Abstract

This study examined differences between direct spending reported through in person surveys administered during a sporting event and online surveys administered after the event’s conclusion. The same direct spending and demographic information questions were used for both surveys. Subjects for the study were participants in a half-marathon that was held in the mid-Atlantic region of the United States during 2012. Unlike previous studies that collected data from different subjects for the in person during event and online post event data collection periods – this study collected responses from the same subjects for both data collection periods. Overall, direct spending estimates were significantly higher for the online post-event direct spending survey respondents than the in person during event survey respondents.

Key Words: direct spending, online survey methods.
Sport researchers have suggested that smaller sporting events may have a greater positive economic impact on host communities than large mega sporting events (Agha & Rascher, 2012). During the past twenty-five years, a growing number of economic impact studies have concentrated on smaller participant oriented sporting events (Chhabra, Sills & Cubbage, 2003; Cobb & Olberding, 2007; Crompton, Lee, Schuster, 2001; Gratton, Dobson, Shibli, 2000; Mondello & Rishe, 2004; Wilson, 2006). Marathons, half-marathons, 5K and 10K races, and triathlons are examples of the many types of sporting events where participant spending is the primary focus.

Selecting the correct survey methodology is important to the success of a study. For example, questions about where to collect data, when to collect data, how to collect data, and sample size are questions that must be answered prior to conducting a direct spending or economic impact study (Delpy & Li, 1998; Jago & Dwyer, 2006). In addition, assessing the advantages and disadvantages of using in person versus online survey methods is recommended. Traditionally, a common approach to collecting sport direct spending data was to develop a survey instrument and then collect data while using face-to-face or "in person" survey methods at a sporting event (Eschenfelder & Li, 2007). The "mall intercept" approach to data collection was typically used to collect data from randomly selected event attendees as they entered and/or exited the sport facility. In some instances, survey data was collected from event attendees at the conclusion of the sporting event through the use of interview survey methods or sending surveys to the homes of potential survey respondents. Telephone surveys and expenditure logs/diaries are examples of other post event data collection methods used by researchers in economic impact studies (Eschenfelder & Li, 2007). It should be noted that some of these data collection methods resulted in low response rates (Delpy & Li, 1998; Oberding & Cobb, 2007).

A major reason for using in person data collection methods at sporting events relates to convenience. Access to participant e-mail lists may be difficult to obtain for an online survey. Surveying individuals during an event will insure that surveys will be collected. If planned and implemented correctly, a large number of surveys can be collected thus resulting in a high response rate. Through the use of randomized survey techniques, inferential statistics can be used to project or apply the findings to a larger group of people. A major disadvantage of in person surveys is that subjects are expected to estimate the total amount of spending prior to the conclusion of the sporting event. As a result, these early estimates can skew the final results. Furthermore, in person surveys can be expensive to implement as potential survey collectors need to be hired and trained.

Literature Review

In the past, several studies (Case & Yang, 2009; de Leeuw, 1992; Dillman, Sangster, Tarnai & Rockwood, 1996; Duffy & Smith, 2005; Hochstim, 1967;
Schuman & Presser, 1981; Schwartz, Strack, Hippler & Bishop, 1991; Shih & Fan, 2008) have explored the impact that various survey methodologies have on the quality and quantity of data collection. As computer technology continues to improve, more studies will direct their attention at investigating various aspects of online research methods. Some of the studies completed so far have even looked at the advantages and disadvantages of both online and traditional survey approaches (Sue & Ritter, 2007; Evans & Mathur, 2005).

Recent advancements in online survey methods have helped to change the face of survey research. Many online internet-based survey programs are commercially available to purchase and use (e.g., Survey Monkey). Online surveys are convenient and accessible to a large number of potential respondents because more people have computer and internet access than in the past. Another distinct advantage of conducting online surveys is that spending records, receipts, credit card statements, and online checking account information can be readily accessed and reviewed. Delpy and Li (1998) emphasize that post event surveys should be distributed within seven days from the conclusion of the event in order to avoid recall bias.

In recent years, a number of questions have surfaced that are linked to advances in computer technology and the ability to conduct online survey research via the internet. For instance, if given the choice, is the "in person" survey a more effective and accurate research method than an online survey when collecting direct spending data for sporting events? Second, are the quality and quantity of responses to "in person" surveys different from responses to online surveys? Common sense would suggest that an online survey conducted after a sporting event has ended is the best approach to collecting direct spending data since respondents have access to spending records and receipts, online bank statements, etc.

