University of Massachusetts Amherst
Department of Resource Economics
Working Paper No. 2003-2
(SEPTEMBER 10, 2004 REVISION)
http://www.umass.edu/resec/workingpapers

Is Cheap Talk Effective at Eliminating Hypothetical Bias in a Provision Point Mechanism?

James J. Murphy[1], Thomas Stevens[2] and Darryl Weatherhead[3]

Abstract:

Significant difference between response to real and hypothetical valuation questions is often referred to as hypothetical bias. Some economists have had success with using "cheap talk" (which entails reading a script that explicitly highlights the hypothetical bias problem before participants make any decisions) as a means of generating unbiased responses in a referendum format. In this article, we test the robustness of cheap talk using a voluntary contribution mechanism with a provision point over a wide range of possible payment amounts. Our results confirm the existence of hypothetical bias, and suggest that cheap talk may eliminate hypothetical bias, but only for respondents facing higher payments.

Keywords: contingent valuation, experiments, hypothetical bias, voluntary contributions

JEL Classification: C9, Q26, H41

[1] James J. Murphy
Department of Resource Economics
University of Massachusetts, 80 Campus Center Way
Amherst, MA 01003
E: murphy@resecon.umass.edu P: 413-545-5716 F: 413-545-5853
[2] Thomas Stevens
Department of Resource Economics
University of Massachusetts, 80 Campus Center Way
Amherst, MA 01003
E: tstevens@resecon.umass.edu P: 413-545-5714 F: 413-545-5853
[3] Darryl Weatherhead, Co-Author

Is Cheap Talk Effective at Eliminating Hypothetical Bias in a Provision Point Mechanism?

James J. Murphy*

Thomas Stevens†

Darryl Weatherhead‡

SEPTEMBER 10, 2004 REVISION

This paper has not been submitted elsewhere in identical or similar form, nor will it be during the first three months after its submission to the Publisher.

Keywords: contingent valuation, experiments, hypothetical bias, voluntary contributions
JEL Classification: C9, Q26, H41

Please direct all correspondence to:
James J. Murphy
Department of Resource Economics
Stockbridge Hall
80 Campus Center Way
University of Massachusetts
Amherst, MA 01003
murphy@resecon.umass.edu
phone: (413) 545-5716
fax: (413) 545-5853

Acknowledgements

This material is based upon work supported by the Cooperative State Research Extension, Education Service, U. S. Department of Agriculture, Massachusetts Agricultural Experiment Station, under Project No. W-133, and by the Center for Public Policy and Administration at the University of Massachusetts-Amherst. The authors would like to thank Laura Taylor for her support and Glenn Harrison for constructive comments. John List and two anonymous reviewers also provided valuable comments. Ira Athale provided research assistance. We take full responsibility for any errors.

---

* Department of Resource Economics, and the Center for Public Policy and Administration. University of Massachusetts–Amherst.
† Department of Resource Economics. University of Massachusetts–Amherst.
‡ U.S. Environmental Protection Agency.

Is Cheap Talk Effective at Eliminating Hypothetical Bias in a Provision Point Mechanism?

Abstract

Significant difference between response to real and hypothetical valuation questions is often referred to as hypothetical bias. Some economists have had success with using "cheap talk" (which entails reading a script that explicitly highlights the hypothetical bias problem before participants make any decisions) as a means of generating unbiased responses in a referendum format. In this article, we test the robustness of cheap talk using a voluntary contribution mechanism with a provision point over a wide range of possible payment amounts. Our results confirm the existence of hypothetical bias, and suggest that cheap talk may eliminate hypothetical bias, but only for respondents facing higher payments.

1. INTRODUCTION

There is strong empirical evidence suggesting that the contingent valuation method (CVM) often overstates real economic value. For example, in a review of the literature, Harrison and Rutström 2002 find that 34 of 39 CVM estimates reviewed contained hypothetical bias with an average bias of about 338 percent. These results are consistent with those in meta-analyses by List and Gallet 2001, and Murphy*, et al.* 2003.

This problem has motivated research to develop techniques that either eliminate or adjust for hypothetical bias. Of particular interest is the "cheap talk" CVM design recently employed by Cummings and Taylor 1999 (hereafter C&T) wherein experimental subjects were read a script describing the bias problem and were explicitly asked to not overstate their true willingness to pay (WTP). C&T were successful in using the cheap talk design to eliminate hypothetical bias in a referendum for three different public goods. However, the evidence about cheap talk's robustness is mixed. Cummings*, et al.* 1995 found that a shortened version of the script actually worsens the bias, but a lengthier script similar to that in Cummings and Taylor 1999 was successful. Similarly, Poe*, et al.* 2002 tested a shortened version of the cheap talk script in a voluntary contribution telephone survey and found that the short script had no effect. Conversely, Aadland and Caplan 2003 find that a short cheap talk script was effective. List 2001 reports that a long script did not reduce hypothetical bias with experienced card dealers, but was effective with inexperienced participants; both Lusk 2003, and Aadland and Caplan 2003 report similar results. Brown*, et al.* 2003 found that the long cheap talk script was successful in a referendum, but only for higher payment amounts.

