The direct effect of ownership status on evaluations remained significant (path c', B = 0.83, p < .001) after including self-object linking. The indirect effect was not significant within a 95% CI (-0.01, 95% CI: -0.09, 0.06). See Figure 13.

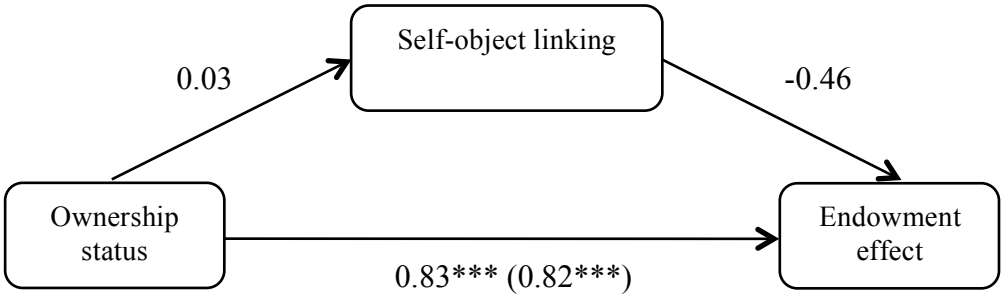

Figure 13.
Mediation of effect of ownership on mere ownership evaluations by self-object linking for those in the independent journal condition.
Note. Ownership coded buyer = 0, owner = 1.
*$p < .05$, **$p < .01$, ***$p < .001$

For those in the interdependent condition, results revealed there was a significant total effect of ownership status on journal evaluations (path c, $B = 0.29$, $p = .230$), with *owners* evaluating the journal more favorably than *buyers*. There was not a significant relation between ownership status and self-object linking, however (path a, $B = 0.04$, $p = .487$), and self-object linking was not significantly related to mere ownership evaluations (path b, $B = 0.51$, $p = .175$). The direct effect of ownership status on evaluations remained significant (path c', $B = 0.27$, $p = .265$) after including self-object linking. The indirect effect was not significant within a 95% CI (0.02, 95% CI: -0.05, 0.10). See Figure 14.

Figure 14.
Mediation of effect of ownership on mere ownership evaluations by self-object linking for those in the interdependent journal condition.
Note. Ownership coded buyer = 0, owner = 1.
*$p < .05$, **$p < .01$, ***$p < .001$

Self-construal.

The results of the self-construal scale were used to create composites representing both Independence (15 items; Cronbach's α = .76) and Interdependence (15 items; Cronbach's α = .74). The two were moderately positively correlated, $r = .10$, $p = .063$. A difference score was computed by subtracting the Interdependence subscale from the Independent subscale.[16]

Effect of ownership, object congruity, and self-construal on possession biases.

Analyses tested the effects of the experimental manipulation on the primary dependent variables. These analyses examined the prediction that the endowment effect (H_{19}) and mere ownership effect (H_{20}) would be greatest when the object was congruent with self-construal.

[16] Mean IND-INT difference scores significantly varied by ethnicity, $F(4,359) = 2.69$, $p = .031$ (European American (N = 91) $M = 0.11$, $SD = 0.98$; Asian/Asian American (N = 114) $M = -0.10$, $SD = 0.85$; Latinx (N = 108) $M = 0.29$, $SD = 0.92$; African American (N = 12) $M = 0.01$, $SD = 0.71$; Native/Other/Multiple (N = 39) $M = 0.15$, $SD = 0.74$). Asian/Asian Americans were again the most interdependent of the cultural groups, although they did not significantly differ from European Americans.

Endowment effect by ownership, object congruity, and self-construal. A multiple regression analysis using the SPSS macro, PROCESS 3.0 (Model 3; Hayes, 2018) tested the hypothesis that self-construal and journal description moderated the relation between ownership status (0 = *buyer*, 1 = *owner*) and the endowment effect (H_{19}). The order of the possession biases was entered as a covariate.

The overall model was significant[17], $R^2 = .15$, $F(12,336) = 4.76$, $p < .001$, however, the interaction between ownership, journal description, and self-construal did not account for a significant amount of variance in journal prices from the endowment effect procedure, $\Delta R^2 = .00$, $F(2,336) = 0.06$, $p = .941$. The endowment effect did not vary across journal conditions for more interdependent individuals[18], $F(2,336) = 0.24$, $p = .787$, or more independent individuals[19], $F(2,336) = 0.52$, $p = .593$. The results did not support H_{22}. More interdependent participants did not show a significantly greater effect in the interdependent journal condition and more independent participants did not show a significantly greater effect in the independent journal condition. *Owners* set higher journal prices than *buyers*, regardless of participants' self-construal and which journal description they read.[20]

Mere ownership by ownership, object congruity, and self-construal. Next, a multiple regression analysis using the SPSS macro, PROCESS 3.0 (Model 3; Hayes, 2018) tested the hypothesis that self-construal and journal description moderated the relation

[17] Only ownership was a significant predictor of EE values.
[18] Ownership predicting EE for more interdependent individuals: control description, $B = 1.52$, $t = 3.15$, $p = .002$; independent description, $B = 1.71$, $t = 3.39$, $p = .001$; interdependent description, $B = 1.22$, $t = 2.41$, $p = .016$.
[19] Ownership predicting EE for more independent individuals: control description, $B = 1.66$, $t = 3.58$, $p < .001$; independent description, $B = 1.69$, $t = 3.42$, $p = .001$; interdependent description, $B = 1.02$, $t = 1.85$, $p = .065$.
[20] A 2 (ownership: *buyers* vs. *owners*) x 2 (culture: European American vs. Asian/Asian American) ANCOVA with bias order as a covariate tested whether we replicated the reduced endowment effect for Asians. Results showed a main effect of ownership, no main effect of culture, and a significant interaction between the two. Unlike the findings of Maddux et al. (2010) and Gobel et al. (2014), the interaction showed the endowment effect was *larger* for Asians/Asian Americans.

between ownership status (0 = *buyer*, 1 = *owner*) and the mere ownership effect (H_{20}). Bias order was entered as a covariate.

