

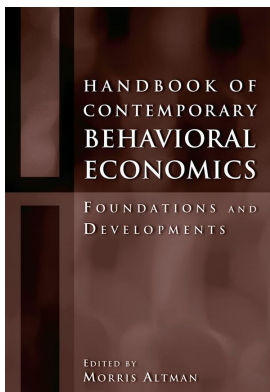
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Access details: *subscription number*

Publisher: *Routledge*

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Handbook of Contemporary Behavioral Economics Foundations and Developments

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The Context, or Reference, Dependence of Economic Values

Publication details

<https://test.routledgehandbooks.com/doi/10.4324/9781315703879.ch21>

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Published online on: 15 Jul 2006

How to cite :- Jack L. Knetsch, Fang-Fang Tang. 15 Jul 2006, *The Context, or Reference, Dependence of Economic Values from: Handbook of Contemporary Behavioral Economics, Foundations and Developments* Routledge

Accessed on: 28 Mar 2023

<https://test.routledgehandbooks.com/doi/10.4324/9781315703879.ch21>

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THE CONTEXT, OR REFERENCE, DEPENDENCE OF ECONOMIC VALUES

Further Evidence and Some Predictable Patterns

JACK L. KNETSCH AND FANG-FANG TANG

The available empirical evidence is frequently at odds with the stability of preferences, fungibility, and procedural invariance assumptions of standard theory and economic practice. The findings indicate that instead of according with the usual axioms, people's preferences commonly depend on the context, or the reference position, in which valuations are made. The numerous recent reports of such discrepancies reflect both the ease of demonstrating them and the consistency of results across a range of search methods.

By focusing attention on particular axioms such as independence and transitivity, we have overlooked an even more fundamental assumption, which most economists seem to take for granted, but which is almost certainly false: namely, that people come to problems armed with a clear and reasonably complete set of preferences, and process all decision tasks according to this given preference structure. (Loomes 1999, F37)

The purposes here are to provide further evidence of the wide extent of the context dependence of valuations and to demonstrate that, rather than being isolated observations having little relationship to each other, these new results, as well as previously reported findings, fall into some predictable patterns in which valuations vary depending on the influence of different context variables.

THE CONTEXT OF GAINS AND THE CONTEXT OF LOSSES

The most well-documented context, or reference, dependence is doubtless the pervasive finding that people value a loss from a reference state more, and often much more, than an otherwise commensurate gain to it—what has become known as the endowment effect or, less often, the reference effect. This disparity between the valuation of a gain and a loss is also illustrative of the implications of other forms of context dependence.

The usual assumption of standard theory, which is the basis for nearly all economic explanations and analyses, predictions, and prescriptions, is that the value or well-being associated with an entitlement increases at a decreasing rate with larger quantities of a good (consumer goods,

money, environmental quality, safety, or whatever). It then follows that for nearly all practical matters the value of incremental increases in quantity is taken to be equal to the value of a commensurate decrease in quantity. While a popular notion, at least among economists and economic analysts, it is not one that seems to match most people's usual behavior and the way they make decisions.

The idea that decision makers evaluate outcomes by the utility of wealth positions has been retained in economic analyses for almost 300 years. This is rather remarkable because the idea is easily shown to be wrong. (Kahneman 2003b, 704)

The earliest reported findings of a disparity between people's valuation of gains and losses involved responses to hypothetical survey questions. For example, a sample of bird hunters in the United States said they would be willing to pay, on average, \$247 to preserve a marsh area important to the propagation of ducks, but would demand a minimum of \$1,044 to agree to its loss—a difference so large, and so inconsistent with the assumptions of standard theory, that the investigators initially attributed it to respondents' misunderstanding of the questions (Hammack and Brown 1974).

Some questioning of the relationship between quantity of a good or money and people's well-being or valuations, assumed in the tenants of standard theory, began some time ago. For the most part, this questioning either was speculative—on the basis of the conventional view not appearing to explain feelings associated with changes in quantities of goods (Markowitz 1952)—or accompanied further reports of observed differences between people's valuations of gains and losses (Gordon and Knetsch 1979; Thaler 1980).

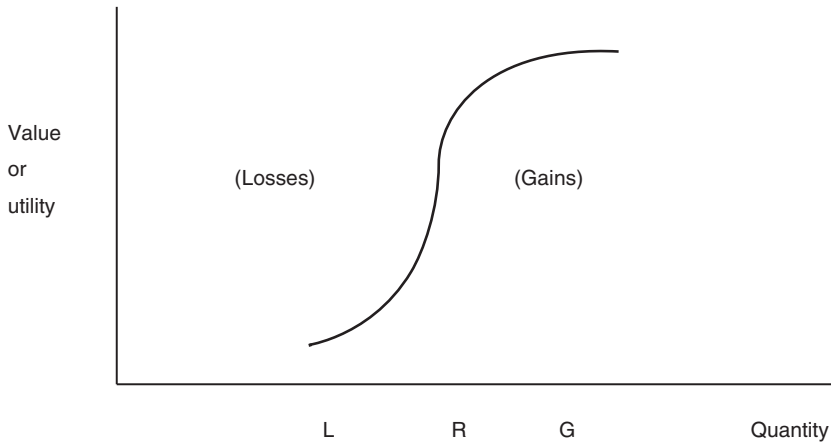
Like the earlier questioning, increasing accumulations of empirical findings that were inconsistent with the conventional views of economists had little impact on how economics was discussed, and even less on how economics was done. When more serious attention to the disparity issue came, it followed, in large part, the work of Daniel Kahneman and Amos Tversky, which "integrated insights from psychological research into economic science," as was noted in the citation for the 2002 Nobel prize for economic science, given to Daniel Kahneman. This work more clearly showed why the commonly observed disparity between people's valuations of gains and losses should not be regarded as a surprising anomaly but instead should be taken as a fully expected outcome.

