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VALUING ENVIRONMENTAL DAMAGES WITH STATED PREFERENCE METHODS: NEW APPROACHES THAT YIELD DEMONSTRABLY VALIDVALUES FOR NON-PRICED, ENVIRONMENTALGOODS

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Summary **of Goals:** We set out to develop valuation methods that yield demonstrably valid estimates of environmental values, i.e., values that reflect real economic commitments. Federal agencies such as the U.S. **Environmental** Protection Agency have a pressing need to improve the validity and credibility of estimates of the values that society places on environmental resources. Traditionally, the task of measuring environmental resource values has drawn heavily on the economic theory of consumer behavior to develop a variety of measurement techniques.' More recently, as matters of public policy have shifted to resources characterized by significant public goods attributes, one form of a stated preference methodology, the Contingent Valuation Method (CVM), has grown both in its attractiveness as a tool to inform public policy and as a target for critics.[2] The credibility of values derived with the CVM has become an issue that is the source of considerable contemporary debate. While some argue that a "properly designed" application of the CVM can yield reasonably accurate estimates of social value (e.g., Hanneman [1994]), others argue , that the method is incapable of yielding estimates of value that comport with values that reflect real economic commitments (e.g. Hausman and Diamond [1994]).

The objective of this project is 'to explore and develop new stated preference valuation institutions--i.e., new Contingent Valuation (CV) methodologies that are capable of yielding demonstrably valid estimates of environmental values. To accomplish this task, we utilized experimental economics and laboratory methods to incorporate scientifically based methodology into the process of CVM survey design. Experimental economics, and its use of laboratory experiments, provided the means for developing and testing refutable hypotheses regarding the efficacy of hypothetical survey instruments in the elicitation of values for public goods that do, or do not, reflect values that represent *real* economic commitments. Two new hypothetical survey designs were tested in this manner: the "Cheap Talk Design" and the "Learning Design."

The Cheap Talk Design: In experimental economics, "cheap talk" refers to informal discussions between the experimenter and subjects concerning behavioral strategies that subjects

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[1] These methods have sought to recover the parameters of users' utility functions using a variety of revealed preference and stated preference techniques. For a review of these methods. see Cummings, Brookshire and Schulze [1986], and Bjomstad and Kahn [Chapter 1. 1995]. See, also, Adamowicz, W.. J. Louviere, and M. Williams [1994], and Louviere [in Bjornstad and Kahn [1995]).

[2] A good review. of issues surrounding the pros and cons of CVM can be found in Bjomstad and Kahn [1995]. For a discussion of the expected growth in demand for CVM by the policy process see Portney [1994].

might employ in a particular institution. The experimenter cannot instruct subjects as to a strategy that subjects must use but can express his/her *opinion* as to the attributes of a "best" strategy. Our use of cheap talk is highly structured and occurs within the context of the valuation question. The cheap talk design introduces, as a part of the **hypothetical** willingness to pay question, a candid description of hypothetical bias encountered in CV studies, and speculation as to why subjects might respond differently to valuation questions involving real and hypothetical payment.

The Learning Design: The essence of the Learning Design is an effort to make operational Plott's [1995] hypotheses concerning the choice process underlying rational individual behavior in market-like settings. Subjects participate in a series of referenda. First, subjects participate in a hypothetical referendum for a good, and then a "real" referendum for the same good. A second referendum is then introduced for a different good and this referendum is hypothetical. This design explores the extent to which subjects, having gone through one hypothetical-then-real series of valuation questions with one good, will learn to anticipate a **real** question in responding to the hypothetical valuation question for the second good, and will thereby respond 'to the second hypothetical question as they would to a real question.

Summary of Results: Results. from over 70 experiments which collected over 1,500 observations indicate that the Cheap Talk Design and the Learning Design eliminate hypothetical bias. In other words, looking across seven different experimental designs, we consistently **find** no significant difference between subjects' responses to valuation questions in real referenda and in hypothetical referenda using the Cheap Talk Design or the Learning Design. In other words, we demonstrate that respondent behavior in hypothetical surveys using either of our two designs comports with behavior observed when actual payments are required. This result was found to be robust to changes in the good valued, to changes in our experimental design, and to changes in the framing of the Cheap Talk script.

EXPERIMENTS CONDUCTED

The two basic elements of all our experiments are the questionnaire design and the procedures used in conducting the experiments. These are discussed in turn below, followed by a discussion of the experimental procedures that were specific to either the Cheap Talk Design or the Learning Design.

Questionnaires: Questionnaires used in all of our experiments have a structure that is common in CV studies: a "good" is described, the payment mechanism and provision rule is described, and then the willingness to pay question is posed. Since we use a referendum format, the willingness to pay question takes the form of a proposition on which subjects vote. The questionnaire format is the same across both the Learning Design and the Cheap Talk design and across each of the different public goods used in our experiments.

To illustrate the questionnaire format, consider one of the public goods used in our experiments – the "Nature Conservancy (NC) good." The NC good involves donations to the Georgia Chapter of the Nature Conservancy, a nonprofit organization that works to protect natural habitats in the State of Georgia. The Chapter has a land acquisition program which directly purchases lands in Georgia that are identified as containing unique and/or endangered flora and fauna to preserve them in their natural state. The NC good is then a donation to the Georgia Chapter of the Nature Conservancy. With N subjects voting in a referendum requiring all participants to pay , $10 if the referendum passes, (N×10) dollars could be contributed to the Conservancy. Respondents are told these monies will be used solely for these land acquisitions. In all referenda using the NC good, subjects vote on the following proposition:

> The NC Proposition:
> Everyone here in the room will contribute $10.00 to the Georgia Chapter of the Nature Conservancy.   e contribution is to be used for the purpose of purchasing additional lands in the State of Georgia to be protected and held in stewardship by the Nature Conservancy.

After presenting the proposition, the payment mechanism and provision rule are explained. A standard majority voting rule is used: if more than 50% of the subjects vote YES, then the referendum passes, everyone pays $10.00, and a N×$10.00 contribution is immediately mailed to the Nature Conservancy. If 50% or less of the subjects vote YES, no one pays $10.00 and the money is not sent to the Conservancy.

We conducted experiments on three different public goods in addition to the good just described. The second good is the "Albuquerque (ABQ) good" which involves contributions to the Southwest Research and Information Center, a non-profit organization located in Albuquerque, New Mexico. Contributions are used for the purpose of funding the publication and distribution of a bilingual (English and Spanish) "Citizens Guide" to low income, Hispanic households in Albuquerque, New Mexico. The Guide informs households in an area overlying a potentially contaminated aquifer as to how they can have their water tested at no cost to them, and the alternative actions that are available to them if they find that their well is indeed contaminated. The

Center's cost for publishing and distributing this Guide is approximately $5.00 per Guide. Thus. with N subjects in a group, each contributing $10.00, N×2 Guides can be funded by the group. In all referenda using the ABQ good, subjects vote on the following proposition:

The ABQ Proposition:

Everyone here in the room will contribute $10.00 to the Southwest Research and Information Center. The contribution is to be used for the purpose of preparing and distributing the Citizen's Guide to households in the area affected by groundwater contamination.

