Econometrica, Vol. 72, No. 2 (March, 2004), 615–625

NOTES AND COMMENTS

NEOCLASSICAL THEORY VERSUS PROSPECT THEORY: EVIDENCE FROM THE MARKETPLACE

BY JOHN A. LIST[1]

Several experimental studies have provided evidence that suggest indifference curves have a kink around the current endowment level. These results, which clearly contradict closely held economic doctrines, have led some influential commentators to call for an entirely new economic paradigm to displace conventional neoclassical theory—e.g., prospect theory, which invokes psychological effects. This paper pits neoclassical theory against prospect theory by investigating data drawn from more than 375 subjects actively participating in a well-functioning marketplace. The pattern of results suggests that prospect theory adequately organizes behavior among inexperienced consumers, but consumers with intense market experience behave largely in accordance with neoclassical predictions. Moreover, the data are consistent with the notion that consumers learn to overcome the endowment effect in situations beyond specific problems they have previously encountered. This "transference of behavior" across domains has important implications in both a positive and normative sense.

KEYWORDS: Endowment effect, field experiment, experience.

1. INTRODUCTION

SEVERAL EXPERIMENTAL STUDIES have shown that preferences are not independent of current entitlements (see, e.g., Knetsch (1989), Kahneman, Knetsch, and Thaler (1990), Bateman et al. (1997)). In Knetsch's (1989) study, for example, Cornell undergraduate students were much more likely to keep their endowed good: 89 percent of those originally endowed with a mug chose to keep the mug (in lieu of trading it for a chocolate bar), and 90 percent of those endowed with a chocolate bar decided to keep the chocolate bar (in lieu of trading it for a mug). Numerous theories have been advanced to explain this behavioral pattern, but the most accepted conjecture invokes psychological effects, and is broadly termed "prospect theory" (Kahneman and Tversky (1979)).[2]

Even though considerable laboratory evidence in favor of prospect theory has accumulated, some economists believe the endowment effect is merely the result of a mistake made by inexperienced consumers and through time these consumers will learn, and their behavior will more closely match predictions from neoclassical models (e.g., Knez, Smith, and Williams (1985), Coursey, Hovis, and Schulze (1987), Brookshire and

[1]Thanks are due to an editor, who provided astute comments that considerably shaped the study. Two anonymous reviewers also provided comments that improved the study. I would like to thank Don Fullerton, Glenn Harrison, Liesl Koch, Jack Knetsch, and Matthew Rabin for comments that improved the manuscript. Seminar participants at numerous universities and conferences also provided useful comments.

[2]Following the literature, in the remainder of the paper I will interchange "prospect theory" and "endowment effect." Thaler (1980) first coined the term "endowment effect," which implies that a good's value increases once it becomes part of an individual's endowment.

Coursey (1987), Shogren et al. (1994)).[3] More recent field experimental evidence supports the notion that the endowment effect can be attenuated with market experience (List (2003)). Examining trading rates of sports memorabilia in an actual marketplace, List (2003) observed an inefficiently low number of trades by naïve traders, consistent with prospect theory. But his data show that individual behavior approaches neoclassical expectations as market experience intensifies.[4]

This evidence suggests behavior does change as market experience is accumulated, but two important issues remain. First, do consumers learn to overcome the endowment effect in situations beyond specific problems they have previously encountered? Second, given that List (2003) was not primarily interested in testing the major theories, his results are open to interpretation. For example, his data may not properly delineate between prospect theory and neoclassical theory because experienced agents may have planned on reselling the good. The importance of this deficiency is highlighted in Kahneman, Knetsch, and Thaler (1990, p. 1328), who note "there are some cases in which no endowment effect would be expected, such as when goods are purchased for resale rather than for utilization." Thus, the data pattern observed may be driven by spurious correlation, as practiced consumers may have planned on reselling the good after the experiment.[5] In this sense, the constructed market bore resemblance to a market where pure arbitrage was approached.

