Journal of Forest Economics 18 (2012) 271–281

Contents lists available at SciVerse ScienceDirect

Journal of Forest Economics

journal homepage: www.elsevier.de/jfe

Attitudes, willingness to pay, and stated values for recreation use fees at an urban proximate forest

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ARTICLE INFO

Article history:
Received 26 December 2011
Received in revised form 7 June 2012
Accepted 8 June 2012

JEL classification:
C51
Q26
Q51

Keywords:
Willingness to pay
Attitudes
Recreation
Fees

ABSTRACT

Studies have combined contingent valuation and attitude theory in models directly predicting willingness to pay recreation fees. Little research, however, has modeled predictions of attitudes toward fees on both the intention to pay (WTP) and stated payment amount ($WTP) simultaneously. This article addresses that knowledge gap using onsite survey data from 1068 recreationists at the McDonald-Dunn forest in Oregon. Attitudes toward paying an annual fee at this forest were directly associated with WTP and were among the strongest predictors of WTP. Respondents with supportive attitudes toward paying the annual fee were more willing to pay than those who were opposed. The strength of attitudes also influenced WTP, with those respondents having stronger opposition being least likely to pay. Attitudes toward paying a fee were indirectly (i.e., mediation) related to the stated payment amount ($WTP), suggesting that payment is influenced by intention to pay (WTP), and this intention is partially a function of attitudes about fees.

Introduction

Fees to visit and recreate in forests, parks, and other natural resources have become prevalent in many countries. In the United States, for example, passage of the Fee Demonstration Program by Congress in 1996 authorized agencies to increase fees substantially (e.g., 50% to 100% increase) at national parks, forests, and wildlife refuges where fees already existed, and charge new fees at sites

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http://dx.doi.org/10.1016/j.jfe.2012.06.003

where they were not charged previously. Fees not only generate revenue, but also may be used for site management (Manning, 2011). There has been substantial research on the potential impact of fees on users, especially the extent that users would be willing to pay fees, the amount that they would be willing to pay, and whether these fees would change visitation patterns (Loomis and Walsh, 1997; Loomis, 2004). Evaluating the potential impact of fees on users requires investigating at least two aspects of human behavior: (a) willingness to pay, which is arguably a behavioral intention toward fees; and (b) attitudes, which involve a social psychological response to fees and are commonly defined as a tendency to evaluate an object, situation, or issue with some degree of favor or disfavor (Fishbein and Ajzen, 1975; Barro et al., 1996).

In economics, the contingent valuation method is one common means for evaluating willingness to pay, which is treated as an estimate derived from stated human behavior (Loomis, 2004). In social psychology, however, this notion of stated behavior is considered to be a behavioral intention that is partially influenced by attitudes (Harris et al., 1989; Ajzen and Driver, 1992). It is important to measure attitudes when evaluating the potential impact of fees on users because attitudes can help to predict behaviors, such as compliance with new fee systems. In addition, attitudes can change in response to persuasive and targeted messages, so individuals with negative attitudes toward fees initially may consider fees more favorably and be willing to pay them after receiving information about the rationale for these fees. Consequently, omission of attitude variables in economic models may skew study outcomes and result in omitted variable bias (Barro et al., 1996; Luzar and Cossé, 1998). Appropriately defined and obtained attitude measures may improve the descriptive and predictive ability of economic models empirically estimating willingness to pay, especially those eliciting the behavioral intention of willingness to pay (Ajzen and Driver, 1992; Luzar and Cossé, 1998; Pouta and Rekola, 2001; Spash et al., 2009), even if only marginally (Bernath and Roschewitz, 2008). Taking advantage of both economic and social psychology decision models (McFadden, 2001), the integration of attitude theory (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Ajzen and Driver, 1992) and contingent valuation (Meyerhoff, 2006; Bernath and Roschewitz, 2008; Spash et al., 2009) may be important for improving the ability to model behavior such as willingness to pay for specific environmental goods (Barro et al., 1996). This article, therefore, integrates contingent valuation and attitude theory in models predicting impacts of attitudes toward recreation fees on both willingness to pay these fees and stated payment amounts.