A key advantage of online survey methods is that they provide fairly quick turnaround in terms of collecting subject responses (Duffy, Smith, Terhanian & Bremer, 2005). They generally have lower administrative costs when compared to mail survey methods (Evans & Mathur, 2005). Mann and Steward (2000) note that online survey methods provide broader respondent reach by collapsing boundaries of time and space. Ward, Clark, Zabriskie, and Morris (2012) emphasize that online surveys provide easier access to larger populations. Hochstim (1967) has stated that survey respondents are more likely to give less objective and more socially acceptable responses in the presence of an interviewer. Miller and Hogg (2000) indicate that online survey respondents answer sensitive questions more often than telephone survey respondents. According to Fleming and Bowden (2009), online survey data can be downloaded quicker and more accurately than traditional surveys that require entering data by hand.

A basic disadvantage of an online survey relates to the possibility of lower response rates. Shih and Fan (2008) write that online survey methods
can result in a response rate as low as 10% when compared to traditional mail survey methods. Similarly, Couper (2000) describes situations where careless online survey techniques resulted in missing data and unanswered questions. Sampling errors are another concern of using online surveys because a minimal level of computer literacy is required for most online surveys and if a potential respondent is not computer literate then he or she may be weeded out or deleted from the study unintentionally. Ward et al. (2012) warn that online surveys can lead to difficulty in sample selection. DeLeeuw (2012) describes potential confidentiality and security issues associated with the use of online surveys. However, it should be pointed out that a number of online survey security issues have been resolved in recent years due to technological advances in online security programs.

In studies involving sport and recreation settings, Dolnicar, Laesser and Matus (2009) discovered that respondents to online surveys have a lower dropout rate and tend to produce less incomplete data than respondents to mailed paper and pencil surveys. The authors stress that survey format can influence survey results and a multi-method survey approach should be used whenever possible. Olberding and Cobb (2007) state that online survey methods are at least as effective as telephone methods when there is evidence that the population to be studied is familiar with computers and e-mail techniques. Case and Yang (2009) studied in person and online survey methods and they found differences with online respondents reporting significantly higher levels of direct spending than the in person respondents. In the Case and Yang (2009) study, different subjects were used for the in person and online surveys for the same sporting event.

Stynes and White (2006) describe using a mail-back survey approach when examining event spending figures. They identified considerable uncertainty concerning discretionary purchases (e.g., souvenirs) when asked to complete in person spending surveys at the event. They recommend asking subjects to record and report spending during the previous 24-hour period in order to reduce recall problems. They caution that this may increase telescoping errors. Rylander, Propst, and McMurty (1995) report that mail-back surveys completed after a trip are another alternative but this method could result in response bias due to low response rates.

Mondello and Rishe (2004), in an economic impact study of the AAU Junior Olympic Games, used an ex ante research methodology to collect data at a sporting event when the gates opened and continued data collection throughout the day. This is in contrast to an "ex post" survey methodology where survey data was collected after the event had ended. The researchers write that they prefer "ex post" survey methods over ex ante methods.

Gratton, Dobson, and Shibli (2000) created a typology of sporting events and suggest that larger international sporting events can generate a significant amount of economic activity by spectators. Other sporting events can
be classified as competitor events where the economic activity is generated primarily by the participants. According to the authors, it is important for individuals studying sport economic impacts to understand the type of sporting event and where most of the economic impact will emanate from. Wilson (2006) examined the economic impact of four local swimming events held on continuous days. He used in person event survey methods and found that spectators at the swimming events generated most of the economic impact when compared to spending by participants. However, it should be noted that a number of the participant swimmers were younger and accompanied by parents or other relatives who likely did most of the spending. Kirk, Carlson, O’Connor, Burke, Davis, and Glover (1997) used a variety of survey methods to collect data related to the economic impact of youth sport participation on families of the participants. Survey instruments were provided by sport associations to family members during the beginning phase of the study. Researchers then conducted in person follow-up interviews with family members of participants in order to determine spending patterns.

Research studies have shown that electronic data collection methods can expedite the processing of survey data (Keisler & Sproull, 1986). It has been reported that online surveys can reduce survey administration costs (Clayton & Werking, 1998). For example, researchers at the Mountain Bike Tourism Association of Canada (2006) used hand held computers to record economic impact data on biking trails and uploaded the data to the internet. The data was then transmitted to a central server for final analysis. In a study by Ward et al. (2012), differences between online surveys and paper and pencil surveys used in leisure settings were examined. A repeated measures research design was used. Results of the study revealed differences between online and paper and pencil responses on three of the six questionnaires. The authors concluded that questionnaire respondents felt that online surveys were better able to protect anonymity.