This study provides some insight into these issues by conducting a field experiment within a well-functioning marketplace: the sportscard market. A major advantage of examining behavior in a naturally occurring market is that subjects would be engaging in similar market activities (e.g., buying, selling, and trading commodities) regardless of whether I ran a field experiment or was a passive observer. In the experiment I vary the endowment point across agents and examine individual trading rates of everyday consumable goods—mugs and chocolate bars. An interesting finding is that individual trading rates for inexperienced consumers are consonant with predictions from prospect theory. The endowment effect anomaly is not universal, however: consumers that have significant market experience do not exhibit behavior consistent with prospect theory; rather, their behavior is in line with neoclassical predictions. Empirical findings are similar over collective choice mechanisms. Overall, the data provide evidence consistent with the notion that consumers learn to overcome the endowment effect in situations beyond specific problems they have previously encountered.

2. EXPERIMENTAL DESIGN

The extant literature exploring whether preferences between two goods are independent of the consumer's current entitlements typically reports endowment effects

[3]Yet this laboratory evidence has not been entirely convincing, as critics argue that the data do not conclusively support the learning premise (e.g., Knetsch and Sinden (1987)). In light of arguments in Camerer and Hogarth (1999), who note that useful cognitive capital most likely builds up slowly over months or years rather than in the limited duration of a laboratory experiment, it is understandable that this important debate remains unresolved.

[4]See also the related study by Plott and Zeiler (2003), who find that when adequate instruction about the allocation institution is provided, subjects' behavior is consistent with neoclassical predictions.

[5]Although in an exit interview List's (2003) subjects stated that they planned to keep the good, critics could contend that this was a case of experimenter satisficing.

for *everyday* consumable goods, such as mugs and candy bars. Accordingly, there is little doubt whether subjects have well-structured preferences for the goods used in these experiments. Alternatively, the experimental design of List (2003) controlled for Hicksian income and substitution effects by examining trading rates of *unusual* pieces of memorabilia in the field. Since List (2003) used several *unique* pieces of memorabilia, which most of the subjects had never previously seen, or heard of, his findings may indicate that experienced subjects are more certain of their preferences (or the goods' values) and therefore trade more often than lesser-experienced agents.[6] With an eye toward testing the competing hypotheses, and more fully exploring whether learning transfers to a different environment, I turn to the experimental design.[7]

Experimental Design IA

As a first attempt to resolve these and other issues, I examine trading rates of everyday consumable goods (mugs and candy bars) in an actual marketplace where subjects typically engage in buying, selling, and trading sportscards and memorabilia. This exercise represents a particularly strict test of the role of market experience on shaping preferences since psychological research suggests that transfer of learning across situations is quite weak (Loewenstein (1999)).

Each subject is randomly placed in one treatment, which differs by only the initial endowment: E_{mug}, E_{candybar}, E_{both}, E_{neither}. For example, subjects in treatment E_{mug} are endowed with 1 coffee mug; subjects in treatment group E_{both} are endowed with 1 chocolate candy bar and 1 mug, etc. The coffee mug was an attractive red and white mug that retailed for \$5.95 at the University of Arizona bookstore. The candy bar was an extra large fine Swiss chocolate bar that retailed for about \$6.00 at fine retail outlets.

The fundamental insights gained from the treatments come from the choices subjects make when asked if they would like to trade. In treatment E_{mug} (E_{candybar}), subjects who are initially endowed with a mug (candy bar) decide whether to trade for a candy bar (mug). Hence, the subject can either keep her initial endowment or trade it for the other good. In Treatment E_{both} subjects are endowed with both goods and must trade both goods for either a mug or a candy bar. Treatment E_{neither} has subjects simply choosing one of the two goods.

The four treatments were run on the floor of a sportscard show in a large Southern city. Each participant's experience followed three steps: (1) completing a survey, (2) considering the potential trade, and (3) concluding the transaction and exit interview. In Step 1, the monitor approached individuals entering the marketplace and inquired about their interest in filling out a survey that would take about five minutes (the survey is similar to List (2001) and is available upon request). If the individual agreed, the monitor explained that in return for completing the survey the subject would receive her endowed good(s). After physically giving the subject the appropriate endowment (when applicable), the subject proceeded to fill out the survey. No time limit was imposed. In Step 2, the monitor informed subjects in Treatment E_{both} that they must

[6]Lesser-experienced agents may keep their endowed good simply to avoid making embarrassing mistakes. Thus, if one takes into account informational asymmetries, neoclassical theory and prospect theory have identical predictions for inexperienced agents.

