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Verbiage Matters: Do Respondents Answer Willingness to Pay Dichotomous Choice Questions on a Per Person or Per Group Basis?

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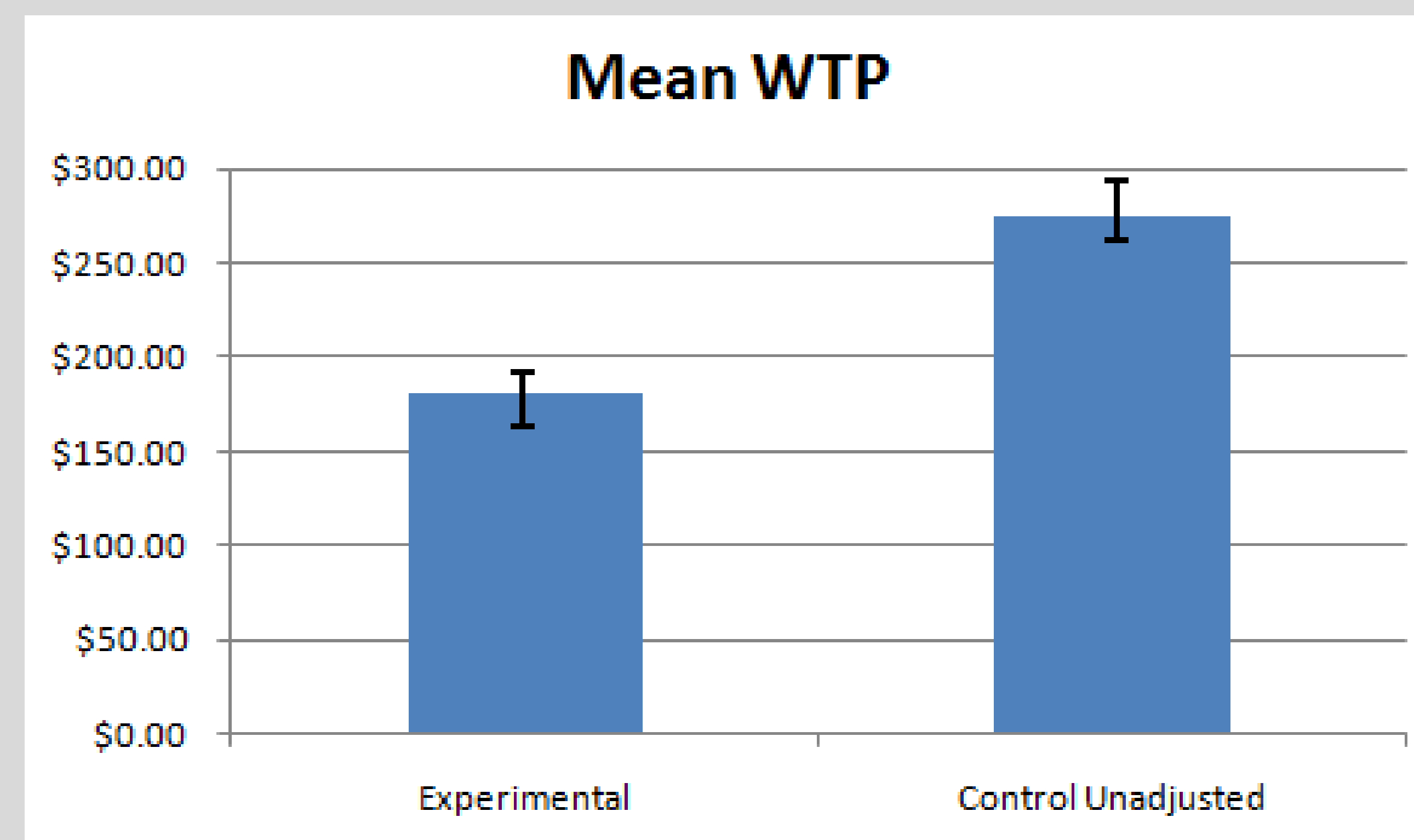
Hypotheses

