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journal homepage: www.elsevier.com/locate/jeboThe endowment effect and the reference state: Evidence and manipulations[☆]Jack L. Knetsch^a, Wei-Kang Wong^{b,*}^a Department of Economics, Simon Fraser University, Burnaby, B.C., Canada^b Department of Economics, National University of Singapore, AS2, 1 Arts Link, Singapore 117570, Singapore

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ABSTRACT

Recent reports suggest that the “endowment effect” may be due to conditions under which it is observed and explained by incentives long recognized in standard theory. Evidence from new experiments, reported here, provides empirical support for the role of the economic environment on people’s perceived reference state and consequently on their valuations, as suggested by Köszegi and Rabin [Köszegi, B., Rabin, M., 2006. A model of reference-dependent preferences. *Quarterly Journal of Economics* 121, 1133–1165], and indicates that the disappearance of the valuation disparity is more likely due instead to conditions that weaken the perception of reference states. Further, these conditions appear to be poor approximations of those that prevail in most cases for which valuations are normally made.

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The widely reported disparity between people’s valuation of gains and their valuation of otherwise commensurate losses – the so-called endowment effect – has generally been held to depend on the reference state used to value a change: positive and negative changes in the domain of losses short of the reference are valued more than changes in the domain of gains beyond the reference state (Kahneman and Tversky, 1979; Thaler, 1980). Consequently, *ceteris paribus*, people are often reluctant to exchange a good A for another good B, as giving up A involves a more highly valued loss and acquiring B a less valued gain. Similarly, they commonly demand more compensation to give up an entitlement than they are willing to pay to acquire it (reviewed in, for example, Samuelson and Zeckhauser, 1988; Rabin, 1998; and, with a focus on environmental values, Horowitz and McConnell, 2002). More recently, Köszegi and Rabin (2006) have suggested a model that endogenizes the reference states as people’s expectations of outcomes in particular economic environments. As people’s beliefs are shaped by economic environments, the perceived reference points can be expected to be sensitive to them.

Recent natural and laboratory experiments have, however, been interpreted as showing that observed valuation disparities are due to well-known incentives of standard theory rather than to any asymmetry in preferences over gains and losses. List (2003), for example, suggests that familiarity with trading gained through experience explains why visitors to a sports memorabilia trade mart were reluctant to give up sports cards for an alternative, whereas traders who had regularly rented booths or tables at such venues for the purpose of carrying out exchanges had no such hesitation to give up their initial entitlement.

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In similar fashion, Plott and Zeiler (2005, 2007) focused on the incentive effects of procedures used in laboratory experiments in which positive endowment effects have been observed. They carried out further tests and interpreted their experimental results as demonstrating that when procedures were used that control for other incentives which classical preference theory predicts to be relevant, this brought about a dramatic elimination of the large disparities between gain and loss valuations that were evident when these controls were absent. For example, when paid training rounds were used to insure familiarity with the procedures,¹ when cascade effects from public disclosure were avoided with anonymously submitted exchange forms rather than a show of hands, when possible signals of relative value were avoided with random assignment of initial entitlements, and when the transaction cost incurred in trade together with any value enhancing information gathered while having possession were alleviated by removing the goods to be given up from the participants before they decided whether or not to exchange it for an alternative, then an otherwise strong reluctance to trade was eliminated.

