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Comparison of payment card vs dichotomous choice questions

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Abstract

This study examines how changes in travel time affects participants' intention to revisit a sport event and how willingness to travel (WTT) questions and resulting willingness to pay (WTP) estimates differ depending on the question format. The analysis relied on post-race online survey data of participants of a running event in the United States (*n*=592). WTT questions were assessed with payment card (multiple cost levels) and dichotomous choice formats (single cost level). Hypothetical travel cost increase was framed as additional travel time rather than travel distance. Results reveal that respondents are less likely to participate as travel time rises, while higher-income respondents are more likely to return. The payment card question format generates greater travel cost sensitivity than the dichotomous choice format, while yielding higher WTP estimates. The study introduced travel time as a valid payment vehicle and offered evidence of how different question formats affect WTT and WTP.

Keywords: Intention to revisit; Monetary valuation; Sport event; Sport tourism; Travel cost; Willingness to pay

Word count: 8565

1 Introduction

For recurring events, understanding if visitors return to the next edition in the following year is characterized by uncertainty (van Cranenburgh et al., 2014), yet important to know from the perspective of event organizers and tourism managers (e.g., Whitehead & Wicker, 2025). This is no different for sport events, especially endurance events like runs, bike races, and triathlons, with a running event being the focus of the present study. In these events, participants compete in several editions for different purposes, including comparing their race performance to the previous years or reaching specific time- or rank-related finisher goals (e.g., Hyun & Jordan, 2020; Stoeber et al., 2009). Participants' decision to return to an event is not only shaped by personal achievement goals, but also by a myriad of further factors, including event-related factors like satisfaction with the event and past visits (e.g., Kaplanidou & Gibson, 2010; Petrick et al., 2001); destination attributes like place attachment (e.g., Raggiotto & Scarpi, 2023) and destination image (e.g., Milovanovic et al., 2021); external factors like weather conditions (e.g., Whitehead & Wicker, 2020); and individual factors like income and travel cost (e.g., Whitehead & Wicker, 2019).

Especially travel costs play a critical role in explaining participants' revisit intentions (e.g., Whitehead & Wicker, 2018). Tourists were found to be sensitive to both high levels of travel cost (e.g., van Cranenburgh et al., 2014) and increases in travel cost (e.g., Whitehead & Wicker, 2018; 2025), ultimately lowering individuals' revisit intentions. For visits to destinations or recurring events like regional sport events where visitors typically travel by car, individuals' travel costs have been conceptualized to consist of two components (e.g., Chae et al., 2012; Whitehead & Wicker, 2018): The first component includes the operating costs of vehicles, which are a function of average motoring costs and travel distance. The second component is

opportunity cost of time, which represents a function of a specific fraction of the wage rate, travel distance, and average driving speed in the region of interest (e.g., Chae et al., 2012).

Tourism researchers have discussed the consideration of opportunity cost of time and the adequate fraction of the wage rate in travel cost calculations. While some scholars argued that travel occurs in individuals' leisure time which has zero opportunity costs (e.g., Pascoe et al., 2014), others stressed that travel time represents disutility to visitors (Ezzy et al., 2012) and should, therefore, be included in travel cost estimations, typically with a wage rate fraction of at least 30% (e.g., Chae et al., 2012; Whitehead & Wicker, 2018). Hence, travel time has typically been used for calculating opportunity costs of time as a component of total travel costs, but has rarely been assessed separately in tourism demand studies. This neglect is surprising since tourists were found to be more sensitive to changes in travel time than travel cost (van Cranenburgh et al., 2014). Given that event organizers and tourism managers are interested in whether participants return to the event and under which conditions, understanding the role of participants' travel time and willingness to travel (WTT) is critical.

One way to gather information about participants' WTT and intentions to return to the event is to conduct post-race participant surveys. Since return visitation questions fall in the category of stated preferences (as opposed to revealed preferences), the manner in which such hypothetical questions are posed needs some attention (Orlowski & Wicker, 2019). For example, decisions must be made regarding the question format, response options, and payment vehicle (e.g., money, travel cost, travel distance, travel time). In terms of question formats, payment card and dichotomous choice represent popular formats (e.g., Orlowski & Wicker, 2019; Whitehead & Wicker, 2019). The payment card format presents respondents with a series of changes in the variable of interest (e.g., travel cost) and asks them to indicate the likelihood of return visitation

at each travel cost, while the dichotomous choice format asks participants the WTT question with a single randomly assigned travel cost. Findings from such hypothetical questions were found to differ depending on the question format (e.g., Groothuis et al., 2023; 2025; Orlowski & Wicker, 2016; Whitehead & Wicker, 2019), but it is not clear whether and to which extent this applies to WTT questions using travel time as a payment vehicle, which is used in the present study.

Importantly, these hypothetical WTT questions can also be used to estimate the value of event participation to participants (e.g., Whitehead & Wicker, 2025). Specifically, information about WTT can be converted into willingness to pay (WTP) estimates, reflecting consumer surplus and the economic value of participation in amateur sport events (Whitehead et al., 2016; Whitehead & Wicker, 2018). WTP estimates can be aggregated over the number of participants to obtain the aggregate benefit of the event when participants have standing. Decision makers like event organizers or policy makers can compare the benefit estimate to the cost of the event to determine its efficiency. For example, government decision makers can conduct benefit-cost analysis to determine if the event warrants public subsidy. Collectively, researchers and practitioners would benefit from knowledge about the role of travel time in shaping visitors' revisit intentions and how different WTT question formats affect responses and findings.

