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The need to belong and the value of belongings: Does ostracism change the subjective value of personal possessions?

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Acknowledgments:

The first author's contribution was supported by a grant from the Leverhulme Trust (RP2012-V-022) and a PhD studentship from the University of Essex.

ABSTRACT

A growing body of research has demonstrated that feelings of possession influence the valuation of personal possessions. Psychological theories of ownership suggest that a special bond between a person and his/her possession arises in response to the innate motivation for effectance, self-identity and need for home. However, current empirical support is insufficient to make a causal link between these psychological needs and feelings of ownership. In four studies (total $N > 800$), we manipulated people's basic needs by inducing feelings of ostracism, which threatens the needs for belonging, self-esteem, control, and belief in a meaningful existence. Despite the fact that these social needs are closely related to the putative antecedents of feelings of ownership, the ostracism manipulation did not significantly affect participants' feelings of ownership, or their valuations of their possessions, whether measured by willingness to accept or willingness to pay. These results suggest that the special bond that people have with their belongings is not readily used to restore basic psychological needs following the experience of social exclusion.

Keywords: psychological ownership, self-extension, endowment effect, ownership, ostracism

INTRODUCTION

How do we become attached to our belongings, and what role does this play in our lives? These questions have motivated psychologists, sociologists, philosophers, anthropologists and geographers to understand the psychological needs that motivate us to develop feelings of ownership, and the processes by which these feelings arise and dissipate. As a result of these theoretical contributions, psychological ownership is now perceived as a distinct mental state, separate from legal or factual ownership, in which an individual considers a target object to be his/hers (Pierce et al., 2001). An important element of this relationship is the strong link between our possessions and our sense of self: owned objects are often viewed as extensions of our individual selves, and intimate part of who we are (Belk, 1988; Furby, 1978; Pierce & Jussila, 2011).

A large body of research has examined the processes by which people develop feelings of ownership: *how* they come to feel like owners of an item, and *how* they integrate that item into their sense of self. Another fundamental question concerns the needs that motivate the development of feelings of ownership – that is, *why* do people develop a special bond with material objects, or *what function* do these feelings serve? Two widely applied theories speak to such issues: *self extension theory*, and the *theory of psychological ownership*. The former theory focuses on the *meaning of the object* for its owner, proposing that objects become *extensions of the self* (Belk, 1988). In contrast, the latter theory focuses on what it *means to be the owner* of an object, positing that the *state of psychological ownership* satisfies several basic motivations, including a need for efficacy, a need for self-identity, and a need to have a “place” or “home” (Pierce et al., 2001; 2003). However, the proponents of these theories point out that the current empirical support is insufficient to make a causal link between these psychological needs and feelings of ownership (Pierce & Jussila, 2011).

We address this limitation in four studies (total $N > 800$) which explore how possessions are perceived and valued when fundamental psychological needs are threatened. Threat is induced via social exclusion (specifically, ostracism) because this can threaten needs that are closely related to the putative antecedents of psychological ownership. We suggest that the negative impact of social exclusion can be reduced by strengthening feelings of object ownership, and that this need to restore psychological needs should increase the valuation of personal possessions (measured by willingness to accept, WTA, and possibly by willingness to pay, WTP).

We first outline self-extension theory and the theory of ownership, which provide important predictions about the roots of psychological ownership. We then describe the effects of ostracism, focusing on those likely to affect people's attitudes towards their possessions. Finally, we link these lines of research to generate hypotheses about the effects of ostracism on people's feelings of ownership for, and valuations of, their personal possessions.

The psychology of self-extension and ownership

Belk (1988) proposes that people regard their belongings as extensions of their selves (see also Dittmar, 1992; Furby, 1978). This develops through appropriation and/or control of the object (Belk, 1988; Furby, 1978), knowledge of the object (Pierce et al., 2003), and investing one's sense of self in the object – for example, by contributing to its creation (Belk, 1988; Locke, 1960; Norton, Mochon & Ariely, 2012). The object then serves to extend the self, to allow mastery over the environment (and sometimes over other individuals), and to provide a bridge between the individual and his/her past experiences. One implication of the self-extension proposition is that loss of cherished material possessions will feel like a loss of

part of oneself (Belk, 1988). For example, theft of a possession may be perceived as an attack on one's own personal identity (Duncan, 1976).

Drawing on similar ideas to those that underpin self-extension theory, the theory of ownership (Pierce et al., 2001; 2003) posits *feelings of ownership* as the critical concept for understanding the link between the individual and his/her possessions. These feelings arise from control, intimate knowledge, and investing the self in the object. The theory of ownership emphasizes that feelings of ownership fulfill basic (possibly innate) psychological needs and drives (Dittmar, 1992; Porteous, 1976; Litwinski, 1942) – and that these motivations explain *why* people strive for psychological ownership. Pierce and Jussila (2011) identify four such needs.

The *effectance motivation* reflects the need to exert control over one's environment and a basic human aversion to powerlessness and helplessness (Pierce & Jussila, 2011). Owning objects corresponds to controlling part of the environment, allowing the owner to rule over the possession's destiny (e.g. by selling it, or giving it away); thereby bolstering a sense of control that can benefit wellbeing (e.g., lack of control is associated with symptoms of depression; see Benassi, Sweeney & Dufour, 1988 for a review).

The *self-identity* motivation relates to the symbolic function of possessions in need satisfaction (Kleine & Baker, 2004; Kogut & Kogut, 2011). Possessions can be a source of autonomy and pleasure, facilitating the maintenance of a consistent and coherent self-identity (Dittmar, 1992); can allow us to express our identity (Pierce & Jussila, 2011); or can symbolize our individuality (Porteous, 1976). These considerations emphasize the role of belongings, not only as static elements of our selves, but also as active ingredients in the development and maintenance of the self-concept (McCracken, 1988).

The *need for “home”* refers to the urge to have “my place”. This is perhaps embedded in an innate need for territory (Ardrey, 1966), and can be achieved by being surrounded by one's possessions (Porteous, 1976) whose presence can enhance feelings of familiarity and security (Pierce et al., 2003).

Finally, psychological ownership can serve a *stimulation* function – reflecting indexical and iconic roles – acting as repositories for our memories and symbolic meanings. Memories and meanings are attached to objects; they verify spatial and factual connections with people and events (Grayson & Shulman, 2000) and can provide autobiographical or story-telling value (Kleine & Baker, 2004; Tian & Belk, 2005).

Self-extension theory and the theory of psychological ownership therefore provide detailed accounts of the roots of, and the motivations that underpin, feelings of ownership. Both provide a rich account of the function served by these feelings; however, the scope of empirical inquiry into this issue is restricted (but see Baer & Brown, 2012; Peck & Shu, 2009; Shu & Peck, 2011). The current work aims to address this limitation by focusing on the role played by basic needs in the formation of psychological ownership testing whether threatening these psychological needs enhance feelings of ownership towards one's possessions (as would be expected if the motivation for developing such feelings is to fulfill these needs). We do so by inducing feelings of ostracism, which threaten fundamental psychological needs (Molden, Gale, Gardner, Dean & Knowles, 2009; Williams, 2001; Zadro, Williams & Richardson, 2004).

Ostracism, psychological needs, and consumer behaviour

Ostracism is a form of social exclusion in which an individual is rejected and ignored by others. Williams (2001, 2007) has put forward a comprehensive taxonomy of its influence; ostracism threatens four basic motivational needs: belonging, control, self-esteem, and the

belief that one has a meaningful existence (see Williams & Zadro, 2005, for a review). The aversive experience of social exclusion is temporary and is followed by coping mechanisms that work to restore one's wellbeing. Such responses may include increased pro-social and cooperative behaviour (Gardner, Pickett, Jeffries & Knowles, 2005), hostility and aggression (Molden et al., 2009), or further social withdrawal (Twenge, Baumeister, DeWall, Ciarocco & Bartels, 2007).