[7]Given that the empirical results in List (2003) indicate that differences between experienced and inexperienced agents are due to learning, I adopt that convention here.

trade their endowment for either a mug or a candy bar. In Treatment E_{mug} (E_{candybar}), the monitor informed the subject that she *had the opportunity* to trade her mug (candy bar) for the candy bar (mug). In Treatment E_{neither} the subject was asked to choose one of the two goods. The monitor allowed the subject to inspect both goods. Step 3 closed the experiment and included an exit interview.

I conducted some of the treatments with professional dealers and others with ordinary consumers. The design was used to capture the distinction between consumers that have intense trading experience (dealers) and those that have less trading experience (nondealers). In the nondealer treatments, the endowment point was changed at the top of each hour, so subjects' treatment type was determined based on the time they visited the table at the card show. The dealer treatments took place in the same fashion as the nondealer treatments, with one exception: instead of waiting for participants to arrive at the table, the monitor visited each dealer at her booth before the market opened, alternating the endowment point. The nondealer treatments took approximately fourteen hours to complete (11 a.m. to 6 p.m. on Saturday and Sunday), while the dealer treatments took about four hours (7 a.m. to 11 a.m. on Saturday).

A few aspects of the experimental design merit further consideration. First, note that subjects received the good(s) as payment for completing the survey, and had the good(s) in their possession while filling out the survey. Second, when performing this type of trading exercise, care should be taken to select goods of approximately equal value to avoid a result of everyone selecting one type of good. In a market pre-test at a June 2001 Tucson trading card show, I asked fifty dealer and nondealer subjects to choose one of the two items. Twenty-six chose the coffee mug, whereas twenty-four chose the chocolate bar. I therefore concluded that the goods were similar enough in value to use for a trading exercise. Third, no subject participated in more than one treatment. Fourth, the monitor worked one-on-one with each subject.

Experimental Design IB

Besides these four treatments examining strictly private allocations, because the existence of non-neoclassical preferences has vast importance for the provisioning of public goods, I also ran four treatments using a collective choice mechanism. The four collective choice treatments use the identical consumable goods that were used in the private allocation treatments. For example, in public good Treatment E_{candybar}, subjects are endowed with a candy bar and must vote on a proposition to fund "Mr. Twister," a small metal box placed at the front of the room that provides mugs. If the group chooses to fund Mr. Twister, which is determined via simple majority rule, *all* N (number of subjects in the room) subjects must give their candy bar to the monitor; upon payment, Mr. Twister's handle is cranked N times and N mugs are delivered. The other three treatments are the public good analogs of Treatments E_{mug}, E_{both}, and E_{neither}.

Because it was necessary to have group decision making, I used an adjacent room in the same building instead of running these treatments on the floor of the sports-card trading show. In these treatments, each participant's experience typically followed two steps: (i) consideration of the invitation to participate in an experiment that would take about 30 minutes, and (ii) participation in the experiment. In step (i), the monitor approached potential subjects entering the trading card show and inquired about their interest in participating in an experiment that would take about 30 minutes. If the individual agreed to participate, the monitor explained that at a pre-specified time

(11:30 a.m., 1:30 p.m., 2:30 p.m., and 3:30 p.m. Sunday) the subject should enter an adjacent room to take part in the experiment. Directions to the room were provided and the subject was informed that she would receive instructions for the experiment when she arrived.

