Abstract
The endowment effect is the tendency for people who own a good to value it more than people who do not. This robust pattern was first attributed to loss aversion, however, a growing body of evidence has emerged in favor of alternate accounts. Recently we developed an integrative theoretical framework attributing the endowment effect to different cognitive frames determining the subset of information accessible at the time an object is evaluated (Morewedge & Giblin, 2015). Ownership appears to be an especially potent frame—merely owning a good is sufficient to boost object evaluations, even in the absence of any threat of loss. Self-enhancement theories of ownership suggest that this effect is due to implicit self-esteem creating an additional positive self-association with owned objects. However, many of these findings are also consistent with an alternate account of ownership based on self-referential effects in memory—associating a stimulus with the self generally results in increased attention and better memory encoding.

In this dissertation, I develop novel predictions that differentiate these competing accounts of ownership effects, arguing that consideration of the self-concept as a cognitive structure affecting information processing (i.e., enhancing attention and memory for self-related stimuli) can explain why ownership might serve as an especially potent cognitive frame sufficient to produce an endowment effect due to mere ownership. Because most goods have predominantly positive features, increased salience of those features due to ownership should generally increase their perceived value. For objects with predominantly negative features, increased salience of those features due to ownership should generally decrease their perceived value. Thus, the present-self reference account can explain a previously puzzling finding that standard self-enhancement based theories of ownership would not predict—the reversal of the endowment effect for objects with predominantly negative attributes. I report the results of a first study demonstrating the reversal of the endowment effect for “bads” in a mere ownership paradigm, consistent with the present self-reference theory. I replicate and extend this effect, then develop a series of empirical tests pitting the predictions of the present self-reference theory against extant self-enhancement theory. The additional studies examine novel moderators derived from a self-reference perspective, including reversals in the direction of the endowment effect depending on valence and culture, and moderation of the magnitude of these effects depending on differences affecting self-reference effects in memory (i.e., private self-consciousness, and features of the good that affect how readily it is connected in memory to salient identities).
People who own an object tend to value it more than people who do not. This robust pattern, known as the endowment effect, emerges even in the absence of choice when possessions are allocated randomly. Historically, the endowment effect has often been attributed to loss aversion (Kahneman, Knetsch, & Thaler, 1991). According to this theoretical perspective, sellers randomly endowed with an object consider the transaction as a loss relative to the reference point of owning the object, while buyers consider the transaction as a gain relative to the reference point of not owning the object. The psychological impact of a loss from the status quo is weighted more heavily than a corresponding gain, thus leading sellers to demand more money on average to part with their possessions than buyers are willing to pay to acquire the same object. Recently, however, evidence has emerged which is not readily explained by loss aversion. Instead, this evidence favors alternate accounts, including ownership and biases in information sampling.

In the following sections, I review evidence of the endowment effect and the leading theories that have been put forth to explain the underlying psychological mechanisms. Based on this evidence, I argue that psychological ownership is a particularly compelling explanation warranting further examination. Psychological ownership entails an association between an object and the self-concept. Previous theory explains the effect of psychological ownership as being due to the positive valence of the self-concept: because people generally show a self-enhancing tendency to view themselves in a favorable light, this positive bias in turn reflects favorably on owned objects.

In contrast to this valence-driven explanation, I develop a new theory of the endowment effect based on research on the cognitive effects of associating a stimulus with the self. Such instances of self-reference have been found to affect attention and memory, which I suggest
could drive ownership effects. I test this theory empirically over the course of several studies designed to differentiate the present self-reference theory from extant explanations.

**The Endowment Effect**

The core claim of the endowment effect is that merely being endowed with an object, such as by random assignment, is sufficient to cause an increase in that object’s perceived value. The endowment effect has been elicited in various experimental paradigms falling into three major categories: the exchange paradigm, the valuation paradigm, and mere ownership.

In the exchange paradigm, participants are randomly allocated one of two objects (e.g., a mug or a candy bar) which they then own. Subsequently, all participants are given the opportunity to exchange their assigned object for the alternate object they were not assigned. Regardless of which object they are initially endowed with, participants tend to show a reluctance to trade.

In one study, for example, participants were randomly assigned to one of three groups (Knetsch, 1989). One group was endowed with a mug (mug-owners) and another group was endowed with a chocolate bar (chocolate-owners). When those participants were allowed the opportunity to exchange their endowment for the other object, only a small minority (less than 11%) chose to do so. A third control group (choosers) was not endowed with either object, but given the opportunity to choose between receiving the two objects. In that case, choosers did not show a meaningful preference for one object over another: 56% chose the mug and 44% chose the chocolate bar. To the extent that this choice could be interpreted as a baseline revealed preference for this population, trading would have been expected to result in similar proportions: people who happened to be assigned the mug but had an underlying preference for chocolate would trade for their desired option, and vice versa. The observed pattern of much lower trading
than expected is what has been described as a reluctance to trade. This evidence thus supports the core claim of the endowment effect that merely being endowed with an object via random assignment increases the object’s perceived value, as measured by endowed participants declining to trade their possession for another object that control-participants found equally valuable, suggesting that endowment itself shapes preferences. This pattern clearly violates Coase theorem, a key economic assumption relied on in policy and law, which assumes that entitlements will be efficiently allocated (i.e., through trade or sale) to the party who most values them, regardless of which party has initial possession (Coase, 1960; Korobkin, 2003).

In the valuation paradigm, half of participants are initially endowed with an object which they then own. Subsequently, they indicate the least amount of money they would be willing to accept (i.e., willingness to accept; WTA) in order to sell the object back to the experimenter, thus putting them in the position of a seller. The other half of participants who do not own the object indicate the highest amount of money they would be willing to pay (i.e., willingness to pay; WTP) in order to acquire the object, thus putting them in the position of a buyer. Sellers tend to demand significantly more money to part with the object than buyers are willing to pay (Kahneman, Knetsch, & Thaler, 1990), a finding that echoes the results of the exchange paradigm and again supports the core claim of the endowment effect that merely being endowed with an object via random assignment increases the object’s perceived value.

It has become increasingly common for such valuation experiments to compare sellers to “choosers” rather than buyers. Choosers make a series of decisions between receiving various cash payments from the experimenter or receiving the object. Participants respond to a series of choice pairs (i.e., “receive $.50 or receive the object,” “receive $1 or receive the object,” etc.) and indicate their preference within each choice pair, with the understanding that one of the
choices will be randomly selected to be enacted in reality, thus making the decision incentive compatible. This exact procedure can be mirrored for sellers, having them choose between receiving various cash payments or keeping the object they were randomly endowed with. The highest value at which the participant chooses the object over the cash payment is recorded as their valuation. Overall, choosers’ valuations tend to fall in between buyers’ and sellers’ (Kahneman, Knetsch, Thaler, 1991, p. 196; Knutson et al., 2008). Comparing sellers to choosers is a particularly clean design as these groups are effectively making the same series of choices (i.e., leaving the experiment with either a cash payment or the object) and the groups only differ in terms of their initial endowment. Experiments utilizing choosers instead of buyers have the additional benefit of eliminating potential confounds such as participants’ individual levels of wealth or cash on hand.

In the mere ownership paradigm, half of participants are endowed with an object which they then own. Subsequently, all participants are asked to evaluate the object (i.e., in terms of how desirable or likeable it is). Owners tend to evaluate the object significantly more positively than non-owners (Beggan, 1992), which again supports the core claim of the endowment effect that merely being endowed with an object via random assignment increases the object’s perceived value.

The endowment effect is robust, replicating across various objects and elicitations. It has been found across a range of cases from everyday consumer goods such as mugs and pens to more abstract entities such as land rights, intellectual property, and pollution (Buccafusco & Sprigman, 2010; Hammack, 1974; Horowitz & McConnell, 2002). The endowment effect challenges a core assumption in economic theory, Coase theorem (Coase, 1960), which assumes that goods and entitlements will eventually be traded to those parties who place a higher value on
them, regardless of initial distribution (i.e., who starts off with possession of the good or entitlement). In contrast, the endowment effect demonstrates the causal impact of merely possessing a good, an effect which appears to emerge instantaneously even under hypothetical conditions, and only strengthens in magnitude for actual incentive-compatible outcomes (Horowitz & McConnell, 2002). The robustness of the endowment effect and its important implications, ranging from psychology to economics to public policy, have sparked a flurry of research aimed at identifying the underlying psychological processes. In the following sections, I review competing explanations of the endowment effect and the corresponding supporting evidence.

**Existing Explanations**

Three major explanations of the endowment effect can broadly be classified in terms of their theoretical focus on loss aversion, ownership, or information processing. First, theories based on loss aversion attribute the endowment effect to the differing positions of sellers and buyers in terms of either gaining or losing the object. Second, ownership based theories attribute the endowment effect to the differing positions of sellers and buyers in terms of owning the object and associating it with the self. Third, information processing theories attribute the endowment effect to differences in the subset of value-relevant information that is searched for, attended to, or remembered depending on endowment status. Such differences may ensue, for example, as a result of conducting confirmatory hypothesis testing favoring the status quo (i.e., reasons sellers should keep the mug and buyers should keep the money).

**Loss Aversion**

Historically, the endowment effect has been primarily attributed to loss aversion. The first studies demonstrating the endowment effect utilized an exchange paradigm, and explained
participants’ reluctance to trade as being a result of their position relative to the reference point of their initial endowment (i.e., choosing between losing one object and gaining the other). Relative to the reference point of their initial endowment, participants were thought to view the trade in terms of losing the object they had been assigned versus gaining the other object. People are generally loss averse—the psychological impact of a loss is stronger than that of an equivalent gain. For example, losing $20 is generally more painful than gaining $20 is pleasurable. Due to loss aversion, the prospect of gaining the unassigned object is perceived as less desirable than the prospect of losing the assigned object is perceived aversive, resulting in a reluctance to trade. This theoretical perspective also extends from the exchange paradigm to the valuation paradigm: according to loss aversion, sellers in a position to lose the object perceive that loss as more impactful compared to buyers’ (or choosers’) perception of the corresponding gain. This asymmetry is in turn reflected in their monetary valuations, resulting in a willingness to pay/willingness to accept gap, commonly referred to as a WTP-WTA gap.

**Mere Ownership**

We know that owners tend to view their possessions more positively than non-owners do. There are competing explanations for why this is, and whether ownership is necessary and/or sufficient to produce an endowment effect. Whereas the loss aversion account attributes the endowment effect to a loss or gain vis-à-vis the status quo, it neither predicts nor explains an endowment effect when there is no prospect of loss, as might be argued to be the case in everyday life when thoughts of losing a possession (i.e., by selling or trading it) are not necessarily salient.

The vast majority of empirical work on the endowment effect confounds loss framing with ownership—owners stand to lose the object while non-owners stand to gain it. However,
when loss and ownership are tested independently, the endowment effect persists even in the absence of loss frames. This suggests that mere ownership is sufficient to increase object valuations. In one such study disentangling ownership and loss aversion, the endowment effect was found to emerge under ownership conditions alone (Morewedge, Shu, Gilbert, & Wilson, 2009). Buyers who were previously endowed with an identical good (owner-buyers) were willing to pay a similar price as sellers demanded to part with it. Furthermore, non-owner-sellers acting as agents on behalf of others did not show increased valuations as would be predicted by a standard loss-aversion account (i.e., since the transaction represented a loss with respect to the status quo). This pattern holds across mere ownership studies asking people to evaluate how much they like owned vs. non-owned objects. Even without implicating any kind of loss (i.e., contemplating selling), owned objects tend to be rated as more desirable than non-owned objects (Beggan, 1992; Nesselroade, Beggan, & Allison, 1999).

Self-enhancement theories of ownership explain this pattern as arising from the positive valence of the self-concept. According to this perspective, ownership creates an association between the self and the owned object. Because people generally hold highly positive self-views, objects associated with the self tend to benefit from positive self-associations. In one direct test of this process, for participants randomly endowed with one of two postcards in the lab, implicit self-evaluations were positively correlated with implicit evaluations of owned (vs. non-owned) objects (Gawronski, Bodenhausen, & Becker, 2007). Other kinds of positive source associations, such as receiving a mug as a prize for good performance, have similarly been found to exacerbate the endowment effect. In contrast, people who received a mug as a prize for poor performance valued it no more or less than non-owners, which may indicate that negative source
associations effectively cancelled out the typically observed endowment effect (Loewenstein & Issacharoff, 1994).

