

Source Dependence in the Valuation of Objects

GEORGE LOEWENSTEIN

Department of Social and Decision Sciences, Carnegie-Mellon University, USA

SAMUEL ISSACHAROFF

Law School, University of Texas at Austin, USA

ABSTRACT

We ran two experiments to test whether people value objects more highly when they obtain those objects due to exemplary performance at a task. In the first, subjects who believed they had obtained a prize due to their performance on a classroom exercise valued it more highly than those who believed they had obtained it by chance. In the second, subjects who obtained a prize due to exemplary performance on a task valued it more highly than those who obtained it due to their poor performance. In both experiments, this 'source dependence' effect is approximately equal in strength to the endowment effect, which compares the valuation of subjects with and without the prize. We suggest a possible explanation for this source-dependence effect based on associationism, and rule out two alternative explanations.

KEY WORDS Preferences Source dependence Endowment effect
Associationism

INTRODUCTION

Does the manner in which people obtain objects affect their valuation of those objects? Specifically, do people value objects differently depending on whether they were obtained by skill or luck, 'legitimately', or 'illegitimately'? From an economic perspective this issue is significant because economic analyses of labor supply and consumption generally assume 'source independence'—that the valuation of an object does not depend on how it was obtained. The assumption of source independence simplifies the analysis of labor supply by implying an additively separable formulation in which utility from consumption and disutility of labor supply are segregated into two preferentially independent components. That is, the utility of consuming an object does not depend on the source of the object, or on the source of the money used to purchase it. Without source independence consumer choice behavior would be more difficult to model because the value of objects could vary as a function of variables, such as the history of how the object was obtained, which are inherently unstable, difficult to measure, and not ordinarily incorporated into economic analyses.

From a psychological perspective, the issue of source dependence is of interest because psychological research has produced evidence indicative of, but not actually demonstrating, violations of source independence. Research on the effect of causal attributions has shown that people react differently

to materially equivalent outcomes depending on their perceived causes. People experience more intense affect when outcomes are attributed to skill rather than to luck, and to internal rather than external factors (Feather, 1967; Weiner, 1985). Cognitive theories of emotions (e.g. Roseman, 1984; Ortony *et al.*, 1988) distinguish between three different emotions one can experience as a result of a positive outcome, depending on the cause of the outcome: joy if the outcome is due to luck, gratitude if it is due to another person's largesse, and pride if it is due to one's own efforts. Pride is generally assumed to be more reinforcing than joy, which is in turn assumed to be preferable to gratitude. Finally, Heath and Tversky (1991) have recently shown that people prefer to bet on their own judgments than on chance devices with matched probabilities of winning when they feel knowledgeable in a topic area and when they believe they have a high chance of winning. One of the explanations they propose for this effect is that 'when the decision maker is an "expert", success is attributable to knowledge, whereas failure can sometimes be attributed to chance' (page 8). All three interrelated lines of research support the notion that people feel differently about materially equivalent outcomes, depending on their perceived causes. However, to our knowledge, no research has directly examined how individuals' valuations of objects are affected by their attributions of how those objects were obtained.

Finally, the issue of source dependence is important from the vantage point of behavioral decision theory. Source dependence has significant ramifications for the 'endowment effect' which is one of the most important and robust empirical regularities to emerge from the field (Thaler, 1980; Kahneman *et al.*, 1990). The endowment effect refers to the observation that, contrary to normative theory, people value objects more highly when they possess them than when they do not. Likewise, the studies presented here show that, in contrast to normative theory, objects are valued differently depending on whether they are attributed to positive performance on a task, chance, or negative performance. But our second experiment demonstrates that source-dependence effects are stronger for objects that one obtains than for objects one fails to obtain. Thus, one values an object won in a game of skill more than one won in a game of chance, but if one fails to win the object, its value does not depend much on whether the game was one of skill or chance. This differential impact of source dependence on objects in and not in one's possession establishes a moderator relationship between source dependence and the endowment effect; positive source effects enhance the impact of endowment and negative source effects weaken it. Consistent with this logic, when subjects in our second experiment received an object in connection with winning a contest of skill, the endowment effect was strong, but when they obtained the same object in connection with losing a contest of skill, negative source dependence was sufficiently strong to completely eliminate the endowment effect.