The simplicity of cheap talk makes it an attractive approach to minimizing hypothetical bias, however it is important to understand how it works in different contexts. Whereas C&T,

and Brown, *et al.* 2003 use a referendum, this article tests the ability of cheap talk to elicit actual values for a public good using a dichotomous choice format in a voluntary contribution mechanism with a provision point (PPM). Although frequently used in CVM studies, voluntary contribution mechanisms are often thought to be neither incentive compatible nor demand revealing (Berrens, *et al.* 2002; Poe, *et al.* 2002). Consequently, a concern here is that voluntary contribution mechanisms may exacerbate hypothetical bias because of free-riding associated with actual contributions.

Although the voluntary contribution mechanism is not incentive compatible, experimental evidence has consistently shown that pure free-riding occurs far less than predicted by expected utility theory (see Ledyard 1995 for a summary of the literature). To reduce any free-riding effects, we use a modified voluntary contribution mechanism that incorporates a one-shot provision point with a money-back guarantee if the provision point is not met (Rondeau, *et al.* 1999). Benefits are extended if the provision point is exceeded. Isaac, *et al.* 1989; Rondeau, *et al.* 1999; and Marks and Croson 1998 show that the PPM significantly increases voluntary contributions. Rondeau, *et al.* 1999, and Rose, *et al.* 2002 observe approximately demand revealing behavior with a provision point mechanism and that it is generally more efficient than a simple VCM, with a few minor exceptions.

Voluntary contribution mechanisms are important because they are widely used and may often be the only plausible way of financing some types of goods, such as local public goods (Berrens, *et al.* 2002; Champ, *et al.* 1997). Moreover, theoretically incentive compatible mechanisms, such as a referendum, are not without disadvantages. Even if a referendum were a credible means of generating the revenue to provide the good, the NOAA panel recognizes that the referendum itself is still hypothetical, and respondents may not believe that the payment

vehicle (*e.g.*, taxes, higher prices, *etc*.) will be implemented (Arrow*, et al.* 1993). In addition, the NOAA panel notes that respondents may not expect their votes to influence the outcome. Moreover, respondents may object to mandatory payments, possibly for selfish reasons or because they do not wish to impose a cost on those who would not otherwise contribute voluntarily (Champ*, et al.* 1997). Clearly, the researcher has no taxing authority, so compulsory payments, if the referendum were to pass, are not only problematic for field studies, but can also generate ill-will in laboratory settings with students who may be involuntarily forced to relinquish money earned for participating. Perhaps most importantly, despite the theoretical advantages of the referendum format in eliminating free-riding, empirical evidence suggests that hypothetical bias persists (Cummings*, et al.* 1995; Cummings*, et al.* 1997; Taylor 1998; Brown*, et al.* 2003), and the complexities involved in applying corrective mechanisms in the field are often overwhelming (Rondeau*, et al.* 1999).

An issue particularly relevant to this paper is that cheap talk may only work well for higher payment levels. C&T used only one payment level ($10), whereas Brown*, et al.* 2003 varied payment amounts between $1 and $8. They found that for referenda cheap talk eliminated hypothetical bias associated with $5 and $8 payments, but cheap talk had very little effect on lower levels. However, their payment range, ($1-$8), is rather narrow and if cheap talk is to be used in a dichotomous choice framework, it is important to determine its impact over a much wider range of values, and in a voluntary contribution setting.

Consequently, in this article we test the robustness of the C&T cheap talk procedure for eliminating hypothetical bias associated with provision of a local public good in a voluntary contribution setting over a relatively wide range of dichotomous choice payments. Our results

indicate that the cheap talk script as used by C&T appears to eliminate hypothetical bias, but only for higher payment levels.

2. EXPERIMENTAL DESIGN

Our experimental design closely follows that of C&T and Brown*, et al.* 2003 with three important differences: (1) we use a PPM whereas C&T and Brown, et al. employed a referendum, (2) each subject was asked to respond to a randomly selected contribution level between \$3 and \$30,[1] and (3) we asked survey participants a series of follow-up questions that explored the nature of their decision-making process and reaction to the cheap talk script. In addition, our experiments were conducted in a computer lab, whereas the C&T experiments were hand-run (we expect that this last difference should not affect the results significantly).

Participants were recruited from the undergraduate population at the University of Massachusetts and randomly assigned to one of the three treatments. There were multiple sessions for each treatment and group size varied between 4 and 17; subjects were not told the total number of experiment participants. The good used in this study was a voluntary contribution to the Massachusetts Chapter of the Nature Conservancy for the specific purpose of placing signs in and around Mt. Toby (about 7 miles from the university) to mark trails as well as rare and endangered species. To mitigate incentives for free-riding, a \$500 provision point was incorporated. Participants were told that their money would be refunded if \$500 were not raised, and that benefits would be extended if the provision point were exceeded. Participants were then asked a dichotomous choice willingness to pay question with the amount asked varying randomly between 3 and 30 dollars:[2]

> "Are you willing to contribute \$_____ to the Nature Conservancy so that signs can be placed in and around Mt. Toby identifying the trails and rare species?"

The computer replaced the blank in the above payment question with the appropriate dollar amount and subjects were unaware of the amounts others were asked to pay. Participants were also asked a series of demographic and follow-up questions. The follow-up questions were designed to gather information about each participant's decision-making process. All questions were presented sequentially, so respondents were unaware of the content of the upcoming questions. Once a question was answered, respondents could not return to a question. The survey, which was computerized, took approximately 20 minutes to complete, after which the participants were paid a $10 show-up fee.