Notably, two of the three canonical paradigms confound loss and ownership—both the exchange and valuation paradigms manipulate loss in tandem with ownership: owners stand to lose the object while non-owners stand to gain it. Perhaps the fairest assessment in light of this confound is that the endowment effect appears to be multiply determined. The limited number of studies attempting to address this confound have found ownership, but not loss, to be sufficient to produce an endowment effect (Morewedge, Shu, Gilbert, & Wilson, 2009). These findings highlight the need to understand the underlying processes by which ownership affects object valuation.

To date, research in the ownership tradition has consistently taken the perspective that the positive valence of the self-concept is what drives increased valuations of owned goods. However, there is a large body of work in cognitive psychology establishing a distinct cognitive effect of self-association, termed the self-reference effect (Sui & Humphreys, 2015). Self-referential bias in attention and/or memory results from cognitively associating a stimulus with the self-concept. The goal of the present research is to test whether this theoretical perspective can serve as an alternate account of the endowment effect. In the following sections, I propose a new self-reference theory of the endowment effect and outline unique empirical predictions that differentiate the present research from previous work.

**Self-Referential Bias**

Associating a stimulus with the self affects cognition throughout multiple stages of information processing, resulting in enhanced perception, attention, and memory for that
stimulus. This pattern of self-bias is known as the self-reference effect (SRE; for a review see Sui & Humphreys, 2015).

In a classic self-reference study, participants view a series of target words (i.e., positive and negative trait adjectives) some of which they are asked to encode relative to the self (i.e., does this word describe you?) and others which they are asked to encode by another means, such as relative to another person or semantic marker (e.g., does this word contain a vowel?). The proportion of target words later recognized or recalled depending on encoding condition is then analyzed for evidence of a self-referential advantage. Self-referential bias in memory has been attributed to increased elaboration and organization of information encoded in association with the self-concept, a particularly well developed and frequently used mental construct (Symons & Johnson, 1997).

The self-reference effect emerges under implicit encoding conditions as well. In one study, an implicit encoding condition was included in addition to the classic explicit encoding (i.e., does this word describe you?). Participants showed better memory for stimuli incidentally paired with the self (i.e., whether a word appeared above or below their name on a screen) than stimuli incidentally paired with an other (e.g., whether a word appeared above or below the name “Angelina Jolie”). A direct comparison revealed that explicit encoding is even stronger, but implicit encoding appears to be sufficient to generate an advantage for self-relevant material (Turk, Cunningham, & Macrae, 2008). This finding can be taken as evidence that even a slight contextual association with the self can affect the way people encode and retrieve information.

Although the canonical self-reference study uses trait adjectives, there is evidence that this paradigm may be extended to memory for consumer goods associated with the self via imagined ownership. In one such study, participants sorted images of objects such as food,
clothing, and electrical items, into baskets labeled as belonging either to themselves or to another participant. In a surprise recall test, participants showed better memory and faster recognition for “owned” objects that had been assigned to a virtual basket labeled with their own name (Cunningham, Turk, Macdonald, & Macrae, 2008).

The evidence for enhanced recognition of verbal stimuli (e.g., personality traits, see Symons & Johnson, 1997) and consumer goods (Cunningham et al., 2008) clearly demonstrates that self-referencing aids overall memory for objects and concepts. Importantly, recent work has directly tested for a more specific self-reference effect of object features, finding that the SRE persists for the accurate and robust encoding of object details needed to properly differentiate highly similar objects (Serbun, Shih, & Gutchess, 2011). In one study, participants encoded images of consumer goods (e.g., earrings, eyeglasses, candles, towels) with reference either to the self, an intimately known other, or a familiar other they did not know personally. Referential-encoding was manipulated within-subjects and established by having participants answer the question of whether the depicted object is something the target [self, intimate other, other] would buy in the next year. Two days later, participants returned and were tested on their memory for the displayed objects. Included in the test set were exact matches, similar matches, and novel stimuli. Similar matches were drawn from the same previously-displayed object category, but with different features, such as two pairs of earrings that differed in shape, materials, and design. The key analysis compared exact same targets correctly identified as “same” (reflecting specific memory for detailed features) vs. similar targets reported as “same” (reflecting general memory for the gist of the object). Results revealed a significant SRE at both the general and specific level (Serbun, Shih, & Gutchess, 2011, Study 1). This finding has been replicated and extended, finding that self-referencing enhances memory for objects at both the general (i.e., gestalt) and
specific (i.e., detailed feature) levels, across both younger and older adults (Hamami, Serbun, & Gutchess, 2011). Across both those investigations, memory performance for objects paired with an intimately known other was similar to performance for the self, consistent with close others being, to some degree, integrated in the mental representation of the self (Aron, Aron, Tudor, & Nelson, 1991).

Self-reference has been found to affect attention as well as recall. In a similar study, participants showed a similar preferential pattern in their attention to nominally owned objects (Turk et al., 2011). Specifically, participants exhibited a more narrow visual focus for objects randomly assigned to be “owned” by the self (vs. other). Perhaps some of the best evidence for the influence of self-reference on attention is the difficulty people have orientating themselves away from self-referenced stimuli (see Sui & Humphreys, 2015). Furthermore, the memory trace of self-reference also appears to be “sticky”—once people have encoded a stimulus with reference to the self, they show interference should that stimulus association be changed in the future. This suggests that processes at the time of encoding are particularly impactful in shaping self-reference effects. SRE has been found for both positive and negative stimuli, however, this can vary depending on whether memory is being measured via recollection or recall. In one study, people showed an SRE for both positive and negative traits when making recognition judgments where the stimulus was fully cued. A second study in this series found that the SRE persisted only for positive traits when measured by uncued recall (i.e., simply asking people to list all the words they remembered from the task, following a brief filler task) (D’Argembeau, Comblain, & Van der Linden, 2005). This may indicate that open-ended retrieval processes are more shaped by people’s desire to view themselves positively. When an object’s full array of
features are available in the immediate environment, as is the case for most endowment studies, this is more analogous to cued recognition.

Overall, the emergence of SRE effects under conditions of imagined ownership echoes the previously described incidental self-encoding findings, suggesting that minimal self-associations are sufficient to produce self-referential effects in attention and memory processes. These results might be interpreted as an especially strong test of mere ownership. The effect would arguably be expected to persist, if not increase, under conditions of actual (vs. psychological) ownership.

**Information Processing**

Recently, we developed an integrative theoretical framework attributing the endowment effect to cognitive frames determining the subset of information accessible at the time an object is evaluated (Morewedge & Giblin, 2015). Cognitive frames can be either exogenous (e.g., role as a buyer or seller) or endogenous (e.g., psychological ownership) and influence the accessibility of value-relevant attributes by shaping the subset of transaction-relevant information that is searched for, attended to, encoded, and recalled in a manner akin to confirmatory hypothesis testing. For example, eye-tracking data indicate that sellers (vs. buyers) of lottery tickets attend more to high (vs. low) possible outcomes, which in turn predicts differences in valuations (Ashby, Dickert, & Glöckner, 2012). To the extent that eye-tracking reveals patterns of attention, it might be argued that participants constructing valuations from memory are able to better recall and integrate information that received more attention. The present self-reference theory of endowment draws on a similar interplay of enhanced attention and memory.
Within the present framework, self-reference theory explains why ownership would act as a cognitive frame increasing the salience of owned object attributes. Through processes such as increased attention or encoding in memory, self-association via ownership may broadly increase the salience of owned object attributes. Because most goods have predominantly positive features, increased salience of those features due to ownership should generally increase perceived value. This conjecture is consistent with the large body of work finding a positive effect of ownership on object valuations. For objects with predominantly negative features, however, increased salience of those features due to ownership should generally decrease perceived value. Here, the present theory diverges from previous work.

The Present Research

Self-reference theory can explain why ownership would be a particularly potent cognitive frame, enhancing attention and memory for objects associated with the self. I conduct a series of studies to investigate this alternate theory of the endowment effect, empirically testing for the influence of self-referential effects of ownership on object evaluations. I also derive predictions for novel moderators relating to self-reference effects, which should in turn affect the direction and magnitude of the endowment effect.

The present self-reference theory of endowment suggests that the mere ownership effect is due to boosted salience of attributes of the good when associated with the self. This diverges from the self-enhancement theory that positive evaluations result from a good being associated with the positively valenced self-concept (Gawronski et al., 2007). Self-reference theory thus makes divergent predictions from previous theory for patterns of evaluation, depending on object valence (i.e., goods and bads). The present self-reference theory agrees with extant theory that ownership should result in increasingly positive evaluations of goods. Notably, the present
theory diverges in predicting that (mere) ownership should result in increasingly negative evaluations of bads. The empirical investigation for this dissertation research consists of ten experiments: Studies 1, 2A, 2B, 2C, 3, 4, 5A, 5B, 6, & 7. Studies 1 and 2(A, B, & C) tested the effect uniquely predicted by the present self-reference theory: a reversal of the endowment effect for bads in a mere ownership paradigm. My first corresponding hypothesis is as follows:

**H1: Ownership Polarization:**
*Stimulus valence should be more intense for owned (vs. non-owned) stimuli.*

There are indeed cases where previous theories predict a reversal of the endowment effect based on increased attentional processing (Bhatia, 2013; Bordalo, Gennaioli, & Shleifer, 2012). However, the present investigation offers the mechanism of self-reference for understanding why endowed objects would receive such increased attention, even under conditions of mere ownership (i.e., in the absence of any loss frame). This differentiates the present self-reference theory from extant research. Further, self-reference theory of ownership generates novel predictions specifying when and for whom the endowment effect (or its reversal) will be strongest. My second corresponding hypothesis is as follows:

**H2: Ownership polarization should be stronger for people who associate the stimulus more closely with the self-concept.**

Studies 3-6 examined how factors uniquely predicted by self-reference theory interact with ownership in the context of the endowment effect. Study 3 tested self-referential advantage in memory as an individual difference. Study 4 manipulated cultural mindset (i.e., interdependent vs. independent self-construal). Studies 5A & 5B examined private self-consciousness (both manipulated and measured) as a moderator. Whereas Study 1 tested the effect within the domain of bads (replicating stimuli from previous research (Brenner, Rottenstreich, Sood, & Bilgin, 2007)), follow-up studies tested self-reference predictions for goods as well. Furthermore, Studies 5 & 6 were designed to extend beyond mere ownership, using the exchange or valuation
paradigms, which allow for additional inferences extending to outcomes more directly related to market behavior.

**H3: Ownership polarization should be stronger for stimuli that are more easily associated with the self-concept.**

Whereas Studies 1-5 focused on differences affecting how readily people link owned stimuli to the self, Study 6 focused on features of the object itself. Study 6 examined how characteristics of the object affect how well the object facilitates self-referential memory. Specifically, I manipulated the identity-relevance of an object, predicting that the reversal of the endowment effect would be stronger for negative stimuli more easily associated with the self in memory.

**Study 1: Ownership Polarization for Bads**

Based on a replication of the experiment used to demonstrate a reversal of the endowment effect for bads, (Brenner et al., 2007; Shu & Peck, 2011) this study instead used a mere ownership paradigm. This design rules out loss-aversion-based explanations by ensuring that participants are assigned to consider themselves as owners without the salient possibility of loss or transfer of that owned outcome. This isolates the role of ownership in the absence of any confounding loss frame, effectively testing whether the pattern found by Brenner et al., a reversal of the endowment effect attributed to valence loss aversion, extends from the exchange paradigm to the mere ownership paradigm. As depicted below, Brenner et al. would not predict a difference in object evaluations based on ownership—their theory depends critically on the perception of loss.

**Valence-Loss Aversion Prediction**

<table>
<thead>
<tr>
<th>Stimulus Attributes</th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominantly Good</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Predominantly Bad</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

DV: Evaluation/liking for the stimulus
In contrast, self-enhancement theory predicts that ownership will add a positive association to the object. For objects with predominantly positive attributes ("goods") this positive association produces a typical endowment effect—owners evaluate the good more positively than non-owners. For objects with predominantly negative attributes ("bads"), an additional positive association should "lessen the blow" and mute owners’ negative evaluations, leading owners to evaluate the bad less negatively than non-owners. In other words, self-enhancement theory predicts a main effect of stimulus valence and a main effect of ownership.

**Self-Enhancement Prediction**

<table>
<thead>
<tr>
<th>Stimulus Attributes</th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominantly Good</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Predominantly Bad</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

DV: Evaluation/liking for the stimulus

In contrast to the two preceding theories, self-reference theory predicts that ownership will increase the intensity of object valence, polarizing judgments of owned goods such that they are evaluated more positively than non-owned goods, and owned bads such that they are evaluated more negatively than non-owned bads. For goods, self-reference theory predicts a similar pattern to self-enhancement theory. For bads, however, self-reference theory makes divergent predictions from both self-enhancement and valence loss aversion theories. For this reason, I begin my investigation in the domain of bads, testing whether the reversal of the endowment effect, previously attributed to loss aversion, can occur under conditions of mere ownership and in the absence of any loss frame.