H_{o1} : Mean $WTP_{Experimental}$ = Mean $WTP_{Control}$

H_{o2} : Mean $WTP_{Experimental}$ = Mean $WTP_{Control/Group\ Size}$

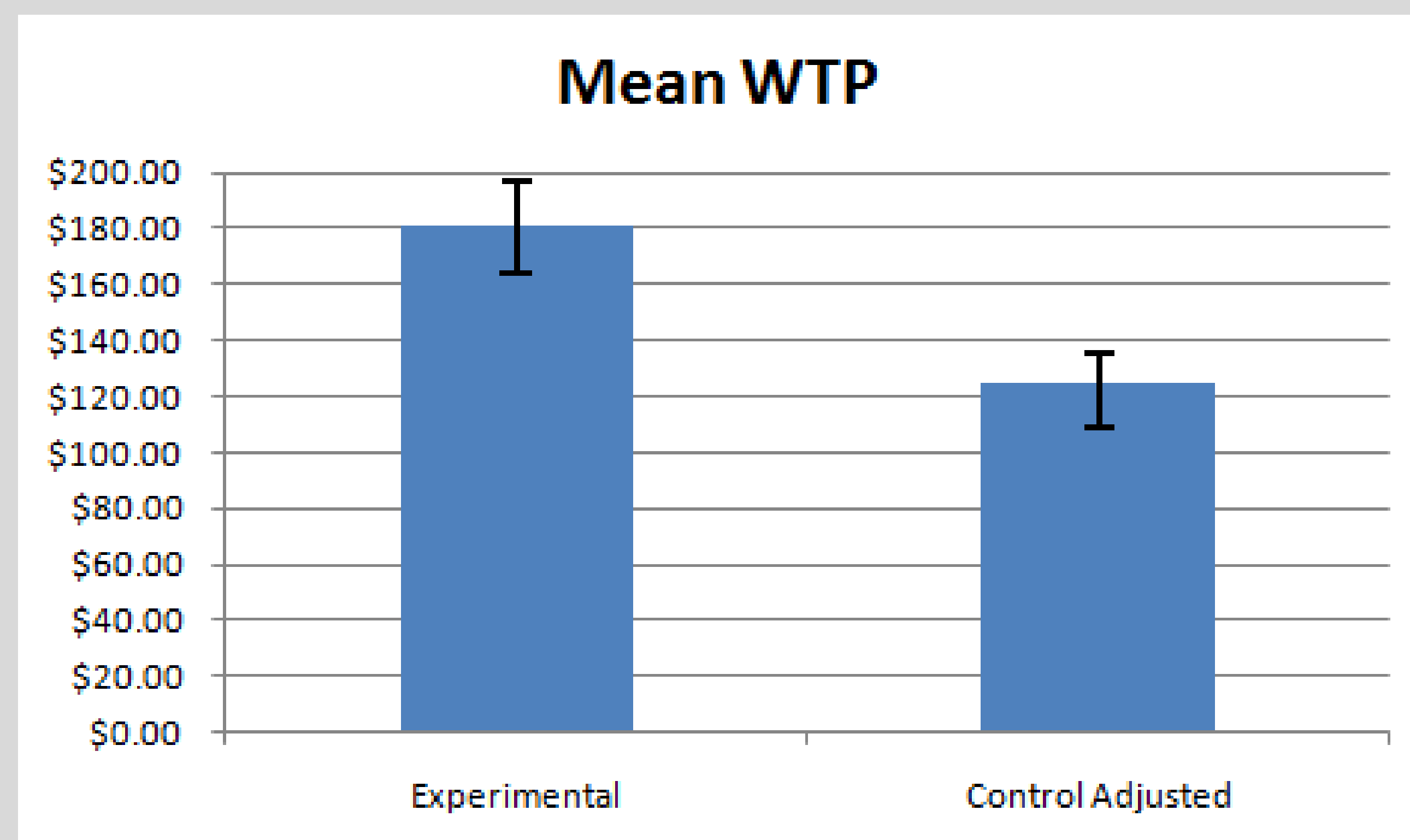
Results

Logit Statistical Model was estimated for all models and the bid coefficients were all negative and significant.