The 3x2 experimental design is shown in Table I; each cell contains the number of observations for each treatment. To test for possible "found money" or "house money" effects, the *CVM-only* and *Auction+CVM* treatments required different amounts of time and effort from participants. Following C&T, the purpose of the auction was to get participants to work so that they felt as though they earned the money they received for participating in the experiments, and will therefore treat it as their own money. In the auction stage, subjects participated in the buying and selling of a fictitious commodity in which they could earn money in addition to the $10 show-up payment. This auction for a fictitious good had no relation to the good being valued or the CVM survey, but it provided participants with an opportunity to earn slightly more money (average auction earnings were about $1) for an additional 30 minutes in the lab. The *CVM-only* participants only participated in the CVM computer survey.

<INSERT TABLE I>

The remaining treatment variable in Table I describes the type of survey environment participants experienced: real payment, hypothetical payment, or hypothetical payment with cheap talk.[3] We will refer to these treatments as *Real*, *Hypothetical* and *Cheap Talk*,

respectively. In each treatment, the good was described in the same way and the provision rule was the same (the instructions are in Appendix A). The only difference among treatments was whether contributions would be real or hypothetical, and whether the cheap talk script was read to the participants in a hypothetical payment setting (see Appendix B for cheap talk script).

In the *Hypothetical* treatment, participants were told that they would not have to pay any money, but that they should respond to the valuation question as though they would have to pay today. Participants were asked the same dichotomous choice voluntary contribution willingness to pay question in the *Real* treatment but, at the end of the session, they were required to actually pay the amount they indicated they would be willing to contribute. For the *Cheap Talk* sessions, participants were given the same survey as the participants in the *Hypothetical* treatment, except there was an additional cheap talk script that was read to them by the experimenter before the WTP question was posed. This cheap talk script was similar to that used by C&T with minor wording changes to account for the provision point mechanism instead of a referendum format.

In a homegrown value study, such as this, it is impossible to know an individual's true preferences. Therefore, consistent with similar experimental valuation studies, we make the assumption that payments in the *Real* treatment accurately reflect the true economic value for the good. Recent work by List*, et al.* 2004 cast some doubt on the validity of this assumption. They find that social isolation can have considerable influence on stated preferences, but that the difference between real and hypothetical values is roughly constant across treatments. This implies that although our response rates may be biased upwards, it should have no qualitative effects on our conclusions.

3. RESULTS

The basic results from our experiments are presented in Table II. Despite a pre-experiment survey that indicated strong support for Nature Conservancy programs, in the *Real* treatment there were only 2 "yes" responses. The unexpected result that the good appears to have relatively little value provides us with the opportunity to test cheap talk in a much simpler setting. In a typical valuation survey, the payment response can be divided into two decisions: (1) do I value this good at all?, and (2) if so, how much am I willing to pay? This decision sequence is sometimes estimated using a hurdle model. Opaluch and Segerson 1989 note that for unfamiliar goods, individuals may not know precisely their WTP, but can place it within a range, or ambivalence region. Hence, should the amount asked fall within this region, the person may become more uncertain about her response. When payments are real, the respondent may invest more cognitive effort to reduce the ambivalence region. This could lead to different responses in real and hypothetical settings. The rationale behind the cheap talk script is to coax individuals to invest this cognitive effort even though payment is hypothetical. In our experiment, subjects typically earned $10-12 for about an hour of their time. For the higher payment amounts, above $9, a "yes" response means that the subject would earn nothing and could possibly have to contribute more than they earned. Given that real WTP approaches zero, for these individuals, it is likely that these higher amounts asked lay outside the ambivalence region. Therefore, the contribution decision in either the hypothetical or the cheap talk setting should have been straightforward—the amount asked differs substantially from the goods value, so respond "no."

<INSERT TABLE II>

However, this is not what we observe in Table II. Overall, the percentage of participants giving a "yes" response to the dichotomous choice question in the *Hypothetical* treatment (32%)

was much greater than in the *Real* treatment (3%). The cheap talk script appears to be effective only at the higher payment levels. For $3 and $6 payments, however, cheap talk does not appear to have achieved its goal—half the *Cheap Talk* participants responded "yes" as opposed to only 11% in the *Real* treatment.

These findings, as expected, strongly suggest the presence of hypothetical bias. Table III presents the results of two logit models in which the binary contribution decision (1="yes" response to contribution question) is a function of the amount the subject was asked to pay, and dummy variables for the *Real* and *Cheap Talk* treatments. The expanded model also includes a dummy variable for the *Auction+CVM* treatment along with social-economic characteristics similar to those in C&T.

In both models, the coefficient for *Real* is negative and highly significant confirming the presence of hypothetical bias. The next issue to be examined is whether the C&T cheap talk script was effective in eliminating this hypothetical bias. For both models, a test of the null hypothesis that *Real* = *Cheap Talk* is rejected at the 5% level of significance indicating that the probability of contributing in the *Cheap Talk* treatment is different from that in the *Real* treatment when the entire range of dollar amounts is considered. In addition, since the coefficient on *Cheap Talk* in the expanded model is not statistically significant, this model suggests that cheap talk had no effect on hypothetical responses.