**Self-Reference Prediction**

<table>
<thead>
<tr>
<th>Stimulus Attributes</th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominantly Good</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Predominantly Bad</td>
<td>-</td>
<td>--</td>
</tr>
</tbody>
</table>

DV: Evaluation/liking for the stimulus
If I indeed find this pattern of results for bads, it will be evidence that mere ownership is a sufficient condition to cause a reversal of the endowment effect. This would be a critical demonstration of the utility of self-reference theory for making novel predictions differentiated from alternate extant theory. Previously, a special version of loss aversion was needed in order to explain the reversal of the endowment effect (valence loss aversion; Brenner et al., 2007). The predicted results, however, would suggest that self-association alone can produce a reversal of the endowment effect, even in the absence of any loss frame. This boundary condition sheds light on the underlying mechanisms behind the endowment effect, isolating a setting where theories make competing predictions.

For positive goods, where self-reference and self-enhancement make similar predictions, it is possible that both mechanisms contribute to endowment effects. My aim is to test processes uniquely related to the present self-reference theory of ownership to examine whether manipulating these factors alone can shift evaluations.

If I do not find the predicted pattern (i.e., endowment reversal for bads under conditions of mere ownership), this discovery will still be quite valuable. Specifically, if the results resemble the predictions of self-enhancement theory (i.e., a standard endowment effect for bads under conditions of mere ownership), this would support an account by which the positive valence of the self-concept drives evaluations. Such a result would contribute to scientific knowledge by refuting the self-referential account of ownership, a theoretical conjecture which we have shared with the scientific community (Morewedge & Giblin, 2015). The present dissertation addresses this open empirical question through the design of the experiments—null results are nonetheless informative to the scientific record.
Indeed, if I find no effect of ownership on evaluations, this evidence would favor Brenner et al.’s original valence loss aversion account of the reversal of the endowment effect, suggesting that such a reversal does indeed require loss framing. This finding would be an important caveat for the proliferating research in favor of ownership accounts, as it would be a case where loss aversion better explains endowment phenomenon than ownership does. Furthermore, few if any information processing studies have yet isolated ownership from loss, so knowing what unique effects are expected in the negative domain is likewise important for theoretical development in that area.

Methods

Participants and Design

Two hundred eight Americans (80 women; $M_{age} = 35.31$ years, $SD = 12.31$) completed a short survey on Amazon Mechanical Turk. The experiment employed a 2 (ownership status: non-owner, owner) x 2 (stimulus: traffic school, cash fine) between-subjects design.

Procedure

Participants were randomly assigned to view and evaluate one of two stimuli: a visit to traffic school or a cash fine. Depending on ownership condition, the stimulus was described as belonging to the participant or not. Critically, both stimuli were drawn directly from previous research finding a reversal of the endowment effect for bads when participants had an opportunity to exchange for another bad (Brenner et al., 2007).

Specifically, the stimuli were presented as follows, depending on ownership condition: for the fine, participants read “Imagine that [you receive/there is] a $100 fine for violating the posted speed limit.” For the traffic school assignment, participants in the ownership condition
read “Imagine that [you receive/there is] a penalty of three 4-hour sessions of traffic school for violating the posted speed limit.”

After seeing the stimulus, participants rated it on two measures which served as the dependent variables. First, they reported to what extent they liked or disliked the penalty on a 7-point scale with labels (1) Dislike Extremely, (4) Neither Like Nor Dislike, and (7) Like Extremely. Next, they responded to the question “How good or bad is this penalty” on a 7-point scale with labels (1) Extremely Bad, (4) Neither Good Nor Bad, and (7) Extremely Good. Finally, participants reported their age and gender and were presented with an attention check (“To gauge your attention to the instructions of this survey, please do not click on any of the values in the scale below”) displayed above a 5-point scale anchored at (1) Very Unsatisfied and (5) Very Satisfied. This attention check was intended to serve as an exclusion criterion to identify participants who may have generally been inattentive (i.e., randomly selecting answers without reading the corresponding questions.)

Results and Discussion

Four participants failed the attention check and are excluded from all subsequent analyses. Six participants erroneously entered a value over 100 for their age (e.g., 800, 1000). These six participants’ ages were treated as missing data when reporting participant demographics; otherwise data for those six participants are included in the analyses reported below. The direction and significance level of all tests reported here do not change if these groups of participants who either failed the attention check or entered an invalid age are included, all p’s remain <=.001.
Results were submitted to a two-way ANOVA with ownership (owner, non-owner) and stimulus (cash fine, traffic school) as between-subjects factors. The two dependent measures (liking and valence ratings) were highly correlated ($r = .76, p < .001$) and were thus collapsed into a single “evaluation” measure for further analysis.

Evaluation

As predicted, there was a main effect of ownership on evaluation, $F(1, 200) = 20.32, p < .001$, such that owners ($M = 2.68, SD = 1.30$) evaluated the stimulus significantly more negatively than non-owners ($M = 3.67, SD = 1.82$); this main effect held if stimulus type was treated as a covariate, $F(1, 201) = 20.40, p < .001$. There was no main effect of stimulus type nor was the interaction between ownership and stimulus significant ($p$’s > .27). This pattern held when the DV’s were analyzed separately for liking and valence (see appendix).

The results of Study 1 are consistent with self-reference theory, suggesting that the reversal of the endowment effect extends beyond the exchange paradigm to the mere ownership paradigm. Using the same stimuli as Brenner et al., I replicate their result in the absence of any loss frame. This result would clearly not be predicted by their theory, which depends critically on loss aversion. Nor would this result be predicted by extant ownership theory based on self-enhancement, which would predict a standard endowment effect even for bads, such that owners would view bads in a more favorable light than non-owners (i.e., bads perceived somewhat less negatively when they benefit from a positive self-association).

Previous information processing theories have focused on how one of two options may receive increased attention affecting evaluations due to being the status quo subject to loss (Carmon & Ariely, 2000; Johnson, Haubl, & Keinan, 2007). The present research further
suggests that ownership may be sufficient to change evaluations of a given negative stimulus depending not on loss, but solely on self-association.

**Study 2A: Ownership Polarization Across Domains**

The purpose of Study 2A was to generalize the findings of Study 1 by examining the observed effect in other domains (i.e., beyond traffic violations). Additionally, Study 2A (and all subsequent studies) included both goods and bads. This design facilitates more direct comparison, increasing the potential impact of the present research.

Appropriate stimuli were identified by consulting relevant literature. Previous research has found an effect of comparisons, such that peoples’ preferences shift depending on which choice alternative is the focal option (Dhar, Nowlis, & Sherman, 1999). This pattern is moderated by valence, such that goods are perceived as more attractive when they are the focal option, and bads are perceived as less attractive when they are the focal option (H1a & H1b; p. 295). The focal option was manipulated in those studies by asking participants how two options were different from one another before eliciting preferences. The focal option was manipulated between-subjects, such that X would be the focal option in the following comparison construction: “In what ways is X different from Y?” Although this previous research may be applicable to explain the exchange paradigm of endowment, it is less clear how the comparison mechanism would be implicated in mere ownership or valuation paradigms. The present theory invokes an analogous pattern that applies across all three different elicitations of endowment: the cognitive effects of self-reference (i.e., self-association via ownership) affecting object evaluations. Thus, I adapted the negative stimuli for the present study directly from this previous, conceptually related work (Dhar, Nowlis, & Sherman, 1999; Study 1). Those authors drew conclusions about valence through sets of attractive and unattractive options that were not
necessarily matched. Attractive sets included desserts, vacation spots, and jobs after graduation. Unattractive sets included punishments for breaking the speed limit (stuffing envelopes vs. cleaning graffiti), medications with various side effects (heartburn and indigestion vs. headaches), and apartment roommates with various annoying qualities (untidy vs. noisy). For a more closely-matched design that would facilitate meaningful comparisons between valence conditions, I started with the negative stimuli pairs and created positive analogs that were in more closely related domains: volunteer opportunities (local neighborhood vs. animal shelter), positive effects of supplements (improved digestion and gut health vs. improved memory), and apartment roommates with various desirable qualities (clean and tidy vs. quiet).

Methods

Participants and Design

One hundred twenty Americans (57 women; $M_{age} = 36.45$, $SD = 11.20$) completed a short survey on Amazon Mechanical Turk. The experiment employed a 2 (stimulus valence: good, bad) x 2 (ownership: owner, non-owner) mixed design, with stimulus valence manipulated between-subjects and ownership manipulated within-subjects.

Procedure

At the outset of the survey, participants were randomly assigned to a valence condition determining whether they would view either goods or bads for the remainder of the study. Within each valence condition, three pairs of stimuli were presented in random order. For each pair, participants were randomly assigned to imagine owning one stimulus, but not the other. Participants rated liking (e.g., To what extent do you like or dislike this [roommate, punishment, etc.]) for each stimulus on a 7-point scale anchored at (1) Dislike Extremely (4) Neither Like
Nor Dislike (7) Like Extremely. Similarly, they rated stimulus valence (e.g., “How good or bad is this [roommate, punishment, etc.]?”) on a 7-point scale anchored at (1) Extremely Bad (4) Neither Good Nor Bad (7) Extremely Good. Finally, participants reported age and gender and were subjected to the same attention check used throughout this research program, as described in Study 1.

Results and Discussion

Three participants failed the attention check and are excluded from all subsequent analyses. Results were submitted to a three-way mixed ANOVA with valence (good, bad) as a between-subjects factor, and both ownership (owner, non-owner) and stimulus category (supplements, experiences, roommates) as within-subjects factors. The two dependent measures (liking and valence ratings) were highly correlated ($r$’s $>.78$, $p$’s $<.001$) and were thus collapsed into a single “evaluation” measure for further analysis.

The purpose of Study 2A was in part to identify paradigms in which to further study my effect throughout the remaining experiments of my dissertation. Thus I present the results here by category, with the data separated by valence (good vs. bad), in order to examine the effect of the focal variable, which was ownership.

For bads, a paired samples t-test revealed a significant effect of ownership on evaluations within the supplement category, $t(57) = -2.45, p = .017$, such that owned supplements ($M = 2.63, SD = 1.09$) were rated more negatively than non-owned supplements ($M = 2.91, SD = 1.04$). For bads, ownership did not have a significant effect on evaluations within either of the other two categories (experiences, $p = .24$; roommates, $p = .22$).

For goods, a paired t-samples test revealed a significant effect of ownership on evaluations within the supplement category, $t(58) = 2.91, p = .005$, such that owned supplements
(M = 5.92, SD = 1.02) were rated more positively than non-owned supplements (M = 5.62, SD = 1.08). For goods, ownership did not have a significant effect on evaluations within either of the other two categories (experiences, p = .70; roommates, p = .44).

Discussion

Although I had predicted a mere ownership effect for goods across all three categories, and a reverse mere ownership effect for bads across all three categories, such results only manifested for one category: supplements. In Study 2B, I test whether the effect found for the supplement category does indeed replicate. The null results for the other two categories in Study 2A do raise questions about unspecified boundary conditions. In this dissertation, I first focus on examining cases where my predicted pattern does arise, and testing related mechanisms that would illuminate why that is so. In the future it will be productive to study what kinds of moderators can “turn off” the effect, as appears to have happened for some categories in Study 2A.

**Study 2B: Replicating the Ownership Polarization Effect for Supplements**

The purpose of Study 2B was to replicate the effect within the paradigm that had worked for Study 2A, before building on that paradigm in subsequent studies. This would ensure that the results were robust for supplements, which was especially important given that I had no a priori reason in Study 2A to predict that this category would behave uniquely from the other two categories I had tested.

**Methods**

*Participants and Design*

One hundred twenty Americans (50 women, 1 “prefer not to respond”; M<sub>age</sub> = 35.85, SD = 11.84) completed a short survey on Amazon Mechanical Turk. Study 2B employed a 2
(stimulus valence: good, bad) x 2 (ownership: owner, non-owner) mixed design, with stimulus valence manipulated between-subjects and ownership manipulated within-subjects. As in the previous studies, the dependent measure consisted of two continuous variables: liking and valence ratings.