The third good used in our experiments involves donations to the Nature Conservancy's *Adopt an Acre* program.[3] This program purchases rain forest acreage that most need protection through partnerships with local agencies in Costa Rica. After describing rainforests to subjects and some of their benefits, the *Adopt* an *Acre* program is presented. This program allows private parties to "adopt an acre" of the rain forest in Costa Rica at a cost $35 an acre. These funds are used to actually purchase the acre of forest and to cover local on-the-ground costs of protection. Subjects are told that 100 percent of the funds will be used solely for the purchase and protection of rain forest acres -- none will be used to cover administrative costs of the project. They are also told that they will not actually own the land, they will only be "honorary owners" of the acres whose purchase they fund. With N people participating in a referendum, (10×N)/35 acres can be adopted by the group. All subjects voting on the "Rain Forest (RF) good" vote on the following proposition:

The RF Proposition:

Everyone here in the room will contribute $10 to the Nature Conservancy. This contribution will be used to adopt acres of the rain forest in Costa Rica.[4]

The last good we use in our experiments is the "Path Foundation (PF) good" which involves donations to the Path Foundation — a non-profit organization located in Atlanta, Georgia. The Path Foundation is building and maintaining a system of pedestrian and bicycling trails throughout the city of Atlanta and its surrounding areas. Subjects are shown maps which indicate where trails have been completed and where they were still under construction at the time of the experiment. The Path Foundation good is then donations to the Path Foundation to help finish a specific 3-mile segment of a greenway. With N subjects voting in the referenda, (Nx 10) dollars could be donated to the Path Foundation. All subjects in these referenda voted on the following proposition:

The PF Proposition:

Everyone here in the room will contribute $ 10.00 to the Path Foundation. The contribution is to be used specifically for construction costs associated with completing the greenway extending from Freedom Park to Ponce de &on Avenue.

We used two basic questionnaires: one for real referenda and one for hypothetical referenda. The scripts used to describe the baseline real and hypothetical referenda for a sample proposition are contained in Appendix A. The only difference between questionnaires used for a given good is that

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'Experiments using the Rain Forest good were conducted as a part of a companion project examining cultural differences in valuation. A full description of this project IS contained in Cummings, Williams and Bjomstad [1996)

'The experimenter reads the value for (10×N)/35 acres where the proposition reads "...to adopt acres..."

in hypothetical referenda subjunctive language is used in describing the referendum. In the real referendum active language is used, such as "you will vote on the following proposition" and "all of you *will* pay $10.00" (italics added). In the hypothetical referendum the active language of the real referendum is replaced with "I want you to *suppose we were to have* a secret vote," "supposing that we *were* to have such a referendum," and "all of you *would* pay $10.00" (italics added). Notwithstanding subjects' knowledge that the referendum is hypothetical in the sense that even if the provision rule is satisfied no one actually pays $10.00, they are also asked to vote as they *would vote* if payment was actually required.

Experimental Procedures: All experiments followed the same basic format outlined below.

(i) Subjects sign consent forms which acknowledge that they are voluntarily participating in a research project, for which they will receive a $10.00 participation fee. The consent forms also acknowledges that respondents will participate in a series of double auctions and a referendum (and that they agree to abide by the rules of the referendum).

(ii) Subjects participate in a series of double auction experiments, which requires 45 minutes to an hour to complete. Subjects play for real money in these experiments. The purpose of this activity is twofold. First, along with a $10.00 participation fee paid to subjects, their earnings provide them with money which can be spent by them in a referendum (a fundamental requirement for human subjects committee approval). Secondly, the lengthy exercise is arguably required to minimize potential "found money" problems.[5]

(iii) Subjects are then told that they are to participate in a referendum. The good which is the subject of the referendum is described to respondents. The good would be one of the four public goods we described earlier.

(iv) The rules of the referendum are described – it is a simple majority rule. If more than 50% vote YES, everyone contributes $10.00 and the good is provided; if 50% or less vote YES, no one pays $10.00, and the good is not provided.

(v) The vote is taken.

(vi) A final round of the double auction is conducted and participants are paid their earnings from the double auction.

All experiments followed this basic structure. If the experiment was a basic hypothetical or basic real referenda, then steps (i) through (vi) are followed exactly, with the exception that in the

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[5] A "found money" problem refers to the possibility that individual expenditure behavior with money given to them in the experiment may differ from such behavior-when expenditures must come from their pre-experimental income. Means used by experimental economists to avoid this problem are processes wherein, rather than giving money to subjects, subjects perform task that allow them to earn money. Our subjects earn money by participating in an hour-long series of double auction experiments.

real referenda. active language is used to describe step (iv) and in the hypothetical referenda subjunctive language is used. If the experiments were of the Cheap Talk design or the Learning design, then step (v) is altered as described below.

Experimental Procedures Specific to the Cheap Talk Design: In referenda that included the Cheap Talk design, the script used is exactly the same as in the hypothetical referenda with one exception: additional verbiage (the Cheap Talk script) is introduced just prior to the vote (step (v)). The Cheap Talk script makes three general points: it describes the hypothetical bias phenomena; it discusses possible explanations for this phenomena – why subjects might vote differently in real and hypothetical referenda; and it requests that subjects vote in the upcoming hypothetical referendum as if it were a real referendum. In addition, the script discusses budgetary substitutes for the public good being considered (both private goods and other public goods were considered), discussed how one might approach the task they have been asked to complete (how to think about voting in, a hypothetical referendum), and discussed the participation fee they were given. The script was approximately 2 pages long and took about 5 minutes to read out loud. The script is designed to make the substance of hypothetical bias an integral and straightforward consideration in the valuation process of subjects. The complete script for a Cheap Talk experiment is contained in Appendix B (scripts changed slightly to accommodate the specifics of the public good being offered in the hypothetical referendum).

Experimental Procedures Specific to the Learning Design: In the Learning Design step (v) is replaced by a series of votes on three propositions. To illustrate, say our interest is in subjects' valuation behavior in a hypothetical referendum for the ABQ good. We would then begin with trial referenda for a different good – for example say the NC good. First, subjects would participate in a hypothetical referendum for the NC gond. After the results of this first vote are shown to subjects. they are then told that they will participate in a second referendum for the NC good, but in this referendum the vote will be binding, i.e., this referendum is real – if the referendum passes everyone in the room will actually have to pay $10.00. Subjects are reminded that the vote in this referendum, as in the first referendum, is secret, and are told that they are not bound by their vote in previous hypothetical referendum – they may vote in this real referendum in anyway they choose. After announcing the results of the real NC referendum, subjects are told that they will participate in a another referendum and the hypothetical ABQ referendum is then administered. The script for this series of auctions is contained in Appendix C.

Our expectation is that this imposed learning process in which subjects vote in a hypothetical and then real referendum offers subjects the opportunity to consider any "mistakes" they might have made in the initial hypothetical referendum during their vote in the second real referendum. If this is so, the empirical question is the extent to which such learning affects their vote in the hypothetical referendum for the ABQ good.

Experiments Conducted: The experiments we conducted, and the hypotheses tested with each experimental design are presented below.

. Baseline hypothetical and real referenda are conducted for each of our four public goods.

With these experiments we test the hypothesis that voting responses in the hypothetical referenda are indistinguishable from responses obtained in the real referenda. If the percentage of YES votes are greater in the hypothetical referenda; and we statistically reject this hypothesis for a good, then we. find this to be evidence consistent with the presence of hypothetical bias in the responses to the hypothetical referenda.

. For goods that we find significant differences in the responses to the real and hypothetical referenda – evidence consistent with hypothetical bias – we conduct hypothetical referenda that include the Cheap Talk Script.

With these "Cheap Talk referenda" we test the hypothesis that (1) the responses to the Cheap Talk referenda are identical to those obtained in the hypothetical referenda and (2) the responses to the Cheap Talk referenda are identical to those obtained in the hypothetical referenda. If the Cheap Talk script is successful in eliminating hypothetical bias, then we would expect to reject the hypothesis described in (1) and fail to reject the hypothesis described in (2).