Conceptual framework

Studies on the roles and effects of attitudes on intention to pay (WTP) and stated payment amount ($WTP) are heterogeneous in terms of context, but attitudes have consistently been found to be statistically significant in a variety of estimated contingent valuation models. Luzar and Cossé (1998), for example, evaluated effects of positive attitudes toward water quality at both individual and statewide scales in an ordinary least squares (OLS) regression of $WTP. Using two different models, Pouta and Rekola (2001) and Pouta (2004) evaluated two attitudes toward abating forest regeneration where one attitude was toward regeneration in the study area and the other was for a policy generally restricting regeneration. In a logistic regression on dichotomous choice data, they first evaluated effects of attitudes on WTP framed as "would you pay X dollars (yes or no)?" In a censored Tobit model, they then evaluated effects of attitudes on $WTP. Meyerhoff (2006) used several attitude objects such as an index of general environmental attitudes, attitudes toward the good, and attitudes toward the behavior (i.e., help finance restoration) in relation to payments associated with floodplain restoration, and found that attitudes were most closely associated with WTP than $WTP, and attitudes toward the specific behavior were more strongly associated with both WTP and $WTP than those for more general objects such as the good and the environment. Not only are attitudes consistent among contingent valuation models, but the specificity of attitude measures is also important when evaluating the descriptive and predictive ability of models estimating willingness to pay.

More specific to this study, attitudes also have been incorporated in models predicting willingness to pay recreation fees. Attitudes toward the specific act of paying a recreation fee and the outcome of how much to pay may elicit different responses and more predictive ability than general attitudes

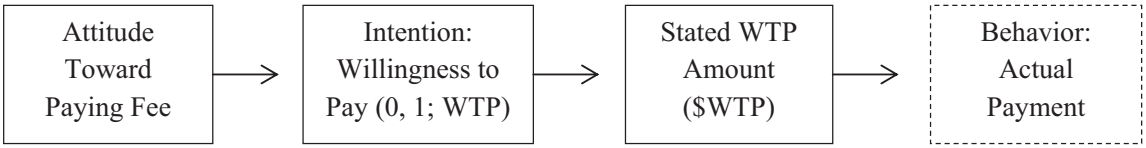

Fig. 1. Modified attitude-behavior model of stated willingness to pay fees.

associated with the context of fees such as the resource, environment, and expected changes resulting from fees (Fishbein and Manfredo, 1992; Whittaker et al., 2006).

Rollins and Trotter (2000), for example, included specific attitudes related to support and opposition toward fees in their contingent valuation studies, and examined effects of these attitudes on $WTP. Ajzen and Driver (1992) examined affective and instrumental attitude statements, and found that affective attitudes toward paying fees were most closely associated with $WTP. Bernath and Roschewitz (2008) evaluated the influence of attitudes on both WTP and $WTP as separate functions, and found that attitudes toward restricting access were not significant for both WTP and $WTP. However, they found attitudes toward a fee significantly influenced WTP, but not $WTP. Little research, however, has modeled attitudes toward paying a recreation fee on both WTP and $WTP simultaneously, and this article helps to address that knowledge gap.

Contingent valuation is one method for applying utility theory to non-market goods or services such that the intended behavior of paying for a non-market good or service within a constructed market setting is predicted by hypothesized factors (Carson, 1991). The results are economic estimates of willingness to pay (i.e., WTP or whether or not respondents are willing to pay in exchange for a non-market good or service) and payment amounts (i.e., $WTP or maximum amounts or prices respondents are willing to pay for a non-market good or service).

More broadly, a goal of social psychological research is to explain and predict human behavior in various social settings, not just those in economic marketplaces. One line of research emphasizes the importance of attitudes in explaining human intentions and actual behaviors (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Ajzen, 1991). The theory of reasoned action, for example, states that actual human behavior can be partially predicted by behavioral intentions, and these intentions are partially influenced by attitudes and subjective norms (i.e., an individual's belief that other people or groups think he or she should or should not perform the behavior and motivation to comply with these other people or groups; Fishbein and Ajzen, 1975). The theory of planned behavior is a similar model emphasizing the importance of not only attitudes and norms in influencing intentions, but also the perceived ability or behavioral control over engaging in the intended behavior (Ajzen and Fishbein, 1980; Ajzen, 1991).

Despite the seemingly complementary nature of these economic and social psychological approaches, willingness to pay responses in most economic studies do not provide the same information as behavioral intentions in most social psychological contexts (Barro et al., 1996; Bernath and Roschewitz, 2008). In the theories of reasoned action and planned behavior, for example, behavioral intentions are assumed to indicate the extent that individuals are willing to perform the behavior. Stated WTP in contingent valuation, however, does not necessarily convey any strength of intention to pay (Vossler et al., 2003). Important assumptions of some attitude research, therefore, are often not met by WTP responses alone (Bernath and Roschewitz, 2008).