Factors such as the experience of individuals in making similar transactions and the incentives induced by experimental designs may well have an influence on people's apparent valuations of gains and losses in particular instances. However, in cases such as the differences in outcomes between traders and visitors at a trade mart, and the valuations and exchange behavior exhibited by participants in experiments in response to manipulations of the conditions of exchange, a more general and parsimonious explanation for the reported outcomes may apply. This alternative, examined in the present study, is that such differences are due mainly to impacts of the conditions and controls on the reference states that people use to value changes so that a shift away from an initial endowment is not felt as a loss. For example, the Plott and Zeiler experimental treatments of taking away the good owned by participants and replacing it with an alternative, then asking which one they wished to take home, likely resulted in their having little feeling of a loss of the first good – the reference state that would have produced such attachments or sensations may well have been largely nullified by this manipulation. Similarly, the Plott and Zeiler experimental instructions for random assignment, by telling the subjects that it is equally likely for them to start with mugs or pens, that it is by pure chance that they have started with mugs (or pens), and that subjects next door have started with the alternative good, all make the alternative good an equally likely entitlement that they could just as well have received and an equally likely reference state, a perception that is likely to be reinforced by the subjects having possession of only the alternative good or of both goods when they make their decision. For example in Plott and Zeiler's (2007) "full set of controls" and "loss emphasis" treatments respectively.² As Köszegi and Rabin suggest, in these reported cases in which endowment effects were not observed, the conditions and controls may "have successfully decoupled subjects' expectations from their initial ownership status" (2006, p. 1142) and created a dichotomy between the perceived reference states (against which gains and losses are evaluated) and the status quo endowments.

There are then two alternative explanations for the observations of disparities between valuations of gains and losses. The first is that, if uncontrolled, incentives of classical preference theory – such as transaction costs, inexperience with goods to be valued, unfamiliarity with trading rules, signaling, and cascades due to public revelation of choices – can induce asymmetric choices. Although procedures that allow such opportunities may well be one source of the observed disparities, manipulations of procedures to eliminate such chances may also change the reference state so that a shift away from the original endowment is not felt as a loss, and it is this reference dependence rather than the procedural controls for classical incentives per se which leads to the on and off results.

Given the important difference in the implications of the alternative explanations for the observed valuation disparities, distinguishing between them clearly warrants further tests. The present test of this distinction was carried out based on the simple and convenient model of Plott and Zeiler's (2007) experimental design, in which participants exchange or do not exchange one good for another. These exchange experiments have the advantage of avoiding rate of substitution measurement and complex elicitation procedures, but they do not really measure the monetary strength of the endowment effect or the size of the WTA–WTP gap.³

The results show that in a treatment that provides essentially all of the procedural controls that are deemed necessary to control for incentives recognized in standard theory but does not *a priori* create a large dichotomy between the perceived reference state and the initial entitlement, the participants exhibit a strong reluctance to trade away initial entitlements despite a lack of ownership of this entitlement. On the other hand, in a treatment that includes procedures that may control for other incentives but can also be expected to create a large dichotomy between the perceived reference states and the initial endowments, the participants show no such reluctance to trade despite having ownership of the original entitlement. Thus, the results provide further empirical evidence that reference states matter, and that the consequences of differing procedural control manipulations are likely to be in large part due to their impacts on the reference states perceived by participants. Further, these findings appear consistent with the role reference states play in the choices people make in their everyday lives.

¹ Brown (2005) also finds evidence of misconception using the verbal protocol technique; when stating WTA, most subjects referred to what the good would be worth to others or in store, instead of what the good was worth to them, despite the use of a random price auction.

² Random assignment of the endowed good is a key condition that leads to the disappearance of the endowment effect in Plott and Zeiler (2007). Specifically, subjects were told, "Before the start of the experiment, a coin was flipped to determine which good, the mug or the pen, to distribute. It came up heads, which means that we start with the mugs (or pens). The subjects in the other room will start with the pens (or mugs)" (Plott and Zeiler, 2007, p. 1454, footnote 13).

³ For instance, for the participants who exhibit reluctance to trade their endowed good away, it is unclear how large the monetary compensation needs to be to induce trade. Obviously, the endowment effect is more economically significant the larger the monetary compensation needs to be.

Table 1
Design features and results of symmetry experiment treatments.

