

Surveying Adolescents: The Impact of Data Collection Methodology on Response Quality

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Abstract: There is wide agreement in the methodology community that the choice of data collection mode may affect the quality of response. In addition, the method of choice may also influence respondent behavior and feelings which may also impact the quality of data. This research examines response quality and respondent satisfaction measures compared across three data collection methods among male adolescent respondents. Results suggest that adolescents provide improved levels for several dimensions of response quality when participating in interview-based research studies compared to text-based methods such as electronic form and paper and pencil formats.

Keywords: Response quality; adolescent respondents; male respondents; interview-based methodology; text-based methodology; response distortion

1. Introduction

Electronic data collection methods have increased in popularity among academic researchers and are perceived as able to deliver results in a cost effective and time efficient manner (McConkey, Stevens and Loudon 2003; Griffis, Goldsby and Cooper 2003). Cobanoglu, Warde and Moreo (2001) emphasize the importance of electronic methods of data collection stating that telephone and mail surveys have reached maturity; however, electronic means for collecting data have not been adequately researched since this method is relatively new. Few research studies pair electronic data collection methods with more traditional forms, such as self-administered paper and pencil methods (McConkey, Stevens and Loudon 2003). This lack of understanding is even further stressed since academic scholars such as Baruch (1999) assert that response rates for academic studies have demonstrated a general decline in recent years. Unfortunately, researchers often spend considerable resources to create and distribute mail-based questionnaires which may produce few responses (Griffis, Goldsby and Cooper 2003).

Both academics and managers must deal with limited resources including time, budget and human resource constraints when conducting research. Therefore, it is critical that researchers from the academic and managerial communities understand the influence the choice of data collection methodology has toward their respondents and survey responses, particularly when making survey design decisions.

The issues and decisions surrounding data collection methodology may become further pronounced when research requires participation from adolescents. The adolescent population is of particular interest since their role in consumer decision-making and marketplace involvement is represented by purchases of more than \$160 billion in family goods and services, excluding products and services for their own consumption, including the \$11 billion spent in such categories as snacks, sweets, toys, games and clothing (Del Vecchio 1998). As we continue to conduct research with the adolescent market, research to help advance our understanding of adolescent response behavior may help guide researchers in gathering relatively high levels of response quality among adolescent respondents. This research is intended to help fill this gap by comparing various response quality factors between three common data collection methods among the adolescent market segment.

2. Literature review

For purposes of this study, we present a review of prior efforts addressing issues related to data collection methodology. We focus on two key aspects, namely; data collection modes and adolescents as research subjects.

2.1 Data Collection Modes

Several scholars have recognized the impact of situational factors toward consumer response and behavior (Bush & Parasuraman 1985). Kassarian (1968) emphasized the importance of the environment on individual

behavior and early scholars such as Lewin (1935) viewed behavior as a function of the perceived environment (Bush & Parasuraman 1985). Belk (1975) also stressed the impact of the situation with respect to consumer choice along with Ward and Robertson (1973) who posited that situational variables could account for substantial variance when evaluating individual behavior (Bush & Parasuraman 1985).

Situations during research tasks are at least partially established based on a researcher's choice of data collection mode. For example, respondents from a self-administered questionnaire typically sit in a chair looking down with a writing instrument in hand and reading the survey instrument. Respondents participating in an in-person interview typically are placed in a different situation involving listening to an interviewer.

The academic literature reveals that the choice of a researcher's survey mode impacts resulting survey data in a variety of different ways. Knapp and Kirk's (2003) study involving the use of the Internet, telephone and paper and pencil for data collection among undergraduate students reveals no significant differences in responses provided. In their study of business education leaders, Truell and Goss (2002) found that there were no significant differences among response quality factors examined, specifically, levels of item omission, between email and postal mail administered surveys. Tse (1995) compared paper mail and email responses in his research of administrators and teachers at the University of Hong Kong and found that there were no significant differences between the average unanswered questions between the two methods. Vazzana and Bachman (1994) found similar data quality results between their study comparing fax and mail survey methods. Additionally, Sproull (1986) found no significant differences in the actual responses provided between electronically collected and hardcopy collected data. Similarly, Branthwaite's (1983) research found similar results revealing that the data collection situation appeared to have little impact on the responses for both sensitive and non-sensitive questions.