. We conduct the Learning Design experiments for two goods: the ABQ and NC goods. For the Albuquerque good the Learning Design sequence of referenda is a hypothetical referenda for the NC good, then a real referenda for the NC good, and finally hypothetical referenda for the ABQ good. For the Nature Conservancy good, the order of the referenda as just described is. reversed. In other words, the Learning Design sequence of referenda for the NC good is a hypothetical referenda for the ABQ good, then a real referenda for the ABQ good, and finally hypothetical referenda for the NC good.

The hypothesis we wish to test here is that the responses to the third hypothetical referenda offered in the Learning Design sequence is (1) not different than the responses to the baseline hypothetical referenda and (2) not different than the responses to the baseline real referenda. If the Learning Design is successful in eliminating hypothetical bias, then we would expect to reject the hypothesis described in (1) and fail to reject the hypothesis described in (2).

. As described earlier, the Cheap Talk script discusses the issue of hypothetical bias with subjects. As part of this script, results from the baseline real and hypothetical referenda on the same good they are about to vote upon are presented to subjects to demonstrate hypothetical bias exactly. We test the robustness of the Cheap Talk script to this design feature by eliminating the discussion of the exact results from previous experiments. We only discuss the direction of the hypothetical bias found in earlier work in a "modified Cheap Talk" script. This script is conducted on the ABQ good and is contained in Appendix D.

The hypotheses we test with the "modified Cheap Talk referenda" are that (1) the responses to the modified Cheap Talk referenda are identical to those obtained in the Cheap Talk referenda. (2) the responses to the modified Cheap Talk referenda are identical to those obtained in the hypothetical referenda and (3) the responses to the modified Cheap Talk referenda are identical to those obtained in the hypothetical referenda. If the modified Cheap Talk script is successful in eliminating hypothetical bias, then we would expect to reject the hypothesis described in (2) and fail

to reject the hypothesis described in (1) and (3).

- Finally, we test the robustness of the Cheap Talk design to changes in the experimental design itself. We conduct simple surveys using the Cheap Talk script that use the same descriptions of the goods and the referendum rules as in previous experiments, however, subjects are **not** paid a participation fee and they <u>do not</u> participate in any oral double actions. We simply ask the hypothetical referenda questionnaire with the Cheap Talk script inserted. These surveys are conducted with the ABQ and NC goods and both the Cheap Talk script and the modified Cheap Talk script are used.

A brief summary of all the experiments we conducted and the notation that will be used to describe each of the experiments is presented in Table 1.

Table 1. Summary of Experiments.

ABBREVIATION	DESCRIPTION
Baseline Experiments	
NC-R, ABQ-R, RF-R, PF-R	Real referenda using the Nature Conservancy good, the Albuquerque good, the Rain Forest good, and the Path Foundation good, respectively.
NC-H, ABQ-R, RF-H, PF-H	Hypothetical referenda using the Nature Conservancy good, the Albuquerque good, the Rain Forest good, and the Path Foundation good, respectively.
Cheap Talk Experiments	
NC-CT, ABQ-CT, RF-CT	Hypothetical referenda with the Cheap Talk script using the Nature Conservancy good, the Albuquerque good, and Rain Forest good, respectively.
Cheap Talk Robustness Experiments	
ABQ-MCT	Hypothetical referenda with the *modified* Cheap Talk script using the Albuquerque good.
NC-CT$, ABQ-CT$	Hypothetical referenda with the Cheap Talk script where the referenda are **not** preceded by the double oral auction and subjects are **not** paid a participation fee, using the Albuquerque and Georgia Nature Conservancy goods, respectively.
NC-MCT$, ABQ-MCT$	Hypothetical referenda with the *modified* Cheap Talk script where the referenda are **not** preceded by the double oral auction and subjects are **not** paid a participation fee, using the Albuquerque and Nature Conservancy goods. respectively
Learning Design Experiments	
ABQ-LD. NC-LD	Hypothetical referenda offered *third* in the series of three referenda offered in the Learning Design (the ABQ-LD is preceded by NC-H and NC-R, the NC-LD is preceded by ABQ-H and ABQ-R)

A total of 1,550 observations were collected from over 70 experiments. The results from the referenda conducted, and a few selected data summaries are presented in Table 2. Note the variation in the percentage of YES votes across goods. The percent of YES votes was highest for the Rain Forest good and lowest for the Path Foundation across each referenda design. The consistent differences in voting outcomes across **goods** may be viewed as suggesting that our respondents distinguished between goods as opposed to responding to a generic "good cause" proposition (see Smith [1996] and Smith and Mansfield [1996]). Furthermore, note that there is little difference between the percentage of YES votes in the real and hypothetical referenda for the Path Foundation good (only a 2.9 percentage point difference). For this good, there does not appear to be evidence of hypothetical bias.

Because a large proportion of our sample is comprised of students, the mean age of respondents is in the mid-twenties. The sample is approximately split equally between men and women and the percentage of married **subjects in** the sample varies from as little as 8% to over 38%. Again, the small percentage of married respondents is likely due to the large number of students used for the experiments. The mean income as reported by the respondents is generally in the mid-thirty-thousand dollars per year. This may seem high for students, however, our income question asked for the household income (including the income of any relatives living with the student). This most likely lead many students to report their parent's income, regardless of whether or not the student was living with their parents at the time of the experiment.

Table 2. Referenda results and selected data summaries for the baseline experiments.

Referenda Treatment[a]	N	YES Responses	NO Responses	Mean Age[a]	Mean Income[2,4]	Percent Male[3]	Percent Married[3]
NC-H	115	49 (42.6%)	66 (57.4%)	24.8 (6.2)	35.6 (19.2)	40.7	20.3
NC-R	71	18 (25.3%)	53 (74.6%)	25.1 (4.6)	30.9 (20.7)	45.6	19.1
NC-LD	85	24 (28.2%)	61 (71.8%)	25.9 (6.2)	27.3 (19.6)	45.6	19.0
NC-CT	74	20 (27.0%)	54 (73.0%)	75.6 (7.6)	37.1 (19.2)	45.7	18.6
NC-CT$	58	18 (31.0%)	40 (69.0%)	23.1 (8.4)	35.8 (19.6)	43.1	10.3
NC-MCT$	59	16 (27.1%)	43 (72.9%)	27.4 (7.1)	33.7 (14.5)	50.0	25.9

Referenda Treatment[1]	N	Y E S Responses	NO Responses	Mean Age[2,3]	Mean Income[1,4]	Percent Male[1]	Percent Married[1]
ABQ-H	211	98 (46.4%)	113 (53.6%)	36.4 (15.3)	38.8 (18.3)	50.0	37.0
ABQ-R	182	54 (29.7%)	128 (70.3%)	35.1 (15.9)	37.3 (19.8)	48.3	38.1
ABQ-LD	125	28 (22.4%)	97 (77.6%)	24.9 (6.0)	34.4 (19.7)	46.4	18.4
ABQ-CT	84	29 (34.5%)	55 (65.5%)	22.4 (3.5)	34.0 (20.3)	50.6	9.6
ABQ-MCT	56	19 (33.9%)	37 (66.1%)	23.5 (6.4)	34.8 (18.4)	52.7	10.9
ABQ-CTS	53	17 (32.1%)	36 (67.9%)	23.0 (5.2)	34.9 (20.1)	51.0	7.8
ABQ-MCT!§	45	15 (33.3%)	30 (66.7%)	23.7 (6.0)	34.2 (18.2)	47.7	11.4
RF-H	63	43 (68.3%)	20 (31.7%)	22.1 (4.8)	14.9 (17.7)	41.3	9.5
RF-R	90	44 (48.9%)	46 (51.1%)	26.2 (5.0)	27.5 (18.8)	58.9	32.6
RF-CT	33	16 (48.5%)	17 (51.5%)	23.2 (5.6)	13.5 (14.1)	45.5	15.1
PF-H	97	21 (21.6%)	76 (78.4%)	26.8 (6.8)	28.1 (20.7)	52.3	24.4
PF-R	49	12 (24.5%)	37 (75.5%)	21.0 (2.4)	40.1 (17.7)	50.0	8.3

[1] See Table 1 for variable definitions.
[2] Standard deviations are in parentheses.
[3] Percentages for some groups are based on less than the full sample due to non-responses.
[4] Income is repotted in thousands and is based on the mid-point of an interval response to a question asking the monthly after-tax income of the household. Intervals were 0-300, 301-400, 401-500, 501-600, 601-800, 801-1,000, 1,001-2,000, 2,001-3,000, 3,001-4,000, over 4,000.