<INSERT TABLE III>

The five variables omitted in the condensed model were not jointly significant in the expanded model ($\chi^2 = 4.09$, p-value=0.54). The rationale for the condensed model is that since the amount asked varied across subjects, it is possible that controlling for bid level, rather than the non-significant socio-economic variables, is driving the equivalence between the *Cheap Talk*

and *Hypothetical* treatments in the expanded model. The primary results of the condensed model are consistent with the expanded model: the coefficient on *Real* is significant, and a test of the null hypothesis that *Real* = *Cheap Talk* is rejected at the 5% level. However, the *Cheap Talk* coefficient is significant, indicating that the script had some effect in reducing the bias, but the reduction was not sufficient to bring hypothetical payment responses in line with the real payment responses.

The model in Table III also includes a dummy variable for whether the individual participated in the auction. This coefficient is not statistically significant which suggests that either there were no found money effects, or the found money effects were the same across both the *Auction+CVM* and *CVM only* treatments. This is consistent with both Clark 2002 and List 2004 who find no evidence of found money effects in public goods experiments.

The logit results in Tables III indicate that when taken over all payment amounts, cheap talk reduced the percentage of subjects giving "yes" responses relative to subjects in the hypothetical situation without cheap talk, but did not bring these responses in line with the real payment condition. Using the approach in Brown*, et al.* 2003, Table IV presents the results from a series of Fisher's exact p-value tests to determine whether the effectiveness of cheap talk is sensitive to the payment amount. These tests make pairwise comparisons of the treatments while holding the payment level constant. To ensure sufficient observations for a meaningful test, we combined adjacent dollar amounts. When all dollar amounts are pooled, the results in Table IV are consistent with the logit results—there is a statistically significant difference between the real and cheap talk treatments. However, this conclusion is sensitive to the amount asked. Cheap talk appears to be ineffective for payments of $3 or $6, but is able to align real and hypothetical responses with higher dollar amounts. Thus, it appears that Brown*, et al.* 2003 result is robust

across both referenda and PPM.[4] It is worth noting that a recent meta analysis (Murphy*, et al.* 2003) reports median real and hypothetical CV values in similar experimental settings of $3.67 and $7.18, respectively. These values fall within the range where the effectiveness of cheap talk may be limited in our study.

<INSERT TABLE IV>

The next issue to be addressed is why the cheap talk script was successful in eliminating hypothetical bias for higher but not for lower payment levels. Brown, *et al*. suggests that some respondents may have believed they would not vote against a referendum at low payment levels. "That is, they may not have envisioned significant bias at that level, leaving them less susceptible to the script." However, interpreting our results is somewhat more complex because there are well-known theoretical reasons why individuals may behave differently in a voluntary contribution as compared to a referendum valuation format (Hoehn and Randall 1987). Taylor 1998 points out that if "the real-payment experiment is not demand revealing, then differences in responses to hypothetical and real valuation questions could be due to free-riding in the real-payment scenario and not due to hypothetical bias in the hypothetical survey." In fact, C&T note that their evidence of hypothetical bias could actually be due to free-riding since their referenda are not strictly closed. Taylor 1998 did conduct a subsequent closed referenda for one of the goods and reported results similar to those found in the C&T open referendum. However, since the voluntary contribution mechanism used in our study is not necessarily incentive compatible, it is important to determine whether results of our real treatments were biased downward because of free-riding.

To test for free-riding behavior, we asked each subject a series of follow-up questions. Respondents were asked to rate on a scale of 1 to 10 the extent to which the following statement

influenced their decision about how much to pay: "Since others will pay, I do not need to contribute as much." Subjects were also asked to indicate on a scale of 1 to 10 the degree to which they agreed with the statement that "most other people will contribute less than what (the good) is really worth to them because they will be able to enjoy the benefits, regardless of how much they contribute." We also asked whether the respondent's decision about how much to pay depended on what they thought others would do, and whether they would change their payment decision if they knew exactly what others had paid.

Table V summarizes the responses to these follow-up questions. Most respondents were neutral with respect to the likelihood that others would free-ride, and report that free-riding had very little influence on their own payment decision; a very small percentage of respondents said that their decision about how much to pay depended on what they thought others would pay. These results suggest that there is very little evidence of free-riding behavior in our experiments and are consistent with the observations of Ethier*, et al.* 2000 and Rondeau*, et al.* 1999 that a PPM can approximate actual demand in experimental settings. Even if free-riding behavior exists in our subjects' responses, the resulting free-rider bias in our WTP estimates would likely be the same in all three treatments and any differences in WTP should be due to the hypothetical nature of the valuation question.[5] Consequently, we believe that the observed difference in responses to our *Real*, *Hypothetical*, and *Cheap Talk* treatments is primarily due to hypothetical bias and not free-riding.[6]

<INSERT TABLE V>

However, we are unable to completely eliminate the possibility that free-riding contributed to the hypothetical bias observed in this study. Moreover, as noted by one reviewer, some respondents may have felt that voluntary contributions are not a fair way to fund public

goods. If concerns about fairness have a greater affect on real than on hypothetical responses, then hypothetical bias in a voluntary contribution setting may be related to both free riding and concern about fairness. Since the C&T cheap talk script does not attempt to address either of these issues, cheap talk may not be as effective in a voluntary contribution setting relative to the traditional referendum context.