The most straightforward explanation for source dependence arises from the concept of 'associationism', which dates back to the ancient Greeks, and which had a long history in British philosophy (Kendler, 1987; Buckingham, 1984). According to the associationistic perspective, thoughts and emotions become associated with one another by nature of certain situational and conceptual factors. Modern investigations in the associationist tradition include a study by Berkowitz and LePage (1967) showing that the proximity of weapons among subjects with little experience in their use was sufficient to induce aggression, a study by Feinberg (1986) showing that consumers spend more when in the presence of credit-card paraphernalia (even when charging their purchases is not an option), and a series of studies by Rozin and coauthors (summarized in Rozin and Fallon, 1987), showing that objects can induce disgust simply due to their historical or semantic association with distasteful sources.

One important factor leading to association between thoughts, according to Hume (1748/1955, page 32) is 'cause and effect'. Hume believed that causes and their consequences tend to become associated in the mind so that the contemplation of one naturally evokes the other. Applied to

tasks and their rewards, Hume's logic implies that contemplating a reward (the effect) for one's performance at a task (the cause) will cause one to think of the latter. Thus, if the reward was obtained due to exemplary performance, contemplating the reward should produce a pleasurable stream of association whereas, if the reward was obtained, say, as a 'booby prize', then the stream of association will be less pleasurable.

Relaxing the source-independence model to take account of Hume's insight would lead one to predict that one's success or failure at a task and whatever material consequences result from such performance are likely to become linked so that thinking about either one tends to evoke the other, whether consciously or unconsciously. Since thinking about success is generally pleasurable, such an association would increase the positive affect associated with possession of the reward object. Such positive affect would provide an incentive for increasing one's valuation of the reward object above what it would be if it were received in a more neutral way. Likewise, since thinking about failure is aversive, the value of an object would be decreased if it were obtained as a result of failure or poor performance at a task.

We conducted two experiments to test these predictions. In the first, we compared the valuation of individuals who believed they had obtained an object by chance with those who believed that they had obtained it due to their performance on a task. In the second, we compared the valuations of people who believed they had or had not obtained an object due to their positive or negative performance on a task. Although the experiments do not test the associationist account of source dependence directly, they were designed to rule out, as much as possible, alternative explanations for any observed source dependence.

EXPERIMENT 1

To test whether people who obtain an object due to positive performance at a task value that object more highly than those who obtained it due to chance, we distributed mugs to students who had received top grades in a class exercise. Half of these students were told that they had received the mug due to their performance on the exercise and half were told that the mugs had been randomly assigned. Mug values were then elicited from all these students. Our prediction was that students who believed that they had received the mugs due to their performance on the exercise would value them more highly than those who believed they had received them by chance.

The design was intended to rule out mood effects as an explanation for any observed difference between the two groups, since the students in question all had reason for positive affect. All had received a mug and all had received comparably high grades on the exercise. One effect we could not rule out, however, is that receiving a mug *in connection with* one's high score on the exercise — the interaction between getting a mug and getting a high score — might give an additional boost to mood. However, if such an interaction effect exists, one would expect its effect to be small relative to the two main effects of receiving a high score and a mug.

We also elicited buying prices from the remainder of the students as a replication of the well-known endowment effect. However, since this group was not randomly assigned, but on the basis of their low grade on the test, their data are not strictly comparable to that of the other groups.

Method

Subjects were 39 students in an executive education class at Northwestern University. Earlier in the class, a graded exercise, which had been submitted in a previous class, had been returned to the students. Based on these grades, mugs had been prepared for the 27 students who had received

an A- or higher. These mugs were stuffed with slips of paper labeled with their names and a short message. For half — randomly selected — the message informed them that 'you were randomly selected to receive a mug'. The message received by the other half told them that 'you have received a mug based on your performance on the exercise'.

Both groups were then given a form which presented them with a series of choices of the form:

keep mug____. trade it for \$x____.

where x ranged from \$0.25 to \$10.00 in \$0.25 increments. The instructions at the top of the form read:

You now have the opportunity to trade your mug for some money. Below are a series of lines marked: 'Keep mug____. Trade it for \$amount____.' On each line check whether you would prefer to keep the mug or to trade it in for the amount of money written on the line. *Check one or the other on every line.*

We have predetermined a money amount for the mugs. The amount is written on a slip of paper in the envelope. When everyone has completed their forms, the amount will be revealed. If you specified below that you would prefer to trade the mug in for the money amount we reveal then you will give up the mug and we will give you the money. If you specified that you would prefer to keep the mug over the amount we reveal then you will keep the mug.