The overall model was significant[21], $R^2 = .14$, $F(12,351) = 4.56$, $p < .001$, however, the interaction between ownership, journal description, and self-construal did not account for a significant amount of variance in journal evaluations, $\Delta R^2 = .01$, $F(2,351) = 0.93$, $p = .396$. The mere ownership effect did not vary across journal conditions for more interdependent individuals[22], $F(2,351) = 0.39$, $p = .676$, but did significantly vary for more independent individuals[23], $F(2,351) = 3.15$, $p = .044$. As expected, more independent participants in the independent condition ($B = 1.06$, $t = 3.42$, $p = .001$) showed the greater mere ownership effect. The results provide partial support for H_{20}. Interdependent individuals did not show the largest mere ownership effect in the interdependent journal condition, but independent individuals did in the independent journal condition.[24] It is important to note, however, that across self-construal, the mere ownership effect was only found in the independent journal condition[25].

Effect of ownership, object congruity, and self-construal on self-object linking.

An analysis next tested H_{21}, which proposed that more interdependent *owners* would should increased self-object linking after reading the interdependent journal description,

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[21] Ownership and the interaction of ownership with the journal description (coded as independent description vs. interdependent and control) were significant predictors of MO evaluations.

[22] Ownership predicting MO for more interdependent individuals: control description, $B = 0.38$, $t = 1.22$, $p = .225$; independent description, $B = 0.64$, $t = 1.96$, $p = .051$; interdependent description, $B = 0.24$, $t = 0.77$, $p = .441$.

[23] Ownership predicting MO for more independent individuals: control description, $B = -0.01$, $t = -0.05$, $p = .963$; independent description, $B = 1.06$, $t = 3.42$, $p = .001$; interdependent description, $B = 0.38$, $t = 1.08$, $p = .283$.

[24] A 2 (ownership: *buyers* vs. *owners*) x 2 (culture: European American vs. Asian/Asian American) ANCOVA with bias order as a covariate tested whether we showed a reduced mere ownership effect for Asians. Results showed a main effect of ownership, no main effect of culture, and a significant interaction between the two. The interaction revealed the mere ownership effect was only found in Asians/Asian Americans.

[25] In addition to the interdependent and independent individuals, participants at the mean level of self-construal, only showed the mere ownership effect in the independent journal condition, $B = 0.85$, $t = 3.81$, $p < .001$.

while more independent *owners* would show high levels of self-object linking after reading the independent journal description. A multiple regression analysis using the SPSS macro, PROCESS 3.0 (Model 3; Hayes, 2018) was run to assess whether self-construal and journal description interacted with ownership (0 = *buyer*, 1 = *owner*) to predict self-object linking. IAT block order was entered as a covariate.

Results showed the overall model was significant[26], R^2 = .08, $F(12,351) = 2.48$, p = .004, however, the interaction between ownership, journal description, and self-construal did not account for a significant amount of variance in self-object linking, ΔR^2 = .00, $F(2,351)$ = 0.57, p = .566. Self-object linking did not vary by ownership or across journal conditions for more interdependent individuals[27], $F(2,351) = 0.93$, p = .394, or more independent individuals[28], $F(2,351) = 0.56$, p = .573. Results did not support H_{21}. *Owners* did not show significantly greater linking in congruent journal conditions.

Self-object linking mediating the effect of ownership on possession biases, moderated by object congruity and self-construal. Next, moderated moderated mediation models tested whether owners showed increased self-object linking when the journal was congruent with their self-construal, which in turn mediated the relation between ownership status and the possession biases (Hypotheses 22-23). The conditional indirect effects across all models were calculated using 5,000 bootstrapping samples, generating confidence intervals of the bias-corrected bootstrap type.

[26] Only IAT block order was a significant predictor of self-object linking.
[27] Ownership predicting SOL for more interdependent individuals: control description, B = -0.53, t = -0.61, p = .546; independent description, B = 0.12, t = 1.32, p = .189; interdependent description, B = 0.04, t = 0.41, p = .685.
[28] Ownership predicting SOL for more independent individuals: control description, B = -0.70, t = -0.84, p = .402; independent description, B = -0.04, t = -0.47, p = .637; interdependent description, B = 0.06, t = 0.64, p = .525.

Moderated moderated mediation of endowment effect values. A moderated moderated mediation tested the full model, assessing whether journal description (Mod) interacted with self-construal (Mod) to moderate the effect of ownership (X) on self-object linking (Med), which in turn would predict journal values from the endowment effect procedure (Y) (PROCESS Model 11; Hayes, 2018). IAT block order and the order of possession biases were included as covariates in the model.

The moderated moderated mediation through self-object linking was not significant for those that read the independent journal description (index of moderated moderated mediation at independent journal condition vs. control/interdependent condition $B = 0.02$, $SE = 0.04$, 95% CI [-0.04, 0.14]) or those that read the interdependent journal description (index of moderated moderated mediation at interdependent journal condition vs. control/independent condition $B = 0.00$, $SE = 0.04$, 95% CI [-0.07, 0.10]). There was no significant indirect effect of ownership on journal prices through self-object linking for more independent individuals in the independent journal condition compared to the other conditions ($B = -0.01$, $SE = 0.06$, 95% CI [-0.13, 0.11])[29], or on more interdependent individuals in the interdependent journal condition compared to the other conditions ($B = -0.03$, $SE = 0.06$, 95% CI [-0.20, 0.06])[30]. There was not support for the prediction that congruity between the journal description and self-construal increased self-object linking for owners, which mediated the effect of ownership on endowment effect prices. These results therefore did not support H_{22}.