Procedure

At the outset of the study, participants were assigned to one of two stimulus valence conditions, which determined whether they would see goods or bads. Each participant was displayed information about two supplements. Ownership framing was varied within-subjects such that one supplement was framed as being owned by the participant and the other was not. Specifically, participants assigned to view and rate goods read, depending on ownership condition, “Imagine that [you take/there is] a nutritional supplement that improves [your] [digestion and gut health/memory].” Participants assigned to view and rate bads read, depending on ownership condition, “Imagine that [you take/there is] a nutritional supplement that causes [you] [frequent mild headaches/mild heartburn and indigestion] as side effects.” Participants rated each of the two supplements they had viewed on two 7-point scales, as in Study 1 and Study 2A (“To what extent do you like or dislike this nutritional supplement?” “How good or bad is this nutritional supplement?”).

Results and Discussion

Four participants failed the attention check, and are thus excluded from subsequent analyses. Liking and stimulus valence ratings were highly correlated ($r’s \geq .94$), and were thus collapsed into a single evaluation measure. Results were submitted to a 2 (stimulus valence: good, bad) x 2 (ownership: owner, non-owner) mixed ANOVA with stimulus valence as the between-subjects factor and ownership as the within-subjects factor. There was a significant ownership x stimulus
valence interaction, $F(1, 114) = 6.18, p = .014$. Given the significant interaction, data were next examined for simple main effects of ownership. Within bads, there was a marginal effect of ownership such that owned bads ($M = 2.19, SD = 1.08$) were evaluated lower than non-owned bads ($M = 2.43, SD = 1.26$), $F(1, 57) = 3.59, p = .063$. Within goods, the effect of ownership on evaluation was marginal, however, the pattern was trending in the direction of a standard endowment effect, such that owned goods ($M = 5.84, SD = 1.12$) were evaluated (non-significantly) higher than non-owned goods ($M = 5.29, SD = 1.30$), $F(1, 57) = 2.73, p = .104$.

Liking. The pattern of results reported for the collapsed evaluation measure was similar to that for liking alone. For liking, there was a significant ownership x stimulus valence interaction, $F(1, 114) = 7.82, p = .006$. Within bads, owned bads ($M = 2.00, SD = 1.06$) were significantly less liked (i.e., more disliked) than non-owned bads ($M = 2.31, SD = 1.33$), $F(1, 57) = 4.94, p = .030$. Within goods, owned goods ($M = 5.81, SD = 1.23$) were marginally more liked than non-owned goods ($M = 5.50, SD = 1.39$), $F(1, 57) = 3.24, p = .077$.

Valence. For the valence outcome measure, the stimulus valence condition x ownership interaction was marginal, $F(1, 114) = 3.25, p = .074$. Looking at the simple main effects of ownership, the trends were consistent with the present theory, but were also non-significant. Within goods, owned goods ($M = 5.88, SD = 1.09$) were rated as somewhat more good than non-owned goods ($M = 5.69, SD = 1.29$), $F(1, 57) = 1.63, p = .207$. Within bads, owned bads ($M = 2.38, SD = 1.21$) were rated as somewhat less good (i.e., more bad) than non-owned bads ($M = 2.55, SD = 1.31$), $F(1, 57) = 1.63, p = .207$. 

Overall, the results of Study 2B suggest that the effect of interest might be better captured by a liking outcome than by a valence outcome.

**Study 2C: Non-Replication of Ownership Polarization**

Given the mixed results in subsequent studies, an exact replication of Study 2B was recently conducted (in July 2018) with a higher number of participants in order to increase statistical power and examine the robustness of the effect.

**Methods**

*Participants and Design*

Two hundred fifty-one Americans (111 women; M_{age} = 35.34, SD = 12.07) completed a short survey on Amazon Mechanical Turk. This exact replication of Study 2B again employed a 2 (stimulus valence: good, bad) x 2 (ownership: owner, non-owner) mixed design, with stimulus valence manipulated between-subjects and ownership manipulated within-subjects. As in the previous studies, the dependent measure consisted of two continuous variables: liking and valence ratings.

*Procedure*

All procedures and stimuli were identical to the original Study 2B.

**Results and Discussion**

Thirty-seven participants failed the attention check, and are thus excluded from subsequent analyses. Liking and stimulus valence ratings were highly correlated (r’s ≥ .915, p’s < .001) and were thus collapsed into a single evaluation measure. Results were submitted to a 2 (stimulus valence: good, bad) x 2 (ownership: owner, non-owner) mixed ANOVA with stimulus valence as the between-subjects factor and ownership as the within-subjects factor. There was no significant
ownership x stimulus valence interaction on evaluations ($p > .43$). Nor was there any main effect of ownership on evaluations ($p > .34$). There was, however, a significant main effect of stimulus valence on evaluations, such that goods ($M = 5.71$, $SD = .99$) were rated more positively than bads ($M = 2.50$, $SD = 1.41$), $F(1, 212) = 360.50$, $p < .001$.

Liking. A similar pattern emerged when examining the liking measure alone: There was no significant ownership x valence interaction ($p > .64$), nor was there a main effect of ownership ($p > .26$). There was, however, a significant main effect of stimulus valence on liking, such that goods ($M = 5.66$, $SD = 1.09$) were liked more than bads ($M = 2.40$, $SD = 1.48$), $F(1, 212) = 329.26$, $p < .001$.

Valence. Again, a similar pattern emerged when examining the valence measure alone. There was no significant ownership x valence interaction ($p > .32$), nor was there a main effect of ownership ($p > .60$). There was, however, a significant main effect of stimulus valence on valence ratings, such that goods ($M = 5.76$, $SD = .98$) were rated as relatively more positive than bads ($M = 2.60$, $SD = 1.44$), $F(1, 212) = 340.12$, $p < .001$.

Overall, this study constitutes a failure to replicate the ownership polarization findings of Study 2B, which had previously been built on for subsequent studies testing more complex hypotheses. This may help explain the mixed results found in this project overall. The persistence of a main effect of stimulus valence supports a minimum level of internal validity, casting doubt on any interpretation that these participants responded entirely randomly. Notably,
there was no effect of ownership whatsoever observed in this replication attempt, which is inconsistent with both self-enhancement theory and the present self-reference theory.

**Study 3: Self-Reference Effects as an Individual Difference**

Study 3 is designed to replicate the results of the previous studies, in addition to extending those findings. Study 3 tests my second hypothesis, that stimulus valence should be more intense for people who more readily associate the stimulus with the self.

*Predicted Results*

I predict the reversal of the endowment effect for bads will be stronger for people who show a stronger self-reference effect in a preceding (unrelated) task (i.e., who show greater evidence of privileged memory encoding for self-referent stimuli).

**Self-Reference Prediction for BADS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-reference Score</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Low Self-reference Score</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

DV: Evaluation/liking for a BAD

For goods, I predict that the standard endowment effect will be stronger for people who show a stronger self-reference effect.

**Self-Reference Prediction for GOODS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-reference Score</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Low Self-reference Score</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

DV: Evaluation/liking for a GOOD

In contrast to the present self-reference theory, which invokes the cognitive effects of the self-concept, self-enhancement theory invokes the positive valence of the self-concept. There is not a clear connection between the self-reference effect as an individual difference and
constructs related to the valence of the self-concept. Thus, self-enhancement theory would not predict moderation by self-reference scores.

It is possible that higher self-esteem is associated with a more salient or elaborated self-concept that might affect self-reference scores, in which case self-reference scores might be expected to moderate the endowment effect for goods, leading to a similar prediction as the present self-reference theory.

**Self-Enhancement Prediction for GOODS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-reference Score</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Low Self-reference Score</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>

DV: Evaluation/liking for a BAD

For bads, however, the predictions of self-enhancement theory clearly diverge from those of self-reference theory. Any connection between self-reference scores and the positive valence of the self-concept (i.e., implicit self-esteem) would suggest that people who score high (vs. low) on self-reference as an individual difference should show a stronger standard endowment effect (i.e., owned bads should be rated as relatively less bad than non-owned bads).

**Self-Enhancement Prediction for BADS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-reference Score</td>
<td>--</td>
<td>-</td>
</tr>
<tr>
<td>Low Self-reference Score</td>
<td>--</td>
<td>-</td>
</tr>
</tbody>
</table>

DV: Evaluation/liking for a BAD

Study 3 utilizes the same style of mere ownership paradigm as Studies 1, 2A, and 2B. Critically, mere ownership does not invoke any form of loss. Therefore, loss-aversion-based theories would not predict any endowment effect nor reversals, for neither goods nor bads. Furthermore, loss aversion does not directly relate to self-reference as an individual difference. Therefore, there is no clear basis for loss aversion to predict any form of moderation by self-reference score.

**Loss Aversion Prediction for BADS (null effect)**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-reference Score</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Low Self-reference Score</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

**Loss Aversion Prediction for GOODS (null effect)**

Query Theory states that people focus on the value-increasing aspects of the status quo, and the value-decreasing aspects of the alternate option. In the present paradigm, there is no alternate option, so the focus should be solely on the value-increasing aspects of the status quo. For both goods and bads, this would lead to a standard endowment effect. Query Theory does not directly relate to self-reference as an individual difference. Therefore, there is no clear basis for Query Theory to predict any form of moderation by self-reference score.

**Query Theory Prediction for BADS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-reference Score</td>
<td>--</td>
<td>-</td>
</tr>
<tr>
<td>Low Self-reference Score</td>
<td>--</td>
<td>-</td>
</tr>
</tbody>
</table>

**Query Theory Prediction for GOODS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-reference Score</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Low Self-reference Score</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>

Overall, the present self-reference theory is unique in its prediction that there will be a mere ownership reversal for bads, such that owned bads are rated as worse than non-owned bads (as in Studies 1, 2A, and 2B). Study 3 aims to replicate this finding, consistent with my first hypothesis. Additionally, self-reference theory is unique in its prediction that the endowment
effect (and its reversal for bads) will be moderated by individual differences in self-reference. As such, Study 3 aims to empirically test my second hypothesis.

Methods

Participants and Design

Participants completed a two-part study. The first part of the study measured the extent to which participants showed a general self-referential memory advantage (i.e., as an individual difference score). In the second part of the study, participants were randomly assigned to an ownership condition (owner, non-owner) and recorded their evaluations of stimuli.

Procedure

The two parts of this study were presented as unrelated. First, participants completed a standard self-reference task in which they encoded personality trait words in relation to self vs. other. Following previous research investigating individual differences in the strength of the self-reference effect, participants considered 32 traits total: half in reference to themselves (e.g., ‘To what extent does the word tidy describe you?’) and half in reference to a familiar other (e.g., a president of the United States, ‘To what extent does the word tidy describe Barack Obama?’) (see Smallwood et al., 2011; Study 2). Each response was recorded on a 100-point slider scale ranging from 0 (Not at all) to 100 (Extremely). These responses were merely a way to expose participants to the target words, and are not central to the study of self-reference effects.

Afterwards, participants completed a surprise recognition-memory task in which they were presented 64 trait adjectives (half of them new) and asked, for each word, to indicate whether it had appeared earlier in the experiment. Participants responded via a dichotomous Yes/No measure. The proportion of correct “hits” for self vs. other was later converted to an individual self-reference score.
Part 2 replicated Study 2B of the present paper, testing the effects of mere ownership on evaluations, across both goods and bads, within the nutrition supplement paradigm.

Results and Discussion

Five participants failed the attention check, and are thus excluded from subsequent analyses. Liking and stimulus valence ratings were highly correlated ($r$'s $≥$ .87, $p$'s $<$ .001), and were thus collapsed into a single evaluation measure. An “ownership difference score” was calculated for each participant by subtracting their non-ownership evaluation from their ownership evaluation, such that ownership difference scores further from zero indicated a stronger tendency towards ownership polarization (i.e., with positive scores indicating that owned stimuli were evaluated more positively than non-owned stimuli, and negative scores indicating that owned stimuli were evaluated less positively than non-owned stimuli).

An analysis regressing ownership difference score onto valence condition (good = 1; bad = 0) and SRE score revealed no effect of valence condition, $b = .36$, $p = .46$, no effect of SRE score, $b = .11$, $p = .74$, and no significant interaction, $b = - .33$, $p = .41$.

Results were also submitted to a 2 (stimulus valence: good, bad) x 2 (ownership: owner, non-owner) mixed ANOVA with stimulus valence as the between-subjects factor and ownership as the within-subjects factor. There was no significant ownership x stimulus valence interaction, $F(1, 204) = .054$, $p = .817$. The only significant effect was the main effect of stimulus valence, such that goods ($M = 5.28$, $SD = 1.15$) were evaluated more positively than bads ($M = 2.49$, $SD = 1.15$), $F(1, 204) = 301.01$, $p < .011$.