Note that your choices below will not affect the amount written in the envelope. Therefore, it is in your interest to indicate what the mug is truly worth to you. All trades will take place immediately.

The remaining 12 students (who received grades lower than A-) were not given mugs but, after a delay, were given a choice between getting a mug or various amounts of money using a form that was analogous to the one just described.

Results

Exhibit 1 shows the distribution of selling prices for the two groups which received mugs. Exhibit 2 presents the means, standard deviations, and medians of all three groups. The main finding is that the group whose members believed they had received mugs based on their performance on the exercise valued them more highly on average — \$1.64 more based on means, and \$1.50 more based on medians — than the group that believed it had obtained the mugs based on chance. As is evident from the Exhibit 1 the values were not normally distributed, so the valuations of the two groups were compared with a Wilcoxon rank test which revealed a significant difference ($p < 0.02$). We also evaluated the differences between the two groups after deleting the one subject in these groups who gave a valuation of zero. A zero valuation of the mug (which was objectively quite attractive and retailed for about \$6.00) can be interpreted as a 'protest vote' — a lack of involvement in the experiment. Although this subject was in the chance condition, the difference between the groups remained significant ($p < 0.05$) after this observation was deleted. Finally, a comparison of the valuations of those with and without mugs also produced a significant difference ($p < 0.03$), replicating the standard endowment effect.

Discussion

The prediction that people would value the mugs more highly when they believed that they had obtained them due to their performance on the test was supported. Indeed, the perception that

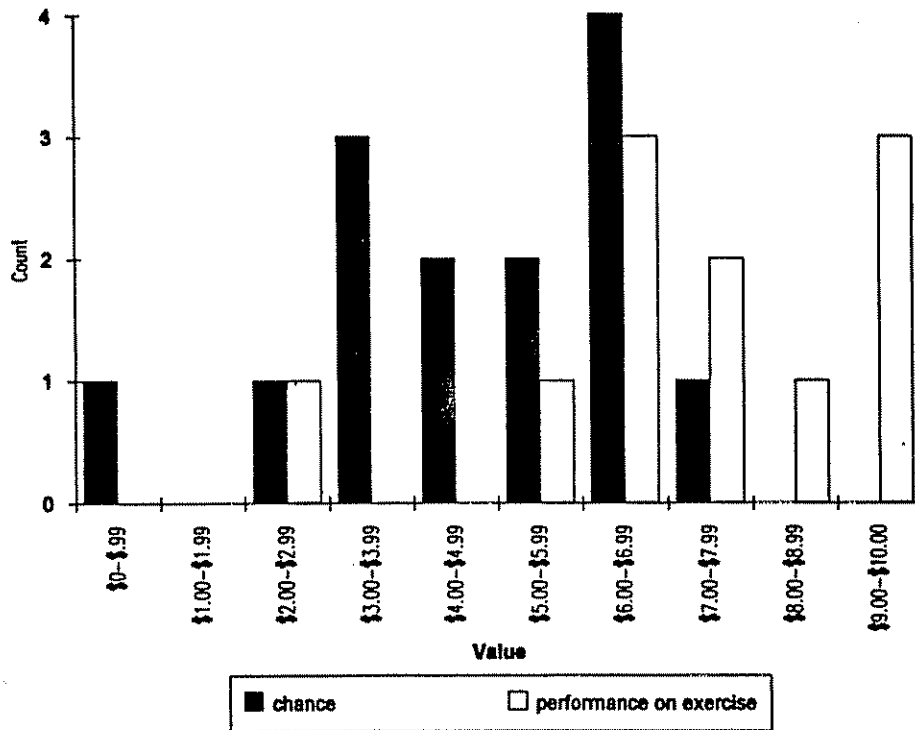


Exhibit 1. Mug values for students receiving mugs as a result of chance or due to their performance in a classroom exercise

Exhibit 2.

Condition	No. of subjects	Mean value	Standard deviation	Median
Mug, due to performance	13	\$6.35	2.71	\$6.75
Mug, due to chance	14	\$4.71	1.91	\$5.25
No mug	12	\$3.23	2.87	\$2.37

mug possession was due to skill rather than chance increased mug valuation by approximately the same absolute amount (measured by means) as did possession of the mug. Thus, source independence is strongly rejected.