The hypotheses we set out to test (as discussed in the previous section) were tested in two ways. First, we report the simple measures of association used to test our hypotheses based on the voting outcomes alone. These are the least restrictive tests because they do not require any additional assumptions or maintained hypotheses that economic models of behavior require. Table 3 reports the null hypotheses tested with the data we have gathered, the Pearson χ^2 statistics testing these hypotheses, and our conclusions based on these tests.

Table 3. Non-parametric Test Results

Null Hypothesis*	Pearson χ^2 (p-value)	Conclusion
NC-R = NC-H	5.672 (0.017)	Reject Null Hypothesis
NC-H = NC-CT	4.716 (0.030)	Reject Null Hypothesis
NC-R = NC-CT	0.053 (0.8 19)	Cannot Reject the Null Hypothesis
NC-CT$ = NC-CT	0.255 (0.614)	Cannot Reject Null Hypothesis
NC-CT$ = NC-R	0.5 12 (0.474)	Cannot Reject Null Hypothesis
NC-CT$= NC-H	2.177 (0.140)	Reject, with weak evidence
NC-MCT$ = NC-CT	0.000 (0.99 1)	Cannot Reject Null Hypothesis
NC-MCT$ = NC-R	0.052 (0.820)	Cannot Reject Null Hypothesis
NC-MCT$ = NC-H	3.998 (0.046)	Reject Null Hypothesis
NC-H = NC-LD	4.356 (0.037)	Reject Null Hypothesis
NC-R = NC-LD	0.163 (0.686)	Cannot Reject Null Hypothesis
ABQ-R = ABQ-H	11.593 (0.001)	Reject Null Hypothesis
ABQ-H = ABQ-CT	3.483 (0.062)	Reject Null Hypothesis
ABQ-R = ABQ-CT	0.63 1 (0.427)	Cannot Reject the Null Hypothesis
ABQ-MCT=ABQ-CT	0.005 (0.942)	Cannot Reject Null Hypothesis
ABQ-MCT = ABQ-R	0.365 (0.546)	Cannot Reject Null Hypothesis
ABQ-MCT = ABQ-H	2.8 16 (0.093)	Reject Null Hypothesis
		table continued, next page

Null Hypothesis'	Pearson χ^2 (p-value)	Conclusion
ABQ-CT$ = ABQ-CT	0.087 (0.768)	Cannot Reject Null Hypothesis
ABQ-CT$ = ABQ-R	0.113 (0.737)	Cannot Reject Null Hypothesis
ABQ-CT$ = ABQ-H	3.558 (0.059)	Reject Null Hypothesis
ABQ-MCT$ = ABQ-CT	0.018 (0.892)	Cannot Reject Null Hypothesis
ABQ-MCT$ = ABQ-R	0.229 (0.632)	Cannot Reject Null Hypothesis
ABQ-MCT$ = ABQ-H	2.586 (0.108)	Reject, with weak evidence
ABQ-H = ABQ-LD	19.365 (0.000)	Reject Null Hypothesis
ABQ-R = ABQ-LD	2.001 (0.157)	Cannot Reject Null Hypothesis
RF-R = RF-H	5.666 (0.017)	Reject Null Hypothesis
RF-H = RF-CT	3.573 (0.059)	Reject the Null Hypothesis
RF-R = RF-CT	0.002 (0.968)	Cannot Reject the Null Hypothesis
PF-R = PF-H	0.150 (0.698)	Cannot Reject the Null Hypothesis

[1] See Table 1 for variable definitions.

As indicated in Table 2, a greater percentage of respondents voted YES in the hypothetical referenda as compared to the real referenda for three of the four goods. The measures of association reported in Table 3 indicate that this difference is statistically significant. As compared to the real referenda, YES responses in hypothetical referenda were 17.3, 16.7, 'and 19.4 percentage points higher for the NC, ABQ, and RF good, respectively. Pearson χ^2 statistics are used to test the null hypothesis that the YES responses in these real and hypothetical referenda (for each good) are independent of payment condition. For the NC, ABQ, and RF goods, we reject the hypothesis that there is no significant difference between voting behavior in the real and hypothetical referenda at no less than the 98% level of confidence (see Table 3). Thus for these three goods, we find evidence consistent with hypothetical bias.[6]

"Tests were also conducted using probability models (see enclosed papers in Appendix E) which support this conclusion. We note that the evidence that us to conclude there IS hypothetical bias present, could also be consistent with free-riding behavior since the referenda we conduct are not a strictly closed referendum (see Randall [19961). To address this issue, we conduct trials of closed referenda on the ABQ good. Preliminary results on a limited number of observations (109 total) indicate that YES responses in the closed-hypothetical referenda were 16 percentage points

However, there was little difference between the percentage of YES votes in the real and hypothetical referenda for the Path Foundation good (only a 2.9 percentage point difference). We fail to reject the hypothesis that there is no significant difference between YES responses in the hypothetical and real referenda for this good. Because we fail to find evidence of hypothetical bias in the referenda for the Path Foundation good, we do not conduct Cheap Talk or Learning design referenda using this good.

Next, we focus on the results from the Cheap Talk referenda. We test the hypothesis that YES responses in the two types of hypothetical referenda -- those with and without Cheap Talk -- are independent of treatment. For each of the goods used in the Cheap Talk experiments, we reject the null hypothesis that voting responses are the same in the hypothetical referenda and the hypothetical referenda with Cheap Talk (see Table 3). These two hypothetical survey instruments, which vary only by the insertion of the Cheap Talk script, yield responses that are statistically different: the responses to the Cheap Talk script are significantly lower than those in the hypothetical survey without the Cheap Talk script.

Our primary concern is with the relationship between voting responses in the real referenda and those observed in the Cheap Talk referenda. The percentage of YES responses to the Cheap Talk referenda differ from those obtained in real referenda by only 1.7, 4.8, and 0.4 percentage points for the NC, ABQ, and RF goods, respectively. We fail to reject the hypothesis that there is no significant difference between YES responses in the real and Cheap Talk referenda for all three public goods at any conventional level of significance (see Table 3). In this case, the measures of association suggest that the Cheap Talk script i's effective in providing responses to *hypothetical* referenda that comport with responses observed when actual *cash payments* may be required by the respondent as a result of their voting choice.'

Results from experiments using the modified Cheap Talk script (ABQ-MCT in Table 1) were that 33.9% of respondents voted YES, which compares favorably with the 34.5% obtained with the original Cheap Talk script (see Table 2). As Table 3 reports, this YES response rate is significantly different than the response rate to the hypothetical referenda and is not significantly different from the response rate to the real referendum for the Albuquerque good.

Finally, for both the NC and ABQ goods, there is not a significant difference between the voting responses in the surveys using the Cheap Talk script (ABQ-CT$ and NC-CT$) and the experiments using the Cheap Talk script (ABQ-CT and NC-CT). This is true regardless of whether or not the original or modified Cheap Talk script is used in the survey (see Table 3). In addition,

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higher than in the closed-real referenda -- a difference equal to that in the experiments reported here. See Osborne [1996] for more on these closed-referenda experiments.