Kahneman and Tversky suggested that the relationship between quantities of a good and people's level of well-being has been largely misspecified by the assumptions of standard theory. In particular, they pointed to three important characteristics of this relationship that would more accurately describe people's preferences and be more consistent with observed behavior (Kahneman and Tversky 1979).

The first is that people value changes in the quantity of a good or an entitlement in terms of additions or subtractions from a reference state rather than in terms of differences between two end states, as in conventional views. Second, people value losses from the reference state more, and often much more, than gains to it—a characteristic of preferences they termed loss aversion. And third, people register decreasing sensitivity to larger gains or larger losses—the difference between 10 and 20 seems more important than the difference between 210 and 220, for example.

Taken together, these three differences point to a relationship between well-being and quantity of a good, as illustrated in Figure 21.1—a function kinked at the reference state and steeper in the domain of losses than in the domain of gains, rather than one represented by a smooth curve increasing at a decreasing rate over the whole range of gain and loss outcomes, as assumed in standard theory.

Figure 21.1 Value of Gains and Losses from Reference State



The consequences of loss aversion for the trade-off of gains and losses can also be illustrated, ignoring the curvature of the utility function for gains or losses, with a simplified version of a function linking quantity of some x with its value $v(x)$, proposed by Tversky and Kahneman (1992):

$$\begin{aligned} v(x) &= x, & x \geq 0 \\ &= \lambda x, & x < 0 \end{aligned} \tag{21.1}$$

with loss aversion implied by having $\lambda > 1$.

While many of Kahneman’s studies and his earlier work with Tversky have had very significant implications for economics, it is almost certain that the single contribution most responsible for his being awarded the Nobel prize for economics was the 1979 paper, co-written with Tversky, on prospect theory, which outlined the reasons for the relationship illustrated in Figure 21.1, and led to later empirical verifications.¹ The choices and behavior suggested by the Kahneman-Tversky formulation have been confirmed by many replicated laboratory and field studies carried out by numerous investigators using a wide variety of methods and entitlements (see summaries in, for example, Kahneman, Knetsch, and Thaler 1990; Rabin 1998).²

Many of the earlier tests for differences in valuations of gains and losses, as noted earlier, were based on responses to hypothetical survey questions. For example, Thaler (1980) found that the minimum compensation people demanded to accept a 0.1 percent risk of sudden death was higher by one or two orders of magnitude than the amount they were willing to pay to eliminate the identical risk. In a widely cited study of changes in risks associated with the consumer use of pesticides, individuals in a large sample of consumers were found to demand nearly nine times more to accept a small increase in risk of injury than they would be willing to pay for a commensurate decrease in this risk (Viscusi, Magat, and Huber 1987).

More direct experimental tests for an endowment effect involving real exchanges of money and goods, as opposed to hypothetical ones, began some twenty years ago (Knetsch and Sinden 1984). Participants in this initial real exchange experiment demanded a minimum of four times as

much money to give up a lottery ticket than the maximum sum they were willing to pay to acquire one. One of many later simple demonstrations of this disparity is provided by the results of an even more persuasive within-subject experiment, also involving real exchanges of money and lottery tickets. In this experiment the *same* individuals were asked for both the maximum amount they would be willing to pay to acquire (i.e., gain) an entitlement to a 50 percent chance to win \$20 and, when they already had such an entitlement, the minimum sum they would require to give it up.³ The easy assumption of conventional theory, that “we shall normally expect the results to be so close together that it would not matter which we choose” (Henderson 1941, 121), which was apparently formulated without benefit of any explicit empirical test, was clearly contradicted by the result. Rather than the predicted near equivalence, these individuals were willing to pay an average of \$5.60 to gain the chance to win \$20 but on average demanded \$10.87 to give it up—they valued the loss about twice as much as the fully commensurate gain (Kachelmeier and Shehata 1992). Other such studies have demonstrated that the valuation disparity is pervasive, usually large, persistent over repeated trials, and not a result of income effects, wealth constraints, or transaction costs (Kahneman, Knetsch, and Thaler 1990).

In a recent review of forty-five tests of the valuation differences, Horowitz and McConnell (2002) found the mean ratio of WTA values over WTP values to be over 7. Further, they found that these differences “do not appear to be experimental artifacts” (p. 442) and that they are generally larger for nonmarket goods than for ordinary private goods.

Several questions have been raised about the validity of the numerous results of valuation experiments and the extent to which they should be taken seriously. These have included the suggestion that the stakes in experimental markets are not sufficient to motivate people to make well-considered decisions; another is that people need experience of repeated trials to learn both their own valuation of an entitlement and how to express this in what is usually an unfamiliar venue and format of an economic experiment. A further suggestion is that while naive participants may well often act in ways inconsistent with standard theory, such as valuing losses more than gains, experienced and well-motivated traders would not (List 2003). Thus far a limited amount of empirical evidence has been provided that appears to show some support for each of these criticisms. However, the weight of all of the current evidence appears to support the behavioral findings.

It is very likely true, for example, that merchants do not consider a sale of a stock item as a loss—that presumably being the point of their enterprise. Such individuals are unlikely to exhibit an endowment effect, at least with respect to buying and selling goods, although they may well show the same inclination in other business dealings. But the absence of an endowment effect in such circumstances has long been recognized—“there is no reason in general to expect reluctance to resell goods that are held especially for that purpose” (Kahneman, Knetsch, and Thaler 1990, 1344)—and quite clearly is a special case.