Although the experiment was designed to limit mood difference between the groups as an explanation for any difference, another alternative interpretation of the results that cannot be ruled out is based on self-presentation. Perhaps the group which believed that mug possession reflected their performance wanted to retain the mug not because they personally valued the mug more highly, but because they believed that retention of the mug would signal their exemplary performance to other students. The second experiment was designed, in part, to eliminate this possible interpretation of the results.

EXPERIMENT 2

In Experiment 1, we were able to determine only the effect of attributions on the valuation of subjects who received mugs. Subjects who did not receive a mug were not told why they had not, or why other people had, received a mug. One purpose of Experiment 2 was to examine the effect of attributions on valuations for those people who do not receive an object — i.e. to determine whether mug values of those people who fail to receive a mug depend on the perceived cause of this failure. As noted in the introduction, any differential impact of source dependence on people in possession and not in possession of objects would have ramifications for the endowment effect.

A second purpose of the second experiment was to strengthen the source manipulation in the first experiment. In that experiment we compared the mug valuations of people who thought that they had received the mug due to their performance on an exercise with those who believed that they had received it by chance. In the second experiment we compare mug valuations of people who thought they had received a mug (or not received one) due to either positive or negative performance on an exercise. We ran two types of contests, one in which winners obtained mugs and the other in which losers obtained mugs. In both, we obtained mug valuations for those who did and did not obtain mugs. Thus, there were four conditions obtained by crossing whether people played in a contest in which losers or winners obtained mugs, and whether the subject actually obtained a mug.

Our main prediction was that people who received mugs due to getting a higher score on the test would value the mugs more highly than those who received them as a result of getting a low score. We did not have a strong prior expectation for those who did not receive a mug. On the one hand, people who fail to get a mug because they got a lower score might view their mugless state as more legitimate than those who failed to receive a mug due to getting a higher score. If legitimacy affects value positively, then the former group should value the mug more highly. On the other hand, consistent with the reasoning for people with mugs, people who fail to obtain a mug in the low-score-gets-mug condition (due to getting a higher score) might value the mug more highly because they want to associate their high score with an object (the mug).

Although we did not have a strong prior expectation about the relative valuations of those without mugs, it should be noted that the latter pattern weighs against the self-presentation interpretation of the effect. If people without mugs in the loser-gets-mug condition (who received higher scores) value the mug more highly than people without mugs in the winner-gets-mug condition (who received lower scores), then self-presentation concerns could not explain the results for the group with mugs. These concerns should motivate subjects in a situation in which mugs were associated with lower scores (the loser-gets-mug condition) to avoid obtaining a mug and thus to price the mug lower.

Method

Subjects were students in two executive education classes ($n = 33$ and $n = 34$) at Northwestern University. The two classes were identical in terms of student composition, subject matter covered, and professor. Earlier in the quarter, students had been assigned to the classes based on arbitrary criteria.

In both classes, students were given a form and were instructed to pair off with another student and to write their own and their partner's name on their own form. The written instructions, which were read aloud by the experimenter, included the following:

Now you will both take a quiz which consists of 16 words that you have probably not heard before. Each word is followed by two definitions. One is the real definition taken from the *Oxford*

Exhibit 3

Condition	No. of subjects	Mean value	Standard deviation	Median
Winner-gets-mug				
Higher score (mug)	16	\$6.17	2.65	\$6.00
Lower score (no mug)	17	\$3.71	1.61	\$3.75
Loser-gets-mug				
High score (no mug)	17	\$4.44	2.43	\$4.75
Lower score (mug)	17	\$4.76	2.41	\$4.75

English Dictionary, the other is a fake definition. For each word, guess which is the correct definition and circle it. One of you will win a mug, depending on who gets the higher score on the quiz.

The test consisted of 16 real words, most of which were extremely obscure, but a few of which were familiar. The purpose of this combination was to make the test meaningful to the subjects and to ensure that performance was largely random. After taking the test, the professor read the correct answers to each question aloud to the class and students scored their own sheet, then checked over their partner's. Students then turned the page, revealing the manipulation that distinguished between the two classes. In one class the form read: 'The student with the higher score gets the mug' and in the other 'The student with the lower score gets the mug'. Mug values were then elicited from all subjects. Those with a mug were given the opportunity to sell it back to the experimenter using the same form as in Experiment 1 and those without a mug were given a series of choices between getting a mug or various amounts of money using the same form as used in Experiment 1 for subjects without mugs.