Recent work has shown that the threat posed by ostracism to these four needs can influence consumer behaviour. For example, Lee and Shrum (2012) demonstrated that being ignored poses a threat to one's need for control and meaningful existence, which increases conspicuous consumption. Likewise, Mead, Baumeister, Stilton, Rawn and Vohs (2011) demonstrated that experiencing social exclusion motivates individuals to spend more on consumer products that could restore their social connectedness, providing a way to overcome the threat to their need for belonging. Similarly, Loveland, Smeesters, and Mandel (2010) found that ostracism increased people's selection of "nostalgia" products, which provide a link to former personal relationships and communities, and that this increase was mediated by an increased need for belonging.

Ostracism therefore exerts a marked influence on basic psychological motivations that can shape product choice. The present work builds on this research by assessing whether social exclusion also changes people's valuations of their existing (or potential) personal property. In the next section, we describe how the psychological needs that are threatened by ostracism are similar to those posited to underlie feelings of ownership and their expression, such that increased emphasis on one's possessions may provide a defense against the needs-threat posed by social exclusion.

Ostracism and ownership

Ostracism lowers self-esteem – the extent to which people “feel good about themselves” – even when the social exclusion is mild or takes place in a virtual environment (Williams, Cheung & Choi, 2000). As discussed above, the self-extension and self-identity motivations for ownership imply that possessions help to provide people with a coherent, positive sense of who they are and of their best qualities (Belk, 1988; Pierce et al., 2003), potentially helping to restore a positive sense of self-worth in the face of social exclusion. Likewise, the self-identity component of ownership should also offset the threat that ostracism poses to people’s need to regard their existence as meaningful – because possessions can add meaning to existence (Dittmar, 1992; Pierce & Jussila, 2011).

Similarly, the fundamental threat to our sense of belonging engendered by a period of ostracism overlaps with the need for a “place” or “home” that possessions can fulfill. Although the need for a home is sometimes construed in geographic terms, it can include a social community such as a neighborhood (Pierce et al., 2003; Porteous, 1976). The use of possessions to establish a sense of “home” is taken to foster a sense of security and identity – again, providing a potential counter to the threat posed by ostracism. The role of possessions in stimulating memories of one’s broader community membership can have the same effect, as when Indian migrants into the US use possessions from their original country both to maintain a sense of place in a new environment and to affirm their previous social bonds (Mehta & Belk, 1991).

Finally, ostracism lowers people’s feelings of control over events – and possessions provide a way to meet our need for effectance. There are important differences between feeling that one has control over a social situation and the sense of efficacy that comes from mastery over a material object, but people might nonetheless seek to compensate a loss of influence in one domain by affirming their control in another.

In summary, ostracism threatens basic psychological needs that overlap with those thought to motivate psychological ownership and which possessions can help to fulfill. In light of the fact that ostracism is rapidly followed by the deployment of coping mechanisms, and our observation that psychological ownership provides a variety of ways to meet the needs that are threatened by social exclusion, we tested the hypothesis that ostracism would increase people's feelings of possession to their belongings and their valuations of these items.

OVERVIEW OF STUDIES 1 TO 4

We tested this hypothesis in four studies (all $Ns > 108$). Study 1 employed a standard endowment paradigm in which participants either received an item and stated how much they would demand to part with it, or were given the opportunity to buy the item. Additionally, half of the participants experienced ostracism during the course of a team-based computer game. The main prediction was that owners who are ostracized will have elevated feelings of ownership towards their good and will correspondingly value their possession more highly. With respect to buyers, theories of psychological ownership provide a less clear prediction. One could expect that, in the absence of legal ownership, ostracism will not affect WTP valuation. On the other hand, feelings of ownership can develop even if a person does not actually own an object (see Reb & Connolly, 2007), and so feeling excluded could make non-owners value the *opportunity* to acquire consumer goods (Lee & Shrum, 2012), resulting in a higher WTP. Studies 2, 3, and 4 further tested whether ostracism influences how people value their possessions, by asking people about items that they already owned (which, arguably, are more appropriate for testing the model of ownership). The prediction was again that ostracism would increase people's feelings of ownership towards their belongings and, accordingly, their financial valuation of those possessions (WTPs and WTAs).

GENERAL METHODS AND MEASURES

Given the considerable overlap in the methods and measures employed in all four studies, we summarize them concurrently here. Table 1 summarizes the scales related to subjective feelings of ownership. Table 2 depicts the procedure for each experiment. In all four studies, the task was presented with the Qualtrics survey system.

Table 1. Summary of scales related to subjective ownership and social exclusion.

Scale	Number of items	Several exemplar item	Used in studies:	Range of α 's
Feelings of control	5	"I feel I have the ability to significantly alter events"; "I feel powerful"	1,2,3,4	.74-.86
Feelings of belonging	5	"I feel rejected"; "I feel disconnected"; "I feel like an outsider"	1,2,3,4	.87-.92
Self-esteem	5	"My self-esteem is high"; "I feel liked"; "I feel insecure"	1,2,3,4	.87-.91
Meaningful existence	5	"I felt important"; "I feel meaningless"; "I feel useful"	1,2,3,4	.85-.89
Feelings of ownership	3	"I feel like this is my possession."; "I feel like I own this [item's name]"; "I feel a very high degree of personal ownership of my [item's name]"	1,2,3,4	.81-.89
Possession-self link	6	"This [item's name] is central to my identity."; "My favourite [item's name] helps me achieve the identity I wish to have"; "My favourite [item's name] is part of who I am"	2,3,4	.89-.92
Need for belonging	10	"I have a strong need to belong."; "I do not like being alone"; "I seldom worry about whether other people care about me"	3,4	.83-.84

Table 2. Chronological summary of the procedure for each study.

Study 1	Study 2	Study 3	Study 4
1. Ownership manipulation	Item selection	Need for belonging trait	Need for belonging trait
2. Ostracism impact assessment	Self-worth (A)	Item selection	Item selection
3. Ostracism manipulation	Ostracism manipulation	Ostracism manipulation	Ostracism manipulation
4. Valuation (BDM)	Valuation	Valuation	Valuation
5. Ostracism impact assessment	Ostracism impact assessment	Subjective ownership	Ostracism impact assessment
6. Feelings of possession	Subjective ownership	Ostracism impact assessment	Subjective ownership
7. Manipulation check	Self-worth (B)	Manipulation check	Manipulation check
8. Self-esteem restoration	Manipulation check	Self-esteem restoration	Self-esteem restoration
9. Self-extension tendency	Self-esteem restoration	Mood + Self-esteem	Mood + Self-esteem
10. Mood + Self-esteem	Self-extension tendency	Market price	Market price
11. Market price revelation	Mood + Self-esteem	Control questions	Control questions
	Market price		

Note. Only items in bold font were used in the analysis (see "Other measures" section for details).

Ownership manipulation (Study 1)

Upon arrival to the lab, participants saw two fruit-shaped notepads: one that was assembled as a demonstration of a completed product, and one that was still in its original packaging. Participants were encouraged to physically inspect the assembled product. They were then assigned by coin flip to be owners or non-owners of the unopened notepad.

Owned item selection (Studies 2-4)

In Study 2, each participant was asked to identify a cherished possession valued as no more than \$300.00, as follows:

“For the next task we need you to think of one of your favourite, cherished material possessions. It does not matter how expensive the object is, but try to pick something that costs no more than \$300.00. It should be something that is important to you and helps to define who you are. It does not necessarily have to be something that you purchased yourself. It is very important that you identify one object before you proceed with the task.”

In order to confirm that participants had a specific item in mind, they were also asked to describe it. In Studies 3 and 4, the range of objects was constrained by asking people to identify their favourite sweater:

“For the next task we would like you to think about your favourite sweater. It is very important that you identify one sweater before you proceed with the task. Once you have a specific sweater in your mind, press proceed to answer some questions about it.”

Ostracism manipulation

In Studies 1 through 3, the ostracism manipulation employed the most recent version (#4) of Cyberball (Williams & Jarvis, 2006): a computer game in which a player controls their (cartoon-character) avatar who passes a virtual ball back and forth with two other characters. The instructions stress the importance of mentally visualizing the entire experience, thereby encouraging players to experience the feelings of their in-game character. Participants in the ostracized condition received only a few passes at the beginning of the game, whereafter the other characters passed the ball amongst themselves. Participants in the non-ostracized condition were passed the ball more often, throughout the entire game. Recent work using Cyberball has found that the game has the same effect even if participants are aware that they are playing with a computer (Zadro, Williams & Richardson, 2004). Consequently, participants were informed that they were playing a computer, as deception was unnecessary.