Step (ii) began when subjects entered the room and signed a consent form in which they agreed to abide by the rules of the experiment. After subjects were situated in the room, the experiment began. The instructions, which are available upon request, were read aloud, and after everyone understood the mechanism, a vote to fund Mr. Twister was taken. To ensure that everyone understood the allocation mechanism and to avoid "noise," I informed the subjects of the optimal behavior of truthtelling. For example, in Treatment E_{candybar} the experimental instructions noted "that it is in your best interest to truthfully reveal your preferences—if you want to keep the chocolate bar, vote NO on the proposition. If you prefer the mug, vote YES on the proposition." Each subject filled out her own decision sheet. Similar to the private good treatments, no subjects participated in more than one treatment, and I randomized subjects into treatments to ensure an equal representation across referenda. Finally, I used only nondealers in these treatments because dealers could not leave their tables to participate.

Theoretical Predictions

Under individual or group choice, neoclassical theory and prospect theory have sharp and disparate predictions about behavior across the various endowment points. For preferences to be consistent under neoclassical theory, the proportion of subjects who trade the mug for the chocolate bar should be equal to one minus the proportion who trade the chocolate bar for the mug. Thus, if 70 percent of the subjects endowed with a chocolate bar keep the chocolate bar, for preferences to be Hicksian, 70 percent of subjects endowed with a mug should trade for a chocolate bar. Similarly, for E_{both} and E_{neither} there should be independence between the point of endowment and the final entitlement.

Alternatively, prospect theory conjectures that a value function exists that is (i) measured over deviations from a reference point, (ii) convex for losses and concave for gains, and (iii) initially steeper for losses than gains (Tversky and Kahneman (1991)). Hence, prospect theory conjectures that mere ownership of a commodity will induce a kink of the value function at the point of endowment, making the proportion of subjects who opt to trade the mug for the candy bar considerably less than one minus the proportion who trade the candy bar for the mug. Likewise, prospect theory predicts that subjects in Treatments E_{both} and E_{neither} will opt for a mug (candy bar) more often than subjects initially endowed with a candy bar (mug).

3. RESULTS

Table I provides a statistical description of the subject characteristics. In total, I observed behavior of 378 subjects—more than 30 subjects in each dealer and nondealer treatment for the private good trading treatments and roughly 30 subjects for each of the public good trading treatments. Central tendencies of the variables reported in Table I reveal that dealers are much more active traders (denoted trading intensity), and have had more years of market experience, than nondealers. More importantly, within each of the dealer and nondealer subsamples there is a considerable amount of subject

TABLE I

SELECTED CHARACTERISTICS OF PARTICIPANTS

	Dealers Mean (Std. Dev.)	Nondealers Mean (Std. Dev.)	Nondealers Mean (Std. Dev.)
Trading intensity	11.81 (10.9)	4.94 (6.58)	6.88 (6.39)
Yrs. of market experience	9.88 (9.79)	7.15 (9.83)	7.21 (8.03)
Income	4.15 (1.75)	4.10 (1.69)	4.18 (1.81)
Age	36.55 (13.1)	34.54 (14.41)	37.04 (14.1)
Gender (% male)	.94 (.24)	.85 (.35)	.82 (.39)
Education	3.54 (1.40)	3.44 (1.33)	3.54 (1.54)
Sample Sizes:			
Private			
Treatment E_{candybar}	30	31	—
Treatment E_{both}	32	30	—
Treatment E_{neither}	35	33	—
Treatment E_{mug}	32	30	—
Public			
Treatment E_{candybar}	—	—	33
Treatment E_{both}	—	—	28
Treatment E_{neither}	—	—	29
Treatment E_{mug}	—	—	35

Notes: 1. Trading intensity represents the number of trades made in a typical month. 2. Yrs. of market experience denotes years that the subject has been active in the market. 3. Income denotes categorical variable (1–8): (1) Less than $10,000, (2) $10,000 to $19,999, (3) $20,000 to $29,999, (4) $30,000 to $39,999, (5) $40,000 to $49,999, (6) $50,000 to $74,999, (7) $75,000 to $99,999, (8) $100,000 or over. 4. Age denotes actual age in years. 5. Gender denotes categorical variable: 0 if female, 1 if male. 6. Education denotes categorical variable (1–6): (1) Eighth grade or less, (2) High School, (3) 2-Year College, (4) Other Post-High School, (5) 4-Year College, (6) Graduate School Education. 7. "Private" and "Public" sample sizes denote the number of subjects in Experiments 1A and 1B, respectively.

variability in the level of trading intensity and years of market experience, permitting an empirical analysis of the effect of market experience on behavior. In the data analysis below, I focus on the effects of trading intensity on behavior. Yet I should note that if I use a measure of the stock of market experience—the product of trading intensity and years of market experience—empirical results are qualitatively similar. Thus, I interchange "market intensity" and "market experience" for the remainder of this study.