While Deutskens, de Jong, de Ruyter and Wetzels' (2006) survey among US and UK business professionals reveals consistent levels of reliability between online and postal mail administered surveys, these researchers found other differences between both survey methods. Specifically, online respondents provided lengthier responses to open-ended questions, providing higher levels of completeness of answer, and online respondents were more likely to respond to a key question within the questionnaire, suggesting lower levels of item omission. Furthermore, Holbrook, Green and Krosnick (2003) found differences between telephone respondents and face-to-face interview respondents, specifically in areas including response time, cooperation, engagement, and respondent satisfaction.

In addition to changing response factors, mode difference may also influence the experiences sensed by research participants. For decades, researchers have been concerned about the possibility of negative feelings and respondent affects due to survey participation. A review of the marketing research literature reveals that respondents are personally affected by participating in research in several different ways. Narayana (1977) introduced a more economical survey scale with the hopes that factors such as respondent boredom and fatigue would decrease. Hart, Rennison and Gibson (2005) evaluated respondent fatigue among victims of crime. Hart, et al (2005) conducted a longitudinal survey using both in-person and telephone interview methods. They found that survey mode does impact respondent fatigue with survey tasks. Additionally, respondents' levels of satisfaction with research participation have been identified as an important factor that may influence response rates (Manfreda, Batagelj, Vehovar 2002). Moreover, Groves (1979) found that respondents appreciate and enjoy the interview method more than other modes of data collection.

Since the choice of data collection mode by a researcher determines the situation that a respondent faces when participating in a research study, there is the potential that the situational variable of data collection methodology will impact a respondent's behavior and feelings which may result in varied levels of response quality, thereby altering the quality of the research data, findings and conclusions. Therefore, while electronically-based data collection methods may provide solutions to numerous problems compared to more traditional methods, there is a need to further examine the impact of applying these newer methods of data collection. Extending the premise that situational factors impact an individual's behavior, this research investigates the response quality results from placing individuals in differing situations to gather their opinions.

2.2 Adolescent Research Subjects

While much previous research has investigated the impact of data collection methodology on response quality among adult samples (e.g., Bush & Parasuraman 1985; Tse 1995; Knapp and Kirk's 2003; Holbrook, Green and

Krosnick 2003; Deutskens, de Jong, de Ruyter and Wetzels 2006), this research investigates response quality among adolescent samples for several reasons.

Adolescents are being recognized as an increasingly important group in terms of their spending power (Clark, Martin, and Bush 2001), their levels of influence toward family spending (McNeal 1998), and their trend setting influence toward parents and peers (Zollo 1999). A recent study reveals that spending for adolescents between 12 and 19 years old was \$155 billion of their own money and even younger children influenced family purchases of over \$500 billion (Dotson & Hyatt 2005). Adolescents are of particular interest to marketers since they potentially represent three markets: a primary spending market, an influence market and a future market (McNeal 1998). Since adolescents are seen as an important group for marketers from a consumer perspective, it is important that the academic community develops a stronger understanding of this group from a research perspective as well.

The consumer socialization framework (Roedder John 1999) describes adolescents' abilities to perceive the marketing environment and respond to marketing factors are parallel with adult consumers in some areas. Roedder John (1999) developed her consumer socialization stages by using dimensions of knowledge development, decision-making skills and purchase influence strategies. Her resulting framework consisted of the following stages: 1) perceptual stage (three to seven years), analytical stage (seven to eleven years) and the reflective stage (eleven to sixteen years).

Based on Roedder John's consumer socialization framework, adolescents who are in the reflective stage of development should have decision-making abilities similar to that of adults. Extending this framework, adolescents should have the ability to respond to consumer research tasks in similar ways as their adult counterparts. Therefore, hypotheses involving response quality factors are formed based on empirical findings from the adult population and tested among adolescent respondents.