'Note that the failure to reject a hypothesis does not provide statistical inference, and we cannot prove that there are no differences between the responses to the real and Cheap Talk referenda. However, considering the results indicating that responses to the Cheap Talk referenda are not the same as in the baseline hypothetical referenda. these "failures to reject" across each set of Cheap Talk experiments provides very reasonable support for the conclusion that the responses to hypothetical referenda with the Cheap Talk script inserted are consistent with those observed in the baseline *real* referenda.

there is not a significant difference in voting behavior in the surveys (conducted with either cheap talk script) and the baseline real referenda for both goods. In general, we may conclude that there is a significant difference between the voting behavior in the Cheap Talk surveys and the baseline hypothetical referenda; the strength of this conclusion varies across goods, however (see Table 3).

Turning to the Learning Design results, we see that the responses to ABQ-H are significantly different than those observed in ABQ-LD (see Table 3). Similarly, the responses for NC-H are significantly different than those observed for NC-LD. Therefore, the raw responses observed in two different designs for hypothetical referenda are not identical. Responses in the *hypothetical* referenda that are preceded by a hypothetical-then-real sequence of votes for another good are significantly lower than those resulting from a single hypothetical vote.

Our primary concern is with the relationship between voting responses in the real referenda and those observed in the hypothetical referenda offered last in the Learning Design. As seen in Table 3, *we fail* to reject the hypothesis that there is no significant difference between YES responses in the real referendum, ABQ-R, and the hypothetical referendum, ABQ-LD, at conventional levels of significance. Similarly, we fail to reject the hypothesis that YES responses to NC-R and NC-LD are independent of treatment at any convention level of significance.

In addition to the tests based on measures of association, we conducted analyses of the referenda using probability models. These models take into account the effects of socio-economic characteristicsof the respondents, and any possible differences support the results in Table 3. For more on the probability analysis, see the attached papers in Appendix E.

Our findings may be summarized as follows.

(1) We find behavior consistent with hypothetical bias – a significant difference between YES votes in a "real" and a hypothetical referendum – in referenda involving three different goods: the ABQ good, the NC good, and the RF good.

(2) Subject responses to different goods are consistent with expectations from utility theory: they are *not* consistent with subjects simply responding to "good cause" motivations.

(3) We do not find hypothetical bias in all goods used in our experiments. We do *not* find a hypothetical bias in the Path Foundation good. We cannot explain why hypothetical bias is found in some goods but not with others.

(4) We find that the Cheap Talk Design appears to eliminate hypothetical bias. In other words, we consistently find no significant difference between subjects' responses to valuation questions in real referenda and in hypothetical referenda using the Cheap Talk Design.

(5) The Cheap Talk design is robust to all goods for which hypothetical bias is identified in hypothetical referenda experiments: the ABQ, NC and RF goods.

(6) The Cheap Talk design is robust to changes in our experimental design that make it more applicable to field applications, i.e., it is effective when implemented as a survey.

(7) The Cheap Talk design is robust to changes in the nature of information given in the cheap talk script (i.e., when the exact results from previous experiments are left out of the discussion).

(8) We find that the Learning Design appears to eliminate hypothetical bias. In other words, we find no significant difference between subjects' responses to valuation questions in real referenda and in hypothetical referenda using the Learning Design.

(9) The Learning Design is robust to different goods: the ABQ and NC-G goods.'

The goods used in our experiments involve contributions public goods or causes that, by design, vary substantially in terms of: what is being delivered; where it is being delivered; and the specificity of the connection between how much is donated to the good and "how much" of the good is provided. For subjects residing in Atlanta: the PF good improves local recreation infrastructure; the NC good preserves natural areas in the State of Georgia; the ABQ good assists low income

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*We have chosen to concentrate resources expended for robustness tests on the Cheap Talk Design. Thus, additional goods were not used in tests of the Learning Design. This choice reflects our judgement that the Cheap Talk Design is more easily adapted to field applications than the Learning Design.

families in relatively remote New Mexico; and the RF good preserves rainforests in still more remote Costa Rica. Further more. the connection between donations and the amount of provision of the good is exact with the ABQ and RF goods, and more ambiguous with the NC and PF goods.

Looking across these different goods, we obtain significantly different responses for the different goods; i.e., subjects do not appear to be simply responding to a "good cause," they appear to differentiate between the goods. Moreover, the relationship between real and hypothetical responses are not the same for all goods. As noted above, while significant differences between these responses are identified with three of the goods, they are not identified in the case of the PF good. This raises an obvious question: why is it that behavior consistent with hypothetical bias is observed in some instances and not in others? If one looks across different studies that involve different "circumstances of choice," one might attribute different findings to different circumstances, as suggested by Smith and Mansfield [1996]. Our results suggest that this response may be inadequate. We find different results in a set of experiments where "circumstances of choice" are held constant; the only thing that varied was the good. The obvious distinction between the PF good and other goods used in our study is its "local" character relative to the other goods. However, we have no good reason for attributing differences in results to this characteristic of the good and must leave efforts to explain this difference to future research. Furthermore, based on our results, the exact connection between the amount of the donation and the amount of provision does not appear to systematically affect voting behavior.

In any case, for the three of our four goods where behavior consistent with hypothetical bias was identified, both the Cheap Talk and Learning Design were effective in eliminating this behavior. Results indicate that voting behavior of subjects participating in hypothetical referenda utilizing either one of these two designs were statistically *indistinguishable* from the voting behavior of subjects participating in referenda where real cash payments were on the line. In addition, the efficacy of these designs in eliminating "hypothetical bias" is robust to changes in the public good valued, changes in the script, and changes in the experimental design.

Our research objective was to advance the present state-of-the-art in survey instrument design and implementation for stated preference studies with the goal of bringing stated preferences (and therefore hypothetical willingness to pay) more closely in line with willingness to pay as observed in revealed preference studies. Whether environmental values are used by federal, state, or local government agencies in their regulatory or legislative processes, by private entities, or by the courts, the process of environmental management is enriched by access to value estimates that demonstrably comport with "real" values. To the extent that we can close the gap between hypothetical and real values in a *demonstrable* way, the credibility and acceptability of environmental assessments are enhanced. We find the results from this research to be an exceptionally encouraging step in this direction.

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The Real Albuquerque Referendum

We will now take a short break from our market experiment to hold a referenda.

Before we begin, please turn over your decision sheet and answer the questions numbered one to five. We will then explain the referendum.

[pause while they write] -- **fill in the "nx2" and "nx10" amounts in the script so you don't get confused while reading the script!!!**

You have all agreed to abide by the rules of a referendum. This is what the referendum is all about.

In Albuquerque, New Mexico, there is an area of the city which overlies a groundwater formation that has been contaminated by toxic substances. The source of these substances is uncertain, but it is generally thought that they come from industrial activity that took place in this area some decades ago. Residents in the affected area are typically low income, primarily hispanic families.

A 1992 survey conducted by an organization called the southwest research and information center found that most people in the area believed that their drinking water was contaminated, but they were not sure. They also expressed confusion as to how they might find out whether or not their wells were contaminated and, if so, what they might do about it.

The Southwest Research and Information Center, which is a private, non-profit organization that works with native american, hispanic, and angle people in communities throughout the southwest, would like to develop, publish and distribute a *bilingual* (English and Spanish) "Citizens Guide" like the one being shown at the front of the room. This guide would clearly identify the' areas that have contaminated groundwater and the sources of pollution in the community. It would tell residents how they can have their water tested to determine if it is con-taminated, and would spell out alternative actions that they might take if indeed their well is contaminated.

The Center does not now have the funds required to prepare and distribute such a citizen's guide. They would require (n x $10) to produce and distribute the guide to (n x 2) households.