It is also sometimes the case that repeated trials do result in people changing their valuations of gains and losses such that the usual valuation disparity is reduced or even eliminated. However, in nearly all such demonstrations the evidence has come from experiments using a second-price Vickrey auction, in which the highest bidder buys at the second highest bid, and the lowest offerer sells at the second lowest offer. While this institution has been thought to lead to truthful revelations of value for all participants, as noted below, the results of explicit tests of the demand-revealing properties of second-price Vickrey auctions are very much in doubt. Consequently, even the limited experimental evidence showing convergence of buying and selling prices seems, at a minimum, open to serious question.

Further studies of the endowment effect have also been carried out on the basis of field data recording how people make everyday decisions. While not conclusive by themselves because of

the usual lack of the stringent controls that mark most economic experiments that are carefully designed for the purpose, they do overcome some of the alleged weaknesses of hypothetical survey and experimental studies.

The results of studies of people's ordinary behavior on the whole provide strong support for the results of the experimental studies. People generally have been found to value losses and reductions of losses substantially more than gains and opportunity costs. For example, a greater sensitivity of investors to losses is apparent in their observed reluctance to realize a loss by selling, leading to smaller volumes of sales of securities that have declined in price relative to those for which prices have increased (Shefrin and Statman 1985). This same asymmetry was evident in an extensive study of the trading records of 10,000 individuals over seven years, which found that not only did taxation and other institutional reasons explain very little of the observed trading behavior, but the stocks that had gone up in price and were sold would have returned an average of 3.4 percent more over the following year than the losing stocks that were not sold (Odean 1998). The strong reluctance to give up a default automobile insurance option when an otherwise more attractive choice is readily available (Johnson et al. 1993), the greater sensitivity to losses in judgments of fairness (Kahneman, Knetsch, and Thaler 1986), and the stronger legal protection accorded to losses over forgone gains in judicial choices (Cohen and Knetsch 1992) are further examples of the difference in people's valuation of gains and losses.

A perhaps even more compelling example is provided by the dramatic change in employee contributions to their retirement savings resulting from provision of a new alternative that recognized the disparity in valuations (Thaler and Benartzi 2004). As is the case with most firms, new employees in a large U.S. company were asked how much of their wages or salaries they would like to have deducted from their pay and put into their pension scheme. This choice frames the contribution as a loss of income, which, because of the usual heavier weighting of losses, discourages agreeing to large deductions. The consequence was an unsatisfactorily low rate of contribution. Thaler and Benartzi's suggestion was to offer employees the opportunity to make pension contributions from future wage and salary increases, thereby framing the payment as a much less aversive forgone gain. The result was that employees increased their private pension plan contribution rate from 3.5 percent to 11.6 percent.

The results of the many studies of people's valuations of gains and losses appear consistent with most people's intuition about the relative weight of gains and losses. This was explicitly noted more than a century ago by the American jurist Oliver Wendell Holmes:

It is in the nature of man's mind. A thing which you have enjoyed and used as your own for a long time, whether property or an opinion, takes root in your being and cannot be torn away without your resenting the act and trying to defend yourself, however you came by it. The law can ask no better justification than the deepest instincts of man. (1897, 477)

It was similarly remarked on even earlier by the same Adam Smith so often championed by defenders of more conventional views of standard economic theory:

We suffer more . . . when we fall from a better to a worse situation, than we ever enjoy when we rise from a worse to a better. (1759, 213)

This seems to be a very general view of most noneconomists, to the point of their wondering why economists should think otherwise.

It is also notable that the findings of large differences between people's valuations of the gain

Figure 21.2 **Combinations of Gains and Losses and Differing Valuations of a Mug (CAD\$)**

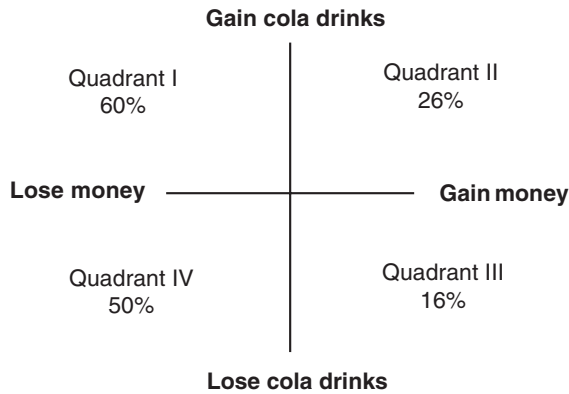


and the loss of a good or entitlement, which have been demonstrated in so many behavioral economics experiments, would not have been apparent in economic experiments that relied on induced values. Induced value experiments have been used extensively, especially for empirical tests of alternative auction rules and market institutions (Smith 1994). However, these experiments are carried out by, essentially, assigning specific values to tokens, as items of trade, and having participants exchange entitlements to these tokens on the basis of these assigned values and the rules governing the exercise.⁴ For example, a person holding a token that can be cashed in at the end of the experiment for \$5 is motivated to sell it to another person who is told that the token can be cashed in for \$10. The value of an entitlement (a token) is prescribed, or a given, in these experiments; values are not ascribed to the entitlement by each participant. It is only when participants in an experiment are given the opportunity to value a good or an entitlement depending on whether the individual is facing its gain or loss that differences in valuations can be exhibited.