**Purpose of Study**

The purpose of this study was to examine differences in direct spending estimates between in person during event and online post event survey methodologies at an inaugural half-marathon event held in the mid-Atlantic region of the United States during 2012. Survey respondents were the same for both the in person during event and online post event surveys. Demographic information was also collected. Moreover, in a study completed by Case and Yang (2009) that used a different sample of subjects for the in person and online versions of a direct spending survey at a sporting event, it was recommended that a future study should attempt to collect data from
the same subjects for the in person and online surveys. It was felt that by surveying the same people, a more complete picture of event survey methods would be developed.

Methodology

Study Design and Instrumentation

The sporting event direct spending survey instrument used in this study was previously created by one of the authors. In the past, the survey instrument has been used in multiple sport direct spending studies. Several experts who conduct direct spending and economic impact studies have reviewed the survey instrument. As a result, the experts have provided feedback that was used to refine the instrument. The survey instrument is 26-questions in length. It has a variety of questions that are directed at gathering direct spending as well as demographic information. A total of eight direct spending categories are measured via the survey instrument. Questions range from gathering information about spending on lodging to questions about retail shopping to questions about food and beverage spending patterns.

Subjects for this study were participants in a half-marathon. Over 6,500 runners were registered for the event with an estimated 1,200 runners traveling from out-of-town. The total number of in person during event respondents that were from out-of-town was 491. Respondents for the in person during event survey were randomly selected by trained survey staff and asked to complete the survey during the multi-day event. While individuals completed surveys at the event, a question on the survey provided them with an opportunity to volunteer for participation in a post event online direct spending survey. An individual was considered to be "out-of-town" if he or she traveled over 120 miles round-trip to the event and stayed overnight in a hotel/motel/condo while participating in the event.

A total of 52 individuals volunteered to participate in the post event online survey. In other sport direct spending studies that have looked at in person and online survey methods (e.g., Case & Yang, 2009), the in person survey respondents were not the same individuals who completed the post event online surveys. A different group of respondents was used as subjects for the online surveys even though it was the same event. In the present study, however, respondents to the in person during event direct spending survey were the same individuals who responded to the post event online survey. A review of the literature indicates that this is the first time such an approach has been used in a sporting event direct spending research study.
As mentioned above, previous studies (Case & Yang, 2009) have found significant differences between the in person during event survey methods and the online post event survey methods for sporting event direct spending estimates. A review and examination of these studies has lead to the current research question. Will differences exist between the in person during event survey direct spending estimates and the online post event survey direct spending estimates if the same individuals are used to respond to both the in person and online surveys for the same event?

Data Analysis

First, an analysis was conducted in order to determine whether or not non-response bias existed in the sample. Non-response bias would exist if the sample for both the in person and online surveys differed significantly from the sample who just responded to the in person survey. To test for this, the difference between in person and online responses for selected demographic variables of gender, distance traveled, and income was examined. The summary statistics for these proportions are presented in Table 1.

### Table 1. Proportions of Demographic Variables in Two Sample Populations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>In Person</th>
<th>In Person and Online</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>Male</td>
<td>150</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>313</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>463</td>
<td>48</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td>&lt;$100,000</td>
<td>241</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>≥$100,000</td>
<td>222</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>463</td>
<td>47</td>
</tr>
<tr>
<td><strong>Distance Traveled</strong></td>
<td>≤300</td>
<td>240</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>&gt;300</td>
<td>185</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>425</td>
<td>48</td>
</tr>
</tbody>
</table>

The total number of responses differed on some of the demographic variables because not every respondent answered the survey completely. Two-sample proportion tests were performed on each demographic variable using the following hypotheses:
H₀: \( p_1 = p_2 \), there is no significant difference between the proportions

Hₐ: \( p_1 \neq p_2 \), there is a significant difference between the proportions

In each case, the null hypothesis could not be rejected, indicating that there was no non-response bias within that particular category. These results are summarized in Table 2.

### Table 2. Results of 2-Proportion Tests for Demographic Variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>P-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.896</td>
<td>Reject H₀</td>
</tr>
<tr>
<td>Income</td>
<td>0.897</td>
<td>Reject H₀</td>
</tr>
<tr>
<td>Distance Traveled</td>
<td>0.26</td>
<td>Reject H₀</td>
</tr>
</tbody>
</table>

The key analytical technique used in this study was difference in means testing. Through this method of testing, it was possible to determine whether or not a significant difference in the reporting of expenditures between in person and online survey responses existed. The mean expenditures, separated into the eight different spending categories, were compared between in person and online responses.