Study 4 used a different method to induce feelings of ostracism: participants were either asked to describe a time when they felt ostracized (rejected) or one where they felt included by a group. Writing about rejection induces behavioural responses typical of ostracism (Gardner, Pickett & Brewer, 2000), and several researchers have used this method to manipulate ostracism (Mead et al., 2011; Nezelek, Wesselmann, Wheeler & Williams, 2012).

Ostracism impact assessment

In all studies, a range of questionnaire measures tested the effects of social exclusion on psychological needs. As per Williams and Zadro (2005), participants' self-esteem, mood (valence), feelings of control, feelings of meaningful existence, and feelings of belongingness were measured using 5-point Likert-scales (1 = Not at all; 5 = Extremely). Responses on all five measures were positively correlated (reported for each study in Appendix A). In all studies, mood, self-esteem and meaningful existence instructions were phrased such that participants specified their *current state* rather than how they felt during the game; and likewise for the scales measuring feelings of control and belonging but only in Study 4.

Valuation

In Study 1, valuation was measured by the BDM (after Becker, DeGroot & Marschak, 1964) auction method in which the participant's bid is set against a random market price, such that it is optimal to specify one's true WTP or WTA. In order to ensure understanding of the BDM mechanism, participants took part in a practice auction, where their task was to state the correct outcome of a hypothetical auction scenario (Plott & Zeiler, 2005). Consistent with what participants had been instructed, the computer drew a random market price between £0.00 and £5.00 at the end of the study, and the experimenter honoured the outcome of the auction (i.e., participants bought/sold/retained/declined the item).

In Studies 2, 3, and 4, valuation was hypothetical and so did not employ the BDM auction mechanism. Instead each participant specified (by typing) both his/her WTA and WTP (order randomized) for their possession (Horowitz & McConnell, 2002). To prompt participants to think carefully about their (individually selected) object in Study 2, the name of their possession was pasted into the text that elicited their WTP and WTA. For example, a participant who nominated their ring would read:

“If you did not own this ring, how much would you be willing to pay to obtain it?”

“How much would somebody have to pay for you to give your ring away?”

In Study 3 and 4, the WTP question (but not the WTA question) was modified to facilitate participants’ understanding of their task:

“Suppose you lost your favorite sweater, and it was possible to buy it back. What would be the highest price that you would be willing to pay in order to get it back? Type a single value in US \$ below:”

Additionally, in Study 2,3, and 4, participants were asked to provide their best estimate of their possession’s market value.

Subjective ownership

Several scales were used to assess the degree to which participants developed feelings of possession towards the target object. We adapted three questions from the “feelings of ownership” scale (Pierce et al., 2001) that assess the degree to which a person perceives himself/herself as owner of a good (5-point Likert-scale: 1 = Not at all; 5 = Extremely). Furthermore, a 6-item measure of possession-self link was adapted from Ferraro et al. (2011). It combines a questionnaire measuring how far items represent an extended self (Sivadas & Venkatesh, 1995) with a measure of brand-relationship (with ‘brand’ substituted with the participant’s chosen object) from Escalas (2004). In order to determine whether the two

measures of psychological ownership (feelings of ownership and the possession-self link) capture different facets of a person-object relationship, we conducted a principal component analysis on responses pooled across all three studies where they were administered concurrently (Studies 2, 3 and 4). The results confirmed that the two scales are distinct (see Appendix B).

Other measures

We also included the "Contingencies of Self-Worth Scale" (Crocker, Luhtanen, Cooper & Bouvrette, 2003; Ferraro et al., 2011) in Study 2, the "Need for belonging trait" scale in Studies 2 and 3 (Leary, Kelly, Cottrell & Schreindorfer, 2012), and a measure of the general tendency for using objects for the purpose of self-extension (Ferraro et al., 2011) in Study 2. Since we did not find the hypothesized effect of social exclusion on valuation of personal possessions, we did not analyze these measures and we do not discuss them further.

In studies 3 and 4, several control questions were included to probe whether participants (a) encountered any technical issues, (b) guessed the purpose of the study, and (c) had played Cyberball before (Study 3 only).

Manipulation check

In the studies that used Cyberball, three standard questions probed whether participants felt that they had received a fair number of passes of the virtual ball (Zadro et al., 2004).

Self-esteem restoration

Finally, as a duty of care to our research volunteers (i.e., *not* a measure for the experiment), participants were asked list their good qualities in a box in order to reverse the negative effects of the ostracism manipulation before the end of the study (Williams & Zadro, 2005).

Each participant then completed the Ostracism Impact Assessment scales to verify that they no longer suffered the adverse effects of social exclusion.

STUDY 1 – OSTRACISM AND ENDOWED POSSESSIONS

Method

108 volunteers from the University of Essex participant pool (68 female, mean age 21.5 years, $SD = 3.1$ years) took part. The advertisement stated that the study took no more than 20 minutes, and that each participant would receive at least £3.00. This experiment had a 2 (ownership: owner vs. non-owner) by 2 (ostracism: ostracized vs. non-ostracized) between-subjects design. The sequence of tasks and measures is shown in the left column of Table 2.

Results

Responses to items from multi-item scales were averaged within each scale for each participant (see Table 1 for the acceptably high reliability statistics). Unless otherwise stated, responses on all scales were approximately symmetrical (i.e., no ceiling or floor effects).

Manipulation check

As expected, participants in the ostracized condition felt more excluded during the game of Cyberball ($M = 3.92$, $SD = 1.09$) than did non-ostracized participants ($M = 1.78$, $SD = .98$), $F(1,106) = 114.14$, $p < .001$, partial $\eta^2 = .518$. The effect of the (Cyberball) ostracism manipulation on psychological needs was verified by comparing the scores of ostracized and non-ostracized individuals on the relevant scales (Table 3) and was consistent with the need-threat framework described by Williams (2007).

Table 3. Study 1: Summary of the scales measuring psychological dimensions following the manipulation of social exclusion.

Scale	Mean (<i>SD</i>) in ostracized group	Mean (<i>SD</i>) in non-ostracized group	F(1,104) for mean difference	<i>p</i> -value (two-tailed)	Partial η^2
Feelings of control	1.87 (0.84)	3.10 (0.88)	51.77	<.001	.328
Feelings of belonging	2.13 (0.82)	3.83 (0.84)	112.72	<.001	.515
Self-esteem	3.54 (0.84)	3.80 (0.73)	3.12	.080	.029
Feelings of meaningful existence	1.81 (0.54)	2.22 (0.83)	9.21	.003	.080
Mood (high score = positive mood)	3.74 (0.74)	4.18 (0.53)	13.46	<.001	.113

Valuation

Two-way ANOVA with ownership and ostracism as between-subject factors was used to test the main hypotheses of this experiment. For valuation as the dependent variable, WTAs and WTPs for the notepad were log transformed to correct for positive skew. The results revealed a significant main effect of ownership, $F(1,104) = 35.20$, $p < .001$, partial $\eta^2 = .253$: owners' WTA (median = £2.00)¹ exceeded non-owners' WTP (median = £0.50), demonstrating an endowment effect. Importantly, there was no main effect of the ostracism manipulation ($F < 1$), nor was there a significant interaction between ostracism and ownership ($F < 1$). Figure 2 highlights that both average WTA and average WTP differed little between ostracized and non-ostracized individuals.

¹ For simplicity of interpretation, for descriptive statistics we report median values rather than log-transformed means throughout this work.

The same two-way ANOVA was run on the feelings of ownership scale ($\alpha = .89$). The results (Figure 3) match the valuation analysis, showing a large and significant main effect of ownership, $F(1,104) = 49.65, p < .001$, partial $\eta^2 = .323$, indicating that owners had developed stronger feelings of ownership ($M = 3.26, SD = .83$) than non-owners ($M = 2.04, SD = .93$). However, there was no significant main effect of ostracism ($M_{ostracized} = 2.77, SD = 1.12; M_{not-ostracized} = 2.58, SD = 1.05; F(1,104) = 1.17, p = .282$, partial $\eta^2 = .011$) and no interaction between the two factors ($F < 1$).