3. Research measures

3.1 Response Quality

Researchers have been concerned with the measurement of survey response quality for more than three decades. Response quality refers to the level of effort and thought a respondent gives to survey questions (Bush and Hair 1985; Houston and Ford 1976). For our research, we defined response quality to include the following items: a) completeness of answers (McCoy and Hargie 2007, Deutskens, de Ruyter, and Wetzels 2006), b) response distortion (Krenzke, Mohadjer, Ritter and Gadzuk 2005, Bush and Hair 1985), c) item omission (McCoy and Hargie 2007, Goritz 2004, Bijmolt and Wedel 1995, Bush and Hair 1985) and d) response time (Weible and Wallace 1998, Bijmolt and Wedel 1995).

Completeness of answer refers to the respondent providing in-depth and complete answers to survey questions (Bush and Hair 1985). For example, asking respondents to provide a list gives researchers a means for evaluating completeness of answer. Shorter lists are considered low levels for completeness of answer whereas longer lists are considered high levels of completeness of answer.

Response distortion refers to the difference between actual characteristics or properties and respondents' stated responses to questions pertaining to these properties (Bush and Hair 1985). For example, suppose a researcher asks respondents questions regarding their voting history. Actual voting records could reveal the level of response distortion to this question by comparing the difference between respondents' answers and confirmed data from objective public records.

Item omission refers to respondents' refusal to answer particular questions from a survey (Bush and Hair 1985). Respondents who skip several questions from a questionnaire produce high levels of item omission whereas respondents who answer every question produce the lowest level of item omission.

Response time is the amount of time it takes for the respondent to complete one survey response (Weible and Wallace 1998). Respondents who take a long time to complete their survey tasks produce high levels of response time whereas respondents who complete their survey tasks very quickly using only a short amount of

time produce low levels of response time. While more time spent on a survey instrument may suggest more attention and thoughtfulness toward survey participation, increased levels of response times do not necessarily indicate improved levels of response quality.

4. Respondent experiences

For purposes of this study, emotional impacts from survey involvement are expressed using the following categories: a) respondent fatigue (Bijmolt & Wedel 1995), b) respondent boredom (Bijmolt & Wedel 1995), and c) respondent satisfaction from participating in a data collection study (D'Ambra, et al 1998).

For decades, researchers have been concerned about the possibility of negative feelings and respondent affects due to survey participation. Narayana (1977) introduced a more economical survey scale with the hopes that factors such as respondent boredom and fatigue would decrease. Hart, Rennison and Gibson (2005) evaluated respondent fatigue among victims of crime. Hart, et al (2005) conducted a longitudinal survey using both in-person and telephone interview methods. They found that survey mode does impact respondent fatigue with survey tasks. Additionally, respondents' levels of satisfaction with research participation have been identified as an important factor that may influence response rates (Manfreda, Batagelj, Vehovar 2002).

5. Research hypotheses

5.1 Completeness of Answers

Vazzana and Bachman (1994) provide empirical results suggesting that data collection method does not impact data quality results. Bush and Parasuraman (1985) found that completeness of answers from in-person data collection methods do not differ significantly from completeness of answers from less personal methods. Therefore, completeness of answers will be equivalent between face-to-face interviews and other less personal data collection methods. Thus, the following hypothesis is given:

H1: Completeness of answers will be equivalent across face-to-face interviews, paper and pencil questionnaires and electronic form data collection methodologies.

5.2 Response Distortion

Bush and Hair (1985) found that in-person data collection methods produce lower response distortion compared to other less personal data collection methods. Furthermore, Holbrook, Green and Krosnick (2003) conclude that respondents participating in research by way of face-to-face interviewing are less likely to provide potentially inaccurate yet socially desirable responses compared to participants of research using other methods of data collection. Applying these findings to this study, face-to-face interviews should produce lower response distortion compared to other data collection methodologies. Therefore, the following hypothesis is given:

H2: Face-to-face interviews will produce lowest response distortion among all data collection methodologies.

