Economics Bulletin

Volume 32, Issue 3

Hypothetical Bias, Consequentiality and Choice Experiments

Craig D. Broadbent
Illinois Wesleyan University

Abstract

The presence of hypothetical bias in stated preference methods has led many researchers to look for methods to ameliorate the bias. This paper investigates the use of a consequentiality question to calibrate stated preference data from a controlled laboratory experiment using a choice experimental framework. Results suggest evidence of hypothetical bias using a likelihood ratio test, however, when comparing marginal willingness to pay results statistical evidence of the bias is not found. The finding of equal marginal willingness to pay could be due to the high number of participants who perceived the survey as potentially consequential.

This research is partially supported by the Provost's Office at Illinois Wesleyan University, and an Artistic and Scholarly Development Grant from the Mellon Center at Illinois Wesleyan University.
Citation: Craig D. Broadbent, (2012) "Hypothetical Bias, Consequentiality and Choice Experiments", *Economics Bulletin*, Vol. 32 No. 3 pp. 2490-2499.
Contact: Craig D. Broadbent - cbroadbe@iwu.edu.
Submitted: May 30, 2012. **Published:** September 09, 2012.

1. Introduction

Stated preference surveys are widely utilized for valuing non-marketed goods and services for a variety of planning and regulatory agencies. A lingering concern about the values obtained from these surveys has been termed 'hypothetical bias,' the phenomenon whereby survey participants tend to overstate their values in a hypothetical setting versus a similar actual purchasing decision. Mitigating for the bias has commonly been done through cheap talk scripts as a method to encourage participants to respond as if they were making an actual purchasing decision (e.g. Cummings and Taylor, 1999; List, 2001; Brown et al, 2003; Murphy et al., 2005; Blumenschein et al., 2008). Calibrating for the bias is commonly accomplished through follow-up certainty questions that recalibrate the responses of participants with low levels of certainty (e.g. Champ et al., 1997; Blumenschein et al., 1998; Johannesson et al., 1999; Ethier et al., 2000; Champ and Bishop 2001, Ready et al., 2010).

Recently, Carson and Groves (2007) have proposed a new calibration technique whereby participants should respond to a hypothetical questionnaire as if it were binding as long as two conditions hold true. First, respondents must believe that the results of the survey could have an influence on policy. Second, respondents must perceive that there is some probability that they will have to pay in order to observe the non-marketed good being delivered. In investigating these criteria Vossler and Evans (2009) used a contingent valuation referendum, finding unbiased results when individuals believed the referenda was consequential. Later, Herriges et al. (2010) employed a dichotomous choice referenda, finding that willingness to pay results are similar for those respondents who believe the survey is at least minimally consequential yet different for those believing the survey will have no bearing on policy decisions. Poe and Vossler (2011) follow Herriges et al. (2010) reviewing the different forms of consequentiality to understand the effects of consequentiality on stated values. They postulate that using a purely inconsequential decision setting may by a partial explanation as to why a divergence exists between actual and stated values. These studies represent the first fruits in the literature to investigate how perceived consequentiality can affect a stated preference survey.

If the Carson and Groves (2007) criteria are correct, using only the responses of participants who believe their responses are potentially consequential (i.e. could have an impact on policy decisions) could allow for a calibration of responses that may ameliorate for hypothetical bias. While previous studies have investigated consequentiality in a contingent valuation framework, this study investigates the use of a consequentiality question to gauge participants' perceived beliefs about the consequential nature of the study in a choice experimental framework. Over the last two decades choice experiments have gained popularity in the non-market valuation literature as a preferred approach to contingent valuation to value multidimensional non-marketed goods obtaining marginal values and not just discrete changes (e.g. Arrow et al., 1993; Hanley et al., 2001; Alpizar et al., 2001; Hudson et al., 2003). As choice experiments have gained popularity studies comparing stated to actual values are arising in the literature (e.g. Carlsson and Martinsson, 2001; Lusk and Schroeder, 2004; Carlsson et al., 2005; List et al., 2006; Cook et al., 2007, Broadbent et al., 2010; Ready et al., 2010; Volinskiy et al., 2011).

This study adds to this growing literature by comparing the responses from participants in a split sample controlled laboratory study to value extensions to Constitution Trail, a multi-use trail throughout the cities of Bloomington/Normal, IL. Using a consequential question similar to that employed by Vossler and Evans (2009) a subset of respondents who believe the survey is potentially consequential is created and used to test the first of the two Carson and Groves (2007)

criteria, that is do participants believe their responses could have an impact upon policy decisions and if so are the preferences of these participants less prone to hypothetical bias.