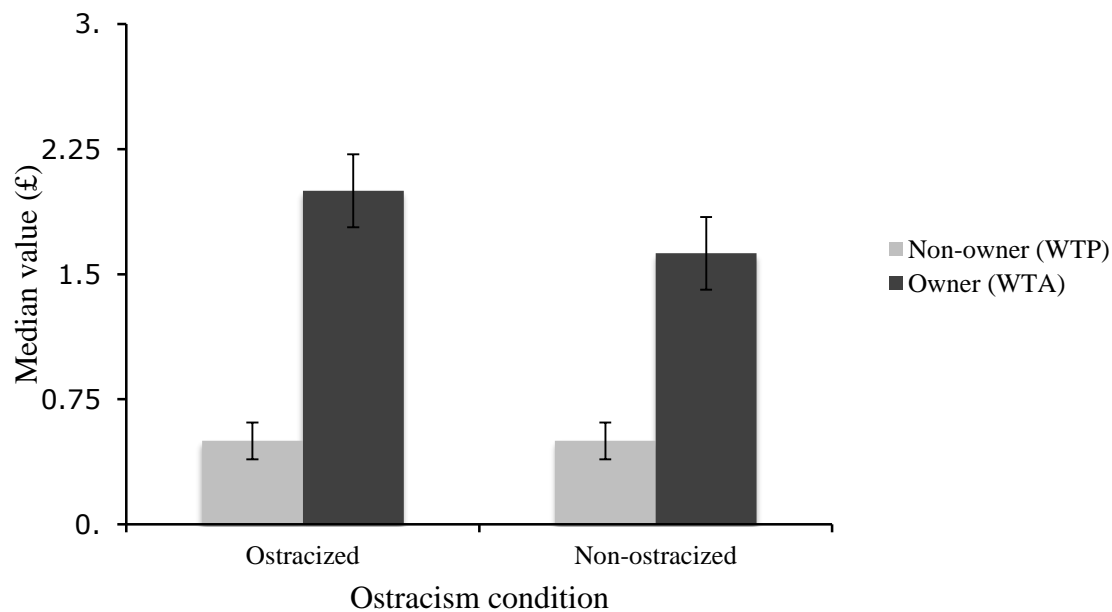


Figure 2. Median valuation of owners and non-owners in both conditions of ostracism manipulation. Error bars show ± 1 standard error.

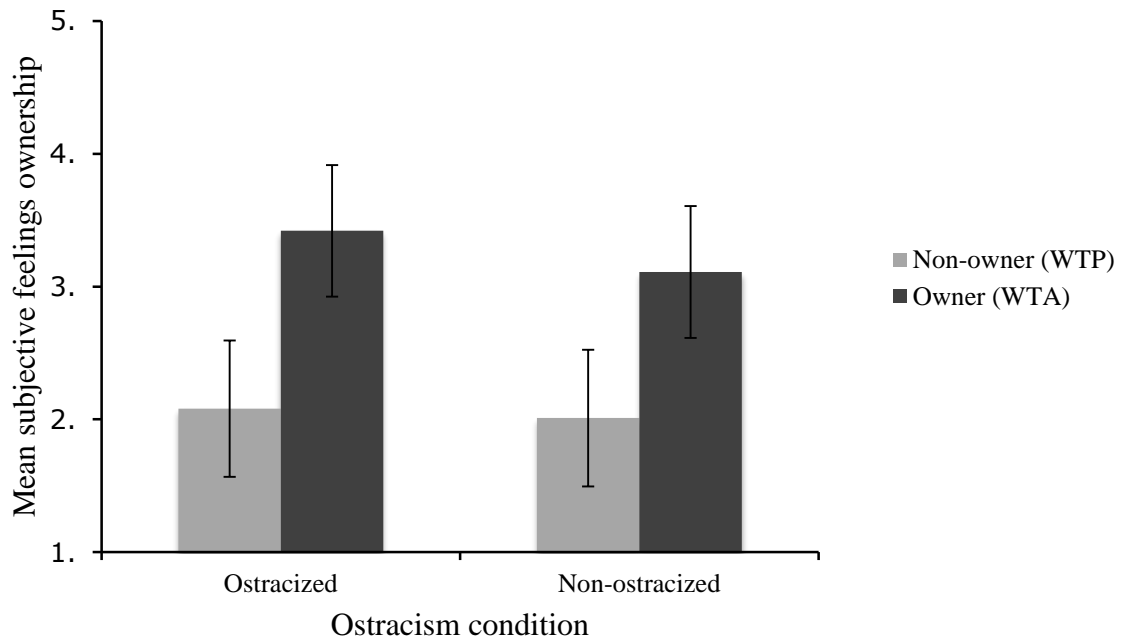


Figure 3. Feelings of ownership in all four groups. Error bars show ± 1 standard error.

Discussion

This study did not detect an effect of ostracism on valuation, either from the perspective of a non-owner (buyer) or an owner (seller). The hypothesized effect on valuation was absent despite the presence of a detrimental influence of ostracism on feelings of control and belonging. Feelings of ownership were also unaffected by social exclusion, which is inconsistent with the proposition that such feelings play a functional role in restoring psychological wellbeing when needs are threatened.

A possible reason for the lack of effect of ostracism on feelings of ownership is the type of object used in this study. The brief ownership and low hedonic value of the notepad may have prevented participants from developing meaningful feelings of ownership towards it (Kleine & Baker, 2004). The three subsequent studies therefore used real, personal, meaningful possessions, which may play a more important role in establishing feelings of control and belonging and in compensating for threats to these feelings.

STUDY 2 – OSTRACISM AND CHERISHED POSSESSIONS

Method

320 participants from the USA were recruited via the online platform Amazon Mechanical Turk (MTurk; www.mturk.com; Paolacci, Chandler, & Ipeirotis, 2010); each receiving \$0.50 for participating (a typical payment for this platform). To ensure independent sampling, responses made from duplicate IP addresses were excluded: if an IP address occurred twice the first completion was retained, unless the two overlapped in time of completion. Data for participants making incomplete responses were excluded. Appendix C shows the exact breakdown of exclusions. The second column of Table 2 summarizes the procedure.

Results and discussion

Data screening

Several steps were undertaken to identify inappropriate responses. Responses were eliminated from respondents who specified an uninterpretable market price or valuation (e.g., “I would never sell my object”) as were responses from individuals who failed to identify a single object or who wrote extremely high selling prices (e.g. \$99999.00; probably indicating that they would not consider selling their possession). We identified these high values by setting an exclusion threshold (based on practice in other studies) for WTAs that were ten times the market price for that product. Almost exactly half of the participants who were disqualified based on this criterion were from the ostracized condition (45/93), so these high WTAs are unlikely to be due to the ostracism manipulation. Based on these criteria, 202 participants were retained. Additional analyses confirmed that altering our exclusion criteria does not yield qualitatively different findings.

Manipulation check

Participants who were ostracized in Cyberball reported feeling more excluded ($M = 4.20$, $SD = 1.15$) than participants who received a fair number of passes ($M = 1.85$, $SD = 1.05$), $F(1,200) = 230.06$, $p < .001$, partial $\eta^2 = .535$. Table 4 shows that the ostracism manipulation had the expected effect, with feelings of belonging, control, self-esteem, meaningful existence and mood all being significantly lowered by experiencing social exclusion.

Table 4. Study 2: Summary of the scales measuring psychological dimensions related to ostracism.

Scale	Mean (<i>SD</i>) in ostracized group	Mean (<i>SD</i>) in non-ostracized group	F(1,205) for mean difference	<i>p</i> -value (two-tailed)	Partial η^2
Feelings of control	1.75 (0.65)	2.83 (0.77)	115.82	<.001	.367
Feelings of belonging	2.06 (0.91)	3.88 (0.84)	218.08	<.001	.522
Self-esteem	3.16 (0.99)	3.63 (0.90)	12.10	.001	.057
Feelings of meaningful existence	3.36 (1.08)	3.97 (0.89)	19.18	<.001	.087
Mood (high score = positive mood)	3.53 (0.98)	4.06 (0.69)	20.42	<.001	.093

Valuation

In all studies, the order in which participants stated their buying and selling price was not a significant factor. Because participants could pick any object that they owned, their WTAs and WTPs were scaled to account for different market prices. The WTA/Market price and WTP/Market price ratios were log-transformed to correct for positive skew.