PATTERNS OF GAINS AND LOSSES

An illustrative example of the differing valuations of an otherwise identical entitlement is provided by the results of a real exchange experiment in which different groups of participants valued a coffee mug but did so in different ways (Kahneman, Knetsch, and Thaler 1990). Individuals in one group valued the mug in terms of the amount of money they would give up to gain the mug. This is a loss from the reference level of money and a gain to the reference state of mugs, and is the trade-off in Quadrant I of Figure 21.2 (with the gain or loss of the entitlement indicated by the vertical axis and the gain or loss of money by the horizontal). As a gain of an entitlement (a mug for this group) is expected to be worth less than its loss, and a loss of money is valued more than the gain of an equal sum, these individuals would presumably be willing to pay (WTP) relatively less for the good. This low valuation is confirmed by the average WTP of only CAD\$2.00. In analogous fashion, the minimum amount they are willing to accept (WTA) (Quadrant III), in which individuals valued the mug in terms of money gained to give up the mug, yielded the expected highest monetary valuation, \$7.00. Another group of individuals valued a mug in terms

Figure 21.3 Proportion of Individuals Preferring £0.80 to Four Cans of Cola



of a choice between a gain of a mug and a gain of money (Quadrant II), resulting in \$3.50 being judged equivalent to the gain of the mug, a value predictably intermediate between the gain (WTP) and loss (WTA) values. A fourth value is provided by the choice between the loss of a mug and the loss of money, the willingness to pay to avoid a loss (Quadrant IV). This equivalent loss valuation was not included in the mug experiment, but a reasonable estimate (based on the ratios of QI to QII values and QII to QIII values) would be around \$4.00.

The disparity between people's valuations of gains and losses is responsible for the predictable pattern of different values evident in the results of the mug experiment (and displayed in Figure 21.2). The mug did not have a single and invariant value; it had a different value depending on the context of the valuation. The opportunity cost of forgoing an entitlement was not valued the same as the real cost of giving it up, for example, and a gain was seen as being worth less than avoiding a loss. The difference in valuations of gains and losses can be expected to give rise to similar patterns in other cases as well, although the extent of the differences will vary for different entitlements and different valuation contexts. While specific tests for such patterns have been limited, the evidence that is available strongly suggests that this predictable pattern appears over a wide array of examples and circumstances.

Bateman and colleagues (1997), for example, asked people to value a common good, four cans of cola drinks, using different reference positions similar to those used in the mug experiment noted above. Arraying the proportions of individuals preferring £0.80 to the cola, which they report in similar quadrant fashion (Figure 21.3), reveals the same predicted pattern of valuations. The aversion to giving up this sum of money to gain the cola drinks, relative to the reverse of losing the cola drinks to gain money, is evident in the 60 percent who valued money more than cola in the first case (Quadrant I) and the minimal 16 percent who did so in the second (Quadrant III). The equivalent gain (Quadrant II) and equivalent loss (Quadrant IV) measures are predictably between the others, with their relative valuations presumably reflecting the strength of the loss aversion of the good (cans of cola, in this case) relative to that of the numeraire (money, in this case).

The same pattern is also evident in another test involving choices between two goods, rather than between money and a good. In this case, three different groups of participants valued a coffee mug relative to a chocolate bar (Knetsch 1989). Individuals in one group were initially given a chocolate bar and then offered an exchange involving giving up the chocolate bar to gain a mug. Those in a second group were given a choice of gaining either one of the two goods.

Figure 21.4 Proportion of Individuals Preferring a Mug to a Chocolate Bar

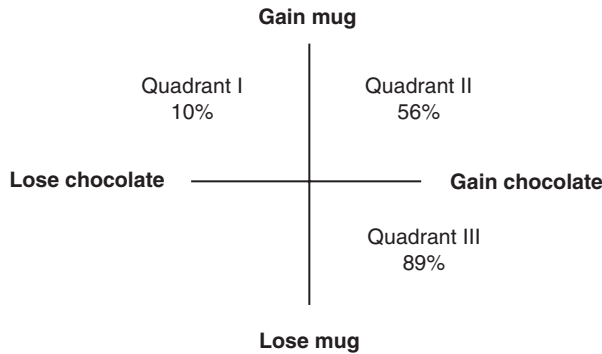
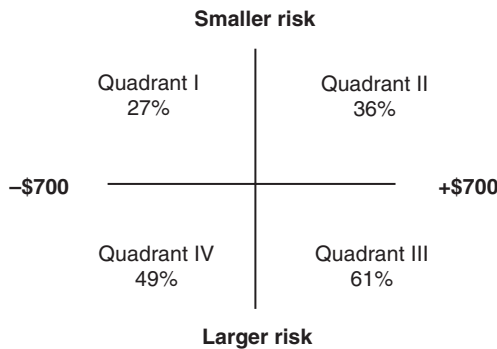


Figure 21.5 Proportion of Individuals Preferring 0.5 Percent Change in the Risk of an Accident to CAD\$700

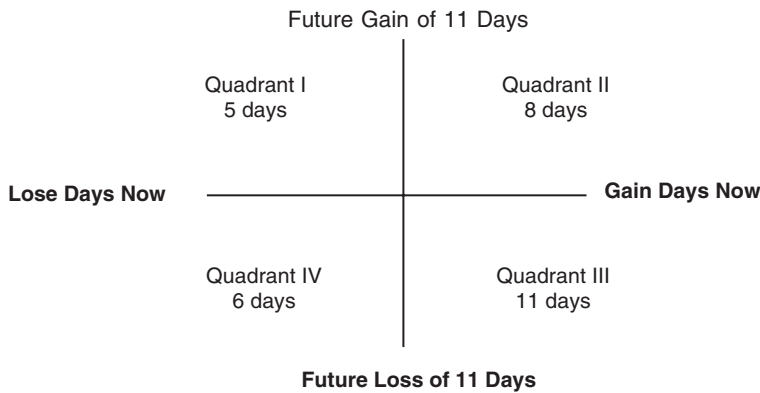


People in the third group were first given a mug and then offered a chocolate bar in exchange. As individuals in all three groups could easily select their preferred good, the standard stability-of-preferences assumption offers the clear prediction of equal proportions across the three groups. However, as indicated in Figure 21.4, the proportion of individuals preferring a mug to a chocolate bar varied from 10 percent (Quadrant I) to 89 percent (Quadrant III). The equivalent gain measure (Quadrant II) was predictably between the other measures (at 56 percent).