2. Methodology

This study utilizes a split sample field experiment for two treatments: 1) hypothetical payments, 2) actual payments. The good chosen for this study is extension plans for Constitution Trail a multi-use trail located in Bloomington/Normal, IL. Constitution Trail is made possible by a joint venture with the City of Bloomington and the Town of Normal. Discussions began as early as 1983 with the parks and recreation staff of both communities to create the trail. In May, 1986 at a joint council meeting, permission was received to proceed with land acquisition. The trail was officially dedicated and named "Constitution Trail" in celebration of the 200th birthday of the United States Constitution on September 17th 1987.[1] Constitution Trail is a multi-use trail system that allows the community to enjoy natural scenery, wildlife watching and the use of picnic shelters, rest areas and drinking fountains along the trail path. Some wildlife species that can be commonly spotted along the trail include deer, peregrine falcon, migrant birds, beavers, turkeys, foxes and the great blue heron.

Because of the popularity of the trail, the cities have developed trail plans for future development. Three proposed lengths to the trail were presented to participants for both communities. These expansions would provide trail access to residents living in the northeastern part of the township of Normal, and trail access to residents living in the southeastern part of the city of Bloomington. It is the intent of both communities to expand the trail and these expansion plans come from the proposed plans for both communities.

Participants in this study were recruited from introductory principles of economics courses at Illinois Wesleyan University located in the city of Bloomington, IL, during the academic year 2010-11. While the use of students in the valuation exercise is not a representative sample of the community, they do provide a convenience sample with similar demographic characteristics to test for differences between the two treatments. To begin each treatment a participant was given a brief background of Constitution Trail in the form of a two page handout read audibly. As part of this instructional period participants were provided a history of the trail, a map of the trail and the proposed future expansion plans. This instructional period ensured that each participant had at least the same minimal level of information about the trail. Each participant was asked to select their preferred expansion plan from three expansion plans for sixteen different choice sets. In each of the choice sets three options were available: the Normal expansion, the Bloomington expansion or the status quo no trail expansion. Each of these options had three distinct attributes. The first attribute is the "miles of trail to be added." Three proposed lengths were used for each development taken to be the actual geographic lengths. The second attribute is the number of "access points per mile," these access points include street crossings and access to parks, places of business and schools. Each time the trail crosses a street it creates two access points. Rather than crossing all streets bridges can be built to cross streets. The last attribute is a voluntary donation to *"Friends of the Constitution Trail,"* a group that works for the expansion and beautification of the trail.

[1] Information about Constitution Trail can be found by visiting http://www.normal.org/gov/parksandrec/facilities/constitutiontrail.asp or http://www.cityblm.org/parks/Parks-Facilities/Constitution-Trail.htm.

Each participant was given a $20 participation fee.[2] Participants in the hypothetical treatment were not asked to donate a portion of their participation fee in order to observe the outcome of their choices. Participants in the actual payments treatment were asked to donate the money associated with their preferred alternative for one of the sixteen choice sets. To obtain the binding choice set sixteen numbered balls were placed in a bingo cage drawing one ball to represent the binding choice set. Donations were then collected from participants, placed in a sealed envelope and delivered to the cashier's office at the University to be mailed to *"Friends of the Constitution Trail."* A receipt of the donated funds was made available for each participant to view on the office door of the researcher. This procedure is similar to the procedure employed by Carlsson and Martinsson (2001) for public goods and by Lusk and Schroeder (2004) for private goods.

At the conclusion of each treatment participants were given a short demographic questionnaire to elicit information about age, gender, ethnicity, trail usership and a question about their belief of the consequential nature of the study. Drawing from the two criteria introduced by Carson and Groves (2007) and the consequential question developed by Vossler and Evans (2009) the consequential question employed in this study is as follows:

Q-C: Do you believe that the results of surveys and experiments such as this can be consequential in policy decisions?

Participants could respond in two ways, *Yes, I believe they can be consequential* or *No, I do not believe that they are consequential*.[3] This question allows for an analysis of choices using only the responses from participants who believe the study is potentially consequential in an effort to understand the impact of consequentiality to calibrate the data to minimize hypothetical bias.