A 2-by-2 mixed-model (ownership by ostracism) ANOVA was performed on the transformed valuations. (Note that "ownership" refers to whether the participant was asked to value their possession from the perspective of a buyer or a seller.) In line with Study 1, there was an endowment effect: selling prices were significantly higher (median = \$325.00) than buying prices (median = \$200.00), $F(1,200) = 61.98, p < .001$, partial $\eta^2 = .237$. However, again, valuations did not differ between ostracized and non-ostracized participants, $F < 1$, partial $\eta^2 = .002$. This null effect was consistent for selling as well as buying prices, as the interaction between ownership and ostracism was not significant, $F < 1$, partial $\eta^2 = .001$.

The findings for feelings of ownership ($\alpha = .89$) also matched those of Study 1, with no difference being found between ostracized ($M = 4.55, SD = .70$) and non-ostracized ($M = 4.54, SD = .66$) participants, $F < 1$, partial $\eta^2 < .001$. Similarly, ostracism did not significantly affect the strength of the possession-self link ($\alpha = .89$; $M_{ostracized} = 56.08, SD = 23.26$; $M_{non-ostracized} = 53.54, SD = 25.25$), $F < 1$, partial $\eta^2 = .003$.

To summarize: despite its negative effect on feelings of belonging and control, the ostracism manipulation did not significantly affect participants' valuations of their chosen treasured personal possession, whether measured by WTA or WTP. Ostracism also had no effect on feelings of ownership or the tendency to incorporate the possession into one's sense of self. These results again question the relationship between feelings of ownership and the needs for belonging, control, self-esteem, and meaningful existence: despite their close relation with the roots of feelings of ownership, threat to these needs had no impact on feelings of ownership

STUDY 3 – OSTRACISM AND FAVOURITE SWEATERS

Allowing participants to select any of their personal possession encourages considerable variability in valuations, which may make it harder to detect effects. We therefore conducted another study in which each participant identified a possession from a single category: their favourite sweater. In the framework of psychological ownership (Pierce et al., 2003), a piece of clothing will often exemplify a strong bond between one's self and an item. Clothing is a very personal type of possession, which undoubtedly plays a role in defining our identity (Kleine & Baker, 2004; Mittal, 2006). As such, a favourite sweater can be treated as an extension of one's self and fulfil basic psychological needs. Once more, we tested this proposition by manipulating ostracism.

Method

296 participants completed the study via Amazon Mechanical Turk for a \$0.50 payment. The study was only available to USA residents. Unlike our other studies, feelings of ownership were measured before assessing of the impact of ostracism. By doing so, we could verify that the lack of effect of ostracism on feelings of ownership was not due to the length of time it took participants to complete a battery of other measures. Column three of Table 2 outlines the procedure.

Results and discussion

Data screening

The criteria for screening inappropriate responses were expanded to exclude participants who reported having played Cyberball before, those who correctly guessed the purpose of the study in a debriefing probe, and those who reported a technical problem with the survey (see Appendix C). The final sample included 261 responses.

Manipulation check

The manipulation check confirmed that ostracized individuals reported feeling more excluded in the Cyberball game ($M = 4.41$, $SD = .921$) than those who were not ostracized ($M = 1.89$, $SD = 1.03$), $F(1,256) = 434.42$, $p < .001$, partial $\eta^2 = .629$. The impact of ostracism on the participants' needs is summarized in Table 5. Participants who were ostracized experienced lowered feelings of belonging and control, replicating both previous studies. However, the effects on self-esteem, meaningful existence and mood were not present, with no significant differences between ostracized and non-ostracized participants. This may be because the measurement of valuation and feelings of ownership were interpolated between the assessment of these constructs and the ostracism manipulation. Previous findings suggest that the effect of ostracism is relatively short-lived because it is immediately followed by attempts to restore psychological balance (Williams, Forgas & von Hippel, 2005).

Table 5. Study 3: Summary of the scales measuring psychological dimensions related to ostracism.

Scale	Mean (<i>SD</i>) in ostracized group	Mean (<i>SD</i>) in non-ostracized group	F(1,256) for mean difference	<i>p</i> -value	Partial η^2
Feelings of belonging	2.01 (0.88)	3.77 (0.85)	268.22	<.001	.512
Feelings of control	1.67 (0.71)	2.71 (0.78)	125.74	<.001	.339
Self-esteem	3.58 (0.89)	3.54 (0.96)	< 1	.714	.001
Feelings of meaningful existence	3.84 (0.93)	3.90 (0.89)	< 1	.626	.001
Mood (high score = positive mood)	3.88 (0.80)	3.91 (0.82)	< 1	.749	<.001

Valuation

Valuation data were subjected to the same log-transformed price ratio scaling used in Study 2. A mixed-model ANOVA with valuation as the dependent variable produced results consistent with those found in Study 1 and 2. The main effect of ownership was significant, $F(1,256) = 38.76, p < .001$, partial $\eta^2 = .131$, with WTA (median = \$50.00) exceeding WTP (median = \$30.00). Once again, the experience of social exclusion had no influence on valuations ($F < 1$); and, again, this effect was not moderated by the type of valuation (WTA vs. WTP, $F < 1$).

Replicating both previous studies, we found no effects of ostracism on the psychological measures of feelings of ownership. With respect to feelings of ownership scale ($\alpha = .81$), ostracized individuals did not score higher ($M = 4.39, SD = .63$) than those who were not ($M = 4.38, SD = .68$), $F < 1$. The possession-self link ($\alpha = .92$) was higher for those who were ostracized ($M = 45.39, SD = 24.07$) than for those in the non-ostracized condition ($M = 39.90, SD = 25.60$), but the difference was small and not significant, $F(1,256) = 3.19, p = .075$, partial $\eta^2 = .012$. These findings are consistent with Studies 1 and 2: despite the fact that experiencing ostracism led to diminished feelings of belonging and control, these negative states seem to have no significant relation to evaluations of a favourite personal possession.

STUDY 4 – PERSONAL EXPERIENCE OF REJECTION AND FAVOURITE SWEATERS

Studies 1-3 manipulated ostracism via Cyberball – the most popular manipulation in the literature – but it is important to check that our failure to find a link between social exclusion and the valuation of personal possessions is not attributable to a particular choice of procedure. Study 4 replicated the general procedure of the Studies 1-3, but used a different

method to induce feelings of social exclusion. Instead of playing Cyberball, participants had to recollect and describe a time in which they either felt ostracized or not ostracized.

Method

314 participants from the USA were recruited via Amazon Mechanical Turk and received \$0.50 for their participation. Column four in Table 2 summarizes the procedure.

Results and discussion

Data screening

Using the same exclusion criteria as Study 3, the sample was reduced to 269 participants (see Appendix C).

Manipulation check

Table 6. Study 4: Summary of the psychological constructs related to the ostracism manipulation.

Scale	Mean (<i>SD</i>) after 'excluded' essay	Mean (<i>SD</i>) after 'included' essay	F(1,267) for mean difference	<i>p</i> -value	Partial η^2
Feelings of belonging	3.39 (1.02)	3.82 (0.93)	12.42	<.001	.046
Feelings of control	3.37 (0.89)	3.39 (0.77)	< 1	.875	<.001
Self-esteem	3.40 (0.96)	3.58 (0.95)	2.37	.125	.009
Feelings of meaningful existence	3.80 (0.94)	3.97 (0.93)	2.31	.130	.009
Mood (high score = positive mood)	3.66 (0.97)	3.98 (0.74)	9.08	.003	.033

The results summarized in Table 6 demonstrate that the (essay writing) ostracism manipulation adversely affected participants' feelings of belonging and their mood. Unlike being ostracized in Cyberball, recollecting a personal experience of ostracism had no significant influence on participants' feelings of control, self-esteem and meaningful existence. The varied nature of what participants wrote about (compared to the uniform treatment in the Cyberball game) may account for this discrepancy (e.g., passively awaiting a pass of the ball that never comes provides a challenge to one's sense of control that may not be present in all cases of social rejection).