The purpose of this study is to examine the effects of changes in travel time (and resulting travel cost) on participants' intention to revisit an endurance event. Moreover, it investigates how hypothetical WTT questions and resulting WTP estimates differ depending on the question format (payment card vs. dichotomous choice). It seeks to answer the following two research questions:

(1) How do increases in travel time (and resulting travel cost, also in light of individuals' financial resources) and the question format affect participants' probability of return visitation? (2) How do different question formats affect WTT statements and resulting WTP estimates?

These research questions are answered empirically using data from a participant survey following a running event in the United States. Contributions of the study include offering evidence of travel time representing a valid payment vehicle within WTT questions. Another insight is that the payment card format is more sensitive to changes in travel time than the dichotomous choice format. These contributions enhance our understanding of participants' revisit intentions.

2 Conceptual framework and related literature

2.1 Contingent behavior method

Hypothetical questions about intentions to revisit an event or a destination belong to the stated preference approaches. The corresponding approach is the contingent behavior method (CBM), where respondents are presented with a hypothetical scenario and asked for their behavioral intentions under the conditions specified in the scenario (Orlowski & Wicker, 2019). Within return visitation studies, respondents' WTT under specific hypothetical conditions is assessed. In previous research, WTT has been assessed with changes in travel distances, which were then converted into travel costs (Whitehead & Wicker, 2018; 2020). The present study diverges from this previous research by including a WTT question with increased travel time. Accordingly, it tests whether the increased travel time is a valid payment vehicle, i.e., the mean through which value is expressed. The background is that CBM and WTT belong to the portfolio of monetary valuation methods, attempting to assign monetary values to intangibles like event participation (e.g., Whitehead & Wicker, 2018; 2025).

Generally speaking, monetary values could also be assessed more directly by employing the contingent valuation method (CVM), which assesses respondents' WTP for a specific hypothetical scenario to occur or to be avoided (Orlowski & Wicker, 2019; Whitehead et al., 2016). However, it is possible that respondents become price sensitive and intentionally understate their WTP (Heyes & Heyes, 1999), ultimately undervaluing the object of interest. Thus, travel distances and travel time reflect more incentive compatible payment vehicles, which can still be converted into WTP and monetary values based on travel costs. Monetary values are of interest as they can be used for comparative purposes and included in benefit-cost analyses.

2.2 Determinants of intention to revisit

The present study focuses on three factors that might affect participants' revisit intentions. The first determinant is travel time which shapes travel cost. In previous tourism studies, travel cost was typically assessed with travel distance which can be converted into travel costs (e.g., Whitehead & Wicker, 2019). The question is whether using travel distance or travel time makes a difference to respondents. It can be argued that it does, as travel distance is a more abstract concept and some individuals are not good at estimating distances and/or converting distances into time requirements. Moreover, depending on the mean of transportation, travel time for the same distance can vary significantly. Ultimately, travel time might be a more accurate reflection of associated travel costs as it already includes aspects like transport means, congestion, and driving speed.

Concerning the relationship between intention to revisit and travel time, it can be assumed that – similar to travel distance – individuals prefer shorter travel time over longer travel time, as traveling causes disutility (Ezzy et al., 2012) and reduces wellbeing (Wicker, 2020). Especially environmental stressors associated with travel such as congestion, crowd,

noise, and pollution reduce wellbeing (Koslowsky et al., 1995). Other stressors like delay, uncertainty of timely arrival, as well as lack of comfort and space might be at work too. Furthermore, longer travel time is coupled with higher opportunity cost, meaning the time spent on traveling cannot be used for other activities, suggesting a negative association with revisit intentions.

The empirical evidence on travel time is relatively scarce as previous research focused on travel costs (and distance). Exceptions include van Cranenburgh et al. (2014) who document a negative association between travel time and revisit intentions. Existing studies for leisure-time physical activity show that participants are sensitive to changes in travel time to the sport facility and are only willing to dedicate a specific portion of their overall exercise time to travel (Pawlowski et al., 2009). For example, for fitness activities, travel time was found to make up one third of the total time spent on the activity, with increases in travel time being associated with decreases in individuals' wellbeing (Wicker et al., 2015). Collectively, these findings indicate that participants have preferences for shorter travel times. This aspect is covered in the first hypothesis:

H1: Travel time is negatively associated with participants' revisit intentions.

The second factor is income, where competing theoretical perspectives can be advanced. Starting with the opportunity cost perspective, the opportunity costs of travel time increase with increasing income, suggesting that return visitation is less likely for higher-income individuals as travel time increases. Previous research on leisure-time physical activity supports this notion. For example, individuals with higher time costs (meaning higher incomes and thus higher opportunity costs) were found to have preferences for less-time consuming (but higher intensity) physical activities compared to activities of longer duration but lower intensity (Meltzer & Jena,

2010). Following this line of thought, higher-income individuals might have a preference for less time-consuming leisure activities including shorter travel time to revisit a sport event.

The second perspective draws from the luxury good hypothesis, holding that activities like leisure-time travel are costly and are, therefore, more likely to be conducted by individuals earning higher incomes who can afford spending money on traveling (e.g., Büchs & Schnepf, 2013; Wicker, 2019). Put differently, these individuals can afford to not do other activities (like paid work to earn money) while traveling. Thus, in some ways, their opportunity costs of travel time might be lower as they would replace the leisure activities of traveling to a sport event by another leisure activity. This notion is relevant as participants of recurring endurance sport events, who are the focus of the present study, can be characterized by earning above average incomes (e.g., Kaplanidou et al., 2012; Whitehead & Wicker, 2020).