[29] No significant indirect effect of ownership on journal prices through self-object linking for more interdependent individuals ($B = -0.04$, $SE = 0.07$, 95% CI [-0.21, 0.06]) in the independent condition compared to other conditions.

[30] No significant indirect effect of ownership on journal prices through self-object linking for more independent individuals ($B = -0.03$, $SE = 0.06$, 95% CI [-0.19, 0.07]) in the interdependent condition compared to other conditions.

Moderated moderated mediation of mere ownership evaluations. Finally, A moderated moderated mediation tested whether journal description (Mod) interacted with self-construal (Mod) to moderate the effect of ownership (X) on self-object linking (Med), which in turn would predict journal evaluations, measured with the mere ownership scale (Y) (PROCESS Model 11; Hayes, 2018). IAT block order and the order of possession biases were included as covariates in the model.

The moderated moderated mediation through self-object linking was not significant for those that read the independent journal description (index of moderated moderated mediation at independent journal condition vs. control/interdependent condition B = -0.02, SE = 0.03, 95% CI [-0.08, 0.03]) or those that read the interdependent journal description (index of moderated moderated mediation at interdependent journal condition vs. control/independent condition B = 0.01, SE = 0.03, 95% CI [-0.05, 0.07]). There was not a significant indirect effect of ownership on journal evaluations through self-object linking for more interdependent individuals in the independent journal condition compared to the other conditions (B = 0.03, SE = 0.04, 95% CI [-0.03, 0.13])[31], nor was there a significant indirect effect of ownership on journal evaluations through self-object linking for more interdependent individuals in the interdependent journal condition compared to the other conditions (B = 0.01, SE = 0.04, 95% CI [-0.05, 0.10])[32]. These results do not support the prediction that congruity between the journal description and self-construal would increase

[31] No significant indirect effect of ownership on journal evaluations through self-object linking for more interdependent individuals (B = 0.00, SE = 0.04, 95% CI [-0.06, 0.09]) in the independent condition compared to other conditions.

[32] No significant indirect effect of ownership on journal evaluations through self-object linking for more independent individuals (B = 0.02, SE = 0.04, 95% CI [-0.04, 0.13] in the interdependent condition compared to other conditions.

self-object linking for *owners*, which in turn would mediate the effect of ownership on mere ownership evaluations. The model did not support $H_{23.}$

Discussion

Study 2 provided another opportunity to test the proposed path of ownership to the possession biases through self-object linking, while examining differences by self-construal and object congruity. Importantly, both possession biases were demonstrated in Study 2. Once again the two measures were positively related, as in Study 1.

Despite the successful production of possession biases, Study 2 again showed no difference in self-object linking by ownership status. All participants associated the self more with the blue journal than the green journal. In Study 1, self-object linking was positively associated with mere ownership evaluations, however, that relation was not replicated in Study 2. Self-object linking was unrelated to either of the possession biases. It is therefore not surprising that once again there was no support for predicted path of ownership to the possession biases through self-object linking.

In Study 2, the description of the journal was modified to create congruity with participants' self-construal. It was expected that linking would increase when objects were seen as more congruent with self-construals, consistent with Ye and Gawronski's (2016) findings. This enhanced linking was expected to stimulate greater possession biases and provide an opportunity to understand the anticipated cultural effect. However, the object congruity manipulation was not entirely effective across conditions. Participants accurately recalled how the journals were described, but the independent description appeared to be more effective than the interdependent description in altering the journal's meaning. This may be due to the existing purpose and benefits participants ascribe to journals. A journal

may be widely seen as private, personal object, which doesn't easily change, even after reading a description of its social benefits.

It was not anticipated that journal description would influence the endowment effect, mere ownership effect, or self-object linking, independent of self-construal. Results showed that expectation was true for the endowment effect and self-object linking. The journal description participants read did, however, affect the journal evaluations measured with the mere ownership scale. Participants reported less favorable evaluations when they read the interdependent journal description. As mentioned before, the journal may simply be a more independent object. The interdependent description may feel inaccurate and be therefore seen as less positive. Alternatively, more interdependent objects may prompt less exaggerated favorable responses.

As in Study 1 there was no effect of self-construal on the endowment effect. There was a significant difference between *owners* and *buyers* regardless of self-construal across all journal conditions. The description participants read had no effect on their valuations, whether that description was congruous with their self-construal or not. An additional test of the endowment effect attempted to replicate Maddux and colleagues' (2010) and Gobel and colleagues' (2014) findings showing a reduced effect for Asians. Yet, when analyzed by cultural group, there was, surprisingly, an even larger endowment effect for Asians/Asian Americans compared to European Americans.

Study 2 did not find an effect of self-construal on the mere ownership effect; there were effects only of ownership and journal description. Thus, contrary to our prediction, it did not appear that congruity between self-construal and the object impacted this possession bias. The mere ownership effect was largest for all individuals when they read the

independent description, defining the journal in terms of the personal benefits it possessed. When evaluations were examined by cultural group, Asians/Asian Americans were shown to have a larger mere ownership effect than European Americans.

As in Study 1, Study 2 found no impact of self-construal on self-object linking. Self-object linking was not increased when the journal description was congruous with a participant's self-construal. Contrary to predictions, more interdependent individuals did not link their self to the journal more when the journal was described in social terms. Self-object linking again did not appear to explain the possession biases, despite the modifications made to increase self-object linking in Study 2. It is therefore not surprising that there was not support for the full test of model, which predicted ownership would lead to increased self-object linking when the object was congruent with individuals' self-construal, and that self-object linking in turn mediated the effect of ownership status on the possession biases.