Valuation

Participants' WTPs and WTAs for their favourite sweater were converted to log-transformed price ratios as per Studies 2 and 3. The median selling price for a sweater was \$40.00, while the median buying price was only \$25.00. The difference between buying and selling prices was significant, $F(1,268) = 11.13, p = .001$, partial $\eta^2 = .040$. Consistent with Studies 1-3, the main effect of ostracism was not significant ($F < 1$), nor was the interaction between ostracism and ownership ($F < 1$).

There was no significant effect of the ostracism manipulation on feelings of ownership ($\alpha = .82$; ostracized: $M = 4.19, SD = .72$ vs. non-ostracized: $M = 4.27, SD = .78$), $F(1,267) = 1.82, p = .367$, partial $\eta^2 = .003$, or for the strength of the link between the possession and one's self ($\alpha = .90$; ostracized: $M = 38.08, SD = 25.87$ vs. non-ostracized: $M = 42.30, SD = 23.76$), $F(1,257) = 1.94, p = .165$, partial $\eta^2 = .007$. Thus, despite its effect of on feelings of belonging, the ostracism manipulation did not affect feelings of ownership or the possession-self link.

GENERAL DISCUSSION

In four studies, with over 800 participants, we found no evidence that feelings of social exclusion influenced people's valuations of their possessions or their feelings of ownership. Our ostracism manipulations lowered people's sense of belonging and control (and, in Studies 1 and 2, their self-esteem and sense of meaningful existence), but this did not motivate them to develop stronger feelings of ownership towards their owned objects. In a standard endowment effect experiment, ostracized individuals did not offer higher buying prices, or demand higher selling prices, for a consumer product than other individuals. The same pattern held in three subsequent studies, where participants specified their buying and selling prices for one of their favourite personal possessions. Even though social exclusion had a negative impact on people's psychological needs, we did not find that it changed their feelings of ownership towards, or the strength of their link with, a possession.

While we failed to reject the null hypothesis with respect to the effect of ostracism on valuation and subjective ownership, the foregoing analysis is limited by its inability to quantify the support *for* the null effect. We therefore computed Bayesian *t*-tests comparing the valuations of ostracized and non-ostracized individuals in all four studies (Rouder, Speckman, Sun, Morey & Iverson, 2009; calculator available at <http://pcl.missouri.edu/bf-two-sample>; see Matthews, 2011, 2012, for a discussion and example applications). We report the results in Appendix D; in every case, the data favour the null by a factor of more than 3 to 1. Appendix D also shows confidence intervals obtained from non-Bayesian (i.e., “orthodox”) analyses of the mean difference in valuations. Most of these confidence intervals span a narrow range, indicating that the “likely limits” on the mean difference encompass only small effect sizes. Together, these results present an unambiguous picture: our data provide substantial support for the null hypothesis, which states that there is no difference in valuation (WTP or WTA) between individuals who were ostracized and non-ostracized. The

same conclusion is drawn from each study and for all measures of psychological ownership. In what follows, we discuss possible explanations for this pattern of findings.

One (methodological) possibility is that our findings are specific to our ostracism manipulations. However, we manipulated social exclusion in two different ways without any obvious change to the pattern of results. Furthermore, both methods of inducing feelings of social exclusion (Cyberball and writing about personal experience) affected participants' needs for belonging and control and have been used extensively in previous work (see Williams, 2007, for a review). Nonetheless, it remains possible that a more impactful, "real life" ostracism experience would elicit a different result. Likewise, social exclusion comes in various forms, and different types of ostracism (e.g., being rejected rather than simply ignored) may exert different effects (Lee & Shrum, 2012) on measures of psychological ownership and valuation.

A related possibility is that our findings are product-specific. Again, however, the findings generalized across product a range of different possessions. Indeed, our use of treasured personal possessions and favourite sweaters was motivated by the relevance of these objects to the self-extension theory of ownership: the sense of self-identity, efficacy, "home", and mnemonic roles of these possessions being especially relevant to the needs-threat posed by ostracism. However, the possibility remains that the effects of social exclusion on feelings of ownership depend on the specific item and its specific role in meeting one's needs for belonging, meaning, self-esteem, and control.

A final methodological explanation is that the impact of ostracism on mood might mask an effect on valuation and subjective feelings of ownership. However, we found no systematic effects of mood in our data: only one out of a possible eight correlations between mood and valuation (4 studies \times 2 valuation methods) was significant: that between mood and WTA in Study 3, $r(256) = .64, p < .01$. Moreover, prior research has found conflicting

effects of mood on valuation (Lerner, Small, & Loewenstein, 2004; Zhang & Fishbach, 2005). One possibility is that specific emotions, rather than overall mood, have a direct impact on valuation and feelings of ownership. As some have suggested (Lerner & Keltner, 2000), same-valence emotions can have a different influence over WTAs and WTPs for consumer products. This point highlights how difficult it is to precisely manipulate specific motivational needs in isolation; to the best of our knowledge, ostracism is the only method that has been robustly shown to negatively influence both feelings of belonging and control.

Putting aside these methodological possibilities, what are the theoretical implications of our findings? One possibility is that the *social* nature of ostracism influences needs that are distinct from those involved in the development of feelings of ownership – however, this does not align well with theories of self-extension and ownership, because several of psychological needs that are central to these theories have an obvious social dimension (needs for belonging, control, sense of place, and stimulation).

Instead, our preferred interpretation is that the needs threatened by ostracism *are* indeed closely allied to those bolstered by ownership – however, people do not use their personal belongings as a blanket defense against the needs-threat of social exclusion. Ostracism threatens people’s self-esteem and need to feel that they “exist”; it lowers their sense of control over events and engenders a sense of *not* belonging. While material possessions provide a way to meet similar needs, and while possessions may be imbued with social meaning, they are also – at bottom – inanimate, asocial artefacts; and the implication of our work is that the self-object link that characterizes psychological ownership is not readily used as a defense against the threatened self-other links that are undermined by social exclusion. Thus, when one feels that one has no influence over the course of a social interaction, it may be scant consolation to think about controlled personal possessions. Likewise, although one’s possessions may affirm one’s acceptance by a broader or different

social community, this may provide little defense against the threatened need-for-belonging evoked by proximal social rejection.

A dissociation between the needs-threat of ostracism and the need-fulfillment of psychological ownership runs counter to a large body of work showing that threats to the self in one domain are often compensated by self-affirmation in another (see Sherman & Cohen, 2006, for a review). However, there is some precedent in studies showing that behavioural responses to ostracism depend on the extent to which these actions provide a way to respond to the needs-threat posed by social exclusion. Ostracized participants outperformed non-ostracized individuals on an anti-saccade task when they were told that participants would be able to compare performance (and thus that doing well would increase their opportunity to affiliate with the group that had just excluded them; Jamieson, Harkins, & Williams, 2010). Likewise, social exclusion increases willingness to pay for an unappealing product only when its public consumption would increase the opportunity for social affiliation (Mead et al., 2011).

A useful direction for future work is, therefore, to examine whether the needs-threat posed by ostracism selectively strengthens people's feelings of ownership towards those possessions which have previously indexed their social affiliation, or which might afford the opportunity for such affiliation in the future. We focused primarily on treasured personal possessions and clothing because of their relevance to the extended self, but it may be that there are other belongings which provide better opportunities for integration with the excluding group, or which have led to social inclusion in the past. For example, personal possessions that represent one's group membership, such as football shirts or county emblems, could be more appropriate for recovering from social exclusion.

In summary, using a range of self-report and behavioral measures, the findings reported in this paper suggest that feelings of ownership are largely unaffected by the

experience of social exclusion. Our work contributes towards a better understanding of the psychological mechanisms of subjective ownership, although further efforts are needed to disentangle the exact conditions under which our personal possessions can allow us to maintain and restore vital psychological needs.