Overall, results do not support any form of ownership polarization and are consistent with neither self-enhancement theory, which predicts a positive mere ownership effect for goods, nor the present self-reference theory, which predicts ownership polarization such that ownership
cause evaluations of goods to be more positive, and evaluations of bads to be more negative.

Furthermore, the results do not support any role for individual differences in self-reference score, counter to the present self-reference theory.

**Study 4: Culture**

Self-enhancement theory of ownership has been evoked to explain cultural differences in the endowment effect. Westerners displayed a stronger endowment effect for goods than easterners, a pattern that was replicated whether culture was primed or treated as a stable individual difference (Maddux et al., 2010). This pattern was explained in terms of independent construals typically endorsed by Westerners being associated with a tendency to self-enhance vs. self-criticize. From this perspective, self-enhancement theory would predict that people with a salient independent self-construal should evaluate bads more positively when they are owners (vs. non-owners).

**Self-Enhancement prediction**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Self-construal</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Interdependent Self-construal</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

DV: Liking for a BAD

The present self-reference theory of ownership provides a novel interpretation of the finding that Easterners show a weaker endowment effect for goods than Westerners. Notably, cultural differences have also been found for the self-reference advantage in memory. Asian-Canadians do not show a typical self-reference effect—personality traits (e.g., happy, stubborn, honest, shy) encoded in reference to the self are inhibited in recognition memory (i.e., slower response time) compared to when such traits are encoded in relation to another person (i.e., close friend) or a semantic property (i.e., presence of a vowel)(Wagar & Cohen, 2003). This finding is consistent with the assertion that the independent self-concept is a more efficient cognitive
structure enhancing memory in Westerners, while the interdependent self-concept might play an analoguous role in Easterners. Pairing a stimulus with an incongruent self-construal (i.e., individual independent ownership for Easterners) appears to lead to inhibited memory.

For goods, this might explain why Westerners show enhanced evaluations for owned goods associated with the self, compared to non-owned goods. (It follows that Easterners might show a similar pattern for goods linked to the collective interdependent self-construal that tends to be more accessible and cognitively elaborate, however this is not a proposition I directly test in the current study).

For bads, the self-reference theory of ownership predicts that when an independent self-construal is more salient, people will rate owned bads more negatively than non-owned bads, showing a strong reversal of the typical endowment effect. When an interdependent self-construal is salient, people should less readily encode information linked to the (incongruent) independent self (i.e., the self evoked in individual ownership) and will show an attenuated reversal of the typical endowment effect.

Specifically, I predict that this pattern of the reversal of the endowment effect for bads will be stronger when an independent (vs. interdependent) self-construal is salient.

<table>
<thead>
<tr>
<th>Self-Reference Prediction</th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Self-construal</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Interdependent Self-construal</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

DV: Liking for a BAD

*Expected Results*

I predict a significant ownership x valence interaction (i.e., ownership polarization) such that for goods, ownership increases positive evaluations (i.e., a standard endowment effect), and
for bads, ownership decreases positive evaluations (i.e., a reversal of the standard endowment effect). Furthermore, I predict that these patterns will be moderated by cultural primes.

For goods, I predict a significant interaction between cultural self-construal and ownership status, such that people will show a stronger endowment effect for a good following an independent (vs. interdependent) self-construal prime. This pattern would effectively replicate the findings of Maddux and colleagues (2010).

The key differentiating prediction of self-reference theory is in the domain of bads. For bads, I predict a significant interaction between cultural self-construal and ownership status, such that people will show a stronger reversal of the endowment effect for a bad following an independent (vs. interdependent) self-construal prime. This pattern would be consistent with self-reference theory, suggesting that the pattern for goods previously attributed to self-enhancement (Maddux et al., 2010) might alternatively be explained by self-reference.

Methods

Participants and Design

Four hundred participants from Amazon Mechanical Turk (171 women, 3 “Prefer not to respond”; $M_{age} = 35.34$, $SD = 10.92$) completed a survey in exchange for monetary payment. This study employed a 2 (culture: interdependent, independent) x 2 (stimulus valence: good, bad) x 2 (ownership: owner, non-owner) design with culture and stimulus valence manipulated between-subjects, and ownership status manipulated within-subjects.

Procedure

Culture Prime. Participants first completed a “participant information survey” containing one of two (randomly assigned) cultural primes in the form of a short essay prompt adapted directly from previous research on cultural moderation of the endowment effect (Maddux et al.,
2010; Study 2). The prompts serve the purpose of priming either interdependent or independent cultural self-construals. Specifically, in the interdependent self-construal condition, participants were asked to “write a brief essay about your friendships and family ties with other people, and how you might foster these relationships.” In the independent self-construal condition, participants were asked to “write a brief essay about your unique character and skills, and how you might stand out compared to other people.” Next, participants were presented with the same nutritional supplement descriptions as Study 2B.

Nutritional Supplements. All participants next viewed information about two hypothetical nutrition supplements presented on separate pages. Depending on valence condition, both supplements had either positive or negative attributes. Within-subjects, each participant was randomly assigned to view one supplement as an “owner” and the other supplement as a “non-owner.” Specifically, in the good condition, depending on ownership assignment, participants were asked to “Imagine that [you take/there is] a nutritional supplement that improves [your] [digestion and gut health/memory].” In the bad condition, participants were asked to “Imagine that [you take/there is] a nutritional supplement that causes [you] frequent mild [headaches/heartburn and indigestion] as a side effect.” Order was counterbalanced both for ownership and for specific nutrition supplement attributes.

Evaluation. On the same page that participants read about a given nutritional supplement, they rated that supplement on two dimensions.

Liking. First, participants reported their liking of the supplement (i.e., “To what extent do you like or dislike this nutritional supplement?”) on a 7-point scale anchored at (1) Dislike Extremely (4) Neither Like Nor Dislike (7) Like Extremely.
Valence. Second, participants rated the valence of the supplement (i.e., How good or bad is this nutritional supplement?) on a 7-point scale anchored at (1) Extremely Bad (4) Neither Good Nor Bad (7) Extremely Good.

Demographics. All participants were asked to report age and gender. Additionally, because this study implicated culture, participants were also asked to report their ethnic background and whether they were a citizen of the United States so that this data would be available as a covariate. Finally, participants were given the opportunity to leave any optional comments.

Results and Discussion

Fifteen participants failed the attention check and are thus excluded from further analyses. An additional two participants did not accurately complete the writing task (i.e., incoherent and unrelated responses to the culture prime) and are thus also excluded from further analyses.

The two dependent measures (liking and valence ratings) were highly correlated for both owned ($r = .915, p < .001$) and non-owned ($r = .882, p < .001$) stimuli. Liking and valence ratings were thus collapsed into a single “evaluation” measure for further analysis.

Evaluation. Results were submitted to a mixed ANOVA with valence condition and culture condition as between-subjects factors and ownership condition as a within-subjects repeated measure. There was a significant effect of valence condition, $F(1,379) = 656.957, p < .001$. All other effects were non-significant. Notably, there was no main effect of ownership, nor was there an ownership x valence interaction ($p’s > .47$).

Study 5A: Measuring Private Self-Consciousness
Private self-consciousness is an individual difference in self-awareness and attention to internal thoughts and feelings (Fenigstein, Scheier, & Buss, 1975). For people high in private self-consciousness, the self-concept tends to be chronically accessible in memory (Eichstaedt & Silvia, 2003).

Private self-consciousness has been found to moderate self-reference effects in memory such that high (vs. low) private self-consciousness predicts better recall of self-relevant stimuli (Hull & Levy, 1979; Hull, Van Treuren, Ashford, Propsom, & Andrus, 1988). Theoretically, this pattern has been explained by private self-consciousness implicating the extent to which people tend to encode information in terms of its self-relevance and tend to be particularly responsive to self-relevant aspects of the environment (Hull & Levy, 1979).

I expect that private self-consciousness will moderate the endowment effect as follows: I expect a main effect of ownership of a good such that valuations are higher amongst owners compared to non-owners (i.e., standard endowment effect). I expect this endowment effect to be stronger for participants high (vs. low) in private self-consciousness. For bads, I expect a reversal of the endowment effect (i.e., a main effect of ownership such that owned bads are valued less than non-owned bads). I expect this reversal of the endowment effect to be stronger for participants high (vs. low) in private self-consciousness.

Predicted Results Compared to Alternate Theories

As depicted below, for goods I predict that private self-consciousness will interact with ownership status such that owners higher in private self-consciousness will indicate a higher valuation of a good than owners lower in private self-consciousness. This interaction is the key prediction, as it differentiates self-reference theory from alternate accounts of the endowment effect.
Self-Reference Prediction for a GOOD

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Private Self-consciousness</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Low Private Self-consciousness</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

DV: Valuation of a GOOD

As depicted below, for bads I predict that private self-consciousness will interact with ownership status such that owners higher in private self-consciousness will indicate a lower valuation of a bad than owners lower in private self-consciousness. This interaction is the key prediction, as it differentiates self-reference theory from alternate accounts of the endowment effect.

Self-Reference Prediction for a BAD

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Private Self-consciousness</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Low Private Self-consciousness</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

DV: Valuation of a BAD

Self-enhancement, by contrast, predicts a main effect of ownership across both goods and bads. Owners would be expected to have higher valuations of objects than non-owners, regardless of whether a good or a bad is being considered. Since self-enhancement theory implicates the positive valence of the self-concept rather than the cognitive structure of the self-concept, there is not a direct basis for self-enhancement theory to make a prediction for any moderation by private self-consciousness.

Self-Enhancement Prediction for a GOOD

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Private Self-consciousness</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>
Query Theory predicts that people will focus on value-increasing aspects of the status quo, along with value-decreasing aspects of the alternative. For owners, possession of the endowed object is the status quo. A focus on value-increasing aspects of the status quo would therefore emphasize the positive aspects of the object, increasing valuations. A focus on the value-decreasing aspects of the alternative would emphasize the negative aspects of the cash, similarly biasing participants to view the object more positively (i.e., as more valuable) in comparison. Overall, Query Theory predicts a standard endowment effect across both goods and bads: owners should view owned objects relatively more positively than non-owners. In other words, in the case of bads, owners should view owned bads relatively less negatively than non-owners.

Critically, since Query Theory implicates the status quo rather than the cognitive structure of the self-concept, there is no direct basis for Query Theory to predict any moderation of the endowment effect by private self-consciousness. Therefore, the Query Theory predictions for this particular study map out similarly to the self-enhancement predictions, albeit for different underlying reasons.

**Query Theory Prediction for a GOOD**
Theories implicating loss aversion predict an emphasis on the forgone. This could result in an exaggeration of perceived attributes for the status-quo (i.e., what stands to be lost). In contrast to Query Theory, the focus would not necessarily be on the value-increasing aspects of the status quo. Assuming people focus on and exaggerate the valence of whatever they stand to lose, loss aversion predicts that owners should exaggerate the valence of owned objects when they are thinking about a prospective loss (i.e., when considering selling or trading an object). In this sense, it could be argued that a loss-aversion-based theory predicts an endowment effect for goods and a reversal of the endowment effect for bads in this study. This is because the dependent variable measures valuations which implicate loss (in contrast to evaluations such as liking, which do not necessarily entail a salient loss).

Critically, however, because loss aversion theories rely on the prospect of forgoing the status quo rather than the cognitive structure of the self-concept, there is no direct basis for loss aversion to predict any moderation of the endowment effect (or its reversal) by private self-consciousness.

### Loss Aversion Prediction for a GOOD

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Private Self-consciousness</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Low Private Self-consciousness</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>

DV: Valuation of a GOOD
High Private Self-consciousness | + | ++
---|---|---
Low Private Self-consciousness | + | ++

DV: Valuation of a GOOD

**Loss Aversion Prediction for a BAD**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Private Self-consciousness</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Low Private Self-consciousness</td>
<td>-</td>
<td>--</td>
</tr>
</tbody>
</table>

DV: Valuation of a BAD

Overall, any moderation of the endowment effect (or its reversal) by private self-consciousness is uniquely predicted by the present self-reference theory.

**Methods**

**Participants and Design**

Two hundred participants from Amazon Mechanical Turk (79 women; \( M_{age} = 33.44 \)) completed a survey in exchange for monetary payment. This study employed a 2 (valence: good, bad) x 2 (ownership: owner, non-owner) design. All participants viewed the same image of a product. Ownership status was randomly assigned by endowing half of participants with the product in an imagined ownership paradigm. Product valence was manipulated by describing that product with an attribute pretested as either positive or negative. All participants reported their evaluation and valuation of the product, the latter dollar valuation serving as the key dependent measure. Private self-consciousness was measured as a continuous independent variable.