	Treatment		
	1. Owned, weak reference	2. Owned, semi-strong reference	3. Not owned, strong reference
Initial entitlement	Random across groups	Random within group	Predetermined across groups
Randomization	Random draw for group	Individual last digit odd vs. even	–
Possession at time of decision	No	No	Yes
Exchange form	Take home mug or pen	Keep or trade	Earn and keep or give up earning
Results			
# Initial mugs	47	46	49
# Keep mug	23	23	33
# Trade for pen	24	23	16
# Initial pens	42	54	49
# Keep pen	21	37	42
# Trade for mug	21	17	7
% Initial mugs			
Keep mugs	49%	50%	67%
% Initial pens			
Trade for mugs	50%	31%	14%
Difference	–1%	19%	53%
<i>p</i> -value ^a	0.54	0.03	0.00

^a The null hypothesis is that the percentage of mug owners who chose mugs is equal to the percentage of pen owners who chose mugs. The alternative hypothesis is that there is endowment effect, i.e., the percentage of mug owners who chose mugs is greater than the percentage of pen owners who chose mugs – an upper-tailed test.

1. Experimental tests of reference dependence

Three treatments were carried out with students recruited from those attending tutorial sections of an economics class at the National University of Singapore,⁴ with the major characteristics of each and the results summarized in Table 1. No payment was made for taking part in the experiment, but all entitlements and trades were real, and all participants took away, depending on their initial entitlement and the result of any trade, either a plastic travel mug with the university insignia imprinted on it that was specially ordered and not otherwise available, or a reasonably good metal pen that was of comparable monetary worth of about S\$8.⁵ In all treatments, participants were told that the exercise involved answering some questions⁶ on a survey form and that they were not to communicate with each other nor react verbally to events during the exercise.

The major manipulation centered on the strength of the reference state believed to govern how people value giving up an entitlement relative to their gaining one. Manipulations of the reference state were made across different treatments, while maintaining essentially all of the procedural controls suggested by Plott and Zeiler as being necessary to prevent misconceptions on the part of participants and to control for differential incentives to show a preference for one good over another recognized in classical preference theory.

Explicit ownership of the good which individuals could choose to give up, or not to give up, to acquire an alternative good, was included as a treatment variable. However, other variables that also help establish a reference state were deliberately designed to weaken, or undermine, the impact of having ownership of the good traded away, thereby providing a stronger test for the reference dependence of people's preferences. This was done by including or excluding ownership, which can be expected to be a positive factor in fixing a reference state that would increase the feeling of its loss, with manipulation of other factors in a way that might be expected to have the opposite effect on the reference state.

The results from the different treatments show that the reluctance to trade motivation provided by ownership may well be important, but even so it can be totally undermined, with trades abounding, by manipulations that weaken this otherwise natural reference state (Treatment 1). In contrast, a very strong reluctance to trade stemming from a large valuation disparity, was induced by manipulations giving rise to strong feelings of a reference state of attachment even in the absence of actual ownership (Treatment 3).

1.1. Treatment 1 – owned, weak reference

The 89 participants taking part in this treatment did so in four groups ranging from 20 to 26 individuals each. All participants in a group were told they owned either a mug or a pen, with the choice of which good (a mug or a pen) was given to

⁴ Results from an earlier, and unrelated, series of experiments carried out at both Simon Fraser University, in Canada, and NUS, in Singapore, showed very similar preferences and choices, suggesting little reason for any lack of generality in the present findings (Knetsch et al., 2001).

⁵ The Singapore dollar was worth about USD 0.70 at the time.

⁶ The questions were unrelated to the purpose of the experiment.

all of them having been determined by a random draw, and that people in the other group were being given the alternative to theirs. Ownership was conveyed by telling them:

“For taking part in this exercise, each of you has earned a mug [pen] which is yours to take home with you. In other words, you now own a mug [pen] which you can collect at the end of this exercise to take with you.”

After the questionnaires were completed, a “decision form” was given to each participant asking them to “tick the item you wish to take home with you” (a mug or a pen). When the decision forms were completed the experimenter collected them and gave each either a mug or pen in accord with their choice.

While mug or pen ownership was established by this procedure, the reference state normally conveyed by this entitlement was deliberately weakened by three measures. First, participants did not have physical possession of the good they owned at the time they completed their decision forms so that there was then no physical giving up of the good if they selected the alternative and consequently less inducement to frame it as a loss. Instead, both mugs and pens were passed around for everyone to examine, and both were then collected from them before they started completing the questionnaire.