In Table II, which provides a summary of the trading data for both nondealers and dealers, Panel A can be read as follows: row 1, column 1, at the intersection of "Treatment E_{candybar}" and "Number of Subjects Choosing Candy Bar," denotes that 25 nondealer subjects out of 31 (81 percent) that were initially endowed with a candy bar chose to keep the candy bar. The figure in row 1, column 2, complements this result and indicates that 6 out of 31 (19 percent) nondealers opted to trade their chocolate

TABLE II

SUMMARY OF EXPERIMENTAL RAW DATA

	Number of Subjects Choosing Candy Bar	Number of Subjects Choosing Mug	Pearson χ^2
Panel A. Nondealers (Private)			
Treatment E_{candybar}	25 (81%)	6 (19%)	19.21 (3 df)
Treatment E_{both}	18 (60%)	12 (40%)	
Treatment E_{neither}	15 (45%)	18 (55%)	
Treatment E_{mug}	7 (23%)	23 (77%)	
Panel B. Nondealers (Public)			
Treatment E_{candybar}	29 (88%)	4 (12%)	34.79 (3 df)
Treatment E_{both}	16 (57%)	12 (43%)	
Treatment E_{neither}	17 (59%)	12 (41%)	
Treatment E_{mug}	6 (17%)	29 (83%)	
Panel C. Dealers (Private)			
Treatment E_{candybar}	14 (47%)	16 (53%)	.54 (3 df)
Treatment E_{both}	14 (44%)	18 (56%)	
Treatment E_{neither}	18 (51%)	17 (49%)	
Treatment E_{mug}	14 (44%)	18 (56%)	
	Preferred Exchange		p-Value for Fisher's Exact Test
Panel D. Trading Rates			
Pooled nondealers ($n = 129$)	.18 (.38)		$< .01$
Inexperienced consumers (< 6 trades monthly; $n = 74$)	.08 (.27)		$< .01$
Experienced consumers (≥ 6 trades monthly; $n = 55$)	.31 (.47)		$< .01$
Intense consumers (≥ 12 trades monthly; $n = 16$)	.56 (.51)		.64
Pooled dealers ($n = 62$)	.48 (.50)		.80

Notes: 1. The Pearson chi-square tests in Panels A–C are distributed with 3 degrees of freedom and each have a null hypothesis of Hicksian preferences. 2. Data in Panel D are pooled from Treatments E_{candybar} and E_{mug}. For nondealers, data from "public" and "private" are pooled. Standard deviations are in parentheses. 3. Experienced consumers are those consumers who trade 6 or more times per month (6 is roughly the mean level of monthly trades). Intense consumers trade 12 or more times per month (12 is roughly the mean plus one standard deviation). 4. Fisher's exact test in Panel D has a null hypothesis of no endowment effect.

bar for the coffee mug. The third column in Table II presents Pearson chi-square tests, which examine the null hypothesis of H_0: $p_{\text{candybar}} = p_{\text{both}} = p_{\text{neither}} = p_{\text{mug}}$, where p_i are the parameters of 4 independent binomially distributed random variables, and therefore the null hypothesis tests whether there is a treatment effect. If the null hypothesis cannot be rejected, then evidence is in favor of neoclassical theory; rejection of the null (with the correct p_i signs) provides evidence in favor of prospect theory.