If everyone in this room were to contribute $ 10.00, these moneys would be sufficient to cover the center's cost to produce and distribute the Citizens Guide to (n x 2) households in this area.

We are then going to have a secret vote to decide whether or not we will do this: all of us pay $10.00 for this purpose, We will vote on the following proposition.

[show slide on projector or show poster]
Proposition:
Everyone here in the room will contribute $10.00 to the
Southwest Research and Information Center. The contribution
Is to be used for the purpose of preparing and distributing the
Citizen's Guide to households in the area

Here's how our referendum will work.
1.   If more than 50% of you vote "yes" on this proposition, all of you will pay $10.00--I will collect $10.00 from each of you--and we will send this money to the Southwest Research and Information Center with instructions that the money is to be used to prepare and distribute the Citizens Guide to (n x 2) households.

We won't send cash. I will take your cash, write this check (show check) for (n x $10.00) and the check will be mailed to the Center. I will put the check in this stamped envelope (show envelope) addressed to the Center. I will ask one of you to put the envelope in the mail box downstairs. When I receive a receipt for the money from the Center, I will make it available for your inspection in front of room 6 10 in the cba building.

2 .   If SO% or fewer of you vote "yes" on this proposition, no one will pay $10.00, we will not send a check to the Center and the Citizens Guide will not be distributed to these households.

Here's what I want you to do. Please remove your ballot from your participant packet. You will vote "yes" or "no" on the proposition that everyone in the room will pay $10.00 and this check is sent to the Center. No one will know how you vote--it's a secret ballot. I will be asking one of you to count the votes for us.

Remember how the vote will work. If more than 50% vote "yes" we will come around and collect $10.00 from each of you, and we will mail this check to the Center right here today.   If 50% or less vote "yes," no one pays $10.00, and we won't mail this check to the Center. Any questions?
[if asked do we have to pay, repeatfrom above; if more than 50% of you vote "yes", the referendum has passed and we will come around and collect $10.00 from each of you.]

O.K Please mark your ballots. After you've marked your ballot, fold the ballot so that no one can see how you voted. Put your folded-up ballot in the box that we are now passing around.
After you have voted, please remain quietly in your seat. We will tell you the result of the referendum shortly, and will tell you whether or not you must pay $10.00. Please mark your ballots.

(collect ballots, get volunteer, and count}

We now have the results of the vote:
_____ people, _____% of you voted "yes" on the proposition.
(depending on the results read one of the two}

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*   since less than 50% voted yes, no one pays S 10.00 and the check will not be mailed to the Center.

*   since more than 50% voted "yes", we will now collect $10.00 from each of you. Please give your $10.00 to the assistants that are now passing. through the room. They will give you a receipt for your $10.00. I am now putting this check for (10 x n) dollars in the envelope. May I have a volunteer to mail this check? *{after money is collected, finish experiment by running last double auction}*

The Hypothetical Albuquerque Referendum

We will now take a short break from our market experiment to hold a referenda.

Before we begin, please turn over your decision sheet and answer the questions numbered one to five. We will then explain the first referendum.

[pause while they write]- **fill in the "nx2" and "nx10" amounts in the script so you don't get confused while reading the script!!!**

You have all agreed to abide by the rules of a referendum. This is what the first referendum is all about.

In Albuquerque, New Mexico, there is an area of the city which overlies a groundwater formation that has been contaminated by toxic substances. The source of these substances is uncertain, but it is generally thought that they come from industrial activity that took place in this area some decades ago. Residents in the affected area are typically low income, primarily hispanic families.

A 1992 survey conducted by an organization called the Southwest Research and Information Center found that most people in the area believed that their drinking water was contaminated, but they were not sure. They also expressed confusion as to how they might find out whether or not their wells were contaminated and, if so, what they might do about it.

The Southwest Research and Information Center, which is a private, non-profit organization that works with Native American, Hispanic, and Anglo people in communities throughout the Southwest, would like to develop, publish and &tribute a *bilingual* (english and Spanish) "Citizens Guide" like the one being shown at the front of the room. This guide would clearly identify the areas that have contaminated groundwater and the sources of pollution in the community. It would tell residents how they can have their water tested to determine if it is contaminated, and would spell out alternative actions that they might take if indeed their well is contaminated.

The Center does not now have the funds required to prepare and distribute such a citizen's guide. They would require (n x $10) to produce and distribute the guide to (2 x n) households.

If everyone in this room were to contribute $10.00, these moneys would be sufficient to cover the Center's cost to produce and distribute the Citizens Guide to (2 x n) households in this area.

I want you to suppose that we were to have a secret vote to decide whether or not we would do this: all of us pay $10.00 for this purpose. Supposing that we were to have such a referendum, we would vote on the following proposition.

[show slide on projector or show poster]
Proposition:
Everyone here in the room will contribute $10.00 to the
Southwest Research and Information Center. The contribution
is to be used for the purpose of preparing and distributing the
Citizen's Guide to households in the area

Supposing that we were to have this vote, here's how it would work.

1. If more than 50% of you were to vote "yes" on this proposition, all of you would pay $10.00--I would collect $10.00 from each of you--and we would send this money to the Southwest Research and Information Center with instructions that the money is to be used to prepare and distribute the Citizens Guide to (2 x n) households.

We wouldn't send cash. I would take your cash, write this check (show check) for (n x $10.00) and the check would be mailed to the Center. I would put the check in this stamped envelope (show envelope) addressed to the Center. I would ask one of you to put the envelope in the mail box downstairs. When I received a receipt for the money from the Center, I would make it available for your inspection in front of room 6 10 in the cba building.

2. If 50% or fewer of you were to vote "yes" on this proposition, no one would pay $10.00, we would not send a check to the Center and the Citizens Guide would not be distributed to these households.

Here's what I want you to do. Please remove your ballot from your participant's packet. Suppose that we were to vote on the proposition that everyone in the room pays $10.00 and this money is sent to the Center. I want to know how you would vote on this proposition if we were actually voting on it here and now today: yes or no. No one will know how you vote--it's a secret ballot, Remember that even though payment of money in this referendum are hypothetical, we ask that you respond to questions as though they involved real cash payments.

Remember how the vote would work. If you were really voting on this proposition today, if more than 50% voted "yes" we would come around and collect $10.00 from each of you, and we would mail this check to the Center right here today. If 50% or less voted "yes," no one would pay $10.00, and we would not mail this check to the Center. Any questions?

[if asked do we have to pay, repeat from above:
Even though earnings or payment of money in this referendum are
hypothetical, we ask that you respond to questions as though they involved
real cash payments.]

O.k.. Please mark your ballots--you are telling me how you would vote on this proposition if you were in fact given the opportunity to do so today. After you've marked your ballot, fold the ballot so that no one can see how you voted. Put your folded-up ballot in the box that we are now passing around. After you have voted, please remain quietly in your seats.

Please mark your ballots.

(run last double auction, and finish experiment by paying them for the double auction)

Before we have our vote, 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 referendum -- not a real one. No one will actually pay money at the end of the vote. But I also asked you to respond to the vote as though the result of your vote could 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 vote differently in a hypothetical referendum, where they don't really have to pay money, than they do in a real referendum, where they really could have to pay money. For example, in a recent study, several different groups of people voted on a referendum just like the one you are about to vote on. Payment was hypothetical for these groups, as it will be for you. No one had to pay money if the referendum passed. The results of these studies were that on average, across the groups, 45% of them voted yes (show overhead). set of groups with similar people voting on the same referendum as you will vote on here, **but** where payment was real and people really did' have to pay money if the referendum passed, the results on average, across the groups were that 27% voted yes. 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 referenda as compared to real referenda--people seem to respond just like you see here on the overhead.