5.3 Item Omissions

Tse (1995) compared unanswered questions between mail and email methods from his research with University of Hong Kong employees. Tse (1995) found no significant differences between the average unanswered questions between the two methods. Sproull's (1986) research involving business professionals compared equal samples of data collected using electronic mail and face-to-face interviews. Results from Sproull's (1986) study revealed that electronic data collection yielded higher levels of item omissions compared to more conventional methods of data collection. Based on these findings, interviews should produce the lowest levels of omissions and electronic forms should produce the highest levels of omissions. Since paper and pencil methods produce approximately equivalent number of omissions compared to electronic form (Tse 1995), interviews should produce the lowest number of omissions among all three methods. Therefore, the following hypothesis is given:

H3: Interviews will produce the lowest levels of item omission among all data collection methodologies.

5.4 Response Time

Leaner communication media, such as text-based forms, result in higher decision times compared to richer media forms (Dennis and Kinney 1998). White's (2003) research revealed that some respondents spent over an hour to complete survey tasks using an electronic-based data collection method. Furthermore, many scholars (e.g., Fowler and Wackerbarth 1980) claim that it takes longer to manually produce a message than to speak it (Dennis and Kinney 1998). Therefore, use of text-based data collection methods that require typing or writing, such as electronic forms and paper and pencil questionnaires, will produce higher response times compared to face-to-face data collection methods (Dennis and Kinney 1998). Hence the following hypothesis is given:

H4: Electronic forms and paper and pencil questionnaires will produce the highest respondent times among all data collection methodologies.

5.5 Respondent Fatigue

White's (2003) research evaluated an electronic data collection method and found some surprising peripheral results regarding the impact of the data collection methodology on respondents' feelings and perceptions. Participants from White's (2003) research did not appear to be bored or fatigued after completing their survey tasks via the Internet. On the contrary, respondents asked permission to provide additional responses (White 2003). For these reasons, the following hypotheses are presented:

H5a: Electronic forms will produce the lowest levels of fatigue among all data collection methodologies.

H5b: Face-to-face interviews and paper and pencil questionnaires will produce the highest levels of fatigue among all data collection methodologies.

5.6 Respondent Boredom

Furthermore, White's (2003) findings reveal that respondents view electronic-based survey tasks as a leisure activity or game. White (2003) quotes one respondent as saying, "I'll play some more" in reference to requesting permission to complete another survey form (White 2003, p.57). Therefore, respondents who complete questions via the electronic form methodology should have the lowest levels of boredom compared to other forms of data collection. Thus, the following hypotheses are presented:

H6a: Electronic forms will produce the lowest levels of boredom among all data collection methodologies.

H6b: Face-to-face interviews and paper and pencil questionnaires will produce the highest levels of boredom among all data collection methodologies.

5.7 Respondent Satisfaction

D'Ambra, Rice and O'Connor's (1998) research asked respondents to evaluate their individual preference for communication media. Under general circumstances, these scholars found that in-person communication modes were preferred and over other forms of less personal communication, including text-based formats such as email and memo formats (D'Ambra, et al 1998). The following hypotheses are formed regarding post-survey satisfaction levels:

H7a: Face-to-face interviews will produce the highest levels of satisfaction among all data collection methodologies.

H7b: Paper and pencil questionnaires and electronic forms will produce the lowest levels of satisfaction among all data collection methodologies.

6. Research method

This research involves collecting respondent data using three different data collection methods. The first method is self-administered paper and pencil questionnaires. The second method is in-person interviews with trained interviewers. The third method is the use of electronic forms administered using offline laptop computers. Participants include adolescent males between 11 and 17 years of age. This age range is consistent with Roedder John's (1999) reflective stage of consumer socialization.

Recruitment for adolescent males resulted from a demographic mix of Boy Scout troops from a large Metropolitan Southeastern city. Pretests were conducted by using a convenience sample of male adolescents to ensure the questionnaire wording was understandable and clear for the research audience. Pretest results

were used to modify the survey instrument to clarify questions and improve overall flow. Three different stations were set up to collect data using the various methods. One station contained multiple stations for answering questions via paper and pencil. The second station contained several offline laptop computers where participants answered questions using an electronic form. The last station was located far enough away from the quieter data collection stations such that in-person interviewing could take place without disturbing the paper and pencil or electronic form stations. At least one adult volunteer was present at each station to ensure flow of respondents and maintain a quiet environment. Additionally, a member of the research team was present to support each station as needed.