Finally, Study 2 again showed an effect of completing the mere ownership scale before the endowment effect procedure. Completing the mere ownership items first increased participants' favorable evaluations and feelings of psychological ownership, yet did not increase prices in the endowment effect measure, unlike in Study 1.

General Discussion

Summary of Results

Across two studies, we employed a manipulation that successfully induced feelings of ownership and successfully produced the endowment effect. The mere ownership effect was not as robust and was found only in the second of the two studies. In both studies, participants' ownership status did not impact self-object linking as expected and was therefore ineffective as a mediator between ownership status and the possession biases. The

endowment effect and mere ownership effect were also not moderated by self-construal in either study, even when the object was manipulated to be congruous with participants' self-construal. Additionally, self-construal had no affect on self-object linking, again whether the object was manipulated to be congruous or not. In total, the studies demonstrated the expected possession biases, but called the role of self-object linking into question by repeatedly showing ownership had no effect on linking and that linking did not predict valuations or evaluations.

Relationship between possession biases

The endowment effect and mere ownership effect were conceptually related and positively correlated in both Study 1 and Study 2. However, unlike the endowment effect, the mere ownership effect was not affected by ownership status in Study 1 and was found in Study 2 only when participants read the independent description of the journal. *Owners* evaluated the independent journal far more positively than *buyers* did, but there was no such difference between *owners* and *buyers* of interdependent or control journal. These results demonstrate one important distinction between the two possession biases. Although the tendency to overvalue owned objects may be robust and displayed by *owners* of many different types of objects, it may be that objects that are perceived to have more individual benefits are better suited to the mere ownership effect.

Self-object linking as an ineffective mediator

Although self-object linking was proposed to explain how ownership status produced possession biases, self-object linking was not affected by ownership in Study 1 or in Study 2. Self-object linking was also unrelated to the endowment effect across studies and was related to mere ownership evaluations only in Study 1, where ownership had no effect on mere

ownership evaluations. It was therefore unsurprising that self-object linking was not an effective mediator of the effect of ownership on the possession biases.

We must consider the possibility that there was a measurement issue in capturing self-object linking, although it seems unlikely. The IAT used in Study 1 and Study 2 was modeled after the measure used by Ye and Gawronski (2016). Their work showed the implicit measure was able to tease apart differences between *owners* and *non-owners'* (their work used *non-owners* rather than *buyers*) associations. Additionally, the IAT method did reveal that self-object linking occurred. All participants demonstrated an association between their selves and the blue journal. We did not find a failure to link to the blue journal or greater linking to the green journal. Instead, there was simply no difference between those who had been assigned versus declared owners of the blue journal. We could also consider the lack of self-object linking differences across ownership to be indicative of a failure of the manipulation. However, there were clear ownership differences in psychological ownership and possession biases, which indicated the effectiveness of the manipulation. The failure to demonstrate greater self-object linking for *owners* suggests a problem with linking as a concept, or linking as an important mediator, rather than a symptom of a manipulation or measurement issue.

We may also question whether the object was not desirable or significant enough to increase self-object linking for *owners*. However, Study 2 included a manipulation of the object to make the journal more congruous with self-construal, and *owners* still did not show greater self-object linking. If self-object linking is important to producing the endowment effect and mere ownership effect, then linking should have varied with self-construal. As the *self* varies, there should be relevant variations in self-object linking. Perhaps we could have

changed the valence of the object instead, as Ye and Gawronski (2016) did, to attempt to produce greater differences in linking between *owners* and *buyers*. Ye and Gawronski's work demonstrated that positive objects should engender greater associations between the self and object for *owners*. However, we did use a presumably positive object (indicated by satisfaction with the journal assignment) and did not find such linking differences.

Across the two studies and despite previously published evidence (Ye & Gawronski, 2016), there was no evidence for the importance of self-object linking in generating possession biases. The measurement of self-object linking appears to be valid, both because it was previously successful and because it did reveal an association between participants and their assigned/owned journal. The object was further modified to give the linking process the best possible chance of varying. Yet, across the two samples, linking was unaffected by ownership and did not explain the possession biases, thus calling the importance of self-object linking into question and suggesting that it needs to be reconsidered as a possible mediator of possession biases.

Cultural differences in possession biases

The current studies did not demonstrate a reduced endowment effect or mere ownership effect either for individuals with more interdependent self-construals, or, in follow-up analyses, Asians/Asian Americans. In addition to providing a basis upon which to test self-object linking, self-construal was used to explain the cultural difference in the endowment effect previously found by Maddux and colleagues (2010) and Gobel and colleagues (2014). However, in our work, self-construal did not affect the endowment effect, mere ownership effect, or the measure of self-object linking that was proposed to underlie those effects. We considered the possibility that our failure to find any anticipated pattern in

self-object linking by self-construal in Study 1 was due to the owned object not being congruent enough with individuals' self-construals. The modification of the description of the journal in Study 2, however, did not appear to alter the process of linking for more independent or, more importantly, more interdependent individuals. Although there may have been some issues with our manipulation of object congruity (to be discussed more below), it was surprising to find that self-construal had absolutely no interaction with any of the other measures.