### Results

The average age of an in person respondent was 42 years, and the average age of an online respondent was 40 years. The average travel party size for the in person respondents was 2.39, and the average travel party size for the online respondents was 2.46. The average round-trip distance traveled to the event by the in person respondents was 408 miles, and the average round-trip distance traveled by the online respondents was 403 miles. The in person respondents stayed overnight an average of 1.4 nights and the online respondents stayed an average of 1.43 nights. Further examination of the demographic data revealed that 67% of the individuals who responded to the in person survey were female and 65% of the online respondents were female. 88.8% of the individuals who responded to the in person survey identified themselves as Caucasian and 86.5% of the respondents to the online survey identified themselves as Caucasian.

Because the data used for hypothesis testing was collected from the same sample, the in person and online data samples are dependent. Thus,
A paired t-test is required to verify whether or not the mean total expenditures reported for the in person surveys are significantly different from the mean total expenditures reported in the online surveys. Paired t-tests are used when there is one sample of interest that has been tested twice; in this case, the testing occurred during the event through the in person surveys, as well as after the event through the online surveys (Walpole, 2012). Of the eight expenditure categories listed, only two were found to have less overall spending reported in the online survey than the in person survey. The other categories showed mean expenditures that were reported to be higher through the online survey than the in person survey (see Figure 1).

![Comparison of Mean Expenditure: Online vs In Person](image)

**Figure 1: Mean Expenditure Estimates per Category, Online vs. In Person.**

To test whether or not a significant difference existed between in person and online spending estimates, the values for total mean expenditures were used. The tests performed on total mean expenditures were based on the following hypotheses:

\[ H_0: \mu_1 = \mu_2, \text{ there is no significant difference between the two means} \]

\[ H_A: \mu_1 \neq \mu_2, \text{ there is a significant difference between the two means} \]

The mean reported spending through the in person survey method is denoted by \( \mu_1 \), and the mean reported spending through the online survey method is denoted by \( \mu_2 \). The t-test statistic resulted in a rejection of the null hypothesis at the 5% significance level (see Table 3). This indicates that there is a significant difference in the mean total reported spending amounts for in person and online surveys.
|                      | Student's t | Pr > |t| | Signed | Pr >= |S| | A - D Normality |
|----------------------|-------------|------|---|----------------|---------|---|----------------|
| Total Difference**   | 2.0867      | 0.0419 | 161 | 0.099  | <0.005  |
| One-Way Difference** | -2.09       | 0.021  | 749 | 0.05    | <0.005  |
| Male*                | 2.1451      | 0.0487 | 37.5| 0.0523  | >.25    |
| Female               | 0.5905      | 0.5597 | 23.5| 0.6014  | <0.005  |
| Income ≥ $100,000*   | 2.5766      | 0.0172 | 80  | 0.0114  | 0.011   |
| Income < $100,000    | 0.5411      | 0.5936 | -3  | 0.9338  | <0.005  |
| Distance > 300 miles | 0.9518      | 0.3507 | 16.5| 0.6661  | <0.005  |
| Distance ≤ 300 miles | 1.1807      | 0.2503 | 39.5| 0.2375  | 0.127   |
| Individual           | 0.2445      | 0.8096 | 0   | 1       | 0.012   |
| Group*               | 2.4333      | 0.0216 | 95  | 0.0374  | <0.005  |

** Indicates significance at the 10% level
* Indicates significance at the 5% level

Use of a paired t-test also requires that the population being sampled follows an approximately normal distribution (Walpole, 2012). Data in this study did not pass the Anderson-Darling test for normality; therefore, the Wilcoxon Signed-Rank test may be a better approach than the paired t-test. The Wilcoxon Signed-Rank test is usually more beneficial in the case of non-normality; however, in this case, both the paired t-test and the Wilcoxon Signed-Rank test should be considered due to a smaller sample size for the online respondents.