The expected pattern has also been found for valuations of risks. In one examination, respondents in a random Toronto household telephone survey were asked one of four valuation questions involving a choice between a CAD\$700 change in annual income and a 0.5 percent change (from either 0.5 to 1 percent, or from 1 to 0.5 percent) in the chance of having “to be admitted to hospital in any given year as a result of a car accident, a work injury, a fall, or some other mishap” (Figure 21.5).

A further test involved time preferences. Just as people are willing to pay less for a present gain than they are willing to accept for a commensurate present loss, they can also be expected to pay less now for a future gain than they demand now to accept a future loss. As the sums they are willing to pay and willing to accept are then the present values of these future outcomes, the

Figure 21.6 **The Present Value, in Days, of 11 Days of Vacation Five Years in the Future**



differences between them imply that people use different rates of discount for future gains and future losses.

This again predictable pattern was found when people were asked to indicate how they would trade off the number of days of vacation given by their employers in the current year and in the future. Four groups of respondents were asked to value the gain or the loss of eleven days of vacation time five years in the future in terms of receiving added days, or giving up days, of vacation time in the present year. The results indicate that people used different rates to discount the value of the future outcomes, with the rates predictably dependent on the particular gain or loss context of the valuation. People were willing to give up relatively few present days to gain eleven days in the future, suggesting a small present value and higher discount rate in this context. They demanded a significantly ($p < 0.01$) larger number of days now to accept a future loss, indicating a large present value and low discount rate for the future loss (Figure 21.6). The equivalent gain and equivalent loss rates, as expected, fell between and were not significantly different from each other ($p = 0.3383$).

Over all of these examples of varied exchanges—money for goods, goods for goods, risk changes, and the trade-offs between present and future outcomes—the patterns of varying rates were similar and, importantly, predictably so. While all of these results violate the preference stability assumptions, each of the variations is in accord with the predicted impact of the single-context variable of a change being a lower-valued gain or a higher-valued loss.

OTHER CONTEXT VARIABLES: VALUATIONS IN SECOND- AND NINTH-PRICE VICKREY AUCTIONS

A further series of experiments was carried out to test for not only the impact of gains and losses on valuations but also the impact of a different form of context dependence—the different evaluations of attributes of an entitlement that vary between two forms of Vickrey auctions. This preference-revealing mechanism is widely believed to have “the remarkable property that each bidder should announce his true willingness to pay for the auctioned object as a dominant strategy” (Laffont 1987, 268) and is widely used in experimental and behavioral economics research studies. The empirical studies reported here were parts of a series carried out in Canada, Singapore,

Table 21.1

The Median Maximum Amount Individuals Would Pay to Buy a Mug and Median Minimum Amount Individuals Would Accept to Sell a Mug: Canada Sample
(CAD\$, $N = 20$ for each manipulation)

Trial	1	2	3	4	5	6	All
WTP to buy							
Second-price auction	4.50	5.00	4.88	5.03	5.52	5.15	5.01
Ninth-price auction	3.45	2.63	2.08	1.70	1.60	1.00	2.97
WTA to sell							
Second-price auction	5.00	4.75	4.75	5.00	4.75	5.00	4.83
Ninth-price auction	9.00	10.00	10.50	10.25	10.75	10.75	10.07

and the People's Republic of China, and thereby also provide some evidence of possible cultural impacts—or lack thereof—on this limited form of economic behavior.

Canada Data

The first test was a between-subject comparison of the valuation of a simple good in a real, not hypothetical, exchange Vickrey auction by Canadian undergraduate students (each of whom was paid CAD\$10 for participating). All participants, in groups of ten, valued a coffee mug in one of four versions of a Vickrey auction. Two versions—a second-price auction and a ninth-price auction—elicited values in terms of the maximum sum each individual was willing to pay for a mug. In the other two versions—again, a second- and ninth-price Vickrey auction—the valuation of a mug was in terms of the minimum amount each would accept to give up a mug (Knetsch, Tang, and Thaler 2001). Each auction was repeated six times for each group, with the winning price posted between rounds and the trial that was used as the basis for the actual exchanges selected by random draw after the last round was completed.

In a second-price auction, the buyer willing to pay the highest sum buys the good at the second-highest price, and the seller willing to sell at the lowest price sells it at the second-lowest price. In the ninth-price auction, eight of the ten individuals in each group buy a mug at the ninth-highest price, and eight sell a mug at the ninth-lowest price. If preferences are stable over contexts, in accord with the conventional assumption, this manipulation should have no effect on the bids and offers made by these individuals—they should reveal equal values in either the second- or ninth-price version (as well as indicate the same buying and selling valuations).

The actual results were very different from those expected with the stability assumption of procedural invariance (Table 21.1). The identical good—a mug—was systematically valued differently in the context of an auction in which buying or selling one mug was on offer than in the context of an auction in which eight mugs were bought or sold ($p < 0.001$ for t -test of individual bid medians, for both buying and selling). There was little evidence of a disparity between buying and selling prices in the second-price auctions—a result fully consistent with the results reported by Shogren and colleagues (1994). The patterns were very different for the ninth-price auction, where a large difference was evident in the first valuation round (a median buy value of \$3.45 and a median sell value of \$9.00). The difference grew even larger over successive trials (\$1.00 versus \$10.75 in the final trial). Clearly, not only did the different context of a gain or loss of a mug lead to different valuations, but the context of a second- or ninth-price auction also influenced the resulting values.