We also conducted analyses by cultural group (European Americans versus Asians/Asian Americans) to test the differences previously demonstrated by Maddux and colleagues (2010) and Gobel and colleagues (2014). Our studies did not replicate their findings. However, there were some significant differences between the cultural groups. In Study 1, but not Study 2, there was a main effect of culture on endowment effect prices, which showed European Americans set far lower prices than Asians/Asian Americans, whether assigned to be *owners* or *buyers*. The endowment effect, or difference between owners and buyers' prices, did not vary by cultural background in Study 1, but surprisingly, in Study 2 there was a much *larger* endowment effect for Asians/Asian Americans compared to European Americans. Similarly, there was no effect of culture on mere ownership evaluations in Study 1, but there was again a *larger* mere ownership effect for Asians/Asian Americans in Study 2 when in fact there was no difference between European American *owners* and *buyers*. We analyzed the results with Latinx participants and found that European Americans were the only group (of the three) that did not demonstrate the effect (Study 2)[33]. These results are unexpected both because of the previous work and because they are inconsistent with the findings by self-construal. When we examined the cultural groups by

[33] Latinx showed a marginal effect (p = .06). None of the groups showed the mere ownership effect in Study 1.

self-construal, we expected to find Asians/Asian Americans were more interdependent than European Americans. Instead, we found Asians/Asian Americans in were more interdependent than European Americans in Study 1, but the two groups did not differ in Study 2. Both when the Asians/Asian Americans showed more interdependent self-construals than European Americans (Study 1), and when there were no difference in self-construals (Study 2), the endowment was found for both cultural groups. It appears self-construal is unrelated to the possession bias, and further, perhaps the measure of self-construal does not reliably capture the differences between cultural groups.

We further expected to show lower levels of self-object linking for Asians/Asian Americans, which could explain any reduced possession biases we replicated from previous studies. There was an impact of cultural group on self-object linking in both studies, which showed, as expected, that European Americans linked the self to the blue journal to a much greater degree than Asians/Asian Americans. Yet this increased linking did not explain greater valuations or evaluations. As previously mentioned, the endowment effect was found for Asians/Asian Americans in both studies. In fact, Asians had a larger effect rather than smaller endowment effect than European Americans in Study 2. Additionally, only Asians/Asian Americans, not European Americans, displayed the mere ownership effect (Study 2), again demonstrating larger rather than reduced possession biases. This pattern of results again signals the failure of self-object linking to explain possession biases, as well as failure to replicate previous literature showing reduced endowment effect for Asians, regardless of high interdependence (Study 1) and reduced self-object linking (both studies).

Impact of mere ownership effect on endowment effect

In both our studies, completing the mere ownership scale before the endowment effect measure had a significant impact on participants' responses to the journal. It increased feelings of psychological ownership across both studies, the positivity of mere ownership evaluations across both studies, and the prices associated with the endowment effect in Study 1. Even though the measures of the mere ownership and endowment effect were correlated, there was a clear directional effect of completing the mere ownership scale first, which influenced both *owners* and *buyers*. Participants appeared to endorse greater feelings of ownership and viewed the journal more favorably when they were asked to report positively framed evaluations, such as how much they liked the journal, first.

Because of this, we tested whether mere ownership mediated the relation between ownership status and the endowment effect. Studies 1 and 2 were combined to provide a robust test of the model. Using the combined sample, it was shown that there was a significant total effect of ownership on endowment effect prices (path c, $B = 1.45$, $p < .001$), which was partially mediated by mere ownership evaluations. The direct effect of ownership status on endowment effect prices remained significant, but was reduced, when mere ownership evaluations were included as a mediator (path c', $B = 1.34$, $p < .001$). The indirect effect was significant within a 95% CI (0.10, 95% CI: 0.03, 0.20). Thus favorable evaluations play some role in explaining the effect of ownership on endowment effect prices.

We therefore also tested psychological ownership as a mediator between ownership status and the possession biases using the combined sample. First, we tested whether psychological ownership mediated ownership's effect on endowment effect prices. There was a significant total effect of ownership on endowment effect prices (path c, $B = 1.45$, $p <$

.001), which was partially mediated by psychological ownership. The direct effect of ownership status on endowment effect prices remained significant, but was reduced when psychological ownership was included as a mediator (path c', $B = 1.09$, $p < .001$). The indirect effect was significant within a 95% CI (0.35, 95% CI: 0.23, 0.50). Next, we tested whether psychological ownership mediated the effect of ownership on mere ownership evaluations. There was a significant total effect of ownership on mere ownership evaluations (path c, $B = 0.34$, $p = .002$), which was fully mediated by psychological ownership. The direct effect of ownership status on mere ownership evaluations was no longer significant when psychological ownership was included as a mediator (path c', $B = -0.07$, $p = .503$). The indirect effect was significant within a 95% CI (0.41, 95% CI: 0.30, 0.52).

It thus appears that, again, while the endowment effect and mere ownership effect are conceptually related, there are some significant differences in their meaning and underlying mechanism. It seems that completing the mere ownership scale first increases explicit attitudinal measures, like psychological ownership and the mere ownership scale itself, yet there is less of a clear effect on the endowment effect, which may include some distinct antecedents.

Limitations and critiques

Across the present studies, there were several failures to show previously established effects. First, the mere ownership effect was not found in Study 1 and was found in Study 2 only in one journal description condition. Despite this, the mere ownership effect related to the endowment effect in both studies and did not appear to be due to a failure of the ownership manipulation, since the endowment effect prices and psychological ownership measure were affected as expected in both studies.

Second, there were also no demonstrated differences in self-object linking across ownership conditions. Was this a failure of the ownership manipulation? Was being *assigned* the blue journal not significantly different enough than being an *owner* of the blue journal? If we had instead assigned participants to own either the blue or green journal, then perhaps we could have demonstrated a larger difference in self-object linking between conditions and produced greater variation in linking scores. Yet, again, despite the uniformity in self-object linking scores, there were significant effects of ownership on psychological ownership, valuations, and evaluations of the journal, which points to the fact that it is more likely a flaw with self-object linking than with the ownership manipulation. Ye and Gawronski (2016) also employed a sequential priming paradigm to assess self-object linking in their work, which, if self-object linking is to be considered again in the future, may be employed as an alternate measure, rather than the IAT used in the current studies.