On the other hand, subjects were also asked follow-up questions to determine whether and how the cheap talk script may have influenced their responses. When asked whether cheap talk influenced individual's contribution decisions, about 56 percent of respondents reported that they had reduced their payment in response to cheap talk. However, about 44 percent stated that they had already carefully considered their contribution decision and that they were, therefore, not affected by the cheap talk script.

4. CONCLUSIONS

Although additional testing of the cheap talk approach is clearly needed, the results reported here suggest that the effectiveness of this method, at least in its present form, may be somewhat limited. It is likely that a number of factors affect hypothetical bias and therefore no single technique will be the "magic bullet" that eliminates this bias. Ultimately, mitigating hypothetical bias will probably involve a combination of techniques, including both instrument and statistical calibration. We also recognize that practical considerations, such as budget and time constraints, may limit the ability of some CVM studies to implement more complex instruments (particularly if laboratory experiments, such as those conducted by Fox*, et al.* 1998, are necessary for calibration). For CVM studies conducted with limited resources, there may be an interest in "short cuts" that are "reasonably" effective. Consistent with Brown*, et al.* 2003, our results

suggest that cheap talk is effective in a PPM, but only at higher payment levels. The cheap talk literature suggests that cheap talk's effectiveness may be sensitive to script length, subject experience with the good, and payment amounts. Therefore, further research is necessary to develop a better understanding of underlying causes of hypothetical bias and how it is affected by cheap talk. We conclude that cheap talk may have the potential to achieve its objective, but the approach should be used with caution.

REFERENCES

Aadland, D., and A. J. Caplan. 2003. "Willingness to Pay for Curbside Recycling with Detection and Mitigation of Hypothetical Bias." *American Journal of Agricultural Economics*. 85(2): 492-502.

Arrow, K., R. Solow, P. Portney, E. E. Leamer, R. Radner, and H. Schuman. 1993. "Report of the NOAA Panel on Contingent Valuation." *Federal Register*. 58(10): 4602-4614.

Berrens, R., H. Jenkins-Smith, A. Bohara, and C. Silva. 2002. "Further Investigation of Voluntary Contribution Contingent Valuation: Fair Share, Time of Contribution, and Respondent Uncertainty." *Journal of Environmental Economics and Management*. 44(1): 144-168.

Brown, T. C., I. Ajzen, and D. Hrubes. 2003. "Further Tests of Entreaties to Avoid Hypothetical Bias in Referendum Contingent Valuation." *Journal of Environmental Economics and Management*. 46(2): 353-361.

Brown, T. C., I. Ajzen, and D. Hrubes. 2003. "Further Tests of Entreaties to Avoid Hypothetical Bias in Referendum Contingent Valuation." *Journal of Environmental Economics and Management*. 46: 353-361.

Champ, P. A., R. C. Bishop, T. C. Brown, and D. W. McCollum. 1997. "Using Donation Mechanisms to Value Nonuse Benefits from Public Goods." *Journal of Environmental Economics and Management*. 33(2): 151-162.

Clark, J. 2002. "House Money Effects in Public Good Experiments." *Experimental Economics*. 5(3): 223-231.

Cummings, R. G., S. Elliott, G. W. Harrison, and J. Murphy. 1997. "Are Hypothetical Referenda incentive Compatible?" *Journal of Political Economy*. 105(3): 609-21.

Cummings, R. G., G. W. Harrison, and L. L. Osborne. 1995. *Can the Bias of Contingent Valuation Surveys Be Reduced?* Economics working paper. Columbia, SC: Division of Research, College of Business Administration, Univ. of South Carolina.

Cummings, R. G., G. W. Harrison, and E. E. Rutström. 1995. "Homegrown Values and Hypothetical Surveys: Is the Dichotomous Choice Approach Incentive-Compatible?" *American Economic Review*. 85(1): 260-266.

Cummings, R. G., and L. O. Taylor. 1999. "Unbiased Value Estimates for Environmental Goods: A Cheap Talk Design for the Contingent Valuation Method." *The American Economic Review*. 89(3): 649 - 665.

Ethier, R. G., G. L. Poe, W. D. Schulze, and J. Clark. 2000. "A Comparison of Hypothetical Phone and Mail Contingent Valuation Responses for Green-Pricing Electricity Programs." *Land Economics*. 76(1): 54-67.

Fox, J. A., J. F. Shogren, D. J. Hayes, and J. B. Kliebenstein. 1998. "CVM-X: Calibrating Contingent Values with Experimental Auction Markets." *American Journal of Agricultural Economics*. 80(3): 455-465.

Harrison, G. W., and E. E. Rutström. 2002. "Experimental Evidence on the Existence of Hypothetical Bias in Value Elicitation Methods." In *Handbook of Results in Experimental Economics*. ed. V. L. Smith. New York: Elsevier Science.

Hoehn, J. P., and A. Randall. 1987. "A Satisfactory Benefit Cost Indicator from Contingent Valuation." *Journal of Environmental Economics and Management*. 14(3): 226-247.

Isaac, R. M., D. Schmidtz, and J. M. Walker. 1989. "The Assurance Problem in a Laboratory Market." *Public Choice*. 62: 217-236.