Second, the explicit mention that the good they received was determined randomly and that participants in the other session were given the other good – “Whether the participants in a particular session earn a mug or a pen is determined by a random draw” – may have further weakened the reference state of having the initial good by highlighting the alternative as an equally likely entitlement that they could just as well have received.

Third, the choice provided in the decision form was purposely framed in completely neutral terms of asking which “item they wished to take home with them”, rather than as a choice between a loss and a foregone gain. Thus, despite ownership, the choice is framed more like the “chooser” condition in Knetsch (1989), where participants were asked to choose between two alternative goods (coffee mugs and chocolate bars) and they seemed equally likely to choose either one. Collectively, these measures appeared to be sufficient to weaken any feeling of a reference state that would lead to a reluctance to exchange their initial entitlement for the alternative.

As indicated in Table 1, exactly half of the 42 participants who were given a pen traded for a mug and the other half kept the pen; and essentially the same was true for the 47 people who were given a mug, with 23 keeping it and 24 exchanging it for a pen. There was no evidence of an endowment effect – this manipulation of the reference state to one for which giving up the initial entitlement did not engender a feeling of loss, did away with any valuation disparity and resulted in a total absence of any reluctance to trade.

1.2. Treatment 2 – owned, semi-strong reference

This treatment is similar to Treatment 1, except that the reference state attachment to the initial entitlement was strengthened slightly by a combination of a different wording of the “exchange form” and the random assignment of initial entitlement being within-, not between-experimental sessions.⁷

The 100 participants taking part in this treatment did so in four groups ranging from 24 to 27 individuals each. All participants in a group were told they owned either a mug or a pen, with the choice of which good (a mug or a pen) to be given to them determined by the last digit of their matriculation/identity card (IC) number (whether it was odd or even).

Ownership was conveyed by telling them:

“For taking part in this exercise, each of you has earned either a mug or a pen which is yours to take home with you. Whether you receive a mug or a pen will be determined by whether the last digit of your matriculation/IC number is odd or even.”

The participants were then asked to write down the last digit of their matriculation/IC number on a piece of colored paper that was placed in front of them. After the participants had written down a number – to preclude any possibility of reporting an ID number to gain a desired good – they were then told that:

“If this number is odd, you now own a mug which you can collect at the end of this exercise to take with you.

If this number is even, you now own a pen which you can collect at the end of this exercise to take with you.”

The participants were told that later, they would be given the opportunity to exchange for the alternative good and which good they chose to end up with and take with them would be up to them. After the questionnaires were completed, an “exchange form” was given to each on which they indicated whether they wanted to “keep the mug [pen]”, or “trade the mug [pen] for a pen [mug].” All necessary exchanges were then made as the forms were collected after completion of the survey questionnaire.

⁷ The random assignment in Treatment 2 is said to be within-session because within each session, some participants will be randomly assigned a mug and others a pen. So the random assignment is across individuals in the same session. The random assignment in Treatment 1 is said to be between-session, in contrast to Treatment 2, because every participant in the same session is assigned the same good, though which good to assign in a particular session is randomly determined. So the random assignment is across individuals in different sessions.

Similar to Treatment 1, while ownership of a mug or a pen was established by the random procedure, the participants were not given physical possession of either good at the time they completed their exchange forms as here too both were passed around for inspection and then collected and placed at the front of the room.