The event context might also be relevant because participants have to decide early if they want to participate in the next year as they need to register for the event. Registration for such endurance events typically opens shortly after the previous event as event organizers would like to reduce their uncertainty by being informed early about participant numbers (Whitehead & Wicker, 2019). Registration fees can be costly and coupled with further costs of the trip (travel costs, accommodation, food), which are more affordable by higher-income individuals (e.g., Wicker et al., 2012). Moreover, many cost components are volatile as they can be subject to price increases because of external factors like peak oil events or inflation which increase price levels (van Cranenburgh et al., 2014). Hence, higher-income individuals might be less sensitive to price volatility and price increases because they could afford the trip also under high-cost conditions. Despite the relevance of financial resources for traveling, income has been rarely included in return visitation studies. The few existing studies reported a positive effect of income

on participants' revisit intentions (e.g., Whitehead & Wicker, 2018; 2019). The second two-part hypothesis reflects the above discussion:

H2a: Income is positively associated with participants' revisit intentions.

H2b: Income under high travel time cost conditions is positively associated with participants' revisit intentions.

The third factor is the question format, i.e., the way questions about return visitation are asked. Within stated preferences studies, different question formats are possible that have been used in previous research (e.g., Orlowski & Wicker, 2019). For example, open-ended questions where respondents are asked to fill in a number themselves were criticized for producing comparably high estimates (e.g., Orlowski & Wicker, 2016), suggesting that the cognitive demands are too high and respondents tend to overestimate their behavioral intentions. The dichotomous choice format is cognitively less demanding as it only includes one option and respondents need to decide if they accept the proposed increase or not. This process can be conducted once (i.e., single dichotomous choice; e.g., Whitehead & Wicker, 2019), twice (i.e., double dichotomous choice; Swierzy et al., 2018), or multiple times where, depending on the answer to the first question, lower respectively higher values are presented until respondents click on 'yes' respectively 'no' or reach a predefined minimum respectively maximum number (e.g., Orlowski & Wicker, 2016).

Moreover, the payment card format has emerged as a popular question format. A payment card includes multiple answers in terms of e.g., increases in prices, travel distances, or travel time (as in the present study) and respondents are asked to state their likelihood of conducting an activity under these circumstances. With several answers being offered, respondents might accept some of the early presented increases but decline higher increases.

While evidence for travel time is not available, scholars have found that for both travel distances (e.g., Groothuis et al., 2023; 2025; Whitehead & Wicker, 2019) and WTP (e.g., Orlowski & Wicker, 2016) the dichotomous choice question format leads to larger estimates compared to the payment card format. The same association is expected when travel time is the payment vehicle:

H3: Intention to revisit is more likely in the dichotomous choice format than in the payment card format.

3 Methods

3.1 Research context

The research context of the present study is the Blue Ridge Relay (BRR), a long distance relay road race. Teams of between four and twelve runners cover 209 miles with a start at Grayson Highlands State Park in Virginia and a finish in downtown Asheville, North Carolina. The 2015 race began on Friday, September 11th and ended on Saturday, September 12th. A total of 184 teams competed in the relay. The economic impact of the event to local economies was estimated to be about $1 million (Sullivan & Whitehead, 2016).

3.2 Data collection and respondent characteristics

The study was approved by the institutional review board of the lead author's university (IRB-14-0086). Following the 2015 BRR race an online survey was administered to participants using Survey Monkey©. Email invitations were sent to all 1,849 registered runners. After the initial email two reminders were sent. Altogether, 792 runners completed the survey, which is equivalent to a response rate of 43%. Non-responses to relevant questions reduced the sample size. Specifically, 176 respondents did not answer the income question, 2 respondents did not answer the first return visitation question, another 16 respondents who answered the first return visitation question stated that they definitely would not participate in 2016 and did not answer

the WTT questions, 1 respondent did not answer the DC question and 5 respondents did not answer at least one of the PC questions. Deleting those respondents with item-response on these two variables yields a final sample size of n=592.

Table 1 shows the respondents' sociodemographic characteristics and event-related factors for the two sub-samples by question format – about 50% of respondents received each format of the WTT question. While almost all respondents were at least moderately satisfied with the event, 74% of survey respondents who received the dichotomous choice question format were extremely satisfied with the 2015 BRR relative to only 66% of those receiving the payment card format (p<0.05). This is the only statistically significant difference between the two sub-samples. On average, respondents have participated in 2 BRR races before 2015. Slightly over 70% are male, 85% are employed, about 80% are married, and about 90% have a four-year college degree. The average age is slightly over 40 years, the average household size is about 3.5, and the average household income is slightly over $100,000 (2015 US dollars).

Insert Table 1 here

3.3 Intention to revisit questions

Two return visitation questions were asked in each survey – one generic question that was the same for all respondents and one with increases in travel time assessed with different question formats. The first return visit intention question was (Figure 1): "How likely is it that you will register for the 2016 Blue Ridge Relay?" Table 2 indicates that about 66% of respondents answered very likely, 23% answered somewhat likely, 6% answered neither likely nor unlikely, 3% answered somewhat not likely and 3% answered very unlikely. Thus, return visitation intentions were elicited with a likelihood Likert scale in the present study. This is contrary to previous research eliciting responses to WTT questions with a probabilistic Likert

scale including the following answer categories: definitely yes, probably yes, neutral, probably no, and definitely no (e.g., Whitehead & Wicker, 2018; 2025). In these previous studies, the combination of 'definitely yes' and 'probably yes' responses enhanced the statistical validity of the return visitation data.

Insert Figure 1 and Table 2 here

Respondents who answered this question with anything other than 'very unlikely' received a follow-up question with increased travel time. This approach (travel time instead of distance) was used as the hypothetical situation due to the different start and finish points of the race making an increased driving distance question difficult to communicate. Two different question formats were used for the second return visitation question. The follow-up question in the payment card format was (Figure 2):

> "Now suppose that for some reason you move farther away from the start and/or finish of the Blue Ridge Relay. Suppose that your round trip travel time increases by the following amounts: 30 minutes, 60 minutes, 90 minutes or 120 minutes. In these new situations, how likely is it that you would register for the 2016 Blue Ridge Relay?"