In this article, intention or willingness to pay a fee (WTP) is distinguished from the stated payment amount ($WTP; Fig. 1). The two statements are related in that once someone states an amount other than zero (i.e., $0) that he or she is willing to pay, then by default he or she has stated an intention to pay. Someone who states no intention of paying, however, may be doing so either because of a zero $WTP value or a protest of the payment mechanism or context, and therefore does not reveal a $WTP that is greater than zero. As Meyerhoff and Leibe (2006) contend, stating an intention to pay by revealing an amount greater than zero is a matter of degree or how motivations and attitudes influence $WTP revelation. Although it is anticipated that attitudes are correlated with both WTP and $WTP, a mediating effect of attitudes toward paying fees may influence stated amounts through the

intention to pay (Fig. 1). That mediating effect is consistent with attitude models such as the theories of reasoned action and planned behavior.

A mediation model involves a separate variable or concept (e.g., WTP) that partially or fully accounts for the relationship between the predictor (e.g., attitude) and criterion variables (e.g., $WTP; Baron and Kenny, 1986). Many studies have tested mediation models, and most analytical approaches have involved various types of regression analyses (e.g., OLS, Heckman sample selection, structural equation modeling) examining direct and indirect relationships among the predictor, mediator, and criterion variables (Baron and Kenny, 1986; MacKinnon et al., 2007; Vaske, 2008). Baron and Kenny (1986), for example, outlined a series of steps for establishing mediation, including regression analyses between the: (a) predictor and criterion variables, (b) predictor and mediator variables, and (c) predictor and both the mediator and criterion variables. This final step involves simultaneously modeling associations among the predictor, mediator, and criterion variables. The hypotheses tested here, therefore, involve mediation effects and are based on integrating both economic and attitude theories:

H_1. Attitudes toward the specific behavior of paying a fee will be directly associated with the intention to pay a fee (WTP).

H_2. Attitudes toward the specific behavior of paying a fee will be indirectly associated with the stated payment amount ($WTP).

Statistical model

Following Bernath and Roschewitz (2008), the effect of a single specific measure of attitude toward paying a fee is modeled on both intended behavior of paying (WTP) and stated amount willing to pay ($WTP) using a Heckman sample selection model. Heckman's two-step procedure is used for deriving an OLS test of the conceptual model to first determine whether the attitude directly affects WTP and then if it directly or indirectly affects $WTP. The Heckman model was developed to evaluate sample selection issues (Whitehead et al., 1994; Hoehn, 2006; Garcia et al., 2009), but its structure fits well with simultaneously modeling associations among predictor, mediator, and criterion variables as in step three of Baron and Kenny (1986), as noted previously. Analysis begins with the regression function relating $WTP with individual-level characteristics of the sample:

$$\$\mathrm{WTP}_i = x'_{1i}\beta_1 + \varepsilon_{1i}, \tag{1}$$

where $\$\mathrm{WTP}_i$ is individual i's stated amount that he or she is willing to pay, x'_{1i} is a $1\times$K vector of characteristics of individual i, β_1 is a K$\times$1 vector of coefficients to be estimated, and ε_{1i} is a stochastic error term with $\mathrm{E}[\varepsilon_1]=0$ and $\mathrm{E}[{\varepsilon_1}^2]={\sigma_1}^2$. It is assumed that stated payment amount $\$\mathrm{WTP}_i$ is not expressed if the individual's preference for access does not exceed a minimum threshold of value.

A second equation is the binary selection equation that can be specified to describe whether individual i is willing to pay (WTP) a fee or not:

$$\mathrm{WTP}_i^* = x'_{2i}\beta_2 + \varepsilon_{2i}. \tag{2}$$

The following observation rule applies:

$$\begin{aligned} &\$\mathrm{WTP}_i = \$\mathrm{WTP}_i,\ \mathrm{WTP}_i = 1 \text{ if } \mathrm{WTP}_i^* > 0 \\ &\$\mathrm{WTP}_i \text{ is not observed},\ \mathrm{WTP}_i = 0 \text{ if } \mathrm{WTP}_i^* \le 0, \end{aligned} \tag{3}$$

where $\$\mathrm{WTP}_i$ denotes individual i's expressed fee amount and WTP_i^* is a latent variable indicating intended willingness to pay or not. Independent variables that may influence WTP_i^* include personal characteristics, attitudes, and visitation behavior. In (2), x'_{2i} is a $1\times$Q vector of the independent variables, β_2 is a Q$\times$1 vector of coefficients to be estimated, and ε_{2i} is a stochastic error term with $\mathrm{E}[\varepsilon_2]=0$ and $\mathrm{E}[{\varepsilon_2}^2]={\sigma_2}^2$. The selection equation is modeled as a probit where $Pr(\mathrm{WTP}_i = 1) = \Phi(x'_2\beta_2)$ and $Pr(\mathrm{WTP}_i = 0) = 1 - \Phi(x'_2\beta_2)$.