Overall, empirical results in Panel A provide strong support for prospect theory. As we move downward in column 1 of Panel A from Treatment E_{candybar} to Treatment E_{mug}, a considerable number of subjects exhibit behavior in line with prospect theory: whereas 81 percent of nondealers in Treatment E_{candybar} departed with the candy

bar, the percentage choosing the candy bar decreases significantly in Treatments E_{both} and E_{neither}, and declines even further in Treatment E_{mug}—to 23 percent. The trading figures from Treatments E_{candybar} and E_{mug} both suggest that subjects were about four times more likely to exit the experiment with their endowed good (computed as $1/2(P_{\text{mug|mug}}/P_{\text{mug|candybar}}) + (P_{\text{candybar|candybar}}/P_{\text{candybar|mug}})$). A Pearson chi-square test (~ 3 degrees of freedom) suggests that the null hypothesis of no treatment effect should be rejected at the $p < .01$ level ($\chi^2 = 19.21$). Examining behavior within the realm of a collective choice mechanism (Panel B in Table II) reveals nearly identical insights. Accordingly, whether behavior is observed over private or collective allocation, the data for ordinary consumers provide strong support in favor of prospect theory.

Data for dealers displayed in Panel C of Table II tell a much different story, however. For example, the data are not in accord with prospect theory's reference point prediction. In fact, quite the contrary result emerges—the data clearly emerge in support of neoclassical theory. First, prospect theory predicts that losses are weighted more heavily than gains. Yet, of the 30 subjects initially endowed with a chocolate bar, only 14, or 47 percent, kept the chocolate bar. This trading pattern holds for those endowed with a mug as well: 44 percent (14 of 32) of subjects trade their coffee mug for the chocolate bar. The intermediate Treatments E_{both} and E_{neither} provide a comforting validity check, as roughly 50 percent of subjects leave with mugs, as neoclassical theory would predict. A Pearson chi-square test also cannot reject the Hicksian null hypothesis at conventional significance levels ($\chi^2 = .54$).

Panel D in Table II splits the data into distinct "experience" subsamples to more fully explore the influence of market experience on the exchange rate. While the experience thresholds may appear *ad hoc*, I used the mean (≈ 6) and standard deviation (≈ 6) of trading intensity as guidance. Liberal changes to these thresholds do not significantly change the nature of the results. The pooled nondealer data indicate that 18 percent of nondealers preferred an exchange. Using a Fisher's exact test, I find that the null hypothesis of no endowment effect in the pooled data should be rejected at the $p < .01$ level ($z = 7.32$). Even though exchange rates increase considerably as market experience increases, Fisher's exact tests suggest that the null hypothesis should be rejected for those consumers that trade fewer than 6 times in a typical month (inexperienced consumers, row 2: $z = 6.97$) as well as for those consumers that make 6 or more trades in a typical month (experienced consumers, row 3: $z = 3.48$).

When we move downward in Panel D to "intense" consumers—those consumers who trade more than 12 times per month, where 12 is roughly equivalent to the mean plus one standard deviation—a much different result emerges. In these data, 56 percent of subjects preferred an exchange and the null hypothesis cannot be rejected at conventional levels ($p = .64$; $z = .33$). Data from the dealer sample reinforce empirical results from the intense consumer data: 48 percent of dealers preferred an exchange, and according to a Fisher's exact test it is inappropriate to reject the null hypothesis of no endowment effect ($p = .80$; $z = .23$).

Although analysis of the raw data provides evidence that is consonant with the notion that market experience attenuates the anomaly, there has been no attempt to control other factors that may influence the endowment effect. To complement the above findings, I estimate the following probit model with data from Treatments E_{candybar} and E_{mug}:

$$(1) \qquad mug = g(\alpha + \beta' X),$$

where *mug* equals 1 if the agent departed the experiment with a mug, 0 otherwise; X includes subject-specific variables that may influence the endowment effect: number of trades in a typical month, years of market experience, yearly income, age, gender, education, a dummy variable indicating whether the agent was endowed with the mug (Treatment $E_{\text{mug}} = 1$; 0 otherwise), and an interaction term: Treatment $E_{\text{mug}} *$ number of trades in a typical month. Estimation of equation (1) therefore provides insights into whether market experience influences the endowment effect.