In this question format, 67% of respondents state that they are very likely to register for the 2016 BRR if travel time increased by 30 minutes, 59% will register if time increased by 60 minutes, 39% will register with a 90 minute time increase, and 34% will register with a 120 minute time increase (Table 3). Considering the combination of 'very likely' and 'somewhat likely' responses, 91%, 86%, 72%, and 61% will register if travel time increases by 30, 60, 90, and 120 minutes.

Insert Figure 2 and Table 3 here

The follow-up question in the dichotomous choice format read as follows (Figure 3):

> "Now suppose that for some reason you move farther away from the start and/or finish of the Blue Ridge Relay. Suppose that your round trip travel time increases Δt minutes. In

this new situation, how likely is it that you would register for the 2016 Blue Ridge Relay?"

where Δt is one of the following randomly assigned increases in travel time: 30, 60, 90, or 120 minutes. In this format, 65% of respondents state that they are very likely to register for the 2016 BRR if travel time increased by 30 minutes, 58% will register with a 60 minute increase, 49% will register with a 90 minute increase, and 33% with a 120 minute increase. Combining the 'very likely' and 'somewhat likely' responses, 90%, 82%, 85%, and 74% will register if travel time increases by 30, 60, 90, and 120 minutes. Responses from the dichotomous choice format are similar to the payment card question format, with one exception. The only exception is with the 90 minute time cost increase. Payment card respondents are less likely to state that they are very likely to return, 39%, relative to dichotomous choice respondents, 49%.

Insert Figure 3 here

3.4 Determinants of return visitation

Logistic regression models were estimated following Whitehead and Wicker (2019):

$$\ln\left(\frac{\pi(RV)}{1-\pi(RV)}\right) = \beta_0 + \beta_1 \Delta TTC_i + \beta_2(\Delta TTC_i \times DC) + \beta_3 Y + \boldsymbol{\delta}' X + e_i \quad (1)$$

where $\pi(RV)$ is the probability of a return visit ($RV = 1$), ΔTTC is the change in travel time and cost, DC is the dummy variable for the dichotomous choice question format, Y is income, $\boldsymbol{\delta}$ is a vector of coefficients, X is a vector of participant characteristics from Table 1 (except income) and the *DC* dummy variable, and e is a random error term, $i = 1, \ldots, n$. The change in travel time and cost (ΔTTC) was measured as the sum of out-of-pocket travel costs and the opportunity cost of time, $\Delta TTC_i = (c \times \Delta d) + \left(\gamma \times w_i \times (\Delta t/60)\right)$, where $c = 0.1718$ is the operating cost per mile for a medium Sedan (American Automobile Association, 2015), $\Delta d = \Delta t(mph/60)$ is the change in one-way distance (in miles), Δt is the change in time from the WTT questions, mph is 50 miles per hour (the average driving speed in North Carolina

according to Google Maps), $\gamma = 0.33$ is the fraction of the wage rate, and $w = Y/2000$. This fraction of the wage rate mirrors previous research (e.g., Chae et al., 2012; Whitehead & Wicker, 2018; 2019). The average change in TTC is $32 with the payment card data and $34 with the dichotomous choice data.

Alternative recodings of the return visitation variable were investigated. In previous research, these recodings were necessitated by comparisons to actual behavior data. For example, Whitehead et al. (2016) found that the combination of 'probably and definitely yes' respondents more accurately predicted actual behavior than only using 'definitely yes' responses. Whitehead and Wicker (2018) documented that the 'probably and definitely yes' models are more statistically robust. The practice is continued here for comparative purposes. Accordingly, the two recoding options are applied as well and the dependent variable is coded as a return visitation if 1) the respondent answers 'very likely' (VL; Model 1) or 2) if the respondent answers 'very likely' or 'somewhat likely' (VL & SWL; Model 2).

The payment card and dichotomous choice question formats are compared using a bootstrap approach. This approach differs from previous research creating the data for comparing the payment card and dichotomous choice versions by randomly drawing only one observation from the payment card data (e.g., Groothuis et al., 2023, 2025; Whitehead & Wicker, 2019). These previous studies found that the dichotomous choice format leads to higher WTP estimates. In contrast, in present bootstrap approach, the question formats are compared with 1,000 random draws from the payment card data and the logit model is estimated 1,000 times. This approach enhances the reliability of results, i.e., avoiding any notion that the random dataset is 'cherry-picked'. The bootstrapped estimates are the mean of the coefficients and standard errors:

$$\bar{\beta}_j = \frac{1}{n}\sum_{k=1}^{n}\hat{\beta}_{jk} \text{ and } \overline{SE}_{\beta j} = \frac{1}{n}\sum_{k=1}^{n}\sqrt{\sigma^2\left(\hat{\beta}_{jk}\right)} \quad (2)$$

where $j = 0, 1, 2, \ldots$ parameters and $k = 1, \ldots, 1000$ replications.

3.5 Monetary valuation

The monetary value of a revisit is the difference between what the consumer is willing and able to pay and the actual cost. In a logit model, the monetary value (i.e., WTP for the event) is the consumer surplus area from the probabilistic demand curve bounded by the probability of intended visitation at an additional travel cost of zero and the additional travel cost that makes this probability equal to zero. We estimate this consumer surplus with the Hanemann (1984) WTP formulas in models where the vector of participant characteristics, X, is not included: $WTP1PC = -(\beta_0 + \beta_3\bar{Y})/\beta_1$ with the payment card data and $WTP1DC = -(\beta_0 + \beta_3\bar{Y})/(\beta_1 + \beta_2)$ with the dichotomous choice data. The $WTP1$ estimate is the dollar value that makes respondents indifferent between a return visit and no return visit, $\hat{\pi}(RV = 1) = 0.50$. $WTP1$ estimates can be negative or not statistically different from zero (Whitehead et al., 2024). We drop the DC dummy variable due to its statistical insignificance and include income to avoid using TTC to measure ability to pay.