**Procedure**
All participants were asked to “Please imagine that you are participating in a research study about your opinion of products. You are given a pen to inspect and answer questions about.” On the same page, all participants viewed an image of a Caliber brand black gel pen. This image was identical across all conditions.

Ownership Manipulation. Within a standard imagined ownership and valuation paradigm, half of participants were endowed with the Caliber brand gel pen depicted in the image (i.e., “owners”). Specifically, owners read “You will keep the pen after the study is over.” The other half of participants were non-owners, who instead were told “You will return the pen after the study is over.” Furthermore, all participants read a list of three facts about the pen. Depending on ownership condition, these statements either described “Your pen” or “This pen.” For example, the first statement was “[Your/This] pen is a Caliber brand pen.” The second statement read “[Your/This] pen uses jet black ink.” The content of the third statement depended on the valence manipulation described below.

Valence manipulation. Participants were randomly assigned to read a positive or negative third statement about the depicted pen that framed it as either a good or a bad. Specifically, participants in the good condition read “[Your/This] pen was made using fair trade labor practices.” Participants in the bad condition read “[Your/This] pen was made in a foreign country by a worker paid $0.13 per hour.” These attributes had been pretested to significantly affect reported purchase likelihood for this pen.

Liking measure. Still on the same page, participants reported their evaluation of the pen on a 7-point scale anchored at (1) Dislike Extremely (4) Neither Like Nor Dislike (7) Like Extremely. This liking measure is similar to those employed in the previous studies conducted for this dissertation, and allows those previous results (particularly those of Study 1) to be
conceptually replicated with new stimuli and valence manipulations (i.e., pens described with different attributes).

*Dollar valuation measure.* Still on the same page, participants were asked to indicate in a series of choice pairs whether they would rather receive the pen or various amounts of payment. This structure followed a standard hypothetical BDM procedure for owners versus non-owner choosers. Specifically, owners were asked to make choices between “keep your pen” or “sell your pen and receive indicated payment.” Non-owners chose between “receive the pen” or “receive indicated payment.” Twelve such choices were made at price points starting at $0, $.01, $.05, $.10, $.25, then increasing in $.25 increments to a maximum of $2.00. Across both owners and non-owners, the highest price point at which participants chose the product over the cash payment was recorded as their valuation. This valuation measure is the key dependent variable outcome on which the predictions outlined in the preamble to this study are based.

*Private self-consciousness measure.* Participants completed a questionnaire used in previous research to measure individual differences in private self-consciousness (Fenigstein et al., 1975; see Appendix). The experimental order was counterbalanced such that the individual difference measure randomly appeared either before or after all tasks related to the pen (described above).

**Results and Discussion**

Twelve participants were excluded from further analysis because their responses on the Becker-Degroot-Marschak valuation were inconsistent (i.e., jumped back and forth from picking the pen to the money at various dollar amounts) and thus uninterpretable as valuations. Data were analyzed for the remaining 188 participants.
An analysis regressing liking onto PSC score, the dummy coded valence (0 = bad, 1 = good) and ownership (0 = nonowner, 1 = owner) conditions, and their interactions, revealed no significant effects ($p$’s > .10). Similarly, an analysis regressing dollar valuations onto PSC, the dummy coded valence and ownership conditions, and their interactions, revealed no significant effects ($p$’s > .38).

I also examined goods and bads separately, regressing liking onto PSC score, ownership, and their interaction. For bads, there were no significant effects ($p$’s > .22). For goods, however, there was a significant effect of ownership condition, $B = -6.34, t = -2.10, p = .039$, and a marginally significant interaction of ownership and PSC score, $B = .622, t = 1.93, p = .057$. To further interpret this pattern, I performed a floodlight analysis using the Johnson-Neyman technique (as recommended by Spiller, Fitzsimons, Lynch, & McClelland, 2013) to examine the influence of ownership on liking of goods across the entire range of observed PSC scores (min = 0, max = 24). This analysis revealed that ownership influenced liking for any PSC score less than or equal to 8.4 (out of 27), $B_{\text{JN}} = -.61, \ SE = .31, p = .048$, but not for any PSC score greater than 8.67.

**Study 5B: Manipulating Private Self-consciousness**

Private self-consciousness can also be manipulated by having people focus on features of the self that make them distinct from others, in turn increasing the cognitive accessibility of the self-concept (Eichstaedt & Silvia, 2003).

Because of the link between private self-consciousness and self-reference effects in memory outlined in the rationale for Study 5A, I predicted a similar pattern of results in Study 5B. Specifically, I expected an ownership x valence interaction (i.e., ownership polarization) such that valuations of goods would be higher amongst owners compared to non-owners, and
valuations of bads would be lower amongst owners compared to non-owners. I expected these patterns to be stronger for participants primed with private self-consciousness.

Study 5B was designed to extend the findings of Study 5A from stable trait differences related to the chronic accessibility of the self-concept to transient experimentally manipulated differences. Manipulating private self-consciousness in Study 5B would help assure that the (predicted) results of Study 5A would not be due to any confounding variable that happens to relate to individual differences in private self-consciousness. Ruling out such confounds was considered especially important for the current investigation, as it would help address alternate explanations related to self-enhancement, and provide additional evidence that the predicted patterns were uniquely predicted by self-reference theory.

This prediction is also consistent with the recent finding that increased self-focus can uniquely increase evaluations of owned (vs. non-owned) objects, even in a population which normally does not show an endowment effect—Western children ages 3-4 (Hood, Weltzien, Marsh, & Kanngiesser, 2016).

**Self-Reference Prediction**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Private Self-consciousness (Prime)</td>
<td>-</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(low willingness to trade due to high valuation)</td>
</tr>
<tr>
<td>Low Private Self-consciousness (Control)</td>
<td>-</td>
<td>--</td>
</tr>
</tbody>
</table>

DV: Willingness to Trade for another GOOD

**Self-Reference Prediction**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Private Self-consciousness (Prime)</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(high willingness to trade due to low valuation)</td>
</tr>
<tr>
<td>Low Private Self-consciousness (Control)</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>

DV: Willingness to Trade for another BAD
Methods

Participants and Design

Four hundred two participants (197 women; $M_{age} = 35.83$ years, SD = 11.39) completed a short survey on Amazon Mechanical Turk. The experiment employed a 2 (valence: good, bad) x 2 (ownership status: owner, chooser) X 2 (private self-consciousness: prime, control) design.

Procedure

Participants were randomly assigned to either a condition priming private self-consciousness or a control condition. The private self-consciousness prime was taken verbatim from previous research, and was displayed for half of participants at the outset of the study. It consisted of 3 brief questions: “What is it about you that makes you different from [your friends/your family/people in general]?” (Eichstaedt & Silvia, 2003, Study 2). According to Eichstaedt and Silvia, “Past work has validated this task as a manipulation of self-focused attention (Silvia & Eichstaedt, 2004), and the task replicates conventional manipulations, for example, mirrors (Sivlia, 2001, 2002)” (2003).

Control participants proceeded straight to the next step of the study. This decision was made in light of previous findings directly contrasting this style of “no control” with a “neutral control” essay task intended to hold writing effort equivalent without invoking self-focus. In previous research relating to self-focus (i.e., response latency recognizing self-related words), the two control conditions did not lead to different patterns of results, and both types of control conditions differed significantly from the effect of the Private Self-consciousness prime. Thus, in order to avoid contaminating the sample with potentially unexpected reactions to previously employed “neutral” topics (for example, “What are the most important features of your
computer’s hardware/operating system/network environment?”; Eichstaedt & Silvia, 2003, Study 2), I chose to have the control participants move straight to the next part of the survey.

All participants then read about two nutritional supplements and were asked to indicate their relative preference. Participants evaluated one pair of either goods or bads. Those stimuli were the nutritional supplements used in my previous studies described as having (side) effects of heartburn or headaches (i.e., bads), or memory improvement or digestion/gut health (i.e., goods). The specific wording used in each condition described below can be referred to directly in the appendix.

Owners were “endowed” with one supplement (‘Supplement A’) and then asked their willingness to trade for another supplement of the same valence (‘Supplement B’). In this ownership condition, relative preference (i.e., willingness to trade) was reported on a 7-point scale anchored at (1) Definitely prefer to keep Supplement A and (7) Definitely prefer to trade for Supplement B.

For choosers, the presentation order of the two supplements was counterbalanced within valence condition such that each type of supplement would be labeled “A” and displayed on the left half the time. In this non-ownership (i.e., chooser) condition, relative preference was reported on a 7-point scale anchored at (1) Definitely prefer Supplement A and (7) Definitely prefer Supplement B.

Results

Twenty-nine participants failed the attention check and are thus excluded from subsequent analyses. Reported significance levels remain unaffected regardless of this exclusion.

Results were submitted to a three-way ANCOVA including the specific “default” supplement as a covariate. This covariate accounts for which specific supplement had been
presented as “Supplement A,” which was displayed first above “Supplement B,” and appeared on the left side of the relative preference measure. For owners, “Supplement A” was also the endowed stimulus. In other words, across both owners and choosers, participants assigned to the same default Supplement A effectively reported a relative preference for the same supplement.

Relative preference ratings served as the dependent variable across both choosers and owners. Results were submitted to a three-way ANCOVA with valence (good, bad), ownership status (owner, chooser) and private self-consciousness (prime, control) as between-subjects factors, and default stimulus as a covariate. The three-way interaction was nonsignificant ($p = .539$). The two-way interaction between ownership and private self-consciousness was marginally significant, $F(1, 366) = 3.258, p = .072$. There were no other significant 2-way interactions between stimulus valence and private self-consciousness prime, nor stimulus valence and ownership ($p$’s > .33).

The simple main effect of ownership was statistically significant for participants primed with private self-consciousness ($F(1, 366) = 5.002, p = .026$), but not for control participants ($F(1, 366) = .086 , p = .770$). Pairwise comparisons were made with a bonferroni adjustment for participants primed with private self-consciousness: owners primed with private self-consciousness ($M = 3.30, SE = .194$) reported a lower willingness to trade than non-owners primed with private self-consciousness ($M = 4.006, SE = .249$). Within bads, there was a significant effect of ownership for people primed with private self-consciousness, such that owners ($M = 3.255, SD = 1.635$) were significantly less willing to trade than non-owners ($M = 4.294, SD = 1.605$), $F(1, 86) = 8.461, p = .005$. This pattern did not hold across stimulus valence: there was no significant effect of ownership for people primed with private self-consciousness who evaluated goods, $p = .459$. 
discussion

Overall, I expected that the private self-consciousness prime would interact with ownership status. For goods, I expected that owners in the private self-consciousness condition would exhibit a lower willingness to trade than owners in the control condition. For bads, I expected that owners in the private self-consciousness condition would exhibit a higher willingness to trade than owners in the control condition.

The results are inconsistent with those predictions. For bads, owners primed with private self-consciousness showed a stronger relative preference for their endowed supplement, compared to non-owners primed with private self-consciousness. This pattern is inconsistent with the present self-reference theory, however it is not wholly consistent with alternate theories either. Although self-enhancement theory predicts a standard endowment effect for bads, it does not clearly predict any moderation by private self-consciousness. Thus, self-enhancement does not readily explain why a standard endowment effect emerged for bads when participants were primed with private self-consciousness, but not in the control condition. Similarly, loss aversion does not implicate factors related to the cognitive representation of the self, such as would be evoked by private self-consciousness. Notably, previous work on possession loss aversion for bads finds an endowment effect reversal, which was not replicated in the present data. Query Theory, which hinges on the status quo, similarly should not implicate any moderation by private self-consciousness.
There are two interpretations of the results, both of which require some degree of speculation. First, it could be the case that loss frames interact with self-reference and create additional boundary conditions beyond the scope of the present theory that might reconcile the fact that a standard endowment effect was observed for bads for PSC participants in Study 5B in a trading paradigm, who were evaluating the same nutritional supplement stimuli which produced an endowment effect reversal in Study 2A and 2B, consistent with the present self-reference theory.

Second, it is possible that there are as yet undiscovered connections between the valence and cognitive structure of the self-concept. Neither of these theories explain why any effect of ownership (or interaction with PSC) would be observed for bads, but not goods. Indeed, the failure to replicate a standard endowment effect for goods, especially in the control condition where participants went straight to the endowment task, is hard to explain within the structure of any of the competing theories discussed in this research program.