Results

The results of the study were evaluated both inclusively and excluding the data from two subjects who valued the mugs at zero, an individual with a mug in the winner-gets-mug condition, and one without a mug in the loser-gets-mug condition. No other subjects valued the mug at less than \$1.00. The results for all 67 subjects are summarized in Exhibits 3 and 4.

The two most relevant comparisons are between those who received mugs because they obtained a higher or lower score on the test and those who did not receive a mug because they obtained higher or lower scores on the test. The mean value for those who received a mug due to getting a higher score was, on average, \$1.41 higher than the valuation of those who received a mug because they received a lower score ($t(31) = 1.6, p < 0.12$ with zero values, $t(30) = 2.2, p < 0.04$ excluding zero values). The mean mug valuation for those who did not receive a mug due to getting a lower score was \$0.73 lower than for those who did not receive a mug due to getting a higher score, although this difference was not significant ($t(32) = 1.0, p < 0.31$ with zero values and $t(31) = 1.5, p < 0.15$ without zero values). Thus, it appears that source dependence has a greater effect on the valuation of objects that one obtains than of objects that one fails to obtain.

Group differences were evaluated with an ANOVA in which mug valuation was the dependent variable and condition (winner-gets-mug versus loser-gets-mug) and possession/nonpossession of a mug were the independent variables. There was a significant main effect of endowment (mug versus no mug) on valuation ($F(1,63) = 6.1, p < 0.02$ including zero values and $F(1,61) = 7.3, p < 0.01$ without zero values), and a significant interaction effect between getting a mug and being in the winner-gets-mug condition ($F(1,63) = 3.6, p < 0.06$ including zero values, and $F(1,61) = 7.3, p < 0.01$ excluding zero values). The main effect of condition was not significant. Interpreting the