We also estimate the consumer surplus with the Hanemann (1989) truncated WTP formula used in previous research (Whitehead & Wicker, 2018; 2019): $WTP2PC = -\ln(1 + \exp[\beta_0 + \beta_3\bar{Y}])/\beta_1$ with the payment card data and $WTP2DC = -\ln(1 + \exp[\beta_0 + \beta_3\bar{Y}])/(\beta_1 + \beta_2)$ with the dichotomous choice data. Conceptually, the $WTP2$ estimates do not allow for negative WTP by truncating the cumulative distribution function at $\Delta TTC = 0$. The $WTP2$ estimate is the integration of the area under the cumulative distribution function between $\pi(RV|\Delta TTC = 0)$ and $\pi(RV) = 0$. In practice, $WTP1 < WTP2$ for most datasets (Whitehead et al., 2024).

Differences in WTP between the two question formats (dichotomous choice, payment

card), the two types of WTP measures (WTP1, WTP2), and the two types of dependent variables (VL and VL & SWL) are analyzed. First, we consider differences in question format by comparing the WTP differences, $\Delta WTP = WTPDC - WTPPC$, between the PC and DC question for both $WTP1$ and $WTP2$ in the VL and VL & SWL models. Second, differences in *WTP* estimation approach are investigated by comparing the difference between the $WTP1$ and $WTP2$ estimates for both PC and DC question formats in the VL and VL & SWL models, $\Delta WTP = WTP2 - WTP1$. Third, differences in *WTP* across VL and VL & SWL models are considered, $\Delta WTP = WTPVL\&SWL - WTPVL$.

For each of these WTP comparisons, we conduct a convolutions test (Poe et al., 1984; Poe et al., 2005). Consider two simulated WTP estimates for scenarios A and B, $\overline{WTP_A} = \frac{1}{n}\sum_{k=1}^{n} WTP_{Ak}$ and $\overline{WTP_B} = \frac{1}{n}\sum_{k=1}^{n} WTP_{Bk}$. The convolutions test involves comparing each of the n WTP estimates from scenario A with each of the n WTP estimates from scenario B. If the expectation is that $WTP_A > WTP_B$, then the p-value in a one-tailed test of the expectation is $p_1 = \frac{C}{n}$, where $C = \sum_{m}^{n\times n} N$ and $N = 1$ if $WTP_{Am} < WTP_{Bm}$. We use the simulated difference as our expectation for the difference in WTP estimates and conduct one-tailed tests. Note that the p-value for a two-tailed test is $p_2 = 2 \times p_1$.

4 Results

4.1 Determinants of return visitation

Table 4 summarizes the logistic regression models, including long (Model 1) and short models (Model 2), with Model 1 including all of the participant characteristics (Table 1) as controls and Model 2 including only the variables that vary according to experimental design and are statistically significant as well as income. In all four estimations, return visitation significantly decreases as TTC increases, lending empirical support for hypothesis H1.

Respondents with higher income are significantly more likely to return visit in three out of four models, suggesting that hypothesis H2a can mostly be accepted. The interaction term of income with TTC is not significant in Models 1a and 1b, meaning that higher income respondents are not more likely to return visit under high TTC conditions. Thus, hypothesis H2b must be rejected. The DC dummy is insignificant in Models 1a and 1b, indicating that the question format does not affect return visitation. Hence, hypothesis H3 cannot be confirmed. The interaction of the DC dummy with TTC has a significant positive association in three out of four estimations, indicating that the question format matters under high TTC conditions and that the DC format increases the likelihood of a return visit.

Overall, the remaining results are largely similar when 'very likely' (VL) and 'very likely and somewhat likely' (VL & SWL) is the dependent return visitation variable. Across models, respondents who have more experience with the BRR and are extremely satisfied with the BRR are more likely to return visit. There are a few differences between the different recodings of the dependent variable. For example, the intercept is larger and statistically significant in the 'very likely and somewhat likely' models, suggesting higher WTP. Respondents with a college degree are less likely to return visit in the 'very likely' models, while older participants are less likely to return visit in Model 1b.

Insert Table 4 here

4.2 Monetary valuation

Table 5 displays the bootstrapped WTP estimates for the VL and VL & SWL models. In the VL model, the WTP for a return visit ranges from $35.70 for the WTP1 estimate from the payment card question format to $53.39 for the WTP2 estimate from the dichotomous choice format. In the VL & SWL model, the WTP for a return visit estimates ranges from $76.27 for the

WTP1 estimate from payment card question format to $119.63 for the *WTP2* estimate from the dichotomous choice format.

Insert Table 5 here

Table 6 reports the statistical test results for differences in WTP estimates. In the first set of tests comparing the two question formats, the effect of the interaction term on the change in TTC and DC variables leads to significantly higher WTP estimates in the dichotomous choice format relative to the payment card format in both the VL and VL & SWL models. In the VL model, the $6.36 difference in the $WTP1$ estimates between the DC and PC formats is statistically significant ($p < 0.01$). Likewise, the difference in the $WTP2$ estimates of $8.05 between the DC and PC formats is statistically significant ($p = 0.02$). In the VL & SWL model, the difference of $39.63 in the $WTP1$ estimates between the DC and PC formats is statistically significant ($p < 0.01$). Similarly, the difference in the $WTP2$ estimates of $40.93 between the two question formats is statistically significant ($p < 0.01$).