The effect of attitudes on stated amount willing to pay ($WTP) is based on the conditional expectation of ε_{1i} given ε_{2i}, $E[\varepsilon_{1i}|\varepsilon_{2i}]$. That is, the conditional expected $WTP, given that an intended payment is expressed or not, is given by:

$$\begin{aligned} E[\$\mathrm{WTP}_i|\mathrm{WTP}_i = 1] &= x'_{1i}\beta_1 + E[\varepsilon_{1i}|\mathrm{WTP}_1 = 1] \\ &= x'_{1i}\beta_1 + E[\varepsilon_{1i}|\varepsilon_{2i} > -x'_{2i}\beta_2] \\ &= x'_{1i}\beta_1 + \frac{\sigma_{12}}{\sigma_2^2}E[\varepsilon_{2i}|\varepsilon_{2i} > -x'_{2i}\beta_2] \\ &= x'_{1i}\beta_1 + \sigma_{12}\frac{\phi(x'_{2i}\beta_2)}{\Phi(x'_{2i}\beta_2)}, \end{aligned} \tag{4}$$

where $\sigma_2^2 = 1$ is the normalization restriction of the standard probit model, ϕ is the normal density function, and Φ is the cumulative normal density function. The term $\phi(x'_{2i}\beta_2)/\Phi(x'_{2i}\beta_2)$ is the inverse Mill's ratio and is denoted $\lambda(x'_{2i}\beta_2)$ by Heckman (1979). Thus, (4) can be re-written as:

$$E[\$\mathrm{WTP}_i|\mathrm{WTP}_i = 1] = x'_{1i}\beta_1 + \rho_{12}\sigma_1\lambda_i(x'_{2i}\beta_2), \tag{5}$$

with $\rho_{12}\sigma_1 = \sigma_{12}$. In this expression, ρ_{12} is the correlation coefficient between the two error terms. If $\sigma_{12} = \rho_{12} = 0$ (i.e., two error terms are uncorrelated), then OLS is a consistent estimator of the $WTP regression equation. If $\sigma_{12} \neq 0$ (i.e., two error terms are correlated), then OLS is an inconsistent estimator for the $WTP regression equation as the result of intended behavior (WTP) conditioned by attitudes.

Given that ρ_{12} and σ_1 are constants, and $\lambda(x'_{2i}\beta_2)$ is a variable determined by the independent variables influencing intended behavior, (5) may be re-written as the Heckman regression equation where $\rho_{12}\sigma_1 = \beta_\lambda$:

$$E[\$WTP_i|WTP_i = 1] = x'_{1i}\beta_1 + \lambda_i(x'_{2i}\beta_2)'\beta_\lambda. \tag{6}$$

A simple test arises in this specification where $\beta_\lambda = 0$ is tested using a t-test in the Heckman regression equation. If $|\beta_\lambda| > 0$, then a regression model ignoring the effect of attitudes on intended behavior will have inconsistent and inefficient parameter estimates, possibly resulting in invalid inferences. The full effects of regressors are recoverable from Eq. (6) where β_1 are the direct effects and indirect effects are a function of β_2 and λ (Greene, 2008).

Data

Data were obtained from a year-long study of recreationists at the McDonald-Dunn forest located northwest of Corvallis, Oregon, United States. This 11,250 acres multiple use forest is owned and managed by Oregon State University for teaching, research, recreation, and timber harvest. Day-use recreation is open to the public free of charge and main activities include hiking, trail running, mountain biking, and horseback riding. In recent years, the budget for managing recreation in this forest has declined dramatically. Timber harvest in this forest also declined dramatically before being suspended between 2009 and 2011, limiting supplemental funds that could be applied to managing recreation. Currently, recreation management in this forest is subsidized by reserve funds from timber harvest revenues generated in previous years. These constraints prompted managers to consider instituting a recreation use fee at this forest in an effort to recover costs and generate revenue independent of timber harvest.