Analyses shows significantly different mean WTP estimates. Mean WTP for the control surveys, unadjusted (not divided by group size), is \$275.47 compared to \$181.07 for the experimental surveys, which explicitly ask for individual responses.

The confidence intervals at 90% for the two estimates do not overlap, indicating that the estimates are statistically significantly different. The black brackets shown on the graphs illustrate these confidence intervals. Thus, we reject H_{o1} : Mean $WTP_{Experimental}$ = Mean $WTP_{Control}$.



Mean WTP for the control surveys, adjusted (divided by group size), is \$124.41 compared to \$181.07 for the experimental surveys.

The confidence intervals at 90% for the two estimates do not overlap, again indicating that the estimates are statistically significantly different. This implies that it is important to ask explicitly for individual responses. Thus, again we reject H_{o2} : Mean $WTP_{Experimental}$ = Mean $WTP_{Control/Group\ Size}$.

Background

To improve management of public lands that support outdoor recreation, it is necessary to determine the value that visitors place on recreation in these areas. However, dichotomous choice contingent valuation survey questions that are often used to estimate these values may be interpreted by the respondent in a way that was not intended by the researcher.

Various studies have focused on the "payment vehicle" (Ivehammar, 2009) and the importance of properly framing the contingent valuation question (Boyle 1989), but there has been little empirical research measuring the effects of differences of alternatively worded dichotomous choice questions.

The process of developing survey questions has also been addressed, such as "selecting and phrasing questions in ways that result in people providing accurate information," (Dillman, 1991), and the necessity of "designing questions to obtain desired measures," (Champ et al., 2003). However, the issue of whether respondents answer questions as an individual or as a member of a group has not been specifically documented. Therefore, the focus of this study is to determine if and how verbiage influences visitors' WTP responses to survey questions, and whether or not individuals respond to surveys in the context of an individual or as a member of a group.



Photo Courtesy of Loretta McElhiney

Study Site:

Quandary Peak, Summit County Colorado

Located outside the ski resort town of Breckenridge, Colorado, Quandary Peak reaches 14,265 feet above sea level, qualifying as one of the 54 "Fourteeners," in Colorado. Visitors to Colorado Fourteeners have a remarkably high WTP for their recreation experience, with a consumer surplus of \$294 (Loomis and Keske, 2008). Comparable studies in other areas found WTP to range from \$20 to \$56. Additionally, Blake (2008) suggests that Fourteeners are synonymous with Colorado's identity, and that many visitors feel a sense of "place attachment" to these areas. Clearly, there is a high demand for recreating in these unique areas, providing a study site in which visitors are highly invested in the management of these areas.



Map Courtesy of Google Maps

Data and Methods

345 control surveys and 200 experimental surveys were distributed on a per carload basis at the trailhead and parking lot at the conclusion of the visitor's recreation activity.

The surveys differed in the wording of the WTP question as follows (\$X bid amount had values ranging from \$2 to \$950):

Control Survey:

If the **total cost** of this most recent trip to the recreation area where you were contacted had been \$X **higher**, would you have made this trip to **this** 14'er?

Experimental Survey:

If **your share** of the total cost of this most recent trip to the recreation area where you were contacted had been \$X **higher**, would **you** have made this trip to **this** 14'er?

Discussion

The results indicate that individuals respond to surveys in different ways depending on the verbiage used. In the case of the control group, individuals may answer the question with the assumption that costs may be spread among the entire group.

We conducted four different analyses of the data, including dividing the control mean WTP by group size (shown), expenses shared group size, and bid amount. These approaches were conducted to correct for potential differences in interpretation, in the event that the respondent answered for the group as opposed to answering as an individual. Each method yielded different results, with non-overlapping confidence intervals.

This lack of consensus between results indicates that there is a high level of variance in visitor's interpretation of dichotomous choice questions. Furthermore, this problem is difficult to correct for, indicated by the fact that we were unable to converge the results through data transformation.

Therefore, it is necessary to use specific verbiage when designing surveys, to ensure responses to WTP dichotomous choice questions can be interpreted correctly by researchers. Specifically, if researchers want respondents to answer on an individual basis, this language needs to be explicitly stated, as presented in the experimental survey.