3. Theoretical Model

The theoretical model is based on the notion that individuals make a single decision from three alternatives. Because the choices are not ordered, a random utility model is used for the i^{th} individual choosing among n alternatives. Assume the i^{th} individuals' utility for choosing option n is given by:

$$U_n^i = V_n^i + \varepsilon_n^i \tag{1}$$

where V_n^i is the systematic portion of the utility function that is determined by the attributes of the trail, and ε_n^i is the stochastic element. Making the assumption that V_n^i is linear in the parameters, the functional form of the utility function for alternative n is expressed as:

$$V_n^i = \gamma_n + \lambda_n X_n^i \tag{2}$$

where X_n^i is a vector of characteristics for alternative n and the i^{th} individual, γ_n is the coefficient for alternative n relative to the status quo option and λ_n is a vector of coefficients representing

[2] It must be acknowledged that participants' decision making behavior can be affected by their receipt of a participation fee. Such effects are commonly described as the "endowment" or "found money" effects and may arise in instances where participants view their participation fee as money that must be used in the experiment. These effects are not addressed in this research. Further research is necessary to determine if these effects exist and the magnitude of the effects if found.

[3] This form of a consequential question allows for an investigation into the first of the two criteria from Carson and Groves (2007). A formal definition of the term 'consequential' was not given to participants, resulting in some ambiguity in how participants interpret the consequential question. Future research should investigate differing forms of this question to understand how participants view 'consequentiality.'

the effect of the attributes for alternative *n* on utility. The probability that the i^{th} individual chooses alternative *n* over alternative *k* is:

$$prob\ [V_n^i + \varepsilon_n^i \geq V_k^i + \varepsilon_k^i; \quad \forall n \neq k] \tag{3}$$

where V_n^i is the systematic utility for alternative *n* for the i^{th} individual and V_k^i is the systematic utility for alternative *k* for the i^{th} individual with ε_n^i and ε_k^i being the stochastic elements.

For the econometric analysis a conditional logit[4] model is employed to test the null hypothesis of preference equity between the two treatments using the full sample and the smaller sample of only the participants who believe their choices could be potentially consequential. A clustering technique is employed to estimate the standard errors to account for the cluster of 16 responses per participant. In this model the two choice specific constants are labeled from the two expansion plans as Normal and Bloomington respectively.

In order to determine if hypothetical bias exists a likelihood ratio test is performed as shown in Louviere et al. (2000) to compare the results of the pooled (hypothetical and actual payments) with the summation of the hypothetical and actual payments treatments as follows:

$$LR = -2(LL_p - \sum LL_u) \tag{4}$$

where LL_p is the log likelihood value for the pooled results and LL_u is the log likelihood value for the summation of the hypothetical and actual payments treatments. This statistics is approximately distributed as chi-squared with *K* degrees of freedom, taken to be the total number of variables in the model including the two choice specific constants.

A second external validity test is conducted to compare the marginal willingness to pay estimates between the treatments. Marginal willingness to pay for the two attributes is calculated by taking the estimate for the attribute ("miles of trail to be added" and "access points per mile") and dividing it by the estimate for voluntary donation. Standard errors are obtained using the bootstrap procedure developed by Krinsky and Robb (1986), where the estimated standard error of the mean willingness to pay is the standard error of the estimated empirical distribution of the mean as explained by Poe et al. (1994). A Student t-test is employed to determine if the estimates differ between the treatments given by:

$$t_{calc} = \frac{\lambda_h - \lambda_r}{\sqrt{s.e._h^2 + s.e._r^2}} \tag{5}$$

where λ_h are the coefficients in the hypothetical treatment and λ_r are the coefficients in the actual-payments treatment, $s.e._h^2$ and $s.e._r^2$ are the squared standard errors for the hypothetical and actual-payments treatments respectively.

4. Results

One hundred and fifty participants were recruited during the academic year 2010-11 resulting in 75 participants in each treatment. Participants answered sixteen choice sets creating a possible sample size of 1200 for each treatment. Results of the demographic questionnaire can be found in Table 1 demonstrating similar characteristics between the two treatments. In addition the results of the consequential question is found in Table 1 with 66 of 75 and 65 of 74 participants in the hypothetical and actual payments treatments stating they believed the survey could be potentially consequential. One participant in the actual payments treatment failed to

[4] A conditional logit model relies on the assumption that the error term is independently and identically distributed. To relax this assumption a multinomial probit model is also employed confirming the results of the conditional logit model. Due to space considerations the results of the multinomial probit model are not presented.

answer this question; their responses are not used in the smaller consequential sample. In addition, roughly half of the participants in each treatment had used Constitution Trail within the last year as demonstrated by the responses to the trail usership question. Because introductory economics course are predominately populated with freshman and sophomore level students, many of these freshman level students had not yet spent time on the trail as they had recently moved to campus creating a fairly equal split of trail users and non-users.