Third, we did not find the cultural differences in the possession biases we anticipated. This may be in part due to the fact that the Asians and Asian Americans in our studies were not as interdependent as we expected. They were significantly more interdependent than the European Americans in Study 1, but not in Study 2. The UCSB subject pool we drew our sample could be distinct, with a group of Asians and Asian Americans that was very similar to European Americans in self-construal. Although, when we looked at the percentage of Asians born outside of the US (30% in Study 1 and 36.8% in Study 2), we found they were no more interdependent than Asian Americans born in the US. This surprising result indicates that it may not be our population but perhaps the self-construal measure that did not capture meaningful differences across the cultural groups.

Finally, the manipulation of object congruity may not have been as effective as intended. The independent journal was successful, with participants not only recalling the description but also endorsing the journal's independent benefits more than participants in either of the other two conditions. The interdependent journal was less successful. Participants again recalled the description, but did not believe the journal provided more interdependent benefits than participants who read about the independent journal description. It is likely that the chosen object for the study, a journal, already symbolizes independence and personal meaning. It is possible that the journal is too independent to be considered as possessing a social, interdependent meaning.

Novelty and implications

The current findings demonstrate that although the endowment effect and mere ownership effect are related, they are actually quite distinct. Although psychological ownership completely mediates the mere ownership effect, it does not do the same for the endowment effect. The studies here provide novel evidence that completing the mere ownership effect first increases evaluations, perceptions of ownership, and even, sometimes, valuations (in Study 1). Reporting favorable evaluations of an object has a significant impact on several markers of ownership.

This research also demonstrates how the meaning of an object may impact the mere ownership effect. Although there was no support for the prediction that congruity would enhance the possession biases, we did find that *owners* had more favorable evaluations of the journal than *buyers* only when the journal was described in independent terms. The participants' own self-construals did not affect this result. This suggests that certain objects or properties may be more conducive to a mere ownership effect. It could be that the object

has to reflect more independent properties to engender the mere ownership effect or perhaps the effect is present when the object is simply described or understood in terms that allow people to reflect on its true state, in this case because the journal may be more believable as an *independent* object.

These studies have raised important questions regarding two lines of published work. First, it seems the association between one's self and owned object, measured in our studies with self-object linking, may not be a critical component of possession biases. Self-object linking did not vary with ownership or self-construal and did not predict endowment effect prices or the mere ownership effect (except in Study 1). Second, previous findings that showed a reduced endowment effect for Asians (Maddux et al., 2010; Gobel et al., 2010) was not replicated in our current work. In fact, when there were cultural differences in our studies, Asians and Asian Americans had larger endowment effects and mere ownership effects than European Americans. We also found no effect by self-construal, again calling into question not only the cultural findings, but also, perhaps the reliability of the self-construal measure (Singelis, 1994).

Future directions

Future investigations should continue examine how ownership induces possession biases and how those biases may vary for different ownership situations and individuals. Our work demonstrated psychological ownership partially mediated the endowment effect, but was not the first to do so (Shu & Peck, 2011). It was, however, the first to our knowledge to demonstrate the complete mediation of the influence of ownership on the mere ownership effect. Additional predictors of these biases can and should be tested. For example, testing

the emotions associated with ownership, or the extent to which owners feel pride, stewardship, or even jealousy.

It has also been established that the experience of ownership changes over time (Reb & Connolly, 2007). The longer an object is owned, the more ownership is felt. If we wanted to test self-object linking again, we could examine how much the self is linked to objects that have been owned for a longer time. We anticipate there should be greater linking of the self with objects with a more established history of ownership.

Examining the time course of ownership would also allow us to learn more about the possession biases. Specifically, when do those possession biases go away? If an object is sold, does the former owner no longer overvalue that object? Or no longer view that object as excessively positive? If so, is linking reduced as well?

Another interesting area for future research could address ownership in the sharing economy. More and more products are shared and consumed "collaboratively" both online and in the physical world (Belk, 2014). With services like Uber, Airbnb, and ZipCar, people are forgoing traditional ownership for a new shared model. But do individuals feel ownership over these shared products? Is there an association between the individual and shared products? Does that association predict overly favorable responses? In our studies, assignment to the blue journal created the same high level of linking and positive evaluation (in Study 1 only) as ownership. While there are questions about the validity of the self-object linking findings, it is interesting to consider how assignment might be akin to using a shared product. While it is not traditional ownership, there is some relationship between the self and object, which could relate to the favorable responses we saw with the mere ownership effect.

Finally, we could continue to examine the cultural findings by testing interdependent individuals with a different form of ownership, rather than just altering congruity like in Study 2. We could examine whether a specific form of ownership could be more conducive to interdependent self-construals: collective ownership. Collective ownership is "a collective sense of ownership - a socially constructed, shared mental model reflecting common beliefs about a group's possessive relationship with a target of ownership" (Pierce, Jussila, & Li, 2017, p.3). If we wanted to create an alternate scenario where feelings of ownership and biases are *more* likely for interdependent individuals, we may want to test their experience in a truly more interdependent ownership situation, like collective ownership.

Conclusion

Ownership is a meaningful experience that produces significant biases in individuals. Despite the robust literature, there are still many questions about how and for whom these biases emerge. The mere experience of ownership amplifies how much owners value their possessions (Studies 1-2) and how favorably they view them (Study 2). It does not appear, however, that these biases are the result of a link formed between the self and the object, at least not with the form of self-object linking measured in the current research. Finally, the results of the studies described here indicate that the process may be more universal than previously demonstrated (Maddux et al., 2010; Gobel et al., 2010).