As indicated in Table 1, exactly half of the 46 participants who were given a mug kept the mug, but only 31 percent of the 54 participants who were given a pen traded it for a mug. This 19 percent difference in the proportions of individuals keeping their initial entitlement to a mug and those giving up their pens and trading for a mug, is evidence of a limited but significant endowment effect ($p = 0.03$) – falling between Treatment 1 and Treatment 3 in magnitude.⁸

The reference state of having the initial entitlement may have been strengthened slightly by posing the choice in the exchange form in terms of whether participants wanted to “keep” the good they owned or “trade” it for the alternative. Further, while classical preference theory suggests that whether randomization is within- or between-experimental sessions should not matter, the modest reluctance to give up an entitlement evident in the results of this treatment may be at least in part due to a sense of deservedness conveyed by the randomization procedures used. The results of a “veil of ignorance” experiment showed, for example, that people overwhelmingly supported an equal distribution of payment for people performing equal work, but favoured the winner of a coin flip receiving far more than the loser of such a pure chance game – presumably on grounds that the “winner” *deserved or is entitled* to keep the greater reward (Bukszar and Knetsch, 1997). Perhaps in a similar way, for some participants, the “winning” of a mug (or a pen) by having an odd (or even) last digit gives rise to at least some reluctance to trade it away.

1.3. Treatment 3 – not owned, strong reference

The 98 participants taking part in this treatment did so in four groups ranging from 23 to 26 individuals each. Each individual in each group in Treatment 3 was given either a mug or a pen, which was then left with them while they completed the questionnaire, with the choice of good for each group predetermined without mention of any random selection. The lack of ownership but strong feeling of a reference state of attachment were induced by oral and written instructions:

“You do not own this mug [pen] yet. Later, if you complete this exercise you will earn it and you can take it home with you. You can inspect it now. But please do not use it yet.”

After the questionnaires were completed, the alternative of a pen [mug] was passed around and each participant was allowed to inspect it before it was passed back to the experimenter and put at the front of the room.

After telling the participants that they could give up earning the mug [pen] later in exchange for earning a pen [mug], an exchange form was given to each on which they indicated whether they wanted to “earn and keep the mug [pen]”, or “give up earning the mug [pen] and earn a pen [mug] instead.” All necessary exchanges were then made as the forms were collected after completion of the survey questionnaire.

With the lack of ownership, the reference state that would normally be absent was deliberately strengthened using three measures. First, the participants had physical possession of the good they were endowed with at the time they completed their exchange forms so that if they selected the other good to take home with them after completing the exercise, they would have to physically give up this good thereby inducing a mental frame of a loss.⁹ It is worth noting that the marginal transaction cost incurred by participants trading for the alternative was zero with these procedures, since they had to fill in the exchange forms for either choice and any exchanges were carried out by the experimenters when they collected the exchange forms (which also had to be collected in either case). Second, attachment to the initial good was strengthened by not mentioning a random assignment of their good, as attachment would presumably be weakened by explicit mention that they could have received either one or the other as a matter of pure chance.¹⁰ Specifically, if a person's reference point is her probabilistic beliefs about the relevant outcome, as Köszegi and Rabin (2006) suggest, then it is quite plausible that the explicit mention of randomization weakens the probabilistic belief of being endowed with the good they own, thereby weakening the tendency to equate the endowed good with the reference state. Third, the choice was purposely framed as gains vs. losses on the exchange forms which asked participants if they wanted to “keep” or “give up” the good they were told they would earn.

⁸ The null hypothesis is that the percentage of mug owners who chose mugs is equal to the percentage of pen owners who chose mugs. The alternative hypothesis is that there is endowment effect, i.e., the percentage of mug owners who chose mugs is greater than the percentage of pen owners who chose mugs – an upper-tailed test.

⁹ Contrast this with an experimental procedure that places the alternative good, instead of the endowed good, with the participants at the time when they make choices, such as in Plott and Zeiler (2007). In this case, if the participants decide to keep the good they are endowed with, they will have to physically lose the alternative good (in their possession), inducing a mental frame of a loss (of the alternative good in their possession) and to physically gain the endowed good (that is not currently in their possession), inducing a mental frame of a foregone gain (of the endowed good). Such an experimental procedure leads to a counter-intuitive prediction: loss aversion predicts that *no* endowment effect will be observed because given the location of the alternative good in front of the participants at the time of the decision, loss aversion induces mental frames that encourage trading the endowed good (not in their possession) for the alternative good (currently in their possession)!