Before moving to the regression estimates, I should note that I chose to interact the endowment point with trading intensity because List (2003) finds that trading intensity influences the propensity to trade. Empirical results are robust to other specifications.

Summary estimates of equation (1) are presented in Table III. The regression estimates are consistent with the unconditional results in Table II: there is evidence of an endowment effect, but it is negatively associated with market experience. For nondealers, the probit coefficient estimate of Treatment E_{mug} is 3.02, which is significantly different from zero at the $p < .01$ level, suggesting that an endowment effect is present in the nondealer subsample. Yet the negative and statistically significant coefficient of the interaction term (Treatment $E_{\text{mug}} *$ trading intensity) suggests that the endowment effect is attenuated for experienced nondealers. Alternatively, for sportscard dealers the empirical estimates suggest that the initial endowment has only a weak influence on whether the dealer departs with the mug. And the interaction term, which is the correct sign, is insignificant at conventional levels, suggesting that dealers have had substantial previous opportunities to interact in a market setting, rendering the marginal impact of another trade less important.

If I examine a measure of the stock of market experience—the product of trading intensity and years of market experience—and interact this measure with Treatment E_{mug}, the empirical results are qualitatively similar. As a further sensitivity test, I estimated a trade function $trade = g(\alpha + \beta' X)$, where *trade* equals 1 if the agent chose

TABLE III

SUMMARY EMPIRICAL ESTIMATION RESULTS

Variable	Nondealers	Dealers
Constant	−2.49 (.87)*	−3.16 (1.4)*
Treatment E_{mug}	3.02 (.48)*	0.61 (.58)
Treatment E_{mug} *trading intensity	−.16 (.05)*	−.03 (.04)
Trading intensity	.02 (.012)	.05 (.03)
Years of market experience	−.03 (.02)	.07 (.04)
Income	.14 (.09)	.39 (.13)*
Age	.01 (.01)	.04 (.20)
Gender	.87 (.47)	−.24 (.80)
Education	−.09 (.12)	−.21 (.17)
N	121	58

Notes: 1. Dependent variable equals 1 if subject departed the experiment with a mug, 0 otherwise. Treatment $E_{\text{mug}} = 1$ if agent was initially endowed with a mug, 0 otherwise; Gender = 1 if male, 0 otherwise. 2. Standard errors are in parentheses beside coefficient estimates. 3. Sample sizes may not match sample sizes in Table I due to some respondents not responding to the income question on the survey. Reported results omit these observations. If means are used to fill in the missing observations, results are not qualitatively different from the results reported. 4. "*" denotes coefficient estimate is significant at the $p < .05$ level.

to trade, 0 otherwise. Given the design of the experiment the maximum probability the subject should trade is 1/2, not 1 as in the probit model. Thus, a standard probit model is inconsistent with the alternative hypothesis that, as experience intensifies, the probability of trading tends to 1/2. I therefore estimated a nonparametric model that involves mixing categorical and continuous kernels. Results from this model are consonant with the notion that market intensity is related to the endowment effect.

4. CONCLUDING REMARKS

Substantial evidence has mounted that illustrates the importance of entitlements: in an influential experimental study, Kahneman, Knetsch, and Thaler (1990) provide compelling evidence to reject the basic independence assumption. These experimental findings have been robust across unfamiliar goods, such as irradiated sandwiches, and common goods, such as chocolate bars, persuading even the most ardent supporters of neoclassical theory to question the validity of certain neoclassical postulates.

In this study, I examine trading patterns for everyday consumables and report several insights. First, prospect theory is found to have strong predictive power for inexperienced consumers. Second, for those consumers that have had a considerable amount of exchange opportunity in the sportscard marketplace, neoclassical theory predicts reasonably well, as I find sharp evidence that behavior approaches the neoclassical prediction for experienced agents. This result is consistent with the notion that via previous market interaction and arbitrage opportunities, agents have learned to treat goods leaving their endowment as an opportunity cost rather than a loss. Thus, while psychological effects have been extremely popular in explaining the endowment effect anomaly, the data herein suggest that psychological effects may also help to explain the attenuation of the anomaly.