An onsite survey of recreationists was used for collecting data where questionnaires were administered to users as they exited this forest between October 2008 and September 2009. A stratified random sampling design was used where sampling dates were randomly selected (approximately three to four days per week) and the times of day/site strata were rotated. Sampling times were selected as morning or afternoon strata beginning approximately one half hour after sunrise and ending one half hour before sunset, which corresponded with most recreation opportunities in this forest. Sampling sites were the five main access gates at this forest: Oak Creek, Jackson Creek, Lewisburg Saddle, Peavy Arboretum, and Highway 99. An attempt was made to contact each adult party onsite

and one questionnaire was administered to the person with the most recently passed birthday in each household in each party. Recreationists were sampled without replacement (i.e., nobody completed the questionnaire more than once). In total, 1462 people were intercepted with 1068 completing the questionnaire (73% response rate).

The primary variables of interest were attitudes and intended behaviors associated with a possible annual fee at this forest. Attitudes were measured by asking respondents to what extent they opposed or supported a mandatory annual use fee. The strength and direction of attitudes toward paying an annual fee were measured using a 5-point scale of 1 "strongly oppose" to 5 "strongly support" an annual fee, with 3 representing "neither." Respondents who reported that they "support" or "strongly support" an annual fee were considered to hold positive attitudes toward paying fees for recreation access to this forest, whereas those who reported "oppose" or "strongly oppose" were considered to have negative attitudes toward this fee. Although measures of attitudes have varied widely in the literature, several studies have used single item or single composite variables for measuring specific attitudes toward natural resource or recreation issues (Rollins and Trotter, 2000; Whittaker et al., 2006; Vaske, 2008; Manning, 2011). This attitude question was asked immediately prior to the willingness to pay questions in the questionnaire.

Respondents were then asked if they would be willing to pay an annual fee (WTP). An open-ended contingent valuation format was used for eliciting the maximum amount in dollars that respondents would be willing to pay for an annual fee ($WTP). This open-ended format is widely used and considered to be appropriate for estimating user fees given the familiarity of respondents to paying fees for access to recreation areas (Pouta and Rekola, 2001; Loomis, 2004; Bernath and Roschewitz, 2008). Respondents were instructed to write "0" if they were not willing to pay an annual fee. It is assumed that all $0 responses are not protest responses because follow-up questions distinguishing true $0 from protest $0 responses were not included in the questionnaire design.

Results

Table 1 reports descriptive statistics (i.e., mean, minimum, maximum value) for the sample used for estimating the models ($n = 805$). Approximately 75% of respondents stated that they were willing to pay an annual fee (WTP; $\mu = 0.75$) and this defines separation of the sample into two groups: (a) WTP sample ($n = 805$), and (b) $WTP sample ($n = 607$), which only included respondents who reported $WTP greater than $0 ($\mu = \$34$) or responded positively to the WTP question. Respondents

Table 1
Descriptive statistics – mean (min, max).

Variable (definition)	Probit WTP sample	OLS-robust $WTP sample
WTP (willingness to pay a fee; 1 = Yes, 0 = No)	0.75 (0, 1)	–
$WTP (amount willing to pay; $/year)	–	$34.34 (3, 200)
Strongly opposed (1 = strongly opposed to paying a fee, 0 = otherwise)[a]	0.23 (0, 1)	0.08 (0, 1)
Opposed (1 = opposed to paying a fee, 0 = otherwise)[a]	0.19 (0, 1)	0.18 (0, 1)
Support (1 = support for paying a fee, 0 = otherwise)[a]	0.33 (0, 1)	0.43 (0, 1)
Strongly support (1 = strongly support for paying a fee, 0 = otherwise)[a]	0.08 (0, 1)	0.10 (0, 1)
Years visiting (# years visiting this forest)	10.54 (0, 50)	10.39 (0, 50)
Hours/Trip (# hours/trip)	1.92 (0.5, 9)	1.92 (0.5, 9)
Group size (size of group; # people)	1.89 (1, 12)	1.92 (1, 12)
Gender (gender of respondent; 1 = female, 0 = male)	0.50 (0, 1)	0.51 (0, 1)
Age (age of respondent; years)	44.07 (18, 88)	43.93 (18, 88)
Student (college student status; 1 = student, 0 = otherwise)	0.18 (0, 1)	0.18 (0, 1)
Education (respondent's education, in years)	16.26 (8, 18)	16.33 (8, 18)
Income (respondent's annual income, in $000)	75.78 (5, 180)	78.84 (5, 180)
Frequency of visitation (# days visited per year)	69.75 (6, 160)	70.16 (6, 160)
Adjacent (miles from residence to forest boundary)	3.95 (0, 7)	3.97 (0, 7)
Mountain biking (1 = mountain biking, 0 = otherwise)	0.16 (0, 1)	0.16 (0, 1)
N	805	607

[a] Neutral/neither response is the omitted category for attitude variables.