¹⁰ The absence of random assignment could be taken as a signal that the good endowed is more valuable than the alternative if most participants believed that the experimenter would compensate them with a greater than necessary reward – a fairly arbitrary speculation, and one that runs counter to the prediction of classical preference theory that typically assumes that all individuals would attempt to maximize their self-interest, leading to the expectations that an experimenter would attempt to minimize payouts instead.

In contrast to Treatment 1 in which a weak reference was induced and trades flourished, the strong reference prompted by the procedures of Treatment 3 induced a great, and highly significant ($p=0.00$), reluctance to exchange the initial entitlements. Only 14 percent of 54 initial pen holders traded for a mug, and 33 percent of the 46 initial mug holders traded for a pen. In this case it seems clear that despite the lack of ownership, inducing a feeling of loss that would accompany an exchange that is brought about by this manipulation of the reference state is enough to have caused these individuals to demand more to accept the loss than they were willing to sacrifice for a commensurate gain.

2. Discussion and conclusions

The strong propensity to exchange evident in Treatment 1, despite the designation of ownership of the endowed good, is in sharp contrast to the very marked reluctance to give up an entitlement in Treatment 3 in which procedures were designed to shift the reference state used to evaluate the consequences of a trade towards one that revealed the disparity, even in the absence of ownership. In this case the procedural manipulations appear to have engendered a reference of having assured access to the good or at least the right to acquire it – a “probabilistic belief” that this is the case. Giving this up would therefore be felt as a more aversive loss than the much less aversive foregoing of the opportunity to acquire the alternative good.

The results suggest that it is the reference state that can give rise to a disparity in valuations and the reluctance to trade. And while ownership may be one factor in determining people's reference, it does not dictate it and its influence, as illustrated in these experiments, can be undermined by other factors such as weakened probabilistic beliefs or expectations and lack of physical possession. The ambiguity of the terms endowment and entitlement, and especially to the extent that they imply ownership, suggests that it may be more accurate to refer to the greater attention and valuation of losses than otherwise commensurate gains as a reference effect rather than as an endowment effect.

There are any number of variables that might influence people's adoption of a reference position for valuing a proposed change. Further search for such explanatory variables, and testing for their importance in differing circumstances, will likely be helpful for better understanding and predicting of reference states and of the relative magnitudes of valuation disparities that might be expected to result, thus leading to greater awareness of the conditions necessary for valuations to conform to those assumed in standard theory and the extent to which such conditions are unlikely to prevail when real choices are made and valuation disparities become the expected result.

Models of the determination of reference points provide extremely useful theoretical guidance in this search. For example, [Kőszegi and Rabin \(2006\)](#) propose that a person's reference point depends on beliefs about outcomes.¹¹ Thus, in economic environments where expectations and the status quo are different, equating the reference point with the status quo can lead to misleading conclusions about the validity of reference dependent preferences if people tie the reference to their expectations rather than the status quo. The experimental evidence provided here supports such theoretical predictions.

It is also useful to compare the conditions in which the reference, or endowment, effect is present to real cases in which economic analyses are used for the usual purposes of explaining, predicting, and prescribing (several such cases are discussed in [Camerer, 2000](#)). These seem in general to be characterized more by conditions analogous to those of Treatment 3 in which the reference state gave rise to reluctance to trade, than to the manipulations necessary to eliminate this hesitation.

Even merchants who are not expected to feel a sense of loss in depleting inventory to make a sale, as this is the nature of their business, might well have a disproportionate feeling of loss on other dimensions of their enterprises, such as a present business location, owning an adjacent expanse of vacant land, or acquisition or disposition of other easily exchangeable assets.¹² It is, again, the reference state that matters. The observed difference in sports memorabilia trading behaviour, noted earlier, may have less to do with traders having more experience and much more to do with the difference in reference states between traders, who were there to engage in trades, and visitors, who had no such reason to attend.