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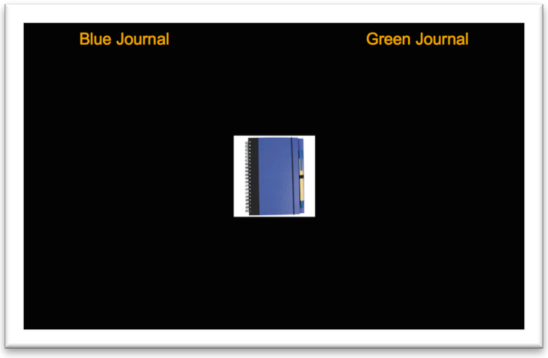
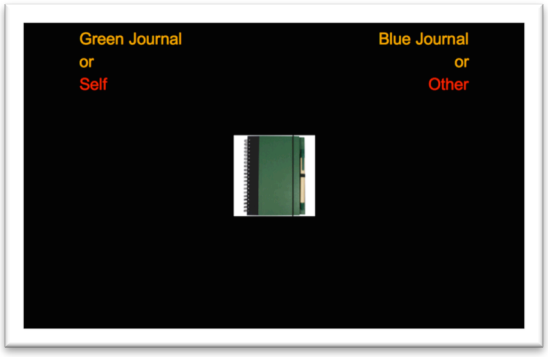
Appendix 1

Studies 1-2
Implicit Association Test measuring self-object linking



Example of initial target-concept discrimination task.

Example of attribute discrimination task.



Example of combined task with the blue journal paired with "self."

Appendix 2

Studies 1-2
Endowment Effect Multiple Price List Procedure

[For owners:]

Now, before the experiment is over, you have the choice to sell your assigned journal to the experimenter. Earlier you were told you would receive compensation for your participation today. You will receive up to $8 for your participation. If, however, you choose to sell the journal, that will increase your compensation.

The experimenter wants to buy the journal that you own. In order to determine if the experimenter will buy the journal from you, you will need to make a series of decisions. You will soon see a series of prices. For each price, you will decide whether you would rather sell the journal at the given price or keep your journal.

At the end of the study, you may sell the journal for monetary compensation or keep the journal. To make sure this outcome is fair, the computer will randomly choose one price. We will use your decision from that price to determine your outcome. There is not necessarily a "correct" answer for each decision as personal values can differ from individual to individual.

Please consider what would be your minimum price for selling the journal. You should select "no" for all prices below the minimum amount you want to sell for and "yes" for all prices above that minimum.

For each row of decisions, you should decide whether you would sell the journal at the stated price. Remember, any choice could be selected for payment and may thus impact your earnings.

You own this journal.

For each row of decisions, you should decide whether you would sell the journal at the stated price.

Remember, any choice could be selected for payment and may thus impact your earnings.

	Yes	No
Sell journal for $0	○	○
Sell journal for $1	○	○
Sell journal for $2	○	○
Sell journal for $3	○	○
Sell journal for $4	○	○
Sell journal for $5	○	○
Sell journal for $6	○	○
Sell journal for $7	○	○
Sell journal for $8	○	○

["Sell Journal for $0" to "Sell Journal for $8" in $1 intervals]

[For buyers:]

Now, before the experiment is over, you have the choice to buy your assigned journal from the experimenter. Earlier you were told you would receive compensation for your participation today. You will receive up to $8 for your participation. If, however, you choose to buy the journal, that will reduce your compensation.

The experimenter wants to sell the journal that you were assigned. In order to determine if the experimenter will sell the journal to you, you will need to make a series of decisions. You will soon see a series of prices. For each price, you will decide whether you would rather buy the journal at the given price or keep your compensation.

At the end of the study, you may buy the journal or keep the monetary compensation. To make sure this outcome is fair, the computer will randomly choose one price. We will use your decision from that price to determine your outcome. There is not necessarily a "correct" answer for each decision as personal values can differ from individual to individual.

Please consider what would be your maximum price for buying the journal. You should select "no" for all prices above the maximum amount you want to buy for and "yes" for all prices below that maximum.

For each row of decisions, you should decide whether you would buy the journal at the stated price. Remember, any choice could be selected for payment and may thus impact your earnings.

You do not own this journal.

For each row of decisions, you should decide whether you would buy the journal at the stated price.

Remember, any choice could be selected for payment and may thus impact your earnings.

	Yes	No
Buy journal for $0	○	○
Buy journal for $1	○	○
Buy journal for $2	○	○
Buy journal for $3	○	○
Buy journal for $4	○	○
Buy journal for $5	○	○
Buy journal for $6	○	○
Buy journal for $7	○	○
Buy journal for $8	○	○

["Buy Journal for $0" to "Buy Journal for $8" in $1 intervals]

Appendix 3

Studies 1-2
Mere Ownership Scale

1. Overall, how favorable is the journal? (1 not at all to 7 very favorable)
2. How attractive is the journal? (1 not at all to 7 very attractive)
3. How much do you like the journal? (1 not at all to 7 like very much)
4. How much would you like to receive the journal as a gift? (1 not at all to 7 very much)

Appendix 4

Studies 1-2
Self-Construal Scale

1. I enjoy being unique and different from others in many respects.
2. I can talk openly with a person who I meet for the first time, even when this person is much older than I am.
3. Even when I strongly disagree with group members, I avoid an argument.
4. I have respect for the authority figures with whom I interact.
5. I do my own thing, regardless of what others think.
6. I respect people who are modest about themselves.
7. I feel it is important for me to act as an independent person.
8. I will sacrifice my self interest for the benefit of the group I am in.
9. I'd rather say "No" directly, than risk being misunderstood.
10. Having a lively imagination is important to me.
11. I should take into consideration my parents' advice when making education/career plans.
12. I feel my fate is intertwined with the fate of those around me.
13. I prefer to be direct and forthright when dealing with people I've just met.
14. I feel good when I cooperate with others.
15. I am comfortable with being singled out for praise or rewards.
16. If my brother or sister fails, I feel responsible.
17. I often have the feeling that my relationships with others are more important than my own accomplishments.
18. Speaking up during a class (or a meeting) is not a problem for me.
19. I would offer my seat in a bus to my professor (or my boss).
20. I act the same way no matter who I am with.
21. My happiness depends on the happiness of those around me.
22. I value being in good health above everything.
23. I will stay in a group if they need me, even when I am not happy with the group.
24. I try to do what is best for me, regardless of how that might affect others.
25. Being able to take care of myself is a primary concern for me.
26. It is important to me to respect decisions made by the group.
27. My personal identity, independent of others, is very important to me.
28. It is important for me to maintain harmony within my group.
29. I act the same way at home that I do at school (or work).
30. I usually go along with what others want to do, even when I would rather do something different.