The second set of tests compares the two WTP estimations. In the VL model, the difference in the $WTP1$ and $WTP2$ estimates in the PC question format is $9.64 and statistically significant ($p < 0.01$). The difference of $11.33 in the DC question format is also statistically significant ($p < 0.01$). In the VL & SWL model, the differences in the $WTP1$ and $WTP2$ estimates of $3.73 (PC question format) and of $2.43 (DC question format) are not statistically significant ($p = 0.21$).

The third set of tests compares the two recodings of the return visitation variable. In the PC question format, the $40.56 difference in the $WTP1$ estimates between VL and VL & SWL models is statistically significant ($p < 0.01$). Likewise, the $73.84 difference in the $WTP1$ estimates across models is significant ($p < 0.01$) in the DC question format. In the PC question

format, the difference in the $WTP2$ estimates across models of \$33.35 is statistically significant ($p < 0.01$). Likewise, in the DC question format, the difference in the $WTP2$ estimates of \$66.24 across models is statistically significant ($p < 0.01$).

Insert Table 6 here

5 Discussion

This study set out to investigate the effects of increases in travel time (and resulting travel cost) on participants' intention to revisit a running event in the United States. It also sought to understand how the question format of hypothetical WTT questions (payment card vs. dichotomous choice) affected responses and resulting WTP estimates. The sample resulting from the post-race survey has a similar structure compared to existing endurance sport research in that participants tend to be male, in their forties, have a high educational level, and earn above-average incomes (Kaplanidou et al., 2012; Whitehead & Wicker, 2020).

The first research question was directed at correlates on participants' revisit intentions. In the regression models including control variables, satisfaction with the event and experience with the event (i.e., past visits) had a positive association, confirming previous research examining the drivers of participants' revisit intentions (e.g., Kaplanidou & Gibson, 2010; Petrick et al., 2001; Whitehead & Wicker, 2018). Thus, given the similarities in sample composition and event-related variables compared to existing research, the present findings should have some credibility and robustness.

The present study focused on three determinants of revisit intentions, i.e., increases in travel time (and resulting travel cost), individuals' income, and the question format of the WTT question in the survey. The negative association of travel time and cost with revisit intentions mirrors previous research (e.g., van Cranenburgh et al., 2014), although these scholars point at

the diminishing disutility from increasing travel time as reflected by a significant positive effect of the squared term of travel time in their study. Non-linear relationships were not considered in the present study as the aim was to compare the payment vehicle travel time with previous payment vehicles capturing changes in travel distance and cost and reporting negative associations (e.g., Whitehead & Wicker, 2018; 2019). Collectively, the findings suggest that travel time can be considered a valid payment vehicle within WTT questions and for CBM research. Moreover, a likelihood Likert scale produces qualitatively similar results to previous studies relying on a probabilistic Likert scale (e.g., Whitehead & Wicker 2018; 2025).

Turning to income, the positive association with revisit intentions is in line with previous research (e.g., van Cranenburgh et al., 2014; Whitehead & Wicker, 2018; 2019). The extension of the present study is the interaction with TTC which does not affect revisit intentions. This means that income only matters per se, but does not work in conjunction with changes in TTC. This finding indicates that participants rather consider their own financial resources when forming behavioral intentions about revisiting an event rather than the development of travel time and resulting travel cost, which are also shaped by external factors like price volatility and inflation (e.g., van Cranenburgh et al., 2014).

The question format does not affect revisit intentions directly, only in combination with changes in TTC. Specifically, the dichotomous choice format increases the likelihood of revisit intentions, but only under high TTC conditions. This finding is similar to previous research where the interaction between the dichotomous choice format (compared to a payment card format) and changes in travel cost was also positive and significant (Whitehead & Wicker, 2019). The present findings add to the robustness of this association as the dichotomous choice

responses were selected with a more sophisticated approach, i.e., bootstrapping, compared to a mere random selection of one response.

The role of the question format leads to the second research question, which explicitly asked how the two question formats affected WTT statements and resulting WTP estimates. This question was answered using a detailed comparison of the dichotomous choice responses with the payment card responses, also in relation to different recodings of the return visitation variable and different ways of estimating WTP. The findings can be synthesized as follows:

First, the dichotomous choice WTP point estimates are greater than the WTP point estimates obtained with the payment card format. This finding mirrors previous research documenting that WTP estimates from the dichotomous choice format are higher than from the payment card format (Whitehead & Wicker, 2019), acknowledging that bootstrapping was not applied in this previous study. The payment card question format makes respondents more sensitive to the travel time (and cost) amounts. The implication is that survey respondents may pay more attention to additional costs when the question is framed so that relative costs are explicit. For example, a respondent in the payment card version knows that the potential range of increased travel time is 30 minutes to 120 minutes. This framing may lead to more cost sensitivity relative to when a respondent with the dichotomous choice format is presented with only one travel time increase. With only one travel time increase being offered, there are no reference points and respondents cannot provide a pattern of answers in the sense that they accept shorter travel time increases while rejecting higher increases.

Second, the WTP2 point estimates (Hanemann, 1989) are greater than the WTP1 point estimates (Hanemann, 1984). This difference is not surprising as it is mostly by construction. WTP is higher when the negative portion of the cumulative distribution function is truncated to

zero. Hence, this second way of estimating WTP leads to significantly higher WTP values than WTP1 independent of the question format (PC and DC) and the recoding of the dependent variable. Third, the WTP point estimates from the VL & SWL model are greater than those from the VL model. This difference is also not surprising, because in the VL & SWL model, more responses in the Likert Scale are combined to measure behavioral intentions about return visitation.