In light of the extant body of psychological evidence that reports limited transfer of learning across tasks (Loewenstein (1999)), the finding that consumers learn to overcome the endowment effect in situations beyond specific problems they have previously encountered is quite surprising. Normatively, this finding is important because presence of an endowment effect frustrates common interpretations of indifference curves and makes cost/benefit analysis illegitimate. They are also important from a positive perspective, where preferences must be independent of current entitlements for the invariance result of Coase to hold, for example. The overall data pattern observed uncovers important successes and failures of the theoretical literature, and provides challenges for both neoclassical and reference-dependent theorists.

Dept. of Economics and AREC, University of Maryland, 2200 Symons Hall, College Park, MD 20742-5535, U.S.A.; Jlist@arec.umd.edu; http://www.arec.umd.edu/jlist/ and NBER.

Manuscript received December, 2002; final revision received June, 2003.

REFERENCES

BATEMAN, I., A. MUNRO, B. RHODES, C. STARMER, AND R. SUGDEN (1997): "A Theory of Reference-Dependent Preferences," *Quarterly Journal of Economics*, 112, 479–505.

BROOKSHIRE, D., AND D. COURSEY (1987): "Measuring the Value of a Public Good: An Empirical Comparison of Elicitation Procedures," *American Economic Review*, 77, 554–566.

CAMERER, C. F., AND R. M. HOGARTH (1999): "The Effects of Financial Incentives in Experiments: A Review and Capital–Labor–Production Framework," *Journal of Risk and Uncertainty*, 19, 7–42.

COURSEY, D., J. HOVIS, AND W. SCHULZE (1987): "The Disparity Between Willingness to Accept and Willingness to Pay Measures of Value," *Quarterly Journal of Economics*, 102, 679–690.

KAHNEMAN, D., J. L. KNETSCH, AND R. H. THALER (1990): "Experimental Tests of the Endowment Effect and the Coase Theorem," *Journal of Political Economy*, 98, 25–48.

KAHNEMAN, D., AND A. TVERSKY (1979): "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica*, 47, 263–291.

KNETSCH, J. L. (1989): "The Endowment Effect and Evidence of Nonreversible Indifference Curves," *American Economic Review*, 79, 1277–1284.

KNETSCH, J. L., AND J. A. SINDEN (1987): "The Persistence of Evaluation Disparities," *Quarterly Journal of Economics*, 102, 691–695.

KNEZ, P., V. L. SMITH, AND A. WILLIAMS (1985): "Individual Rationality, Market Rationality, and Value Estimation," *American Economic Review*, 75, 397–402.

LIST, J. A. (2001): "Do Explicit Warnings Eliminate the Hypothetical Bias in Elicitation Procedures? Evidence from Field Auctions for Sportscards," *American Economic Review*, 91, 1498–1507.

——— (2003): "Does Market Experience Eliminate Market Anomalies?" *Quarterly Journal of Economics*, 118, 41–71.

LOEWENSTEIN, G. (1999): "Experimental Economics from the Vantage-Point of Behavioural Economics," *Economic Journal*, 109, F25–F34.

PLOTT, C., AND K. ZEILER (2003): "The WTP/WTA Gap, the 'Endowment Effect' and Experimental Procedures for Eliciting Valuations," Working Paper, California Institute of Technology.

SHOGREN, J. F., S. Y. SHIN, D. J. HAYES, AND J. B. KLIEBENSTEIN (1994): "Resolving Differences in Willingness to Pay and Willingness to Accept," *American Economic Review*, 84, 255–270.

THALER, R. (1980): "Toward a Positive Theory of Consumer Choice," *Journal of Economic Behavior and Organization*, 1, 39–60.

TVERSKY, A., AND D. KAHNEMAN (1991): "Loss Aversion in Riskless Choice: A Reference-Dependent Model," *Quarterly Journal of Economics*, 106, 1039–1061.