Table 1: Demographic Characteristics

	Hypo	Actual-Pay
N	75	75
Mean Age	19.2	19.2
Gender		
Male	47	43
Female	28	32
Ethnicity		
Caucasian	58	60
African American	6	4
Hispanic	3	1
Asian	7	8
Other	1	2
Trail User		
Yes	33	36
No	39	38
Consequential		
Yes	66	65
No	9	9

Table 2 presents the results of the conditional logit model for the full and smaller consequential sample. While participants in the actual-payments treatment provided a donation to *"Friends of the Constitution Trail"* some of these participants still indicated they did not believe the survey could be potentially consequential. In an effort to include only participants that believed the study could be potentially consequential these participants were removed from the actual-payments data for the smaller consequential sample. Estimates for both attributes in the full sample are significant at the 1% level while the labeling of the two expansion plans is found to only be statistically significant for the Normal expansion in the actual-payments treatment and the Bloomington expansion for the pooled results. For the smaller consequential sample the estimates for the two

Table 2: Conditional Logit Estimates

	Full Sample			Consequential Sample		
Independent Variable	Actual-Pay	Hypo	Pooled	Actual-Pay	Hypo	Pooled
Miles of Trail Added	0.418**	0.298**	0.353**	0.4**	0.33**	0.362**
	(0.039)	(0.037)	(0.027)	(0.043)	(0.039)	(0.029)
Access Points Per Mile	0.16**	0.122**	0.137**	0.144**	0.126**	0.133**
	(0.024)	(0.025)	(0.018)	(0.025)	(0.028)	(0.018)
Donation	-0.335**	-0.239**	-0.279**	-0.315**	-0.252**	-0.279**
	(0.034)	(0.029)	(0.022)	(0.034)	(0.033)	(0.024)
Normal Expansion	-0.654*	0.035	-0.305	-0.63	-0.015	-0.326
	(0.306)	(0.294)	(0.208)	(0.336)	(0.312)	(0.225)
Bloomington Expansion	-0.528	-0.191	-0.364**	-0.469	-0.125	-0.309
	(0.276)	(0.238)	(0.176)	(0.305)	(0.247)	(0.189)
Log Likelihood	-929.72	-1001.81	-1956.36	-826.59	-869.29	-1714.19
Number of Observations	1200	1168	2368	1040	1035	2074

*, ** denotes significant at the 5% and 1% levels respectively, [a] values in parentheses are clustered standard errors

attributes are again found to be significant at the 1% level with the labeling of the two expansion plans being insignificant. Because some participants did not clearly indicate a choice in the hypothetical treatment a total of 1168 observations are used in the analysis with 1200 being used in the actual-payments treatment. Signs for the estimates are as expected finding that an increase in both attributes positively impacts the probability of a choice while an increase in the donation negatively impacts the probability of a choice. The third alternative was set as the status quo meaning that the constant was set equal to zero and the two expansion plans were tested against this constant. In the actual-payments treatment a decrease in the probability of choosing either of the expansion plans that cost money is observed for both the full and smaller consequential samples. Results for the hypothetical treatment are mixed with the choice of the Normal expansion plan increasing the probability of a choice while the choice of the Bloomington expansion plan decreases the probability of a choice; however, the estimates for the choice specific constants are insignificant in both the full and smaller consequential sample.

Employing the likelihood ratio test in equation (4) allows for a rejection of the null hypothesis of preference equity for both the full ($\chi^2 = 49.66$, $p < 0.01$) and smaller consequential sample ($\chi^2 = 36.62$, $p < 0.01$). This result lends statistical evidence that hypothetical bias exists and using a consequential question to calibrate responses does not seem to eliminate the bias. One shortcoming of the likelihood ratio test is the pooling of two different data sets creating estimated parameters that are confounded with respect to scale. Even when correcting for scale differences previous literature has still found evidence of hypothetical bias (e.g. Lusk and Schroeder, 2004; Carlsson et al., 2005; Volinskiy et al., 2011), leading one to wonder if the finding of hypothetical bias is a function of the scale differences between the samples or if participants are just overstating their values in a hypothetical exercise.