Table 2
Estimated Selection (WTP) Equation ($n = 805$)[a].

Variable	Probit – WTP
Constant	0.80 (0.64)
Strongly opposed	−2.09*** (0.19)
Opposed	−0.82*** (0.20)
Support	1.30*** (0.39)
Strongly support	0.42 (0.36)
Years visiting	0.01 (0.01)
Hours/Trip	−0.09 (0.07)
Group size	0.07 (0.05)
Gender (1 = female)	0.09 (0.13)
Age	−0.01 (0.01)
Student	0.17 (0.19)
Education (years)	0.03 (0.03)
Income ($000)	<0.01** (< 0.01)
Frequency of visitation	<0.00 (< 0.01)
Adjacent (within 7 miles)	0.04 (0.03)
Mountain biking	−0.02 (0.20)
Goodness of fit	87% correctly predicted

[a] Standard errors in parentheses.
*** $p < 0.01$.
** $p < 0.05$.

were evenly split between negative (strongly oppose + oppose; $\mu = 0.42$ combined) and positive attitudes (strongly support + support; $\mu = 0.41$ combined) toward paying an annual fee, although strongly support ($\mu = 0.08$) was the least reported attitude. Respondents who opposed paying an annual fee (strongly oppose + oppose; $\mu = 0.26$ combined) were more likely to list $0 as their $WTP and fall out of the $WTP sample, whereas those who supported paying an annual fee were more likely (support + strongly support; $\mu = 0.53$ combined) to report a positive willingness to pay ($WTP greater than $0). The remaining variables in Table 1 were used to control for respondent characteristics and recreation behavior that might be correlated with WTP and $WTP in each model.

Table 2 provides the probit coefficient estimates from the selection Eq. (2), where the dependent variable was WTP. WTP was equal to 1 if the respondent stated an intention to pay an annual fee, and 0 otherwise. Predictions from the probit selection equation were correct for 87% of respondents and the only statistically significant variables in the selection equation were attitude and income. A negative attitude toward paying a fee (strongly oppose, oppose) decreased the probability of being willing to pay (WTP), with stronger negative attitudes related to lower probabilities of willingness to pay. A positive attitude toward a fee (support) increased the probability of being willing to pay and the strongest positive attitude (strongly support) also increased willingness to pay, but was not statistically significant. These findings still generally supported the first hypothesis; attitudes toward paying a fee were directly associated with the intention to pay (WTP). Income, which is a measure of ability to pay, was also positively associated with the intention to pay an annual fee.

Table 3 provides the coefficient estimates for the bid function ($WTP). Three bid functions were estimated: (a) OLS-Separate Equations model ignoring the potential correlation between the error terms from the selection equation and bid function (i.e., assumes $\sigma_{12} = \rho_{12} = 0$) and models only a direct effect on stated amount willing to pay for an annual fee ($WTP); (b) Heckman With Attitudes model permitting a correlation between the selection equation and bid function, but modeling the bid function to include a direct effect and an indirect effect of attitudes on $WTP; and (c) Heckman Without Attitudes model permitting a correlation between the selection equation and bid function, but only including the indirect effect of attitudes on $WTP. Each model performed similarly based on the R^2 goodness of fit measures (0.14–0.16). The sign and significance of all control variables were consistent across the three models, including factors that decreased $WTP such as age of respondents and student status, and factors increasing $WTP such as income and frequency of visitation.

The OLS-Separate Equations model estimates showed that attitudes were important for explaining variations in $WTP and exhibited a pattern similar to attitude effects in the selection equation. The

Table 3
Estimated bid ($WTP) function equations ($n = 607$)[a].