The Wilcoxon Signed-Rank test uses the sample median, rather than sample mean, as the measure of central tendency because median will be less affected by the skewedness of the distribution than the mean. Like the paired t-test, the Signed-Rank test also requires a dependent sample, so it is appropriate for this analysis (Wilcoxon, 1945). The hypotheses for the Wilcoxon Signed-Rank test are as follows:

**H_0**: The median difference between the pairs is zero

**H_A**: The median difference is not zero

The Wilcoxon Signed-Rank test statistic resulted in a rejection of the null hypothesis at the 10% significance level (see Table 3). This confirms that there is a significant difference between online and in person survey responses. After determining that a difference exists between in person and online expenditure estimates, the direction of the difference was examined with a one-way paired t-test. The following hypotheses were used to test this data:
\( H_0: \mu_1 = \mu_2, \) there is no significant difference between the two means

\( H_A: \mu_1 < \mu_2, \) there is a significant difference between the two means

The total mean spending in person is denoted as \( \mu_1, \) and the total mean online spending is denoted as \( \mu_2. \) At the 5% significance level, there is sufficient evidence to say that the total mean spending reported in the post event online surveys was significantly higher than the total mean spending reported for the in person surveys (see Table 3). Similar findings were reported in a study conducted by Case and Yang (2009). In their study, the researchers also found that post event online survey respondents reported significantly higher levels of direct spending than the during event in person survey respondents. Unlike the present study, however, the sample for their study was comprised of two different sets of respondents. One set of respondents completed the in person direct spending surveys during the event and a different set of respondents completed the online surveys after the event. Again, the current study used the same group of respondents to answer both the in person and online direct spending surveys for the same event.

A Wilcoxon Signed-Rank Test was also performed on the difference between total mean expenditures for online and in person survey respondents. The hypotheses for the Signed-Rank test are as follows:

\( H_0: \) The median difference between the pairs is zero

\( H_A: \) The median difference is greater than zero

The median difference was taken as the in person expenditure estimates subtracted from the online expenditure estimates. With a p-value of 0.05, there is significance at the 10% level that online spending estimates exceed in person spending estimates (see Table 3). However, it is not unreasonable to say that this result is also significant at the 5% level, since the p-value approaches 0.05.

Summary and Conclusions

Results of the paired t-test and Wilcoxon Signed-Rank Test for expenditure estimates showed significant differences between the mean values of total spending for the in person and online surveys. Further testing led to the conclusion that online respondents report significantly higher direct spending estimates.

In the future, additional studies are needed to further examine sporting event in person and online survey methods in order to determine the most
appropriate survey method for a particular research setting. At the present
time, most sporting event direct spending and economic impact studies use
in person surveys that are collected at and during the event. As computer
technology continues to expand and advance, it is likely that online surveys
will supplement and/or replace in person surveys when conducting future
sporting event direct spending and economic impact studies. The current
study expanded on previous research that examined differences in survey
methodologies. As pointed out previously, in the past, studies collected data
from different in person and online respondent samples. The present study
included the same respondents for both the in person and online samples.
This approach has not been previously attempted in sporting event direct
spending research. Findings for past studies and the current study were
similar in that post event online survey respondents reported significantly
higher direct spending estimates for the same event. The key finding, how-
ever, is that significant differences were identified between the in person
and online survey methods when reporting direct spending estimates at
sporting events.

If the online and in person data collection methods were indeed the
same, then the final direct spending figures for both methods would be sim-
ilar. However, differences were detected between the two survey method-
ologies. It would seem logical that the online survey method provides more
accurate data since respondents have direct access to receipts and online
spending records. In turn, the in person approach would appear to be flawed
since respondents are generally expected to provide estimates as direct
spending data is generally collected prior to the conclusion of the sporting
event.

In past studies, as well as the current study, online post event direct
spending estimates at sporting events were significantly higher than in per-
son during event direct spending estimates. Dolnicar et al. (2009) have rec-
ommended tailoring the data collection methodologies to the specific sporting
event. For instance, some events may call for selecting only online survey
data collection methods. Other events may call for the use of both online
and in person survey methods. Smart phones, computer note pads, and oth-
er portable data collection devices will likely play a role in assisting with fu-
ture in person and online survey data collection. Additional studies are need-
ed to help determine the best direct spending data collection methodologies
that match the particular research setting. In the present study, for example,
in person data collection methods were used during the sporting event to
collect direct spending data as well as collect e-mail addresses from individ-
uals who were willing to participate in the post event online direct spending
survey. Future direct spending studies, in a similar way, may use a combi-
nation of in person and online methods that will be tailored to the specific
research setting.
The current study is another step in the long investigative journey of finding which survey method is the most effective and accurate when collecting sporting event direct spending data. Clearly there are differences that exist between during event in person and post event online survey methodologies. Additional studies will hopefully point to one "best" survey method or a combination of methods. One thing seems to be almost certain -- online surveys are here to stay and they will play an important role in the planning of future direct spending and economic impact research.

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