The present study has implications for tourism agencies, event managers, and policy makers. The findings indicate that participants are sensitive to changes in travel time when forming their behavioral intentions about revisit intentions. Thus, decision makers need to be aware of any circumstances which potentially increase travel times of participants, especially when these circumstances are already known around the time when registration opens. However, these travel time changes affect all participants equally, meaning that individuals earning lower income are not disproportionately sensitive to changes in travel time and cost. In fact, event managers can learn from our findings that participants only consider their own financial resources and do not set their income in perspective to the general development of prices and travel costs. Another implication relates to the way return visitation questions are asked in post-event surveys, recognizing that respondents' behavioral intentions are more inclined towards revisiting the event when provided with a cognitively less demanding dichotomous choice question format. Furthermore, the monetary values in the form of WTP estimates are informative for decision makers. Specifically, event organizers can compare the benefit estimate to the cost of the changes in attributes of the event to determine their efficiency. Since the monetary values reflect the value of event participation to participants, they are equally insightful for policy

makers and government representatives. These stakeholders can also conduct benefit-cost analysis to determine if the event warrants public subsidy.

6 Conclusion

This study examined the role of travel time increases, income, and the question format in participants' intentions to revisit a running event. The key takeaways are that respondents are sensitive to travel time increases independent of their own income. Moreover, the question format is important in the sense that the cognitively less demanding dichotomous choice format leads to larger WTP estimates than the payment card format, while the type of Likert scale does not play a role.

The present study makes a number of theoretical and empirical contributions to the literature. From a theoretical perspective, it offered insights on how travel time, income and its combination with travel time as well as the question format shapes individuals' behavioral intentions of revisiting an event. Empirically, the study documented that travel time is a valid payment vehicle within WTT and CBM research. Further empirical insights include that the type of Likert scale is not relevant, but the question format is. Beyond the mere comparison of methods, another empirical contribution is the use of a bootstrapping approach for obtaining the random draws from the payment card data. This approach improves the quality of the models and the reliability of results as the random dataset is not 'cherry picked'.

The present work has some limitations that can also guide future research. Although we find that increases in travel time scenarios lead to valid models of return visitation demand, these results are not very enlightening about the most appropriate way to frame the return visitation question as many comparisons could only be performed with previous research but not within the dataset. Future research should compare some variations within one survey. For example, split-

sample tests should be conducted with different survey versions that contain questions posed as increases in travel distance and travel time and determine if different payment vehicles also generate similar WTP estimates in a comparative setting. Similarly, future comparative research should perform split-sample tests with different survey versions that contain questions posed with likelihood and probabilistic Likert scales and determine if different answer scales also generate similar WTP estimates in such a setting. The role of TTC in revisit intentions should also be further explored, for example by considering non-linear relationships between TTC and revisit intentions and understand why TTC works in combination with the question format, but not with individuals' income. The latter questions would benefit from qualitative approaches like participant interviews which can offer in-depth insights about the underlying reasons for the evident effects in the present quantitative models.

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Table 1

Descriptive statistics of participant characteristics

		Payment Card (PC)		Dichotomous Choice (DC)	
Variable	Label	N	Mean	N	Mean
Experience	Number of years participated in the BRR	297	2.08	295	2.06
Satisfied	(very) satisfied with BRR experience (1=yes)	297	0.66	296	0.74
Male	Male gender (1=yes; 0=female)	297	0.72	295	0.73
Age	Age of participant (in years)	297	40.30	296	40.90
Employed	Participant is employed (1=yes)	297	0.85	296	0.85
Married	Participant is married (1=yes)	296	0.79	294	0.83
Household	Household size	296	3.51	294	3.44
College	Participant has a college degree (1=yes)	297	0.92	296	0.88
Income	Annual gross household income (in US$ 1,000)	297	106.05	296	107.06

Table 2

Baseline return visitation

	Baseline	
	Frequency	Percent
Very likely	404	65.8
Somewhat likely	140	22.8
Neither likely nor unlikely	37	6.03
Somewhat unlikely	17	2.77
Very unlikely	16	2.61
Sample size	614	

Table 3

Willingness to Travel Return Visitation

	Payment Card							
	30 minutes		60 minutes		90 minutes		120 minutes	
	Freq	Pct	Freq	Pct	Freq	Pct	Freq	Pct
Very likely	200	67.34	175	58.92	117	39.39	101	34.01
Somewhat likely	69	23.23	81	27.27	97	32.66	79	26.60
Neither likely nor unlikely	23	7.74	30	10.10	43	14.48	50	16.84
Somewhat unlikely	3	1.01	7	2.36	30	10.1	39	13.13
Very unlikely	2	0.67	4	1.35	10	3.37	28	9.43
Sample size	297		297		297		297	
	Dichotomous Choice							
	30 minutes		60 minutes		90 minutes		120 minutes	
	Freq	Pct	Freq	Pct	Freq	Pct	Freq	Pct
Very likely	39	65.00	49	57.65	40	49.38	23	33.33
Somewhat likely	15	25.00	21	24.71	29	35.80	28	40.58
Neither likely nor unlikely	5	8.33	11	12.94	5	6.17	11	15.94
Somewhat unlikely	1	1.67	3	3.53	3	3.70	3	4.35
Very unlikely	0	0	1	1.18	4	4.94	4	5.80
Sample size	60		85		81		69	