Table 21.2

The Median Maximum Amount Individuals Would Pay to Buy a Mug and Median Minimum Amount Individuals Would Accept to Sell a Mug: Singapore Sample
(S\$, $N = 20$ for each manipulation)

Trial	1	2	3	4	5	6	All
WTP to buy							
Second-price auction	3.00	3.00	2.60	2.50	2.00	2.50	2.60
Ninth-price auction	2.00	1.00	1.26	1.00	1.00	1.00	1.00
WTA to sell							
Second-price auction	3.40	2.25	3.00	2.00	2.00	2.00	2.50
Ninth-price auction	5.00	8.00	10.00	10.00	11.00	12.50	9.00

Singapore Data

The comparison of second- and ninth-price Vickrey auction valuations was repeated in a second real (not hypothetical) exchange experimental study carried out in Singapore. The Canadian study used a between-subject design in which the valuations of participants in a second-price auction were compared to the valuations of those taking part in a ninth-price auction. The Singapore study used a within-subject design, in which the same individuals named both a second and a ninth price in each of the six rounds. Participants were told the auction would be conducted in one of two ways, with the rule that counts to be decided later by a flip of a coin, and that they would therefore need to name two prices, which “can be the same or different.” The Singapore participants were not paid a fee for taking part in the experiment, but all of the other details of the experimental tests in Singapore and Canada, including the actual exchanges of mugs and money, were essentially the same.

The results of the Singapore test (Table 21.2) were very comparable to those from the study in Canada (Table 21.1). Again, the significantly different valuations in the second- and ninth-price auctions were apparent both in the sums demanded to give up a mug and in the amounts people were willing to pay to acquire a mug ($p < 0.001$ for individual bid medians for both buying and selling). The median sum over all trials that participants were willing to pay to acquire a mug was \$2.60 in the second-price auctions and \$1.00 in the ninth-price auctions; the comparable median sum they demanded to give up a mug was \$2.50 in the second-price auctions and \$9.00 in the ninth-price auctions. Again, no differences between gain and loss values were evident in the second-price auction, and large differences in the initial trial that increased over successive rounds were exhibited in the ninth-price auctions.

It seems clear in the results of both the Canada and Singapore experiments that individuals valued a common good, a coffee mug, differently depending not just on its gain or loss but on other particulars of the context in which the valuations were made—in this case whether a second- or ninth-price auction was used. This was true for both between-subject comparisons (the Canada data) and within-subject comparisons (the Singapore data), and for both acquiring a mug (the maximum willingness to pay) and giving up a mug (the minimum compensation demanded).

OTHER CONTEXT-DEPENDENT VALUATIONS

People’s valuations of entitlements can vary not just on the basis of their being gains or losses or the nature of an auction used to elicit values but because of other context variables as well. Differ-

ent contexts appear to give rise to varying valuations, at least in part by altering the prominence of particular attributes of an entitlement. This effect of shifting attention to different characteristics of a good was demonstrated by Hsee in a series of joint versus separate valuations (1998). In one experiment, participants seeing only a small cup overflowing with ice cream were willing to pay significantly more for it than other individuals were willing to pay for a partially filled large cup, even though the large cup contained far more ice cream than the smaller one. When a third group was offered both cups together, the participants had no difficulty seeing the difference in the size of the servings and priced them accordingly. This reversal of preference apparently occurred because when they were offered one cup at a time there was little reference for judging whether the serving was large or small. Individuals therefore tended to ignore this quantity characteristic and instead gave undue prominence to the nominally irrelevant factor of how much of the cup was filled with ice cream. Because of this, they valued the serving in the small cup more highly. However, when the two cups were offered together, the comparison provided a ready reference for judging the quantity dimension and the relative attractiveness of the two servings, resulting in their ignoring cup size and placing a higher value on the larger serving.

An example of a similar role of context influencing people's views of the importance of an attribute was provided by people rating a lottery offering a 7/36 chance to win \$9 and a 29/36 chance to lose \$0.05 to be significantly more attractive than others' rating of a lottery offering only the same chance to win \$9 without the possibility of a loss (Slovic et al. 2002). Even though the offer to the first group is slightly inferior to the other, because of the possibility of losing \$0.05, people in the second group had little basis for judging their offer to be very attractive. The introduction of the small loss to the first group provided a reference, or basis, for judging, and they immediately saw the chance to win \$9 and only lose \$0.05 to be a good deal.

The differing contexts of choosing or rejecting may also shift the focus of attention among different attributes and give rise to different preferences (Shafir 1993). People tend to increase their weighting of positive dimensions of goods when asked to choose between them and to weigh negative characteristics more when asked to reject one of them. Consequently, there often is a tendency to prefer one good over another in the context of choosing and to prefer the other in the context of rejecting.

These and many other examples suggest that different attributes of a good or object often appear to be more or less salient depending on the circumstances, or context, of the valuation (Kahneman, Ritov, and Schkade 1999). Increasing the focus on more salient attributes seems to increase the prominence or weight people give to these characteristics. This both increases the significance of these attributes in the final choice or judgment and inhibits the processing of information about other attributes, thereby further decreasing their importance. As well, this initial valuation reaction is likely to effectively create an anchor from which adjustments may be inhibited. All of this often leads to some attributes being given greater weight than warranted by conventional views of economic values, and other characteristics being given less importance.