Although the private self-consciousness prime used in Study 5B is conceptually distinct from the independent self-construal prime in Study 4, they do bear some similarity in drawing attention to distinct features of the self. Study 5B was intended to complement the results of Study 5A by conceptually replicating the effect of private self-consciousness, both measured as an individual difference, and manipulated transiently. Studies 5A and 5B also contribute by extending results from evaluations (i.e., liking ratings) to decisions more directly linked to market outcomes—willingness to trade and valuations.

**Study 6: Moderation by ease of self-association**

Study 6 was designed to test the third hypothesis of the present self-reference theory: the endowment effect (or reversal) should be stronger for stimuli that are readily associated with the
self in memory. Previous endowment studies have considered identity theory in terms of identity-congruence increasing valuations of owned goods. People show an even stronger endowment effect for goods linked to a salient identity, such as a university logo (Dommer & Swaminathan, 2013). This pattern is consistent with both self-enhancement theory and self-reference theory. For bads, however, these two theories make divergent predictions.

**Predicted Results**

I predict that valuations will vary by identity-relevance such that people will show a stronger endowment effect for goods (or reversal for bads) for a highly identity-relevant stimulus (vs. a generic stimulus of relatively lower identity-relevance).

This result would be consistent with the claim of self-reference theory that object attributes will be especially salient for objects associated with the self (i.e., owned vs. not owned). Self-reference theory predicts that owned bads will be readily linked to the self-concept in memory under conditions of high identity-relevance, leading to especially polarized evaluations and a low valuation.

From a valenced self-association (i.e., self-enhancement) perspective, objects linked to a salient identity might be more readily associated with the self-concept in memory, increasing the extent to which stimulus evaluations are influenced by implicit (positive) self-evaluations. For bads, self-enhancement predicts a main effect of ownership such that non-owned bads are valued less than owned bads. For goods, self-enhancement predicts a main effect of ownership such that owned goods are valued more than non-owned goods. Both of these effects should be stronger for objects that are easier to associate with the self in memory, such as those bearing an identity-relevant logo.

**Self-Enhancement Prediction for GOODS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From a self-reference perspective, goods linked to the self in memory are encoded more deeply (i.e., attributes receive increased attention). For objects with predominantly negative attributes, increased salience of those attributes due to ownership should decrease evaluations. In other words, there should be a main effect of ownership such that owned bads are valued less than non-owned bads. This effect should be stronger for objects that are easier to associate with the self in memory, such as objects bearing an identity-relevant logo (vs. generic without logo).

**Self-Enhancement Prediction for BADS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easily associated</td>
<td>$</td>
<td>$$</td>
</tr>
<tr>
<td>(Identity-relevant logo)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult to associate</td>
<td>$</td>
<td>$$</td>
</tr>
<tr>
<td>(No logo)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DV: Valuation ($)

**Self-Reference Prediction for BADS**

<table>
<thead>
<tr>
<th></th>
<th>Non-Owners</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easily Associated</td>
<td>$$</td>
<td>$</td>
</tr>
<tr>
<td>(Identity-relevant logo)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult to associate</td>
<td>$$</td>
<td>$$</td>
</tr>
<tr>
<td>(No logo)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DV: Valuation ($)
Participants and Design

Four hundred four Americans (184 women; $M_{\text{age}} = 35.69$, $SD = 11.04$) participated in a short study on Amazon Mechanical Turk. The study employed a 2 (stimulus valence: good, bad) x 2 (ownership: owner, non-owner) x 2 (identity-relevance: high, low) between-subjects design within an imagined endowment paradigm, with valuations serving as the dependent measure.

Procedure

All participants first selected from a drop-down menu the state they most considered “home.” On the next page, all participants read, “Please imagine that you are participating in a research study about your opinion of products. You are given a mug to inspect and answer questions about.”

Ownership. The text that followed varied as a function of ownership condition, with owners being told to imagine the mug was theirs to keep, and non-owners being told to imagine they would be returning the mug. Specifically, the prompt read “You will [keep/return] the mug after the study is over.”

Stimulus valence. The text that then followed varied as a function of both stimulus valence condition and ownership condition. For goods, participants read “[Your/This] mug was made using fair trade labor practices.” For bads, participants read “[Your/This] mug was made in a foreign country by a worker paid $0.13 per hour.”

Identity-relevance. All participants viewed an image of a standard white drinking mug that varied according to randomly assigned identity-relevance condition. In the high identity-relevance condition, the white mug had an identity-relevant blue logo depicting the previously selected state and the word “home”. In the low identity-relevance condition, the same white mug was displayed with no logo whatsoever (i.e., a blank generic mug).
Liking measure. Participants were asked “To what extent do you like or dislike [your/this] mug?” and reported their responses on a 7-point scale anchored at (1) Extremely dislike; (4) Neither like nor dislike; (7) Extremely like.

Valence measure. Participants were asked “How good or bad is [your/this] mug?” and reported their responses on a 7-point scale anchored at (1) Extremely bad; (4) Neither good nor bad; (7) Extremely good.

Valuation measure. Finally, participants responded to a BDM in the role of either a seller (i.e., owners) or a chooser (i.e., non-owners). “Now please imagine the following: You now have the opportunity to decide whether you would like to either [keep your mug/receive this mug to keep] OR receive a cash payment. Below is a list of dollar amounts. For each amount, please indicate whether you would choose to [keep your mug/receive the mug] OR receive that amount of money. Broadly, the response scale covered choices in $0.50 increments from $0.00 to $10.00. Because of the negative nature of some stimulus attributes, the scale was further supplemented at the lower end to also include $0.01, $0.05, $0.10, $0.25, and $0.75. This modification enables the measure to reflect unique reactions that may result from conducting a BDM with negatively valenced stimuli, such as someone who might rather walk away with no money vs. accept a free mug that was reportedly made using objectionable labor practices.

On the next page, participants responded to two questions related to the “home” state they had selected at the outset of the study which in some cases had served as an identity-relevance manipulation. Specifically, the questions read “To what extent do you [like/feel connected to] [piped text displaying selected home state]?” Responses were recorded on 7-point scales anchored at (1) Not at all; (7) Extremely. Finally, the study concluded with basic demographic measures and an attention check. In order to help interpret results, this page also
included an open-ended question asking “Were the instructions to this survey clear and easy to understand?”

Results

Ten participants were excluded from further analysis because their responses on the Becker-Degroot-Marschak valuation were inconsistent (i.e., jumped back and forth from picking the mug to the money at various dollar amounts) and thus uninterpretable as valuations. An additional six participants failed the attention check, and are thus also excluded from subsequent analyses.

Valuation. Results were submitted to a 3-way ANOVA with ownership, stimulus valence, and identity-relevance all as between-subjects factors. There was a main effect of ownership such that owned mugs (M = $2.02, SD = $2.49) were valued more than non-owned mugs (M = $1.39, SD = $1.84), $F(1, 380) = 8.559, p = .004$. There was also a main effect of stimulus valence such that goods (M = $2.26, SD = $2.51) were valued more than bads (M = $1.14, SD = $1.69), $F(1, 380) = 27.997, p < .001$. Additionally, there was a main effect of identity-relevance condition such that participants in the high identity-relevance condition valued the state mug (M = $2.15, SD = $2.51) higher than participants in the control condition valued the generic mug (M = $1.26, SD = $1.76), $F(1, 380) = 17.964, p < .001$.

There was a marginal two-way interaction between stimulus valence and ownership, $F(1, 380) = 3.132, p = .078$. The interaction between stimulus valence and identity-relevance was non-significant ($p = .148$), as was the interaction between ownership and identity-relevance ($p =$
The three-way interaction between ownership, stimulus valence, and identity-relevance was non-significant ($p = .435$).

Liking Ratings

Results were submitted to a 2 (stimulus valence: good, bad) by 2 (ownership: owner, non-owner) by 2 (identity-relevance: high, low) between-subjects ANOVA with liking ratings as outcome measure. As expected, there was an overall main effect of stimulus valence on liking, such that goods ($M = 4.77$, $SD = 1.28$) were liked more than bads ($M = 3.43$, $SD = 1.67$), $F(1, 380) = 80.558$, $p < .001$. There was also an overall main effect of ownership on liking, such that owners ($M = 4.36$, $SD = 1.63$) reported liking the object more than nonowners ($M = 3.84$, $SD = 1.59$), $F(1,380) = 11.621$, $p = .001$. Additionally, there was an overall main effect of identity-relevance, such that objects high in identity-relevance ($M = 4.34$, $SD = 1.75$) were liked more than objects low in identity-relevance ($M = 3.87$, $SD = 1.47$), $F(1,380) = 10.188$, $p = .002$. There were no significant two-way interactions between any combination of the three independent variables (ownership x identity-relevance; ownership x stimulus valence; stimulus valence x identity-relevance; all $p$’s > .5).

Study 7: Ownership Polarization Mechanism

The purpose of Study 7 was two-fold: first, to test the proposed mechanism more directly and second, to further differentiate the present Self-Reference Theory from extant theory, especially Query Theory. One of the ways the proposed cognitive mechanism can be tested is through an aspect-listing paradigm, in which participants list their thoughts about an object.

Aspect Listing Predictions
The present Self-reference Theory predicts that ownership polarizes evaluations via biased cognition, such that negative cognition is more prominent for owned (vs. non-owned) bads, and positive cognition is more prominent for owned (vs. non-owned) goods. Within an aspect-listing paradigm, this could be reflected across both the frequency and order of differentially valenced aspects. For the frequency of differentially valenced aspects, Self-reference Theory predicts that self-association (i.e., ownership) should increase the frequency of positive aspects for goods, and negative aspects for bads.

Overall, the tendency to list one type of aspect before another indicates an increased accessibility of that category of thought. Self-reference theory predicts increased salience of negative cognitions about owned (vs. non-owned) bads, and increased salience of positive cognitions about owned (vs. non-owned) goods. In terms of aspect order specifically, self-reference theory predicts that positive aspects will tend to be listed earlier for owned (vs. non-owned) goods, and that negative aspects will tend to be listed earlier for owned (vs. non-owned) bads.

Evaluation Predictions

The above-described patterns in aspect listing should in turn predict object evaluations. For goods, a higher frequency or rank-order of positive aspects for owned (vs. non-owned) goods should predict more positive object evaluations. For bads, a higher frequency or rank-order of negative aspects for owned (vs. non-owned) bads should predict less positive object evaluations. The above described patterns in aspect listing are in turn expected to mediate the relationship between condition (ownership x stimulus valence) and object evaluations.

Self-Enhancement Theory Predictions
Self-enhancement theories differ in their aspect-listing predictions because they emphasize the effect of self-association orienting people towards positive information. Self-enhancement predicts a higher frequency and rank order of positive (vs. negative) aspects across all owned (vs. non-owned) objects, regardless of whether the object itself is characterized overall as a good or a bad.

Query Theory Predictions

Query Theory predicts that people first generate supporting reasons to maintain the status quo, followed by reasons supporting the alternative. In contrast, the present Self-reference theory predicts that self-association is the key variable shaping cognition. The Query Theory researchers describe their theory as memory-based, however it should be noted that the object in question (i.e., a mug) was present in front of participants throughout the experiment, so the implications of attention and memory may be difficult to disentangle entirely.

Loss Aversion Predictions

The Query Theory paradigm confounded loss and ownership, whereas the present paradigm focuses on the unique effects of mere-ownership. Because there is no form of loss directly implicated in the present experiment, loss aversion would not predict any differences based on ownership condition, nor any ownership x stimulus valence interactions.

Methods

Participants and Design

Study 7 consisted of a short study on Amazon Mechanical Turk. The study employed a 2 (stimulus valence: good, bad) x 2 (ownership: owner, non-owner) mixed design, with stimulus valence as a between-subjects variable and ownership as a within-subjects variable. Within an imagined endowment paradigm, participants completed a thought-listing task adapted from the
original Query Theory work (Johnson, Haubl, & Keinan, 2007) which served to measure the theorized mediating process variable. Stimulus ratings (e.g., liking) served as the dependent measure.

**Procedure**

Study 7 employed the same basic procedure assigning imagined ownership for nutritional supplements as employed in Studies 2B & 2C, with the key difference being the addition of a thought-listing task between the assignment of the independent variables (stimulus valence and ownership) and the reporting of dependent measures (liking and valence ratings).

Specifically, the information about the assigned supplement was displayed on screen above the prompt “Share a thought about the supplement” and an open-ended text box labeled “First thought.” For each thought entered, the next page of the survey displayed a new text box labeled “Additional thought” and an option for the participant to indicate “No additional thoughts,” up to a grand total of ten thoughts. Any previously entered thoughts were displayed on screen via piped text.