Participants answered questions for a main survey task involving leisure activities and additional questions regarding their feelings about survey participation immediately following. Assent forms explained the multiple objectives of the survey task including their perceptions of an entertainment product as well as their response to various data collection modes. Small incentives were provided to the young participants as tokens of appreciation for their participation.

Approximately 50 respondents were exposed to each of the three data collection methods with a resulting total number of 158 total responses. Our objective was to collect enough responses for 90% confidence and around 5% error under the original assumption of extreme variations in response. This sample resulted in adequate statistical power to produce meaningful results with statistical significance. Respondents were informed that their participation was voluntary for a research study involving video games.

We randomly assigned each participant to a treatment group by handing out color coded, shuffled index cards to each scout who provided a parental consent form. The color of the index cards represented the type of data collection methodology for each participating scout. Scout meeting locations took place at local facilities within a suburban area. Data collection stations were set up as far away from the main scout meeting as possible. Participants were directed to the appropriate station based on random assignments. In-person interviews were conducted away from the quieter text-based methods. Adult volunteers were posted to help with scout flow, ensure efficient use of time by keeping stations occupied and to maintain a quiet environment among the text-based participants.

Respondents were asked to name as many of their favorite video games as possible. There were no additional prompts to this question for any of the data collection methodologies. Similar to the measure for completeness of answer by Bush and Hair (1985), the number of answers given was used to analyze and compare completeness of answer across the various data collection methodologies for respondents, thereby addressing H1.

To assess response distortion, respondents from all three data collection methodologies were asked to name the president of the United States (George W. Bush). This question was chosen to represent levels of response distortion. Since respondents were at least 11 years old, all respondents were of the school age where the name of the president should be known with certainty. Responses were coded as either correctly answered as George W. Bush or incorrectly answered if a different response was recorded. This information is used to address H2.

Item omission occurs when respondents do not answer questions, including refusals to answer questions. Since refusals are most likely to result from sensitive questions, respondents were asked to reveal the subject of their lowest recalled school test (i.e., History). Results from this question provide the information necessary to address H3.

This study asked respondents to record the time at the beginning of their survey response and again at the completion of their survey task. These values were used to compute respondent time and compared across data collection methodologies to address H4.

At the conclusion of the survey, respondents were provided with a questionnaire asking about experiences with completing the survey task. Following the scale of Bijmolt and Wedel (1995), respondents were asked to rate their levels of fatigue, boredom and satisfaction resulting from their participation in the survey. Levels of fatigue, boredom and satisfaction were each measured using a three-item scale. Reliability analyses of these

scales produced Cronbach’s alpha values of .85, .79 and .87, respectively. Responses to these questions were analyzed and compared across data collection methodologies to address H5, H6 and H7.

7. Analysis and results

Respondents were asked a series of questions to verify the effectiveness of the experimental manipulations. Respondents were asked if they participated in a survey using paper and pencil only, an interviewer, or a laptop computer. Almost 90% of the adolescent respondents answered as expected for the paper and pencil manipulation and 100% of respondents correctly identified their data collection method as an interview or an electronic form method. To ensure the scout participants were similar among all the treatment groups, analysis of variance (ANOVA) was conducted to assess differences among the data collection methodology groups. ANOVA was chosen since our primary dependent variables were measured using a scale measurement, while our independent variable (data collection method) was measured as a categorical variable with more than two groups. Results reveal that demographics were not significantly different among the data collection methodology groups.