Fortunately, a second external validity test which compares marginal willingness to pay estimates between the treatments can be conducted that does not pool the results of the two treatments. These results can be found in Table 3 for the full and smaller consequential samples along with the estimated t-values using equation (5). As shown in Table 3 all marginal willingness to pay estimates are statistically different from zero. A few interesting results appear in these estimates. In the full sample the "miles of trail to be added" attribute equals the actual payments treatment estimate. For the "access points per mile" attribute the hypothetical treatment slightly overestimates the actual payments treatment. In the smaller consequential sample the hypothetical treatment slightly overestimates both attributes. Using the Student t-test from equation (5) the hypothesis of equal

Table 3: MWTP Estimates

MWTP for…	Actual-Pay	Hypo	T-values
Full Sample			
Miles of Trail Added	1.25**	1.25**	0
	(0.149)	(0.158)	
Access Points Per Mile	0.48**	0.51**	0.245
	(0.069)	(0.102)	
Sample Size	1200	1168	
Consequential Sample			
Miles of Trail Added	1.27**	1.31**	0.165
	(0.175)	(0.168)	
Access Points Per Mile	0.46**	0.50**	0.299
	(0.081)	(0.106)	
Sample Size	1040	1035	

** denotes significant at the 1% level, [a] values in parentheses are clustered standard errors

marginal willingness to pay cannot be rejected for either attribute in both the full and smaller consequential samples. This lends evidence that willingness to pay estimates obtained from a choice experiment survey may not be prone to hypothetical bias. Further, the use of a consequentiality question to calibrate participant responses is not found to change the results significantly.

5. Conclusions

As researchers continue to employ stated preference techniques lingering concerns about the accuracy of these estimates exist. The recent proposal by Carson and Groves (2007) provides insight into individual's perceptions about the perceived consequential nature of a study. This study attempts to understand how a consequential question similar to Vossler and Evans (2009) can recalibrate the data by using only the responses of participants that deem the questionnaire as potentially consequential. The results of a likelihood ratio test allow for a rejection of preference equity between a hypothetical and actual payments questionnaire. Calibrating the data to only include the responses of participants who deem the questionnaire as potentially consequential does not eliminate the bias using a likelihood ratio test, which may be a function of pooling the two treatments to conduct a likelihood ratio test. A comparison of marginal willingness to pay estimates between the two treatments results in a differing conclusion as the estimates do not statistically differ which is in harmony with previous literature (e.g. Carlsson and Martinsson, 2001; List et al., 2006).

While this study has found evidence of hypothetical bias using one external validity test the second test does not find hypothetical bias. Due to the high number of participants believing the survey could be potentially consequential in both the hypothetical (88%) and actual payments (86.67%) treatments, the results could be skewed such that the Carson and Groves (2007) criteria is fulfilled in the surveys and a recalibration of the data is unnecessary. A degree of caution needs to be taken with this result as the convenience sample used in this study was populated primarily of freshman level students. Additional research is necessary using a representative sample of the two communities to investigate if the findings of this research hold true beyond the convenience sample. Further, understanding how a consequential question, as presented in this research, could be used to recalibrate data when many participants do not view the survey as potentially consequential is necessary.

As demand for values for non-marketed goods and services continues to grow, it is evident from the growing literature that applied researchers must maintain a cautious eye on potential hypothetical bias. To date, there is perhaps not a clear conclusion in the literature on how to calibrate for the bias. This paper adds to the small but growing comparison studies employing a choice experimental setting to test for hypothetical bias using only the responses of participants that believe the questionnaire is potentially consequential. Continued research is necessary to find the best possible conditions to obtain unbiased values for non-marketed goods and services.

References:

Alpizar, F., F. Carlsson, and P. Martinsson. (2001) "Using Choice Experiments for Non-Market Valuation." Working Paper in Economics no. 52, Department of Economics, Goteborg University.

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

Blumenschein, K., G.C. Blomquist, M. Johannesson, N. Horn, and P. Freeman. (2008) "Eliciting Willingness to Pay without Bias: Evidence from a Field Experiment." *The Economic Journal* 118 (525): 114-137.

Blumenschein K., M. Johannesson, G.C. Blomquist, B. Liljas, and R.M. O'Conor. (1998) "Experimental Results on Expressed Certainty and Hypothetical Bias in Continent Valuation." *Southern Economic Journal* 65 (1): 169-177.

Broadbent, C.D., J.B. Grandy, and R.P. Berrens. (2010) "Testing for Hypothetical Bias in a Choice Experiment Using a Local Public Good: Riparian Forest Restoration." *International Journal of Ecological Economics and Statistics* 19 (F10): 1-19.