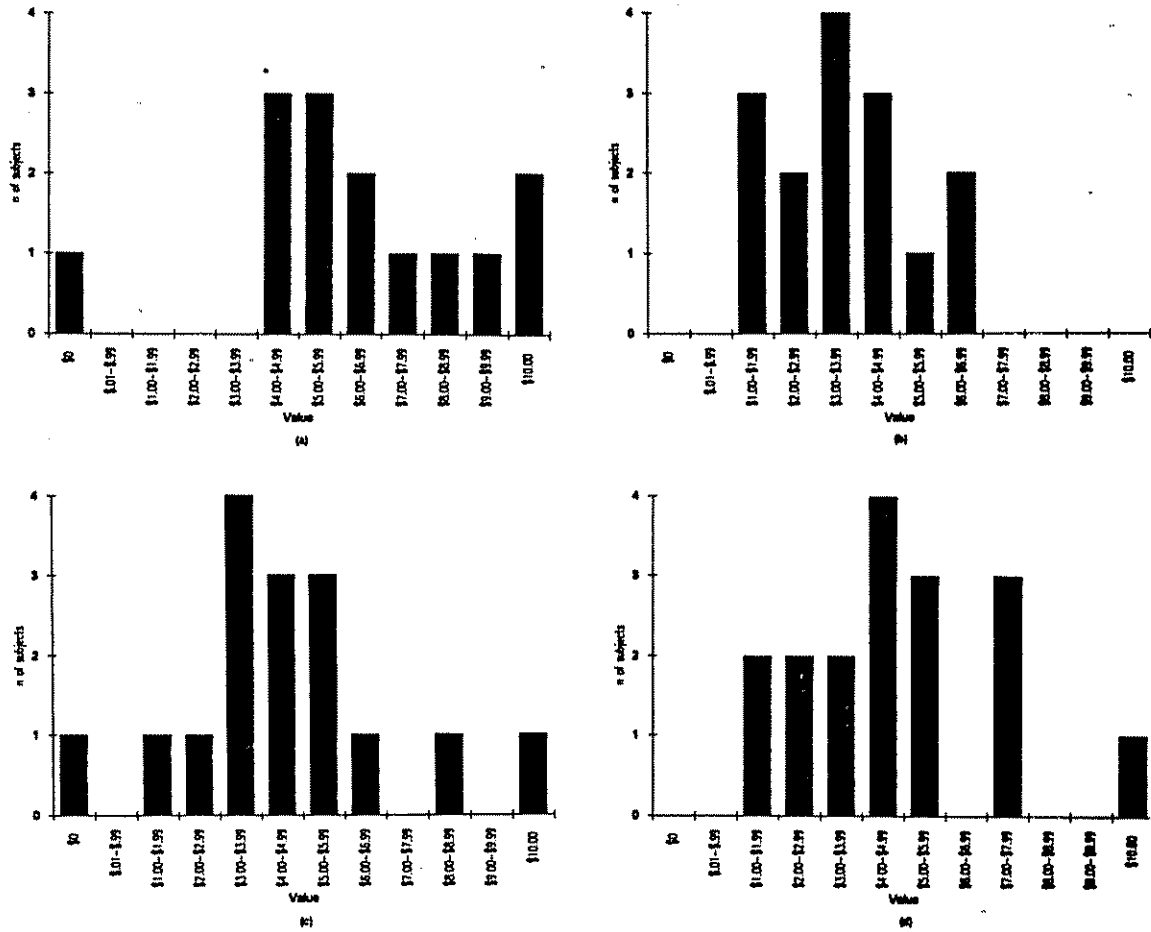


Exhibit 4. Mug values. (a) Winners in winner-gets-mug condition. (b) Losers in winner-gets-mug condition. (c) Winners in loser-gets-mug condition. (d) Losers in loser-gets-mug condition

results somewhat differently, there was a significant endowment effect in the condition in which winners obtained mugs (\$6.17 for sellers versus \$3.71 for choosers, $t(24) = 3.2, p = 0.004$), but no endowment effect in the condition in which the person with the lower score obtained the mug (\$4.76 for sellers versus \$4.44 for choosers, $p < 0.60$). Once again, despite the stronger manipulation of the source, the source-dependent effect appears to have been approximately as strong as the endowment effect. In this case the equality of strength meant that, when source dependence operated in opposition to the endowment effect, it effectively neutralized it.

Discussion

Source independence was again violated in a manner consistent with the results from the first study. There is a significant preferential interaction between winning the game and receiving a mug; people who obtained a mug due to their exemplary performance at an exercise valued it more highly than those who obtained it due to their relatively poor performance. Moreover, two alternative explanations for the results are ruled out by the pattern of valuation of subjects who did not receive mugs. First,

the fairness of the situation either had no impact on mug valuation or was overwhelmed by other effects. If people were concerned about the fairness of the situation, then we would expect that people who did not obtain a mug because they received a higher score would give it less value than those who did not obtain a mug because they received a lower score. Second, the results weigh against self-presentation as the cause of the effect. Self-presentation would suggest that both people who did and did not obtain mugs in the loser-gets-mug condition should state low values so as to get rid of their mugs or avoid getting them. However, no such effect was observed. Averaging across both those with and without mugs (which is necessary to reduce source-dependence differences to a minimum), the mean mug valuation in the winner-gets-mug and loser-gets-mug conditions were virtually identical. Examining only subjects without mugs, people in the loser-gets-mug condition actually valued their mugs more highly than those in the winner-gets-mug condition. Thus, the results cannot be explained on the basis of self-presentation effects.

GENERAL DISCUSSION

In combination, the two experiments show that people become differentially attached to objects as a function of how those objects were obtained. The first experiment demonstrated that people value objects more highly when those objects were obtained through exemplary performance at a task than when identical objects are perceived as having been received by chance. The second showed that objects are more highly valued when they result from positive as opposed to negative performance at a task. Perhaps coincidentally, the strength of the source-dependence effect was in each case equal in magnitude to that of the endowment effect. In the first experiment, obtaining a mug, or obtaining a mug due to one's performance, each raised the value of the mug by equivalent amounts. In the second, when the source-dependence effect operated in opposition to the endowment effect the two effects canceled out.

Although the studies were not intended specifically to test the associationist explanation for source dependence, they were designed to rule out, or at least minimize the likelihood of, two alternative explanations. The finding (in the first experiment) that people who obtained a high score and a mug, but did not associate the two, placed a lower value on the mug than those who associated the high score with getting the mug, seems to rule out mood as the cause of the enhanced valuation. If people who receive a mug due to their performance on a test value the mug more highly simply because getting a high score put them in a better mood, then we would not expect such a difference between the two groups.