Variable	OLS – separate equation	Heckman with attitudes	Heckman without attitudes
Constant	40.36*** (8.58)	44.31*** (9.68)	43.51*** (8.69)
Strongly opposed	−9.08*** (2.37)	4.89 (16.50)	–
Opposed	−4.69* (2.49)	−0.88 (5.14)	–
Support	4.88** (2.22)	2.95 (3.17)	–
Strongly support	13.74*** (3.88)	12.68*** (3.42)	–
Years visiting	−0.05 (0.09)	−0.07 (0.10)	−0.08 (0.10)
Hours/Trip	−0.14 (0.86)	0.14 (1.00)	0.25 (0.96)
Group size	0.42 (0.61)	0.18 (0.64)	0.19 (0.59)
Gender (1 = female)	−0.65 (1.75)	−0.99 (1.78)	−0.94 (1.77)
Age	−0.28*** (0.07)	−0.25*** (0.08)	−0.25*** (0.08)
Student	−6.21*** (2.07)	−6.72** (2.65)	−6.53** (2.62)
Education (years)	−0.24 (0.40)	−0.32 (0.45)	−0.17 (0.45)
Income ($000)	0.07*** (0.02)	0.06*** (0.02)	0.07*** (0.02)
Frequency of visitation	0.06*** (0.02)	0.06*** (0.02)	0.07*** (0.02)
Adjacent (within 7 miles)	−0.34 (0.39)	−0.44 (0.37)	−0.40 (0.36)
Mountain biking	−2.01 (2.38)	−2.08 (2.39)	−2.27 (2.43)
λ	–	−13.24 (15.30)	−14.04*** (2.50)
R^2	0.16	0.16	0.14

[a] Standard errors in parentheses; all models include heteroskedasticity robust standard errors.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.10$.

strength of the attitude mattered where negative attitudes were associated with decreased $WTP and positive attitudes were associated with increased $WTP. When the error terms from the selection equation and bid function were correlated, however, this is the same problem as omitted variable bias where λ, the inverse Mills ratio, is the omitted variable. Linking the selection equation and bid function through the Heckman sample selection model (Eq. (6)) provided a test of the correlation between the two equations. Results of the Heckman With Attitudes model, when juxtaposed with the Heckman Without Attitudes model, showed that attitudes had countervailing impacts on $WTP when both were included in the model. Neither the direct attitude measures (strongly oppose, oppose, support) nor the indirect attitude effects through λ were statistically significant. When the direct measures of attitudes were dropped from the model in the Heckman Without Attitudes, the indirect effects of attitudes via λ were statistically significant. These findings, therefore, supported the second hypothesis and Fig. 1; attitudes toward the behavior of paying a fee were indirectly (i.e., mediation) related to stated payment amount ($WTP).[1]

Discussion and conclusions

Consistent with past research, these results showed that respondents with supportive attitudes were more willing to pay recreation fees than those with attitudes of opposition. The strength of attitudes also influenced willingness to pay recreation fees in the expected fashion, with respondents

[1] Ancillary analyses tested the model in Fig. 1 using structural equation modeling (SEM) as an alternative to the approaches used in this article (e.g., Probit, OLS, Heckman). SEM results were consistent with findings from these approaches, as full mediation was present. In step one, the path coefficient between the predictor (attitude) and criterion ($WTP) was significant at $p < .05$. In step two, both coefficients between the predictor and mediator (WTP), and the mediator and criterion were also significant at $p < .05$. In step three, the coefficient between the predictor and criterion was added back into this model and was insignificant. The chi-square difference test between steps two and three was also insignificant ($\Delta\chi^2 = 1.95$, $p = .163$), suggesting full mediation. Structural model fit for the full mediation model among the three variables was strong (CFI = .95, NNFI = .94, RMSEA = .05). This SEM approach, however, is arguably inferior to the approaches used in Tables 2 and 3 (e.g., Probit, OLS, Heckman) because SEM typically necessitates multiple variables measuring each latent concept instead of just the single manifest variables used here. In addition, SEM does not easily permit comparison of the different individual levels of the attitude variable (i.e., oppose, strongly oppose, support, strongly support) and their effects on both WTP and $WTP.

having stronger opposition also being least likely to pay these types of fees. Attitudes were among the strongest predictors of willingness to pay, suggesting that future contingent valuation studies should include attitude measures as part of the suite of variables (e.g., income, visitation, age, education) used for understanding and predicting willingness to pay in recreation and other natural resource contexts.