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.

Carson, R.T., and T. Groves. (2007) "Incentive and Informational Properties of Preference Questions." *Environmental and Resource Economics* 37 (1): 181-210.

Carlsson F., P. Frykblom, and C.J. Lagerkvist. 2005. "Using Cheap Talk as a Test of Validity in Choice Experiments." *Economics Letters* 89 (2): 147-152.

Carlsson, F., and P. Martinsson. (2001) "Do Hypothetical and Actual Marginal Willingness to Pay Differ in Choice Experiments?" *Journal of Environmental Economics and Management* 41 (2): 179-192.

Champ, P.A., and R.C. Bishop. (2001) "Donation Payment mechanisms and Contingent Valuation: An Empirical Study of Hypothetical Bias." *Environmental and Resource Economics* 19 (4): 383-402.

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.

Cook, J., D. Whittington, D.G. Canh, F.R. Johnson, and A. Nyamete. (2007) "Reliability of Stated Preferences for Cholera and Typhoid Vaccines with Time to Think in Hue, Vietnam." *Economic Inquiry* 45 (1): 100-114.

Cummings, R.G., and L. Taylor. (1999) "Unbiased Value Estimates for Environmental Goods: A Cheap Talk Design for the Contingent Valuation Method." *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.

Hanley, N., S. Mourato, and R.E. Wright. (2001) "Choice Modeling Approaches: A Superior Alternative for Environmental Valuation?" *Journal of Economic Surveys* 15 (3): 435-462.

Herriges, J., C. Kling, C-C. Liu, and J. Tobias. (2010) "What are the Consequences of Consequentiality?" *Journal of Environmental Economics and Management* 59 (1): 67-81.

Hudson, D., K. Gallardo, and T. Hanson. (2003) "Hypothetical (Non)Bias in Choice Experiments: Evidence from Freshwater Prawns." EconWPA in series Experimental, number 0503003.

Johannesson, M. G.C. Blomquist, K. Blumenschein, P.O. Johansson,B. Liljas, and R.M. O'Conor. (1999) "Calibrating Hypothetical Willingness to Pay Responses." *Journal of Risk and Uncertainty* 18 (1): 21-32.

Krinsky, I., and A.L. Robb. (1986) "On Approximating the Statistical Properties of Elasticities." *The Review of Economics and Statistics* 68 (4): 715-719.

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

List, J.A., P. Sinha, and M.H. Taylor. (2006) "Using Choice Experiments to Value Non-Market Goods and Services: Evidence From Field Experiments. *Advances in Economic Analysis and Policy* 6 (2): 1-37.

Louviere, J.J., D.A. Hensher, and J.D. Swait. (2000) "Stated Choice Methods: Analysis and Applications." Cambridge University Press, Cambridge, MA.

Lusk, J.L., and T.C. Schroeder. (2004) "Are Choice Experiments Incentive Compatible? A Test with Quality Differentiated Beef Steaks." *American Journal of Agricultural Economics* 86 (2): 467-482.

Murphy, J.J., T.H. Stevens, and D. Weatherhead. (2005) "Is Cheap Talk Effective at Eliminating Hypothetical Bias in a Provision Point Mechanism?" *Environmental and Resource Economics* 30 (3): 327-343.

Poe, G.L., and C.A. Vossler. (2011) "Consequentiality and Contingent Values: An Emerging Paradigm." in *International Handbook on Non-Market Environmental Valuation*, J. Bennett, Ed., Cheltenham: Edward Elgar Publishers, 122-141.

Poe, G.L., S. E.K. Severance-Lossin, M.P. Welsh. (1994) "Measuring the Difference (X-Y) of Simulated Distributions: A Convolutions Approach." *American Journal of Agricultural Economics* 74 (4): 904-915.

Ready, R.C., P.A. Champ, and J.L. Lawton. (2010) "Using Respondent Uncertainty to Mitigate Hypothetical Bias in a Stated Choice Experiment." *Land Economics* 86 (2): 363-381.

Volinskiy, D., W. Adamowicz, and M. Veeman. 2011. "Predicting Versus Testing: A Conditional Cross-Forecasting Accuracy Measure for Hypothetical Bias." *The Australian Journal of Agricultural and Resource Economics* 55 (3): 429-450.

Vossler, C.A., and M.F. Evans. (2009) "Bridging the Gap Between the Field and the Lab: Environmental Goods, Policy Maker Input, and Consequentiality." *Journal of Environmental Economics and Management* 58 (3): 338-345.