Ledyard, J. O. 1995. "Public Goods: A Survey of Experimental Research." In *The Handbook of Experimental Economics*. ed. J. H. Kagel, and A. E. Roth. Princeton, NJ: Princeton University Press.

List, J., R. P. Berrens, A. K. Bohara, and J. Kerkvliet. 2004. "Examining the Role of Social Isolation on Stated Preferences." *American Economic Review*. 94(3): 741-752.

List, J. A. 2001. "Do Explicit Warnings Eliminate the Hypothetical Bias in Elicitation Procedures? Evidence from Field Auctions for Sportscards." *American Economic Review*. 91(5): 1498-1507.

List, J. A. 2004. "Young, Selfish and Male: Field Evidence of Social Preferences." *Economic Journal*. 114(January): 121-149.

List, J. A., and C. Gallet. 2001. "What Experimental Protocol Influence Disparities Between Actual and Hypothetical Stated Values?" *Environmental and Resource Economics*. 20: 241-254.

Lusk, J. L. 2003. "Willingness-to-pay for Golden Rice." *American Journal of Agricultural Economics*. 85(4): 840-856.

Marks, M., and R. Croson. 1998. "Alternative Rebate Rules in the Provision of a Threshold Public Good: An Experimental Investigation." *Journal of Public Economics*. 67(2): 195-220.

Murphy, J. J., T. H. Stevens, P. G. Allen, and D. Weatherhead. 2003. *A Meta-Analysis of Hypothetical Bias in Stated Preference Valuation*. Working paper. Amherst, MA: Univ. of Massachusetts, Dept. of Resource Economics.

Opaluch, J. J., and K. Segerson. 1989. "Rational Roots of Irrational Behavior, New Theories of Economic Decision-Making." *Northeastern Journal of Agricultural and Resource Economics*. 18: 81-95.

Poe, G. L., J. E. Clark, D. Rondeau, and W. D. Schulze. 2002. "Provision Point Mechanisms and Field Validity Tests of Contingent Valuation." *Environmental and Resource Economics*. 23: 105-131.

Rondeau, D., W. Schulze, and G. Poe. 1999. "Voluntary Revelation of the Demand for Public Goods Using a Provision Point Mechanism." *Journal of Public Economics*. 72(3): 455-470.

Rose, S. K., J. Clark, G. L. Poe, D. Rondeau, and W. D. Schulze. 2002. "The Private Provision of Public Goods: Tests of a Provision Point Mechanism for Funding Green Power Programs." *Resource and Energy Economics*. 24: 131-155.

Taylor, L. 1998. "Incentive Compatible Referenda and the Valuation of Environmental Goods." *Agricultural and Resource Economics Review*. 27(2): 132-139.

[1] See Table II for bid distribution across treatments.

[2] For some students, the amount asked exceeded the amount earned in the experiment. In the instructions, we told students "If you choose to contribute more than you have earned today, you will be expected to pay the difference in cash or check at the end of today's session" (with minor wording changes for the hypothetical treatments). In these cases, it is possible that some contributions may have been constrained by the amount of money the students had with them. However, we doubt this was an issue since no one responded "yes" to a real payment above $6.

[3] In this article, we use the terms "real" and "actual" interchangeably. Contributions in the real payment treatment may or may not be related to the actual Hicksian surplus measure that CVM attempts to estimate.

[4] Our combined $9 and $12 amounts are comparable to C&T's $10 amount asked. In the *Hypothetical* treatment, 24% of respondents responded "yes." However, in both the *Real* and *Cheap Talk* treatments, we observe zero "yes" responses which is consistent with C&T's cheap talk result.

[5] For each question in Table V, we used a two-sample Kolmogorov-Smirnov test to make pairwise comparisons of the distribution of responses across treatments. In all cases, the tests failed to reject the hypothesis of equal distributions at any conventional level of significance.

[6] It is also worth noting that many previous empirical studies find very little, if any, evidence of free-riding behavior in actual CVM situations (Milon 1989).

Table I

Experimental Design

Number of Observations per Treatment

	Real	**Cheap Talk**	**Hypothetical**
Auction+CVM	30	31	30
CVM-only	31	37	30

Table II

Distribution of responses by amount asked and treatment

Amount asked	Real		Hypothetical		Cheap Talk	
	Yes	No	Yes	No	Yes	No
$ 3	1	7	9	1	5	5
$ 6	1	10	2	7	5	5
$ 9	0	10	2	6	0	12
$ 12	0	12	2	7	0	14
$ 15	0	10	2	5	1	5
$ 18	0	7	2	8	0	12
$ 21	0	1	0	4	0	1
$ 24	0	1	0	1	0	0
$ 27	0	0	0	1	0	1
$ 30	0	1	0	1	0	2

Table III

Logit Models for Dichotomous Choice Valuation Question

Variable	Expanded Model [a] Coefficient (Std. error)		Condensed Model [b] Coefficient (Std. error)	
Intercept	275.5		1.66	***
	(208.7)		(0.57)	
Amount Asked	–0.25	***	–0.24	***
	(0.06)		(0.05)	
Real	–3.24	***	–3.06	***
	(0.91)		(0.81)	
Cheap Talk	–0.89		–1.15	**
	(0.71)		(0.49)	
Participated in *Auction+CVM* treatment	–0.20			
	(0.51)			
Number of subjects in group	–0.04			
	(0.08)			
Year of Birth	–0.14			
	(0.11)			
Gender = 1 if female	–0.30			
	(0.53)			
Monthly Disposable Income [c]	0.22			
	(0.30)			

Dependent variable is whether the individual contributed the amount asked (0=did not contribute, 1=did contribute). *** significant at 1%, ** significant at 5%.