Future work building on these results and describing these types of relationships among attitudes, intentions, and behaviors can provide new attitude-contingent valuation applications and more information for assisting with interpretation of willingness to pay estimates (Luzar and Cossé, 1998; Spash et al., 2009). Some past studies provide important examples of how these social psychological measures can be integrated within contingent valuation methods to estimate willingness to pay recreation fees (e.g., Ajzen and Driver, 1992; Barro et al., 1996; Rollins and Trotter, 2000; Bernath and Roschewitz, 2008). Each study, however, has varied widely in the attitude measure used, resource investigated, application purpose, and model type. Additional research bridging social psychology and contingent valuation is warranted to build on the approaches and results presented here and in these other studies.

Most of these previous contingent valuation and attitude studies also separately examined direct effects between attitudes and willingness to pay. This article, however, modeled attitudes toward paying a recreation fee on both willingness to pay (WTP) and stated payment amount ($WTP) simultaneously to test for any potential mediating effects of attitudes toward paying fees on stated amounts through the intention to pay. The hypotheses that attitudes toward paying an annual fee would be directly associated with the intention to pay and indirectly associated with the stated payment amount were supported by the data and modeling approach. This mediation effect is consistent with aspects of attitude models such as the theories of reasoned action and planned behavior that suggest a hierarchy of cognitions where actual behavior is influenced by intention to engage in the behavior, and this intention is a function of attitudes and other cognitions about the behavior (Ajzen and Fishbein, 1980). Researchers should remain cognizant of this hierarchy and flow-through effects of attitudes on intentions to pay and other forms of stated behavior when modeling effects of attitudes on willingness to pay.

These findings also suggest that the specificity of the attitude object is an important consideration when incorporating attitude measures into contingent valuation studies. The single measure of attitudes in this study was specific to the fee being evaluated (i.e., annual fee) and given that the intention to pay was correlated with stating an amount to pay, then specific attitudes about paying a fee should be correlated with willingness to pay and payment amount. Results showed that specific attitudes about paying a fee were stronger predictors of an individual's intention to pay or not than how much he or she was willing to pay. Other attitude objects, however, may be related to intentions to pay and stated payment amounts. Meyerhoff (2006), for example, tested an index of several specific and more general attitudes, and found that attitudes toward the specific behavior of helping to finance floodplain restoration were more strongly associated with both WTP and $WTP for restoration than effects of general attitudes toward the broader environment on both WTP and $WTP. Despite these results, Meyerhoff (2006) concluded that general attitudes toward the environment and the good should still be incorporated along with more specific attitudes in willingness to pay models. Contemporary research regarding the effect of attitudes on stated willingness to pay includes the use of latent class models (Morey et al., 2006; Cunha-e-Sá et al., 2012) and integrated choice and latent variable (ICLV) models (Hess and Beharry-Borg, 2012). As noted by Green and Tunstall (1999) and Fishbein and Manfredo (1992), however, attitudes about general goods or objects should be considered inferior to attitudes about specific events (i.e., paying a fee) as predictors of behavioral intentions such as willingness to pay. Attitudes toward the good (i.e., the recreation activity) or physical context (i.e., the forest) were not measured in this article and may enter into the proposed framework differently (Fig. 1). This is a topic for future research.

From a research perspective, these results suggest the importance of integrating economic and social psychological approaches to improve understanding of willingness to pay recreation use fees. These findings, however, also have applied implications. Managers and policy makers, for example, can benefit from understanding user attitudes because as shown in this study, these attitudes can help to predict possible behavioral reactions to policies such as implementation of new fee systems. A number of studies have also shown that attitudes can frequently change and be receptive to communication and educational campaigns using persuasive and targeted messages (Fishbein and Ajzen,

1975; Barro et al., 1996; Whittaker et al., 2006; Manning, 2011). Managers and policy makers seeking to increase willingness to pay behaviors and compliance with fee policies, therefore, may want to consider targeting individuals with negative attitudes and conveying educational messages informing these users about the rationale and need for fees and related policies.

Despite these implications, data in this article are limited to a single forest in Oregon that is owned and managed by a university for multiple purposes (e.g., teaching, research, recreation, timber harvest) and where most recreationists are participating in non-motorized activities (e.g., hiking, mountain biking, horseback riding). This forest is also adjacent to an urban area and fees have never been charged for recreation access to this site. Findings, therefore, may not generalize to other activity groups, natural resource settings, or sites used for other purposes. Applicability of these methods and findings to other activities, geographical areas, and locations managed for different purposes and with fees already in place remain topics for future empirical investigation.

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