REFERENCES

- Ardrey, R. (1966). *The territorial imperative*. New York: Atheneum.
- Ariely, D., Huber, J., & Wertenbroch, K. (2005). When do losses loom larger than gains? *Journal of Marketing Research*, 42, 134.
- Avey, J. B., Avolio, B. J., Crossley, C. D., & Luthans, F. (2009). Psychological ownership: theoretical extensions, measurement and relation to work outcomes. *Journal of Organizational Behavior*, 30, 173-191.
- Baer, M. & Brown, G. (2012). Blind in one eye: How psychological ownership of ideas affects the types of suggestions people adopt. *Organizational Behaviour and Human Decision Making Processes*, 118, 60-71.
- Baumeister, R., Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin* 117, 497.
- Peck, J., Barger, V. A., Webb, A. (2012). In search of a surrogate for touch: The effect of haptic imagery on perceived ownership. *Journal of Consumer Research*, 23(2), 189- 196.
- Becker, G., DeGroot, M. & Marschak, J. (1964). Measuring utility by a single response sequential method. *Behavioral Science*, 9, 226-236.
- Beggan, J. K. (1992). On the Social Nature of Nonsocial Perception: The Mere Ownership Effect. *Journal of Personality and Social Psychology*, 62(2), 229-237.
- Belk, R. W. (1988). Possessions and the extended self. *Journal of Consumer Research*, 15, 139-168.

- Benassi, V. A., Sweeney, C. A., Dufour, P. D., Charles, L. (1988). Is there a relation between locus of control orientation and depression? *Journal of Abnormal Psychology, 97*(3), 357-367.
- Carmon, Z., & Ariely, D. (2000). Focusing on the foregone: How value can appear so different to buyers and sellers. *Journal of Consumer Research, 27*, 360-370.
- Crocker, J., Luhtanen, R. K., Cooper, M. L., & Bouvrette, A. (2003). Contingencies of self-worth in college students: Theory and measurement. *Journal of Personality and Social Psychology, 85*, 894-908.
- Dittmar, H. (1992). *The social psychology of material possessions: To have is to be*. Hemel Hempstead: Harvester Wheatsheaf.
- Duncan, J. S. (1976). Landscape and the communication of social identity. *The mutual interaction of people and their built environment*, eds. James S. Duncan and Nancy C. Duncan, The Hague, The Netherlands: Mouton, 391-401.
- Escalas, J. E. (2004). Narrative processing: Building consumer connections to brands. *Journal of Consumer Psychology, 14*(1), 168-180.
- Ferraro, R., Escalas, J. E. & Bettman, J. R. (2011). Our possessions, our selves: Domains of self-worth and the possession-self link. *Journal of Consumer Psychology, 21*(2), 169-177.
- Furby, L. (1978). Possession in humans: an exploratory study of its meaning and motivation. *Social Behavior and Personality, 6*, 49.
- Furby, L. (1991). Understanding the psychology of possession and ownership: A personal memoir and an appraisal of our progress. In F. W. Rudmin (Ed.), *To have possession: A*

- handbook on ownership and property. *Journal of Social Behavior and Personality*, 6(6), 457-463.
- Gardner, W.L., Pickett, C.L., Jefferies, V., & Knowles, M. (2005). On the outside looking in: Loneliness and social monitoring. *Personality and Social Psychology Bulletin*, 31, 1549.
- Gardner, W. L., Pickett, C.L., & Brewer, M. B. (2000). Social exclusion and selective memory: how the need to belong influences memory for social events. *Personality and Social Psychology Bulletin*, 26, 486.
- Goodman, J. K., Cryder, C. E., & Cheema, A. (2012). Data collection in a flat world: The strengths and weaknesses of Mechanical Turk samples. *Journal of Behavioral Decision Making*, 26, 3, 213-224.
- Grayson, K., & Shulman, D. (2000). Indexicality and the verification function of irreplaceable possessions: A semiotic analysis. *Journal of Consumer Research*, 27, 17-30.
- Horowitz, J. K., & McConnell, K. E. (2002). A review of WTA/WTP studies. *Journal of Environmental Economics and Management*, 44(3), 426-447.
- James, W. (1980). *The principles of psychology*. New York: Holt.
- Jamieson, J. P., Harkins, S. G., & Williams, K. D. (2010). Need threat can motivate performance after ostracism. *Personality & Social Psychology Bulletin*, 36, 690-702.
- Johnson, E. J., Hohns, G., & Keinan, A. (2007). Aspects of endowment: A query theory of value. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 33, 461-474.

- Kahneman, D., Knetsch, J. L., Thaler, R. H. (1991). Anomalies: The endowment effect, loss aversion, and status quo bias. *The Journal of Economic Perspectives*, 5, 193-206.
- Kleine, S. S. & Baker, S. M. (2004). An integrative review of material possession attachment. *Academy of Marketing Science Review*, 1, 1-35.
- Kogut, T., & Kogut, E. Possession attachment: Individual differences in the endowment effect. *Journal of Behavioral Decision Making*, 24(4), 377-393.
- Leary, M. R., Kelly, K. M., Cottrell, C. A., & Schreindorfer, L. S. (2012). *Individual differences in the need to belong: Mapping the nomological network*. Unpublished manuscript, Duke University.
- Lee, Jaehoon & L. J. Shrum (2012). Conspicuous consumption versus charitable behavior in response to social exclusion: A differential needs explanation. *Journal of Consumer Research*, 39, 530-544.
- Lerner, K. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion specific influences on judgment and choice. *Cognition and Emotion*, 14, 473-493.
- Lerner, J. S., Small, D. A., & Loewenstein, G. (2004). Heart strings and purse strings: Carryover effects of emotions on economic decisions. *Psychological Science*, 15, 337-341.
- Litwinski, L. (1942). Is there an instinct of possession? *British Journal of Psychology*, 23, 28-39.
- Locke, J. (1690). *Two treatises of government*. Oxford: Oxford University Press.

- Loveland, K. E., Smeesters, D., & Mandel, N. (2010). Still preoccupied with 1995: The need to belong and preference for nostalgic products. *Journal of Consumer Research*, *37*(3), 393-408.
- Kogut, T. & Kogut, E. (2011). Possession attachment: individual differences in the endowment effect. *Journal of Behavioral Decision Making*, *24*(4), 377-393.
- Matthews, W.J. (2011). What might judgment and decision making research be like if we took a Bayesian approach to hypothesis testing? *Judgment and Decision Making*, *8*, 843-856.
- Matthews, W.J. (2012). How much do incidental values affect the judgment of time? *Psychological Science*, *23*, 1432-1434.
- McCracken, G. D. (1988). *Culture and consumption: New approaches to the symbolic character of consumer goods and activities*. Indiana University Press: University of California.
- Mead, N. L., Baumeister, R. F., Stillman, T. F., Rawn, C. D., & Vohs, K. D. (2011). Social exclusion causes people to spend and consume in the service of affiliation. *Journal of Consumer Research*, *37*, 902-912.
- Mehta, R., & Belk, R. W. (1991). Artifacts, identity, and transition: Favorite Possessions of Indian Immigrants to the U.S. *Journal of Consumer Research*, *17*, 398-411.
- Mittal, B. (2006). I, me, and mine – how products become consumers' extended selves. *Journal of Consumer Behaviour*, *5*, 550-562.
- Molden, D. C., Lucas, G. M., Gardner, W. L., Dean, L. L., & Knowles, M. L. (2009). Motivations for prevention or promotion following social exclusion: Being rejected versus being ignored. *Journal of Personality and Social Psychology*, *96*, 415-431.