DEGREES OF CONTEXT DEPENDENCE

The evidence suggests that the value an individual places on an entitlement, in the usual sense of a willingness to sacrifice, will likely be a function of the context variables that are relevant to the particular valuation.⁵ That is, the value will vary depending on, for example, whether it is in terms of a gain or a loss, whether it is in a context that provides a choice or one that provides little or no reference guidance, and whether it is for a present or future outcome. The sensitivity to these context variables can be expected to vary for different goods, in a manner perhaps analogous to

the different sensitivities of market goods to price and the incomes of potential buyers. Some goods have a higher price elasticity of demand than others, some have a higher income elasticity, and some have higher cross-price elasticities of demand. While some characteristics of goods are known to influence these elasticities—goods with more substitutes will tend to have a larger price elasticity of demand than ones with fewer, for example—determining the coefficients of elasticity for individual goods remains largely an empirical matter.

The available findings indicate that much the same may be expected for the impacts of context on values; some context variables are likely to have the same sorts of impacts on different valuations, but determinations of particular influences seem also to be largely an empirical matter. Analogous to coefficients of elasticity, what might be thought of as context-dependent coefficients seem likely to be functions of particulars of the valuations.

An illustration of differences and possible patterns in the impact of context variables on valuations was provided by a further series of Vickrey auction experimental studies. In this case each included a variation in the size of the group taking part in the auction to either buy or sell a good. The impact of changes in the number of bidders has been the subject of several studies, mainly tests of the prediction that increased numbers would lead to more aggressive bidding and higher prices (a review is provided by Kagel 1995).

Singapore Data

One real exchange study, carried out in Singapore as part of the earlier series, involved a large number of entitlements to be gained or lost, comparable to the ninth-price auction of the earlier comparisons. Participants again took part in groups of ten. After explanations of the nature of the auctions and how payouts would take place, sellers were informed (with analogous instructions for buyers), “For each round, the auction will be conducted in one of two ways. The one that counts will be determined later by a flip of a coin.” One rule was that the auction would involve all ten individuals, with eight selling at the ninth-lowest price. The other rule was that the group would be divided randomly into two groups of five, with three of the five in each small group selling at the fourth-lowest price. They were then instructed to make two offer prices, one for each group size eventuality.

As in the earlier ninth-price auctions, large differences between WTA and WTP values are again evident in the results. The valuations, however, indicate less, and inconsistent, sensitivity to the size of the group (Table 21.3). There was a small, and not significant, difference between the valuations of large and small groups for WTP valuations ($p > 0.30$ for t -test of individual bid medians). The differences between median WTA values for small and large groups were significant, though of modest size ($p < 0.01$).

China Data

A further real exchange test of the influence of group size on valuations was carried out at Chongqing University in the People’s Republic of China, with senior computer and architecture students taking part. While the essentials of the experiment mirrored those of the group size experiment conducted in Singapore, this second test included second-price auctions for both large and small groups, as well as ninth-price auctions for large groups and fourth-price auctions for small groups. As mugs were not available, comparably priced graduation photo albums were used in this experiment.

The China results were consistent with those from the earlier tests conducted in Canada and Singapore in several important ways (Table 21.4). There was again a large difference in WTA

Table 21.3

The Median Maximum Amount Individuals Would Pay to Buy a Mug and Median Minimum Amount Individuals Would Accept to Sell a Mug in Small and Large Groups: Singapore Sample (S\$, $N = 20$ for each manipulation)

Trial	1	2	3	4	5	6	All
WTP to buy							
Small group (fourth price)	4.00	2.50	2.25	2.25	2.05	2.00	2.50
Large group (ninth price)	5.00	3.00	2.00	2.25	2.00	1.35	2.00
WTA to sell							
Small group (fourth price)	5.00	5.75	5.80	5.75	6.00	6.00	6.00
Large group (ninth price)	6.00	7.50	7.00	8.00	9.00	9.25	8.00

Table 21.4

The Median Maximum Amount Individuals Would Pay to Buy an Album and Median Minimum Amount Individuals Would Accept to Sell an Album, by Group Size and Varied Price Auctions: China Sample (¥, $N = 20$ for each manipulation)

Trial	1	2	3	4	5	6	All
WTP to buy							
Second-price auction							
Small group	4.50	3.96	3.79	3.72	3.70	3.85	3.92
Large group	4.33	4.21	3.93	3.89	3.96	4.12	4.07
Fourth- and ninth-price auction							
Small group (fourth price)	2.09	2.14	2.59	2.57	2.50	3.40	2.55
Large group (ninth price)	2.27	2.58	3.02	2.88	2.84	3.70	2.88
WTA to sell							
Second-price auction							
Small group	7.04	6.04	4.46	4.15	3.49	3.52	4.78
Large group	6.98	5.56	3.92	3.43	2.87	3.04	4.30
Fourth- and ninth-price auction							
Small group (fourth price)	11.72	12.09	11.39	11.15	11.68	10.55	11.44
Large group (ninth price)	13.90	13.98	14.70	14.17	14.55	13.99	14.22

and WTP values in the ninth-price auctions, but little in the second-price auctions. The size of the group also had a smaller and less consistent impact on valuations. As with the Singapore results, there was no significant difference between the fourth- and ninth-price WTP values for small and large groups ($p = 0.259$), but there was a significant, though relatively modest in absolute size, difference between the fourth- and ninth-price WTA values of small and large groups ($p = 0.0075$). There were smaller, and marginally nonsignificant, differences between the small and large groups using second-price WTP and WTA valuations ($p = 0.0691$ and $p = 0.0763$, respectively).