Next, participants responded the same two dependent variables employed in previous studies: “To what extent do you like or dislike this nutritional supplement?” “How good or bad is this nutritional supplement?”

Participants were then asked to self-code their responses. Instructions read, “To better understand your thought process, please rate the following thought(s) you entered earlier.” Each previously entered thought was displayed one by one, with the question “Do you feel that [thought] is positive or negative?” This measure was recorded dichotomously for each previously listed thought, with a forced choice between “Positive” or “Negative.” Once each previously
entered thought had been displayed and self-coded, participants moved on to a final demographics block, including the attention check.

Results and Discussion

Order of Aspects

For the relative order of differentially valenced aspects, Self-Reference Theory predicts that positive aspects should appear relatively earlier in the aspect listing for owners (vs. non-owners) of goods, and negative aspects should appear relatively earlier in the aspect listing for owners (vs. non-owners) of bads.

Drawing on the methodology from the original Query Theory paper, (Johnson, Haubl, & Keinan, 2007, p. 465), a score was calculated for each participant reflecting their standardized median rank difference of aspect types (SMRD; see Appendix F). The resulting score could take on values between -1 and 1, with negative values indicating a tendency to list negative aspects before positive aspects, and positive scores indicating a tendency to list positive aspects before negative aspects.

The present Self-Reference theory predicts that owners of goods will have a significantly higher SMRD score than non-owners, and that owners of bads will have a significantly lower SMRD score than non-owners.

Self-enhancement theories predict a focus on positive self-related information, such as would be illustrated with a higher score for owners vs. non-owners, across both goods and bads (i.e., a main effect of ownership condition on SMRD scores).

Query Theory emphasizes people’s tendency to focus on information supporting the status quo (i.e., value-increasing aspects, consisting either of positive attributes of the status quo, or negative attributes of the alternative). Should ownership be construed as the status quo, Query
Theory would make a similar prediction to Self-Enhancement, that ownership should increase the accessibility of positive aspects across both goods and bads. Loss aversion would have no basis to predict any difference based on mere-ownership condition alone.

Concluding Remarks

Overall, the data from this series of studies does not clearly support the present Self-reference Theory. I found consistent evidence of ownership polarization in Study 1 for bads, and in Study 2A and Study 2B across both goods and bads, particularly within the nutrition supplement paradigm. I employed that nutrition supplement paradigm in subsequent experiments (Study 3, Study 4, and Study 7) for conceptual replications extending the research program. I also employed new stimuli extending the range of market goods which my research considered, such as pens in Studies 5A and 5B, and mugs in Study 6. After failing to replicate the basic ownership polarization effect found in Study 1, Study 2A, and Study 2B, I attempted a simple, direct replication of Study 2B, which is now reported as Study 2C, a failed replication of the basic effect of ownership polarization. Although these data do not support the present Self-reference theory, their inclusion in the scientific record may help shape the direction of future research. The instances where mere ownership has independently caused an endowment effect (e.g., Morewedge, Shu, Gilbert, & Wilson, 2009) with no loss frame may need to be explained by alternate formulations of self-enhancement and information processing accounts.
REFERENCES


TABLES AND FIGURES

LIKING AS A FUNCTION OF OWNERSHIP AND STIMULUS VALENCE
(STUDY 2B)

Figure 1. The effect of ownership and stimulus valence (goods vs. bads) on liking ratings in Study 2B.
Figure 2. The effect of ownership and stimulus valence (goods vs. bads) on valence ratings in Study 2B.

Figure 3. The effect of ownership and stimulus valence (goods vs. bads) on liking ratings in Study 2C.
Figure 4. The effect of ownership and stimulus valence (goods vs. bads) on valence ratings in Study 2C.

Figure 5. The effect of ownership, culture prime, and stimulus valence (goods vs. bads) on liking ratings in Study 4.
Figure 6. The effect of ownership, identity relevance, and stimulus valence (goods vs. bads) on dollar valuations in Study 6.

Figure 7: The effect of ownership, identity relevance, and stimulus valence (goods vs. bads) on liking ratings in Study 6.
Figure 8: The effect of ownership, identity relevance, and stimulus valence (goods vs. bads) on valence ratings in Study 6.

Figure 9: The effect of ownership, identity relevance, and stimulus valence (goods vs. bads) on mean evaluations in Study 6.
APPENDIX A

The results of Study 1 hold if the two dependent variables (liking and valence) are analyzed separately rather than collapsed into a single evaluation measure. 6 participants who entered a value over 100 (e.g., 500, 800, 1000) for their age are not included in the age figure so as to avoid skewing the demographics.

Liking

There was a main effect of ownership on liking ratings ($F(1, 200)=23.97, p<.001$) such that owners ($M= 2.30, SD = 1.39$) reported liking the object significantly less than non-owners ($M = 3.45, SD = 1.93$). There was no main effect of object nor was the interaction between ownership and object significant ($p$’s > .21).

Valence

There was a main effect of ownership on valence ratings ($F(1, 200)=12.47, p=.001$) such that owners ($M= 3.05, SD = 1.52$) reported liking the object significantly less than non-owners ($M =
3.89, SD = 1.88). There was no main effect of object nor was the interaction between ownership and object significant (p’s > .16).

APPENDIX B

The pattern of results for Study 2A in the supplements category was similar whether looking at the collapsed evaluation measure (as previously reported) or the separate liking and valence measures.

Liking.

For goods, owned supplements (M = 5.93, SD = 1.05) were liked more than non-owned supplements (M = 5.64, SD = 1.09), \( t(58) = 2.66, p = .010 \).

For bads, owned supplements (M = 2.51, SD = 1.23) were liked less than non-owned supplements (M = 2.74, SD = 1.13), however this pattern was only marginally significant \( t(57) = -1.64, p = .107 \).
Valence.

For goods, owned supplements were rated higher (i.e., more “good”, M = 5.92, SD = 1.06) than non-owned supplements (M = 5.61, SD = 1.13), t(58) = -2.68, p = .010.

For bads, owned supplements were rated lower (i.e., more “bad”, M = 2.74, SD = 1.13) than non-owned supplements (M = 3.09, SD = 1.11), t(57) = 2.77, p = .007.

APPENDIX C

Supplemental Analyses for Study 4

_Liking_. Results were submitted to a mixed ANOVA with valence condition and culture condition as between-subject factors and ownership condition as a with-subject repeated measure. There was a significant between-subjects effect of valence condition, $F(1,379)= 682.297, p < .001$. Further contrasts revealed that the main effect of valence on liking was such that participants in the good condition (M=5.324, SD=1.075) rated the nutritional supplements significantly higher than participants in the bad condition (M=2.253, SD=1.210). All other effects and interactions were non-significant. In particular, there was no significant main effect of ownership $F(1,379) = .397, p = .53$. Nor were there any significant interactions between ownership and/or valence and/or culture, $p$’s >.76.
APPENDIX D

Private Self-Consciousness Measure (Study 5A; Item 4 Reverse-Coded)

Please be as honest and as accurate as possible when answering these questions. Try not to let your answer to one question influence your answers to other questions. *There are no correct or incorrect answers.*

For each question, please indicate the extent to which each statement is like you by circling a number from 0 to 3.

1. I’m always trying to figure myself out.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Somewhat like me</td>
<td>A lot like me</td>
</tr>
</tbody>
</table>

2. I think about myself a lot.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Somewhat like me</td>
<td>A lot like me</td>
</tr>
</tbody>
</table>

3. I often daydream about myself.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
</table>
Not at all like me  A little like me  Somewhat like me  A lot like me

4. I never take a hard look at myself.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not at all like me</strong></td>
<td><strong>A little like me</strong></td>
<td><strong>Somewhat like me</strong></td>
<td><strong>A lot like me</strong></td>
<td></td>
</tr>
</tbody>
</table>

5. I generally pay attention to my inner feelings.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not at all like me</strong></td>
<td><strong>A little like me</strong></td>
<td><strong>Somewhat like me</strong></td>
<td><strong>A lot like me</strong></td>
<td></td>
</tr>
</tbody>
</table>

6. I’m constantly thinking about my reason for doing things.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not at all like me</strong></td>
<td><strong>A little like me</strong></td>
<td><strong>Somewhat like me</strong></td>
<td><strong>A lot like me</strong></td>
<td></td>
</tr>
</tbody>
</table>

7. I sometimes step back (in my mind) in order to examine myself from a distance.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not at all like me</strong></td>
<td><strong>A little like me</strong></td>
<td><strong>Somewhat like me</strong></td>
<td><strong>A lot like me</strong></td>
<td></td>
</tr>
</tbody>
</table>

8. I’m quick to notice changes in my mood.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not at all like me</strong></td>
<td><strong>A little like me</strong></td>
<td><strong>Somewhat like me</strong></td>
<td><strong>A lot like me</strong></td>
<td></td>
</tr>
</tbody>
</table>

9. I know the way my mind works when I work through a problem.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not at all like me</strong></td>
<td><strong>A little like me</strong></td>
<td><strong>Somewhat like me</strong></td>
<td><strong>A lot like me</strong></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E

Study 5B Prompts – Willingness to Trade for a Nutritional Supplement

GOOD/OWN/MEMORY

Imagine that you need to take a nutritional supplement.

You are given Supplement A. It improves memory.

You can switch to another supplement: Supplement B. It improves digestion and gut health.

To what extent would you be willing to trade your supplement?

GOOD/OWN/DIGESTION

Imagine that you need to take a nutritional supplement.

You are given Supplement A. It improves digestion and gut health.

You can switch to another supplement: Supplement B. It improves memory.

To what extent would you be willing to trade your supplement?

BAD/OWN/HEARTBURN
Imagine that you need to take a nutritional supplement.

You are given Supplement A. It causes mild heartburn and indigestion as a side effect.

You can switch to another supplement: Supplement B. It causes mild headaches as a side effect.

To what extent would you be willing to trade your supplement?

BAD/OWN/HEADACHE

Imagine that you need to take a nutritional supplement.

You are given Supplement A. It causes mild headaches as a side effect.

You can switch to another supplement: Supplement B. It causes mild heartburn and indigestion as a side effect.

To what extent would you be willing to trade your supplement?

GOOD/CHOOSE/MEMORY

Imagine that you need to take a nutritional supplement.

You are given the choice between two possible nutritional supplements:

Supplement A: improves memory.

Supplement B: improves digestion and gut health.

To what extent do you prefer one supplement over the other?

GOOD/CHOOSE/DIGESTION

Imagine that you need to take a nutritional supplement.

You are given the choice between two possible nutritional supplements:

Supplement A: improves digestion and gut health.

Supplement B: improves memory.

To what extent do you prefer one supplement over the other?

BAD/CHOOSE/HEARTBURN
Imagine that you need to take a nutritional supplement.

You are given the choice between two possible nutritional supplements:

Supplement A: causes mild heartburn and indigestion as a side effect.

Supplement B: causes mild headaches as a side effect.

To what extent do you prefer one supplement over the other?

BAD/CHOOSE/HEADACHE

Imagine that you need to take a nutritional supplement.

You are given the choice between two possible nutritional supplements:

Supplement A: causes mild headaches as a side effect.

Supplement B: causes mild heartburn and indigestion as a side effect.

To what extent do you prefer one supplement over the other?

APPENDIX F

The following methodology for analyzing aspect order in Study 7 is adapted directly from the original Query Theory paper (Johnson, Haubl, & Keinan, 2007, p. 465), with any modifications for the present research paradigm indicated in brackets.

“Because participants listed different numbers of aspects, we tested this prediction by calculating, for each participant, a score that reflects his or her tendency to produce [positive] aspects before [negative] ones. This score, the standardized median rank difference of aspect types (SMRD), is defined as \(-2(MR_{[pos]} - MR_{[neg]})/n\), where \(MR_{[pos]}\) = median rank of [positive] aspects in a participant’s sequence, \(MR_{[neg]}\) = median rank of [negative] aspects in a participant’s sequence, and \(n\) = total number of aspects in a participant’s sequence.”

“Note that for any sequence (of length \(s\)) in which only one of the two response categories of interest (i.e., [positive] aspects or [negative] aspects) appears, the median rank of
the unobserved response category is set to \( s + 1 \), which is a conservative way of representing the low level of accessibility of thoughts of that type. In addition, for the purpose of calculating SMRD score, \( n = s + 1 \) for such single category sequences. For sequences that include responses from both categories, \( n = s \)."