- Morewedge, C. K., Shu, L. L., Gilbert, D. T., & Wilson, T. D. (2009). Bad riddance or good rubbish? Ownership and not loss aversion causes the endowment effect. *Journal of Experimental Social Psychology, 45*, 947-951.
- Nezlek, J. B., Wesselmann, E. D., Wheeler, L., & Williams, D. (2012). Ostracism in everyday life. *Group Dynamics: Theory, Research, and Practice, 91*, 91-104.
- Norton, M. I., Mochon, D., & Ariely, D. (2012). The IKEA effect: When labor leads to love. *Journal of Consumer Psychology, 22*, 453-460.
- Novemsky, N., & Kahneman, D. (2005b). The boundaries of loss aversion. *Journal of Marketing Research, XLII*, 119-128.
- Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on Amazon Mechanical Turk. *Judgment and Decision Making, 5*, 411-411.
- Peck, J., & Shu, S. B. (2009). The effect of mere touch on perceived ownership. *Journal of Consumer Research, 36*(3), 434-447.
- Plott, C. R., & Zeiler, K. (2005). The willingness to pay/willingness to accept gap, the “endowment effect,” subject misconceptions, and experimental procedures of eliciting valuations. *American Economic Review, 95*, 530-545.
- Pierce, J. L. & Jussila, I. (2011). *Psychological ownership and the organizational context: Theory, research evidence, and application*. Cheltenham, UK: New Horizons in Management.
- Pierce, J. L., Kostova, T., & Driks, K. T. (2001). Towards a theory of psychological ownership in organizations. *Academy of Management Review, 26*, 298-310.

- Pierce, J. L., Kostova, T., & Dirks, K. T. (2003). The state of psychological ownership: Integrating and extending a century of research. *Review of General Psychology, 7*, 84-107.
- Pierce, J. L., Stephen, A., Rubinfeld, A., & Morgan, S. (1991). Employee ownership: A conceptual model of process and effects. *Academy of Management Review, 16*, 121-144.
- Porteous, J. D. (1976). Home: The territorial core. *Geographical Review, 66*, 383-390.
- Reb, J., & Conolly, T. (2007). Possession, feelings of ownership and the endowment effect. *Judgment and Decision Making, 2*, 107-114.
- Rouder, J. N., Speckman, P. L. Sun, D., & Iverson, G. (2009) Bayesian t-tests for accepting and rejecting the null hypothesis. *Psychonomic Bulletin & Review, 16*, 225-237.
- Rucker, D. D., & Galinsky, A. D. (2008). Desire to acquire: Powerlessness and compensatory consumption. *Journal of Consumer Research, 35*, 257-267.
- Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna (Ed.) (*Advances in experimental social psychology* p.183-242). San Diego, CA: Academic Press.
- Shu, S. B., & Peck, J. (2011). Psychological ownership and affective reaction: Emotional attachment process variables and the endowment effect. *Journal of Consumer Psychology, 21*, 439-452.
- Sivadas, E., & Venkatesh, R. (1995). An Examination of Individual and object-specific influences on the extended self and its relation to attachment and satisfaction. *Advances in Consumer Research, 22*, 406-412.

- Strahilevitz, M. A., & Loewenstein, G. (1998). The effect of ownership history on the valuation of objects. *Journal of Consumer Research*, 25, 276-289.
- Thaler, R. H. (1980). Toward a positive theory of consumer choice. *Journal of Economic Behavior and Organization*, 1, 39-60.
- Tian, K., & Belk, R. W. (2005). Extended self in the workplace. *Journal of Consumer Research*, 32(2), 297-310.
- Twenge, J. M., Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Bartels, J. M. (2007). *Journal of Personality and Social Psychology*, 92(1), 56-66.
- Van Dyne, L., & Pierce, J. L. (2004). Psychological ownership and feelings of possession: three field studies predicting employee attitudes and organizational citizenship behaviour. *Journal of Organizational Behavior*, 25, 439-459.
- Williams, K. D. (2001). *Ostracism: The Power of Silence*. New York: Guilford.
- Williams, K. D. (2005). Ostracism: the indiscriminate early detection system. In Williams, K. D., Forgas, J. P., & von Hippel, W. (Eds.), *The social outcast: Ostracism, social exclusion, rejection, and bullying* (19-34). New York: Psychology Press.
- Williams, K. D. (2007). Ostracism. *Annual Review of Psychology*, 58, 452-452.
- Williams, K. D., Forgas, J. P., & von Hippel, W. (Eds.). (2005). *The social outcast: Ostracism, social exclusion, rejection, and bullying*. New York: Psychology Press.
- Williams, K. D., & Jarvis, B. (2006). Cyberball: a program for use in research on ostracism and inter-personal acceptance. *Behavior Research Methods, Instruments, & Computers*, 38, 174-180.
- Zadro, L., Boland, C., & Richardson, R. (2006). How long does it last? The persistence of the

effects of ostracism in the socially anxious. *Journal of Experimental Social Psychology*, 42, 692-697.

Zhang, Y., & Fishbach, A. (2005). The role of anticipated emotions in the endowment effect. *Journal of Consumer Psychology*, 15(4), 316-324.

Appendix A – Intercorrelation table of ostracism impact assessment measures

Study 1

	Meaningful Existence	Self-esteem	Feelings of belonging	Feelings of control	Mood
Meaningful Existence	1				
Self-esteem	-.068	1			
Feelings of belonging	.171	-.034	1		
Feelings of control	.187	.221*	.237*	1	
Mood	.176	.348**	.348**	.435**	1

Study 2

Meaningful Existence	1				
Self-esteem	.774**	1			
Feelings of belonging	.542**	.462**	1		
Feelings of control	.339**	.313**	.698**	1	
Mood	.688**	.741**	.501**	.351**	1

Study 3

Meaningful Existence	1				
Self-esteem	.760**	1			
Feelings of belonging	.187**	.218**	1		
Feelings of control	.141*	.181***	.660*	1	
Mood	.703**	.787**	.191**	.194**	1

Study 4

Meaningful Existence	1				
Self-esteem	.750**	1			
Feelings of belonging	.773**	.781**	1		
Feelings of control	.620**	.710**	.608***	1	
Mood	.728**	.805**	.744**	.657**	1

Note. Sig. Values * <.05 ** <.01

Appendix B – Principal component and measures of psychological ownership

We performed a principal component analysis with oblimin rotation on all items used to measure psychological ownership (3-item feelings of ownership and 6-item self-possession link). For this purpose we pooled the results from studies 2, 3 and 4, where both scales were used. The solution produced two factors, explaining 48.94% of variance. The factor loadings are presented below. Clearly, the two factors correspond to two unique measures of psychological ownership, providing further evidence that these scales capture distinct aspects of the relationship between a person and his/her belonging.

Item	Component	
	Self-possession link	Feelings of ownership
Self-object link: My favorite sweater is part of who I am.	.86	-.17
Self-object link: I derive some of my identity from my favorite sweater.	.86	-.21
Self-object link: My favorite sweater is central to my identity.	.85	-.21
Self-object link: My favorite sweater helps me narrow the gap between what I am and what I try to be.	.82	-.18
Self-object link: My favorite sweater helps me to achieve the identity I wish to have.	.82	-.15
Self-object link: My favorite sweater and I have a lot in common.	.66	-.13
Feelings of possession: I feel like I own the sweater.	.29	.88
Feelings of possession: I feel like this sweater is my possession.	.33	.87
Feelings of possession: I feel a very high degree of personal ownership of my sweater.	.50	.64

Appendix C – Exclusion criteria

Criterion	Study 2	Study 3	Study 4
Total number of responses recorded	451	404	377
Duplicate computer IP address	44	23	5
Incomplete responses	122	84	58
Sample size	285	295	314
Inappropriate value	15	6	10
Inappropriate item	4	6	1
WTA above the threshold	100	30	36
Reported technical issue	na	16	1
Described purpose of the study	na	15	8
Played Cyberball before	na	30	Na
Final sample size	207	233	270

Note. Participants could meet more than one exclusion criterion.

Appendix D – Bayes factor and confidence interval for the comparison of valuation between ostracized and non-ostracized individuals

Study	Measure	JZS Bayes factor	95% Confidence intervals on the effect size (units of Cohen's d)
Study 1			
	WTA	3.62	-.57, .66
	WTP	3.46	-.77, .61
Study 2			
	WTA	6.38	-.25, .21
	WTP	4.90	-.15, .34
Study 3			
	WTA	5.52	-.19, .25
	WTP	5.60	-.15, .32
Study 4			
	WTA	5.84	-.42, .20
	WTP	7.30	-.31, .25