Appendix 5

Studies 1-2
Psychological Ownership Check

[7-pt Likert scale from "Strongly disagree" to "Strongly agree"]

1. I feel like this is MY journal.
2. I feel a very high degree of personal ownership over the journal.
3. I feel like I own this journal.

Appendix 6

Studies 1-2
Manipulation Checks

Which journal were you assigned?
- Green
- Blue

You initially saw two journals. Were you assigned the journal you liked best of the two?
- Yes, I was assigned the journal I liked best
- No, I wanted to be assigned the other journal
- No preference

Please rate your agreement with the following statement: I understood the price decision task.
- 1 (strongly disagree) to 7 (strongly agree)

Journal description *[Study 2 only]*
To what extent do you agree with the following: The journal I was assigned...
a) Has social/interpersonal benefits
b) Has individual/personal benefits

How was the journal described at the beginning of the study?

Demographics
Instructions: Please fill in the following background information about yourself.

What is your gender?
- Female
- Male
- Other

What is your age?

What is your year in school?
- 1st
- 2nd
- 3rd
- 4th

Are you a citizen of the USA?

Yes/No

What is your nationality?

American
Mexican
Canadian
Chinese
Japanese
Korean
Indian
Other_____

What is your ethnicity?

African American or Black
Asian American, Asian, or Pacific Islander
European American or White
Latinx (Latino/a or Hispanic)
Native American or Alaskan Native
Dual or Multiple Ethnicities
Other (please specify below) _____

Supplementary Materials

Study 2 Pilot Test

Prior to Study 2, a pilot test tested the effectiveness of the object congruity manipulation. This pilot test examined whether the object meaning, or the journal descriptions used in the manipulation, accurately reflected the values associated with independent and interdependent self-construals without impacting participants' valuation or evaluation of the object.

Method

Design and participants. The pilot test experimentally manipulated object meaning (meaning: independent vs. interdependent) in a between subjects design. Participants were 102 individuals (64 female; M_{age} = 35.50, SD = 12.71) recruited from Amazon's Mechanical Turk (MTurk) who were compensated for their participation. ***Procedure and measures.*** Participants were told the research was concerned with how people evaluate objects and that they would evaluate a journal. They were randomly assigned to either the independent or interdependent condition.

Object meaning manipulation. Object meaning was manipulated by having participants read a description of either the independent or interdependent journal. Participants read that the journal they were valuating has many benefits. It encouraged them to express their self (understand close others), their feelings (others' feelings), and your experiences (others' experiences). The journal was designed for them to reflect on their personal identity (relationships) and what makes them stand out (belong). See Study 2 Method for full statement text.

Valuation. Participants completed a measure that captured the perceived value of the journal. It was not the same measure used in Studies 1 and 2, since participants were neither buying nor selling the journal. Instead, participants were asked, "How much would you spend on this journal?" and marked their response from $1 to $8.

Evaluation. Participants were then asked how favorable the journal was. A single item, "Overall, how favorable is this journal?" was taken from the mere composite scale used in Studies 1 and 2. Participants indicated their response on a 7-pt Likert scale from 1 (not at all favorable) to 7 (very favorable).

Object meaning measure. Object meaning was measured using the same manipulation checks used in Study 2. Participants responded to the two items about the journal's personal and social benefits using a 7-pt Likert scale from 1 (strongly disagree) to 7 (strongly agree).

Demographic variables. Participants filled out demographic measures including gender, age, and ethnicity at the end of the survey.

Results

Valuation. An independent samples *t*-test compared the prices chosen by those in independent and interdependent conditions. Results showed no significant difference in the valuation of the journals, $t(102) = 1.84$, $p = .068$, 95% C.I. [-0.50, 1.37].

Evaluation. An independent samples *t*-test compared favorable impressions of the journal across the independent and interdependent conditions. There was not a significant difference in the evaluation of the journal across conditions, $t(102) = 1.34$, $p = .182$, 95% C.I. [-0.19, 0.97].

Object meaning. First, an independent samples *t*-test assessed whether participants endorsed the journal's personal benefits differently across conditions. Results showed a

significant difference between the conditions, $t(102) = 2.07$, $p = .041$, 95% C.I. [0.03, 1.16]. As anticipated, participants in the independent condition ($M = 5.61$, $SD = 1.41$) reported the journal possessed greater personal benefits, compared to participants in the interdependent condition ($M = 5.02$, $SD = 1.51$).

Next, an independent samples *t*-test assessed whether participants endorsed the journal's social benefits differently across conditions. There was a significant difference by condition, $t(102) = -2.01$, $p = .047$, 95% C.I. [-1.13, -0.01]. Participants in the interdependent condition ($M = 5.18$, $SD = 1.49$) reported the journal possessed greater social benefits, compared to participants in the interdependent condition ($M = 4.61$, $SD = 1.39$), as the manipulation intended.

Discussion

The results of the pilot test demonstrated that the two journal descriptions were successfully reflected the values associated with more interdependent and more independent self-construals. The independent journal description was reported to provide more personal benefits than the interdependent journal was, while the interdependent journal was endorsed as possessing greater social benefits when compared to the independent journal. Additionally, the manipulation did not differentiate the journals in terms of value or evaluations. The journals were priced equal in the two conditions and were reported to be equally favorable.