In the real referendum, where people knew they would have to pay money if the referendum passed, 27% voted yes and 73% voted no. When payment was hypothetical and people knew they would not pay anything if the referendum passed, just like your vote today, 45% voted yes and 55% voted no.

How can we get people to think about their vote in a hypothetical referendum like they think in a real referendum, where if enough people vote "yes", they'll really have to pay money? 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 aren't 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 referendum than they do when the referendum is real. **I** think that when we hear about a referendum that involves doing something that is basically good -- helping people in Albuquerque, improve environmental quality. or anything else -- our basic reaction in a hypothetical situation is to think: sure, I would do this. I really would vote 'yes' to 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 referendum is real, and we would actually have to spend our money if it passes, 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 families in Albuquerque, that's money I don't have to spend on groceries, go to a movie, or perhaps give to some environmental organization. So when the payment is real if the referendum passes, we vote in a way that takes into account the limited amount of money we have. We vote 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 hypothetical referenda.

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

- Think about what you're voting on. If this were real--if more than 50% of you voted yes, you would actually have to dig into your pocket and pay $10.00 right now--do you really want to fund the distribution of the Citizens Guide to families in Albuquerque enough that you. would be willing to spend the money?

- Also, let me make clear that the $10.00 participation fee that you were paid today, and any earnings that you made in the bidding experiment, is your money. You've spent more than an hour of your time in this experiment, and you've earned it! You were told that the money is yours, believe it! So, if I were in your shoes, and I was asked to vote yes or no on this proposition that requires all of us to pay $10.00, I would think about how I feel about spending my money this way. When I got ready to vote, I would ask myself: if this were a real referendum, and I had to pay $10.00 if the referendum passed, do I really want to spend my money this way. If I really did, I would vote yes; if I didn't I would vote 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 vote just exactly as you would vote if you were really going to face the consequences of your vote: which is to pay money if the proposition passes.

Please keep this in mind in our referendum.

This appendix contains a script for the Learning Design sequence: ALB_ 1 H / ALB_ 1 R / NC_ 1 H. The scripts are exactly reversed for NC_1H / NC-1 R / ALB_1 H.

Learning Design Rerferenda: Albuquerque / Nature Conservancy

In Albuquerque, New Mexico, there is an area of the city which overlies a groundwater formation that has been contaminated by toxic substances. The source of these substances is uncertain, but it is generally thought that they come from industrial activity that took place in this area some decades ago. Residents in the affected area are typically low income, primarily hispanic families.

A 1992 survey conducted by an organization called the Southwest Research and Information Center found that most people in the area believed that their drinking water was contaminated, but they were not sure. They also expressed confusion as to how they might find out whether or not their wells were contaminated and, if so, what they might do about it.

The Southwest Research and Information Center, which is a private, non-profit organization that works with Native American, Hispanic, and Anglo people in communities throughout the Southwest, would like to develop, publish and distribute a *bilingual* (English and Spanish) "citizens guide" like the one being shown at the front of the room. This guide would clearly identify the areas that have contaminated groundwater and the sources of pollution in the community. It would tell residents how they can have their water tested to determine if it is contaminated, and would spell out alternative actions that they might take if indeed their well is contaminated.

The Center does not now have the funds required to prepare and distribute such a citizen's guide. They would require (n x $10) to produce and distribute the guide to (2 households.

If everyone in this room were to contribute $10.00, these moneys would be sufficient to cover the Center's cost to produce and distribute the citizens guide to (2 x n) households in this area.

I want you to suppose that we were to have a secret vote to decide whether or not we would do this: all of us pay $10.00 for this purpose. Supposing that we were to have such a referendum, we would vote on the following proposition.

[Show slide on projector or show poster]
Proposition:
Everyone here in the room will contribute $10.00 to the
Southwest Research and Information Center. The contribution
Is to be used for the purpose of preparing and distributing the
Citizen's guide to (2 x n) households.

Supposing that we were to have this vote. here's how it would work.

1.   If more than 50% of you were to vote "yes" on this proposition, **all** of you would pay $10.00--I would collect $10.00 from **each** of you--and we would send this money to the Southwest Research and Information Center with instructions that the money is to be used to prepare and distribute the Citizens Guide to (2 x n) households.

    We wouldn't send cash. I would take your cash, write this check (show check) for **(n x** $10.00) and the check would be mailed to the Center. I would put the check in this stamped envelope (show envelope) addressed to the Center. I would ask **one of you** to put the envelope in the mail box downstairs. When I received a receipt for the money from the Center, I would make it available for your inspection in front of room 610 in the cba building.

2.   If 50% or fewer of you were to vote "yes" on this proposition, **no one** would pay $10.00, we would not send a check to the Center and the Citizens Guide would not be distributed to these households.

    We are now passing out another ballot. Here's what I want you to do. Suppose that we were to vote on the proposition that **everyone** in the room pays $10.00 and this money is sent to the Center. I want to know how you would vote on this proposition if we were actually voting on it here and now today: yes or no. No one will know how you vote--it's a secret ballot. Remember that even though payment of money in this referendum are hy**pothetical**, we ask that you respond to questions as though they involved real cash payments.

Remember how the vote would work. If you were really voting on this proposition today, if more than 50% voted "yes" we would come around and collect $10.00 from each of you, and we would mail this check to the Center right here today. If 50% or less voted "yes," no one would pay $10.00, and we would not mail this check. to the Center. Any questions?

> *[If asked do we have to pay, repeat from **above**;*
> *Even though **earnings or payment of** money in this referendum are*
> *hypothetical, we ask that you respond to questions as though they involved*
> *real cash payments.]*

O.k.. Please mark your ballots--you are telling me how you would vote on this proposition if you were in fact given the opportunity to do so today. After you've marked your ballot, fold the ballot so that no one can see how you voted. Put your folded-up ballot in the box that we are now passing around.

    Please mark your ballots.
(Collect ballots and count to get the results}

    The results of the vote are that __ of you vote yes, and ____ of you voted no. This implies that % voted yes, and so this referendum (Has / has not) passed.

Now we would like you to consider the following. The vote we just took -- to see if all of us in the room would donate $ 10.00 to the Southwest Research and Information Center -- was hypothetical. Regardless of how this vote turned out, we said that you would not actually pay any money today based on the vote.

Now we would like to take a vote that is real, not hypothetical. What we mean is that we would like to re-vote on the same proposition, that all of us would donate $10.00 to the Southwest Research and Information Center. We will now give each of you a ballot for this vote. You are not bound by how you voted in the hypothetical referendum that we just completed. Vote now anyway that you would like. However, this time the vote will be binding. If more than 50% of you vote yes in this vote, then we will actually come around and collect $10 from each of you. We will write out this check for (nx 10) and one of you will mail this envelope to the Center.

Remember, the vote will be secret, just as it was last time. Just as there was no way to tell who voted yes or no in the first vote, no one will know whether or not you vote yes or no in this vote. Both votes are secret. The only difference between this vote and the last vote is that this vote is real. If more than 50% of you vote yes, we will actually collect $ 10 from each of you and mail this check to the Center today.

Remember how the vote would work. If more than 50% vote "yes" we will come around and collect $10.00 from each of you, and we will mail this check to the Center right here today. If 50% or less vote "yes," no one will pay $10.00, and we will not mail this check to the Center. Any questions?

[If asked do we have to pay, repeat from above;
*If more than 50% of you vote yes, the referendum has **passed** and we will come around and collect $10 from each of you.]*

We will now re-vote on the proposition that (point to the overhead} everyone here in the room will contribute $10.00 to the Southwest Research and Information Center. The contribution is to be used for the purpose of preparing and distributing the citizen's guide to (2 x n) households.