In the second experiment, the fact that people who did not receive a mug due to their high performance on a test valued the mug more highly (albeit not significantly) than those who did not receive a mug due to their low performance, weighs against a self-presentation interpretation of the effect. If people wanted to retain mugs to signal to others their exemplary performance on the test then those without mugs in the loser-gets-mug condition should have been anxious to avoid getting a mug and should have stated low values.

Source dependence has numerous implications for human behavior. For example, a policy advanced by the Reagan administration conferred home-ownership on previous renters of public housing. The expectation was that ownership would cause people to value their homes more highly and to treat them better in terms of upkeep. Although the current studies do not challenge the logic behind this policy, they do suggest that one's valuation of a home will not increase as much if one is simply endowed with it, as opposed to feeling that one has earned it (e.g. by purchasing it). Thus, it may be better to sell such apartments, even at a very low price and even if the purchase price is in the form of a subsidized loan, than to give them away, if the intended goal is improved self-maintenance.

Source dependence may help to explain certain economic anomalies such as the failure of poor working people to go on welfare when benefits in the 1980s were cut 1 to 1 for each dollar earned. Economic theory predicts that such a 100% taxation of earnings should eliminate the incentive to work of those whose earnings do not add to appreciably more than they could make on welfare. Source dependence would help to explain why numerous people in exactly this situation did not quit their jobs, since it implies that the pleasure one obtains from items purchased with earned income is greater than those obtained from government transfers. At the other end of the socioeconomic spectrum, source dependence could account for the reputed misery of the idle rich. Perhaps heirs and heiresses are miserable because they cannot appreciate acquisitions purchased with money they did not earn.

The concept of source dependence may also help to explain anomalous preferences in the way that subsidies are allocated. Elster (1988) reports the strong political preference of Norwegian working people for subsidies to capital rather than labor. For example, fishermen concerned with the loss of fishing jobs lobbied for subsidies to ship-ownership rather than to wages, even though the latter would be a far more efficient and effective means of maintaining labor demand. Although difficult to explain on economic grounds, the preference for a subsidy to capital rather than labor could be explained on the basis of source-dependence if directly subsidized earnings (or the purchases they finance) are seen as somehow tainted and thus confer less utility than earnings that are not directly subsidized.

At the same time, several factors are likely to moderate source-dependence effects. First, the 'self-serving attribution bias' (Ross and Sicoly, 1979) suggests that people are probably generally quite facile at justifying why they have legitimately earned whatever rewards they receive. Although the experiments just presented were designed to produce unambiguous attributions, in the real world it is generally possible to attribute a reward one receives to any number of causes. Thus, the recipient of a government apartment may find numerous reasons why the apartment was, in fact, earned, which would eliminate any disparity in valuation between those who purchase and those who are given their homes.

A second complication arises from the role of money in the real world. Most people do not work for objects but for money which they subsequently use to purchase goods and services. Most people have multiple sources of income (e.g. earnings from work, interest on savings, gifts, social security payments, bonuses, tax rebates) and, since money is a homogeneous commodity, it is impossible to determine the source of the money used for any given expenditure. It is this source-ambiguity which gives rise to the possibility of 'mental accounting' discussed by Thaler (1985), and more recently by Henderson and Peterson (1992). If people have some leeway in how they balance their mental accounts, then it may be possible, for example, to associate tangible assets with earned income, while mentally connecting unearned income with miscellaneous expenses. Thus, heirs and heiresses who earn some income may conduct their mental accounts in such a way that their own income is used to purchase the Rolls, while the trust fund pays for taxes, utilities and gasoline for the Rolls.

The economic consequences of source dependence will depend, in part, on whether people are able to anticipate the impact of source dependence on their valuation of objects. Source dependence will have a greater impact on behavior if people can anticipate it because then they can take it into account when deciding whether and when to engage in contests involving chance and skill. Thus, for example, if people can predict the effect of source dependence on their valuation of objects, they might be more likely to engage in contests of skill when rewards are tangible (e.g. trophies) and in contests of chance when rewards are more amorphous (e.g. money). This is a testable proposition. However, there is grounds for pessimism concerning this type of prediction accuracy. Research by Loewenstein and Adler (1993) shows that people cannot predict the impact of the endowment

effect — they do not recognize that they will become attached to objects with which they are endowed. For example, subjects who were told that they had a 50% chance of winning a mug and were asked to provide selling prices contingent upon receiving one, gave prices that were identical to the choice prices provided by another unendowed group. Moreover, a disproportion of the 50% of subjects who subsequently received mugs stated that they wished they could increase the price they had stated earlier. Given the similarities and interconnections between the endowment effect and source dependence, the failure of people to predict the former may be indicative of a failure to predict the latter.