[a] N=176. Likelihood Ratio Test: $\chi^2[8] = 52.00$ (p=0.00). A test of the null hypotheses Real=Cheap Talk is rejected at the 5% level of significance ($\chi^2[1]=5.39$, p=0.03).

[b] N=189; Likelihood Ratio Test: $\chi^2[3] = 50.70$ (p=0.00). A test of the null hypotheses Real=Cheap Talk is rejected at the 5% level of significance ($\chi^2[1]=5.47$, p=0.02).

[c] Categorical variable (1=$0-300; 2=$301-400; 3=$401-500; 4=$501-600; 5=$601-800; 6=801-1000; 7=$1001-2000; 8=$2001-3000; 9=$3001-4000; 10=over $4000).

Table IV
Test of equal proportions by treatment and amount asked
(Fisher's exact p-value, two-sided)

	Amount Asked						
Null Hypothesis	**All amounts**	**$3 & 6**	**$6 & 9**	**$9 & 12**	**$12 & 15**	**$15 & 18**	**>$18**
Real = Hypothetical	**0.00**	**0.00**	0.15	**0.03**	**0.02**	**0.10**	0.57
Real = Cheap Talk	**0.02**	**0.01**	0.19	[a]	0.48	1.00	[a]
Hypothetical = Cheap Talk	**0.06**	0.75	1.00	**0.02**	0.15	0.18	0.48

Bold denotes significant at 10% level.

[a] There were not any "yes" responses in either treatment so test cannot be conducted.

Table V
Mean Response to Follow-up Free-rider Questions [a]

Question	Treatment		
	Real	**Cheap Talk**	**Hypothetical**
1. "To what extent did the following influence your decision about HOW MUCH to contribute…Since others will pay, I do not need to contribute as much." (1 = less influence, 10 = more influence)	2.38 (2.04)	2.56 (2.05)	2.21 (1.62)
2. **"**What factors did you consider when deciding how much to contribute TODAY?…What I thought others would do." (0 = did not consider this factor, 1 = considered factor)	0.08 (0.28)	0.07 (0.26)	0.11 (0.32)
3. "Most other people will contribute less than what (the good) is really worth to them because they assume they will be able to enjoy the benefits, regardless of how much they contribute." (1 = disagree, 10 = agree)	5.69 (3.04)	6.37 (2.67)	5.93 (2.53)
4. **"**If you knew exactly how much everyone else contributed, would that change your contribution decision?" (0 = no, 1 = yes)	0.20 (0.40)	0.30 (0.46)	0.18 (0.38)

[a] Standard deviation in parentheses.

APPENDIX A - INSTRUCTIONS FOR REAL PAYMENT TREATMENT

The instructions for both the hypothetical payment and cheap talk treatments is the same, except for minor wording changes to indicate that the payments are hypothetical. The text for the hypothetical payment treatment is in <italics>.

The market experiment is now over.

Before you leave, we would like to ask you *<a hypothetical question>* about contributing to the Massachusetts Chapter of the Nature Conservancy, which is a non-profit organization that protects land in order to preserve plants, animals, and natural communities in Massachusetts.

<Even though earnings or payment of money in this upcoming part are hypothetical, we ask that you respond to questions as if they involved a real cash payment.>

ALL CONTRIBUTIONS ARE *<WOULD BE>* VOLUNTARY.

If you *<were to>* choose to contribute more than you have earned today, you will *<would>* be expected to pay the difference in cash or check at the end of today's session.

If you *<were to>* choose not to contribute anything, your earnings from today are *<would be>* yours to keep.

The Commonwealth of Massachusetts has one of the most diverse ranges of habitats among all states in the U.S.

Massachusetts has the country's sixth largest state park system and the country's largest concentration of land trusts operate here. The activities of the Nature Conservancy in Massachusetts help to preserve these areas through acquisition of land so that these lands may be kept in their natural state for years to come.

The Massachusetts Chapter of the Nature Conservancy has preserved 14,000 acres, many harboring rare species of plants and animals.

The Conservancy bases its land protection action on scientific studies and surveys. These studies identify the rarest plants, animals and natural communities that are at risk.

In Massachusetts these types of areas have included parts of the Connecticut River Valley, Martha's Vineyard, and the Southern Berkshires. By protecting these areas, threatened and endangered species such as cooper's hawks, box turtles, spring salamanders, and the yellow lady's slipper are provided safe habitat in which they may continue to live.

The Conservancy protects these types of natural areas by outright acquisition of the land, by Conservation easement, and through registry programs that allow private landowners to preserve their properties under the guidance of the Conservancy.

Locally, the Nature Conservancy is currently purchasing land near the Mt. Toby State Forest, which is about 10 minutes from campus.

The mixed oak-hemlock-sugar-maple forest of Mt. Toby and its wetlands are home to rare salamanders, turtles, and many wildflowers, both rare and common, including the autumn coralroot and the trout lily. Mt. Toby is also a refuge for wildlife such as ravens and wild turkeys.