The observation that egg purchasers were more sensitive to price increases, which impose a loss, than to decreases, that confer a gain, leading to an estimated price elasticity of -1.10 for the former and only -0.45 for the latter ([Putler, 1992](#)), similarly seems to have little to do with the inexperience of buyers. Given the commonly repeated nature of such purchases, the disparity appears more consistent with greater concern with a negative departure from a reference state – likely their previous egg purchases in this case – than with a positive change.

In much the same way the evidence that investors who commonly buy and sell securities are reluctant to realize a loss by selling shares that are trading at a price below their acquisition price, relative to their willingness to sell ones that have gone up in price ([Shefrin and Stateman, 1985](#); [Odean, 1998](#)) may also have little to do with a lack of experience, but more to do with a reference state that is related to the prices that were originally paid.

¹¹ Also related is [Novemsky and Kahneman's \(2005\)](#) discussion of the boundaries of loss aversion.

¹² However, it is worth noting that there is a third explanation for why traders show little reluctance to trade; the [Randall and Stoll's \(1980\)](#) model suggests that traders have no WTA–WTP gap or reluctance to trade because traders can buy or sell their merchandise at the market price with little transaction cost. Thus, any change in their inventory or holdings due to trade can be easily reversed. We thank an anonymous referee for this point.

Similar behaviour reflecting a similar lack of such conditions has been found in the housing market, where again the purchase price had a clear influence on the reference (Genesove and Mayer, 2001; Einio et al., 2008).¹³ These are behaviours more consistent with a disparity between the value of losses and gains, than it is with the conditions necessary to induce valuation equivalence, such as those of Treatment 1.¹⁴

The decisions of workers to increase contributions to their pension scheme from 3.5 percent of their wages when the choice was a deduction from their expected pay, to 11.6 percent when offered as foregoing a portion of future wage increases, is another example of real and meaningful choices being influenced by well-formed reference states (Thaler and Benartzi, 2004). A loss from the set wage was quite clearly more aversive than the reduction of a gain.

The dominant role of the reference state, and relegation of the influence of ownership, was also demonstrated in an experiment in which participants were asked to donate to a charity either before or after they had completed a task for which they were to receive payment (as reported in Akerlof, 2007). Those who were asked after were more likely to keep the money, rather than give it away, presumably because of a reference state consistent with feeling that they had earned it and were thus entitled to keep it.

It also seems likely that individuals have a well-formed reference when confronted with a choice between mitigating a harm, or loss, and acquiring a gain. For example, when asked if they would favour a replacement of a failed bridge or construction of a new one, both of which would cost the same and confer the same benefits of time savings and the like, knowledgeable respondents overwhelmingly chose the first rather than be indifferent as prescribed by conventional views of gain and reduction of loss equivalence (Chin and Knetsch, 2008).

On present evidence, the influence of the reference state on people's valuations appears to offer a far more general and parsimonious explanation of observed instances of losses being valued more than otherwise commensurate gains, than reliance on incentives recognized in standard theory alone. Further, the valuation disparity seems to be a pervasive though perhaps not universal characteristic of their preferences. While the persistence and size of the disparity may well be influenced by circumstances of their measurement, in many important cases the disparity can be expected to be large and persistent, and to call for more serious attention.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.jebo.2009.04.015](https://doi.org/10.1016/j.jebo.2009.04.015).

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¹³ Interestingly, the Genesove and Mayer results also showed that “both investors and owner-occupants behave in a loss-averse fashion, although investors exhibit about one-half of the degree of loss aversion as owner-occupants”, likely reflecting a weaker reference focus on the part of investors (Genesove and Mayer, 2001, p. 1235). A similar weak differential was found in the Einio et al. (2008) study of Helsinki apartment sales.

¹⁴ For example, consider ordinary people who are thinking about selling their house. The existing residence is unlikely to be perceived as randomly assigned, there is possession (they occupy the house they are selling), and the transaction is more likely to be thought of as a path-dependent choice (giving up the existing house for another) rather than as a fresh choice between the two.