Based on the research presented above, our main conclusion is that violations of source dependence do in fact occur. However, the economic importance of such violations and their precise psychological cause remains undetermined. Furthermore, we have examined only one of what is undoubtedly a wide range of forms of source dependence. For example, there is probably a tendency to value the same gift more highly if it was given to us by someone we like rather than someone we detest. As Plato wrote, 'What is the feeling of lovers when they recognize a lyre or a garment or anything else which the beloved has been in the habit of using? Do not they from knowing the lyre form in the mind's eye an image of the youth to whom the lyre belongs?' (Kendler, 1987, page 54). Although preferences for lyres might be difficult to elicit, the implications of Plato's observation for object valuation would not be difficult to test.

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REFERENCES

- Berkowitz, L. and LePage, A. 'Weapons as aggression eliciting stimuli', *Journal of Personality and Social Psychology*, 7 (1967), 202-7.
- Buckingham, H. W. 'Early development of association theory in psychology as a forerunner to connection theory', *Brain and Cognition*, 3 (1984), 19-34.
- Elster, J. 'Is there (or should there be) a right to work?' In Gutmann, A. (ed.), *Democracy and the Welfare State*. Princeton, NJ: Princeton University Press.
- Feather, N. T. 'Attribution of responsibility and valence of success and failure in relation to initial confidence and task performance', *Journal of Personality and Social Psychology*, 7 (1967), 129-44.
- Feinberg, R. A. 'Credit cards as spending facilitating stimuli: a conditioning interpretation', *Journal of Consumer Research*, 13 (1986), 348-56.
- Heath, C. and Tversky, A. 'Preference and belief: ambiguity and competence in choice under uncertainty', *Journal of Risk and Uncertainty*, 4 (1991), 5-28.
- Henderson, P. W. and Peterson, R. A. 'Mental accounting and categorization', *Organizational Behavior and Human Decision Processes*, 51 (1992), 92-117.
- Hume, D. *An Inquiry Concerning Human Understanding*, New York: Macmillan, 1748/1955.
- Kahneman, D., Knetsch, J. L. and Thaler, R. H. 'Experimental tests of the endowment effect and the Coase theorem', *Journal of Political Economy*, 98 (1990), 1325-48.
- Kendler, H. H. *Historical Foundations of Modern Psychology*, Pacific Grove, CA: Brooks/Cole Publishing Company, 1987.
- Loewenstein, G. and Adler, D. 'A bias in the prediction of tastes', Working Paper, Carnegie-Mellon University, 1993.
- Ortony, A., Clore, G. L. and Collins, A. *The Cognitive Structure of Emotions*, Cambridge: Cambridge University Press, 1988.
- Roseman, I. 'Cognitive determinants of emotions: A structural theory', In Shaver, P. (ed.), *Review of Personality and Social Psychology*, 5, Beverly Hills, CA: Sage, 1984, 11-36.

- Ross, M. and Sicoly, F. 'Egocentric biases in availability and attribution', *Journal of Personality and Social Psychology*, 37 (1979), 322-36.
- Rozin, R. and Fallon, A. E. 'A perspective on disgust', *Psychological Review*, 94 (1987), 23-41.
- Thaler, R. 'Toward a positive theory of consumer choice', *Journal of Economic Behavior and Organization*, 39 (1980), 36-90.
- Thaler, R. 'Mental accounting and consumer choice', *Marketing Science*, 4 (1985), 199-214.
- Weiner, B. 'An attributional theory of achievement motivation and emotion', *Psychological Review*, 92 (1985), 548-73.

Authors' biographies

George Loewenstein is Professor of Economics in the Department of Social and Decision Sciences at Carnegie Mellon University. His research interests include intertemporal choice, psychological aspects of the economics of information, bargaining, psychology and the law, and the psychology of curiosity.

Samuel Issacharoff is Professor of Law and Preston Shirley Faculty Fellow at the University of Texas School of Law.