The area provides many types of outdoor activities including hiking, bird-watching, and cross-country skiing. However trails and rare species are often not well marked, which can reduce the enjoyment people get from visiting the park.

The Nature Conservancy needs donations to support its program to prevent development on Mt. Toby and to mark trails so these lands may be preserved in their natural state for the use and enjoyment of the public today and in the future.

Several groups of people are being asked to contribute to this program. If a total of $500 dollars is raised, we will be able to place signs in and around Mt. Toby identifying the trails and rare species.

However, if not enough money is raised to fund this program, everyone's contribution will be refunded. If more than enough is raised, additional contributions can be provided to the program.

<Suppose that we were to ask for actual cash payments today.

You would then be asked to check 'yes' or 'no' on whether or not you would contribute to the Nature Conservancy.>

If enough money is <*were*> raised, the money will <*would*> be sent to the Nature Conservancy and the receipt will be posted on the bulletin board outside of Stockbridge Hall Room 220.

<Although payment will be hypothetical, we ask that you respond as if this involved a real cash payment.>

In a moment, you will be asked <*a hypothetical question about*> whether you wish to contribute to Nature Conservancy here and now.

These voluntary contributions will <*would*> be deducted from your earnings today. If you <*were to*> choose to contribute more than you earned, you will <*would*> be expected to pay the difference in full at the end of today's session.

Before you continue, if you have any questions raise your hand and someone will come to you.

APPENDIX B - CHEAP TALK SCRIPT

Participants were given a printed copy of this script and were asked to read along as the experimenter read the script aloud.

Before you make a decision about this, please open the stapled sheet of paper in your participants' packet. Please read along as I read the contents to you.

Before you make your decision, I want to talk to you about a problem that we have in studies like this one. As I told you a minute ago, this is a hypothetical decision, not a real one. No one will actually pay money at the end of the decision. But I also asked you to respond to the decision as though the result of your vote would involve a real cash payment by you.

And that's the problem.

In most studies of this kind, folks seem to have a hard time doing this. They act <u>differently</u> in a hypothetical situation, where they don't really have to pay money, than they do in a real situation, where they really could have to pay money. For example, in a recent study, several different groups of people made decisions just like this one you are about to make. Payment was hypothetical for these groups, as it will be for you. No one had to pay money in this hypothetical situation. The results of these studies were that on average, across the groups, 38% of them decided to contribute. With another set of groups with similar people deciding on the <u>same</u> situation as you will decide on here, <u>but</u> where the payment was real and people <u>really</u> did have to pay money if they said yes, the results on average, across the groups were that 25% decided to contribute. That's quite a difference isn't it?

We call this a 'hypothetical bias.' 'Hypothetical bias' is the difference that we continually see in the way people respond to hypothetical situation as compared to real situations, people seem to respond just like you see here on the overhead.

In the real situation, where people knew they would have to pay money if they decided to contribute, 25% said 'yes' and 75% said 'no.' When payment was hypothetical and people knew they would not pay anything if they decided to contribute, just like your decision today, 38% said 'yes' and 62% said 'no.'

How can we get people to think about their decision in a hypothetical situation like they think in a real situation? How do we get them to think about what it means to really dig into their pocket and pay money, if in fact they really are not going to have to do it?

Let me tell you why I think that we continually see this hypothetical bias, why people behave differently in a hypothetical situation than they do when the situation is real. I think that when we hear about a situation that involves doing something that is basically good, for example helping people in need, improving environmental quality, or anything else, our basic reaction in a hypothetical situation is to think: <u>sure</u>, I would do this. I <u>really would</u> spend the money; I really, really, think I would. What our "yes" vote really means in this case, is that we are basically good people, and that we would like to see good things happen.

But when the situation is real, and we would actually have to spend our money, we think a different way. We basically still would like to see good things happen, but when we are faced with the possibility of having to spend money, we think about our options: If I spend money on this, that's money I don't have to spend on other things. If I spend money to help conserve natural areas in Massachusetts, that's money I don't have to spend on groceries, go to a movie, or perhaps to give to some other environmental organization. So, when the payment is real, we act

in a way that takes into account the limited amount of money we have. We decide realizing that we just don't have enough money to do everything we might like to do. This is just my opinion, of course, but it's what I think may be going on in the hypothetical situation.

In any case, the only way that we know to get people like you to decide in our hypothetical situation just like you would if the situation was real is to simply ask you: In the decision that we're going to take in a few minutes please do the following:

Think about what you are deciding on. If this were real, if you said yes, you would actually have to dig into your pocket and pay $____ right now, do you really want to fund the conservation of natural lands in the state of Massachusetts enough that you would be willing to spend the money?

If I were in your shoes, and I was asked to decide 'yes' or 'no' on this proposition that requires me to spend $___, I would think about how I feel about spending my money this way. When I got ready to decide, I would ask myself: if this was a real situation, and I had to pay $___, do I <u>really want</u> to spend my money this way. If I really did, I would say yes; if I didn't, I would say no. I wouldn't throw my money around. That' s just my opinion, of course. You must do whatever you want to do.

In any case, I ask you to decide exactly as you would if you were really going to face the consequences of your decision: which is to pay money if you say yes to contribute.

Please keep this in mind when deciding whether you would contribute to this program.

If you have any questions raise your hand and someone will come to you.