There was some suggestion, at least in this data set, that the number of entitlements being bought or sold may be an important context variable. When only one album was to change hands, participants seemed to give greater prominence to this variable and to give less weight to the gain or loss attribute, thereby giving rise to the lack of significant differences between WTA and WTP values in second-price auctions. With more albums changing hands in the ninth-price auctions for large groups and fourth-price ones for small groups, more prominence was given to whether a gain or a loss was at issue—consistent with the finding of large differences in the ninth-price auctions.

In all, the results demonstrate that different context variables vary in the magnitude of their

impact on preferences and valuations. They also indicate that variables such as the size of the group are likely to have a far smaller impact on valuations than the context variables of gain or loss and second- or ninth-price auctions.

CONCLUSION

There appears to be little evidence that people hold stable preferences in the common textbook sense. The preferences that are revealed in the real choices in the experiments reported here, and in other studies, are context-dependent rather than stable and invariant to valuation procedures.⁶ Further, the results of these studies suggest that some context variables, such as the gain or the loss of an entitlement, impart a very predictable influence on preferences and valuations. However, there appear to be many other context variables that have varying, and sometimes dramatic if less obviously predictable, impacts—the large difference between second- and ninth price-valuations in Vickrey auctions seems to be such a case.

To the extent that context variables change the prominence or importance of different attributes of entitlements, the same good may take on the character of becoming essentially different goods in different contexts. That is, the loss dimension becomes a prominent attribute of the good in the context of a loss, and the gain dimension becomes one in the context of a gain. This might help explain, for example, the seemingly low correlations observed between people's buy and sell prices in several within-subject experiments (Borges and Knetsch 1998). A reasonable presumption would seem to be that individuals valuing a good more would be willing to both pay more to obtain it and demand more to give it up, and that those valuing it less would be willing to both pay less for it and demand less for its loss—giving rise to high buy and sell correlations. However, the limited evidence on this suggests correlation coefficients in the range of 0.25 to 0.40. While there may be other explanations, such low correlations seem consistent with people viewing a good in the context of a loss as being in some essentials a different good from that in the context of a gain—and there would then be little more reason to expect high buy and sell correlations for the nominally same good than there would be to expect them when people are buying and selling completely different entitlements.

Context-dependent preferences would presumably include stable preferences as a special case—one that might arise with, for example, near-perfect substitutes valued in identical contexts. Viewing context dependence as a more general class would appear to offer better explanations of a wider range of economic behavior, to include, for example, a wide range of what are now commonly taken to be preference reversals.

In much the same way, the context-dependent way in which gains and losses are differently weighed gives rise to the observed lack of complete reversibility of indifference curves as individuals demand more to give up one good than they are prepared to exchange for another (Knetsch 1989). Similarly, the gains from trade are likely to be overstated by analyses based on standard theory (Borges and Knetsch 1998), and nearly all standard preference order assumptions are commonly violated by people's actual behavior (Knetsch 1995).

Nearly all comment on the observed discrepancy between people's behavior and that suggested by standard models of rational economic choice suggests that such differences are due to either some broadly defined forms of transaction costs, including the effort necessary to think through the implications of options, or human limitations of not being able to accurately discern all of the implications and consequences of all alternatives (bounded rationality). Both of these traditional explanations no doubt account for many of the disparities.

However, the evidence is also consistent with people's behavior and choices not being

hampered by transaction costs or bounded rationality but instead reflecting their real preferences—preferences that are not accurately modeled by the standard economic theory of rational choice.

While economics texts have long proclaimed that people's valuations of gains and losses should be equivalent (except for an income or wealth effect), there seems to be little reason for accepting this empirically unsubstantiated behavioral assertion as an accurate description of people's actual preferences and therefore the standard of how they should behave. The empirical evidence suggests when people demand a higher sum to give up a good than they are willing to pay to acquire the identical entitlement, they are not making mistakes and they are not displaying the inability to foresee the consequences of their actions. This is not to suggest that human limitations implied by bounded rationality are not important. But it is to suggest that this is not likely the whole of the matter, and may not even be the more interesting part of it.

NOTES

This research was supported in part by the U.S. Forest Service through a cooperative agreement with Simon Fraser University.

1. It is also nearly certain that Amos Tversky would have shared the prize had it not been for his early death in 1996. Kahneman and Tversky's decision to publish their 1979 paper on prospect theory in *Econometrica*, one of the most notable international journals in all of economics, was made not because of "a wish to influence economics" but instead largely on the grounds that this "just happened to be the journal where the best papers on decision-making to date had been published, and we were aspiring to be in that company" (Kahneman 2003a, 13). It is, and has been for many years, by far the most often cited paper ever published in *Econometrica*, and one of the most cited in all of economics—a testament not only to its importance but to the wide range of the implications of their findings.

2. Many of the most notable studies and detailing of implications of these findings have been collected in Kahneman and Tversky 2000.

3. The order of the two transactions was reversed for half of the participants to eliminate any order effects on the valuations.

4. This is usually done by having the experimenter stand ready to redeem the token at whatever price is specified.

5. The variability of valuations demonstrated by the many reported examples has prompted the suggestion that preferences might better be thought of as being "constructed" or "assembled" during the decision process, rather than revealed by it (Payne, Bettman, and Johnson 1992; Slovic 1995). However, it seems more accurate to describe most economic preferences as being "rather imprecise, organized (perhaps fairly loosely) around certain very basic principles" (Loomes 1998, 478), perhaps more akin to being context-dependent, the term used here.

6. While a very limited test for any cultural differences, the results indicate similar behavior among the participants in Canada, Singapore, and China. Given what seems to be little empirical evidence relative to the large numbers of speculations and assertions of the likely impacts of such differences on economic behavior of the sort examined here, results of further tests might be of considerable interest.

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