Table 4

Logistic Regression Results for Return Visitation

	Very Likely (VL)				Very Likely and Somewhat Likely (VL & SWL)			
	Model 1a		Model 2a		Model 1b		Model 2b	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Intercept	0.1279	0.6780	-0.0145	0.1729	2.1399**	0.8631	1.4594***	0.2109
TTC	-0.0468***	0.0123	-0.0311***	0.0056	-0.0501***	0.0149	-0.0338***	0.0070
Income	0.0069**	0.0033	0.0105***	0.0020	0.0059	0.0043	0.0101***	0.0028
Income × TTC	0.0001	0.0001			0.0001	0.0001		
DC	-0.5285	0.3382			-0.5899	0.4355		
DC × TTC	0.0135*	0.0076	0.0048	0.0039	0.0222**	0.0094	0.0114**	0.0045
Experience	0.2947***	0.0700			0.3649***	0.1036		
Satisfaction	0.8317***	0.2018			1.0716***	0.2296		
Male	0.3092	0.2391			0.3764	0.2859		
Age	-0.0134	0.0116			-0.0258*	0.0143		
Employed	0.1689	0.2982			0.2006	0.3464		
Married	0.3933	0.2784			0.2241	0.3428		
Household	-0.0576	0.0783			-0.1082	0.0985		
College	-0.5777*	0.3049			-0.4515	0.3985		
Sample size	592		592		592		592	

Notes: TTC=travel time and cost; DC=dichotomous choice format; bootstrapped estimates with 1000 draws, displayed are the mean coefficients and mean standard errors (SE) of these 1000 draws; ***p<0.01; **p<0.05; *p<0.1.

Table 5

Willingness to pay estimates (in US$)

	VL		VL & SWL	
	WTP	SD	WTP	SD
WTP1PC	35.70	1.79	76.27	7.50
WTP1DC	42.06	0.65	115.90	14.05
WTP2PC	45.34	3.49	78.70	8.32
WTP2DC	53.39	2.62	119.63	15.57

Note: PC=Payment card; DC=Dichotomous choice; bootstrapped WTP estimates with 1000 draws.

Table 6

Difference in Willingness to Pay: Two-sided Convolutions Tests

		VL		VL & SWL	
Test	WTP	ΔWTP	*p*-value	ΔWTP	*p*-value
DC vs PC	1	6.36	<0.01***	39.63	<0.01***
	2	8.05	0.02**	40.93	<0.01***
		VL		VL & SWL	
Test	WTP	ΔWTP	*p*-value	ΔWTP	*p*-value
WTP2 vs WTP1	PC	9.64	<0.01***	3.73	0.21
	DC	11.33	<0.01***	2.43	0.21
		WTP1		WTP2	
Test	WTP	ΔWTP	*p*-value	ΔWTP	*p*-value
VL & SWL vs. VL	PC	40.56	<0.01***	33.35	<0.01***
	DC	73.84	<0.01***	66.24	<0.01***

Notes: PC=Payment card; DC=Dichotomous choice; VL=very likely; SWL=somewhat likely; bootstrapped ΔWTP estimates with 1000 draws; ***$p<0.01$; **$p<0.05$.

Figure 1

Baseline Return Visitation Question

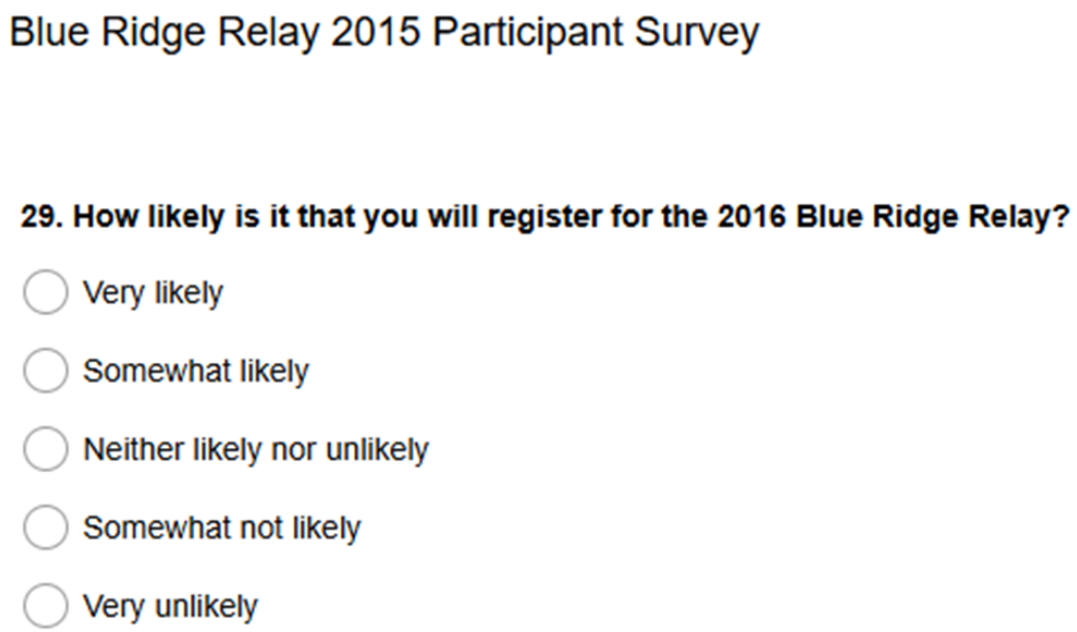

Figure 2

Payment Card Return Visitation Question

Blue Ridge Relay 2015 Participant Survey

Now suppose that for some reason you move farther away from the start and/or finish of the Blue Ridge Relay. Suppose that your round trip travel time increases by the following amounts: 30 minutes, 60 minutes, 90 minutes or 120 minutes.

30. In these new situations, how likely is it that you would register for the 2016 Blue Ridge Relay?

	Very likely	Somewhat likely	Neither likely nor unlikely	Somewhat not likely	Very unlikely
30 minutes	○	○	○	○	○
60 minutes	○	○	○	○	○
90 minutes	○	○	○	○	○
120 minutes	○	○	○	○	○

Figure 3

Dichotomous Choice Return Visitation Question