O.k.. Please mark your ballots

{Collect and count the ballots)

The results of this referendum are as follows:
_____ of you voted yes, and
_____ of you voted no, which mean _____ % of you voted yes and the referendum (Has / has not) passed.

(If passed, collect money, give receipts, write check. and ask for a volunteer to mail check after experiment ends (do not let them leave before the next referendum)}

Ok, now we would like to continue with the experiment. We will now hold anpther referendum, This referendum is on a different subject. Even though payment of money in this referendum are **hypothetical**, we again ask that you respond to questions as though they involved real cash payments.

This is what this referendum is **all** about.

'The Nature Conservancy is a non-profit organization whose mission it is to preserve plants, animals, and natural communities that represent the diversity of life by protecting the lands and waters they need to survive. The Georgia Chapter of the Nature Conservancy has preserved more than 50 natural areas -- some 150,000 acres, many harboring rare species of plants and animals.

The Nature Conservancy bases its land protection actions on scientific studies and surveys. These studies identify the rarest plants, animals and natural communities that are most at risk. In Georgia these types of areas have included parts of the Altamaha River, Broxton Rock in Coffee County, and Wolf Island National Wildlife Refuge. By protecting these areas, and others described in this phamplet (show phamplet), threatened and endangered species such as the red-cockaded woodpecker, bald eagle, and the **greenfly** orchid 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 easements, and through registry programs that allow private landowners to preserve their own properties under guidance of the Conservancy.

The state of Georgia has one of the most diverse ranges of habitats among all states in the us. These habitats include the **appalachian** mountains, old-growth forests, cypress swamps and wet savannas, Georgia shelters more types of plants and animals than any other state except Florida, Texas, California, and Hawaii. The activities of the Nature Conservancy in Georgia help to preserve these diverse areas through acquisition of land so that these lands may be kept in their natural state for years to come.

The Nature Conservancy needs donations to support its program to directly acquire lands in Georgia so these lands may be preserved in their natural state for the use and enjoyment of the public today and in the future. If everyone in this room were to contribute $10.00, (nx 10) dollars could be donated to the "land acquisition fund' of the Nature Conservancy. This donation would be used only to purchase natural lands around the state of Georgia to ensure their preservation.

I want you to suppose we were to have a secret vote to decide whether or not we would do this: all of us pay $10.00 for this purpose. Supposing that we were to have such a referendum, we would vote on the following proposition.

[Show slide on projector or show poster]
Proposition:
Everyone here in the room will contribute $10.00 to the Georgia Chapter of the Nature Conservancy. The contribution is to be used for the purpose of purchasing additional lands in the state of Georgia to be protected and held in stewardship by the Nature Conservancy.

Supposing that we were to have this vote, here's how it would work.

1.   If more than 50% of you were to vote "yes" on this proposition, all of you would pay $10.00--I would collect $10.00 from each of you--and we would send this money to the Nature Conservancy with instructions that the money is to be used for land acquisition.

We wouldn't send cash. I would take your cash, write this check (show check) for (n x $10.00) and the check would be mailed to the Nature Conservancy. I would put the check in this stamped envelope (show envelope) addressed to the Conservancy. I would ask one of you to put the envelope in the mail box downstairs. When I received a receipt for the money from the Conservancy, I would make it available for your inspection in front of room 610 in the CBA building.

2.`   if 50% or fewer of you were to vote "yes" on this proposition, no one would pay $10.00, and we would not send a check to the Nature Conservancy.

Here's what I want you to do. We are now passing out ballots to each of you (pass out ballot for 3rd vote}. Suppose that we were to vote on the proposition that everyone in the room pays $10.00 and this money is sent to the Nature Conservancy. I want to know how you would vote on this proposition if we were actually voting on it here and now today: yes or no. No one will know how you vote--it's a secret ballot. While payment of money in this referendum is hypothetical, we ask that you vote as though the referendum involves real cash payments.

Remember how the vote would work. If you were really voting on this proposition today, if more than 50% voted "yes" we would come around and collect $10.00 from each of you, and we would mail this check to the Nature Conservancy right here today. If 50% or less voted "yes," no one would pay $10.00, and we would not mail. this check to the Conservancy. Any questions?

> *[If asked do we have to pay, repeat from above; even though earnings or payment of money in the referendum are hypothetical, we ask that you respond to questions as though they involved real cash payments.]*

O.k.. Please mark your ballots--you are telling me how you would vote on this proposition if you were in fact given the opportunity to do so today. After you've marked your ballot, fold the ballot so that no one can see how you voted. Put your folded-up ballot in the box that we are now passing around. As soon as you have finished, we'll continue with the experiment.

Please mark your ballots.
{Collect and count the ballots (if there is time - if time is short, begin right away with last marker period)}
The results of this referendum are as follows:
of you voted yes, and
_____ of you voted no, which mean _____ % of you voted yes and the referendum (Has / has not) passed.
{To finish the experiment, the experimentor now returns to the script for the last market period and runs another 5-minute market period.}

Before we have our vote, 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 referendum -- not a real one. No one will actually pay money at the end of the vote. But I also asked you to respond to the vote as though the result of your vote could 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 vote **differently** in a hypothetical referendum, where they don't really have to pay money, than they do in a real referendum, where they really could have to pay money. For example, in a recent study, several different groups of people voted on a referendum just like the one you are about to vote on. Payment was hypothetical for these groups, as it will be for you. No one had to pay money if the referendum passed. Another set of groups with similar people were also used in this study. These people voted on the **same** referendum as you will vote on here, **but** payment was real and these people **really** did have to pay money if the referendum passed. On average, more people voted "yes" when the referendum was **hypothetical** than when it was **real**.

We call this a "hypothetical bias". "Hypothetical bias" is the difference that we continually see in the way people respond to hypothetical referenda as compared to real referenda--people seem to respond differently when they really don't have to pay money as a result of their vote.

In the real referendum, where people knew they would have to pay money if the referendum passed, fewer voted "yes" than when payment was hypothetical and people knew they would not pay anything if the referendum passed.

How can we get people to think about their vote in a hypothetical referendum like they think in a real referendum, where if enough people vote "yes", they'll really have to pay money? 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 aren't 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 referendum than they do when the referendum is real. I think that when we hear about a referendum that involves doing something that is basically good -- helping people in Albuquerque, improve environmental quality, or anything else -- our basic reaction in a hypothetical situation is to think: **sure,** I would do this. I **really would** vote 'yes' to 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 referendum is real, and we would actually have to spend our money if it passes, 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 end money on this, that's money I don't have to spend on other things. If I spend money to help families in Albuquerque, that's money I don't have to spend on groceries, go to a movie, or

perhaps give to some environmental organization. So when the payment is real if the referendum passes, we vote in a way that takes into account the limited amount of money we have. We vote 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 hypothetical referenda.

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

- Think about what you're voting on. If this were real--if more than 50% of you voted yes, you would actually have to dig into your pocket and pay $10.00 right now--do you really want to fund the distribution of the Citizens Guide to families in Albuquerque enough that you would be willing to spend the money?

- Also, let me make clear that the $10.00 participation fee that you were paid today, and any earnings that you made in the bidding experiment, is **your** money. You've spent more than an hour of your time in this experiment, and you've earned it! You were told that the money is yours, <u>believe it</u>! So, if I were in your shoes, and I was asked to vote yes or no on this proposition that requires all of us to pay $10.00, I would think about how I feel about spending my money this way. When I got ready to vote, I would ask myself: if this were a real referendum, and I had to pay $10.00 if the referendum passed, do I <u>really want</u> to spend my money this way. If I really did, I would vote yes; if I didn't I would vote 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 vote just exactly as you would vote if you were really going to face the consequences of your vote: which is to pay money if the proposition passes.

Please keep this in mind in our referendum.