Analysis of variance (ANOVA) and post hoc and t tests were used to reveal significant differences in responses to measures of response quality among the three methods of data collection. For completeness of answer, respondents were instructed to list as many favorite video games as possible and the number of games listed per respondent was used to compute completeness of answer averages. Across the three methods, an analysis of variance reveals that there is a significant difference in the average number of games listed for at least one data collection methodology ($p < .01$). Therefore, we tested for differences comparing each method in pairs using t-tests and confirmed with post hoc tests. Results (Table 1) indicate that the interview method produces a significantly lower average number of responses compared to the paper and pencil ($t=3.18$; $p < .01$) and electronic form ($t=4.34$, $p < .01$) methodologies. As expected, there were no significant differences for completeness of answer between the text-based methods of electronic form and paper and pencil. Since there are significant differences between the data collection methodologies tested, H1 is not supported by these findings.

Table 1: Differences in Completeness of Answers for Adolescent Males (H1)

Completeness of Answers	Paper and Pencil (responses)	Interview (responses)	Electronic Form (responses)
Mean →	8.78	6.41	9.67
Paper and Pencil		$t = 3.18$ $p < .01$	Not significant $t = 4.34$ $p < .01$
Interview			

Interview respondents were not able to view the survey instrument used by the interviewer. Therefore, interview respondents were unaware of the number of blank spaces or response lines available for listing their favorite games in the interview method. However, respondents were able to see that there were 15 blanks available in the text-based methods of paper and pencil and electronic form. Furthermore, recent research supports the notion that a visual presentation of the number of blank spots available for open-ended questions helps to establish researcher expectations for response. Research conducted among German adolescents and adults of employment age reveals that the use of formal systems to indicate the number of expected responses, such as response lines for open-ended survey questions, produces higher quantities of responses (Spörrle, Gerber-Braun, Fösterling 2007). Perhaps if interviewers had said, “list as many as you can, up to 15 game titles” instead of simply “list as many as you can”, this framing might have set expectations for the respondents and given respondents a more equivalent question compared to the text-based forms, where the total of 15 possible blanks was more apparent.

Respondents were asked to name the president of the United States in order to assess levels of distortion across the three data collection methodologies. From personal observation, written comments on the text-based forms and a lack of “don’t know” responses, all respondents appeared to have knowledge of the correct answer to this question. However, some respondents chose to provide intentionally distorted responses for this question. As hypothesized, there was a significant difference in the proportion of respondents who

provided distorted responses between the interview and other data collection methodologies. Adolescent respondents from the interview methodology tended to provide distorted responses significantly less often than respondents from the paper and pencil ($t=2.08, p < .05$) and electronic form ($t=3.47, p < .01$) methodologies (Table 2). Therefore, H2 is supported by these findings.

Table 2: Differences in Response Distortion for Adolescent Males (H2)

Distortion (%)	Paper and Pencil (percent)	Interview (percent)	Electronic Form (percent)
Proportion →	8.3%	0.0%	17.2%
Paper and Pencil		$t = 2.08$ $p < .05$	Not significant
Interview			$t = 3.47$ $p < .01$

We strongly suspect that all adolescents surveyed know the president of the United States, particularly since the group chosen to participate consisted of Boy Scouts. This would lead us to believe that all distortion present is intentional; however, we do not have a mechanism in place to determine with certainty if the distortion is intention or unintentional.

The hypothesis regarding item omission was analyzed via a t-test of differences in proportion. The proportion of item omissions from the electronic form methodology were compared to the non-technical data collection methodologies to determine if there is empirical support for the hypothesis that item omissions rates are higher for both electronic form and paper and pencil data collection methods. While findings reveal what appears to be large differences in item omission rates (8% for paper and pencil formats versus less than 2% for electronic form), these differences are not statistically significant (Table 3).

Table 3: Differences in Item Omissions for Adolescent Males (H3)

Omissions (%)	Paper and Pencil (percent)	Interview (percent)	Electronic Form (percent)
Proportion →	8.0%	2.0%	1.7%
Paper and Pencil		Not significant	Not significant
Interview			Not significant

This lack of significant findings on item omissions may be at least in part due to the relatively small sample sizes used per cell. Anecdotal evidence, such as the relative approach taken toward the paper and pencil format, leads us to believe that the differences would have been significant had larger samples been available. However, results based on our statistical results lead us to conclude that H3 is not supported although we caveat these findings. Regarding the lack of differences in item omissions, the novelty of electronic data collection methods and the perceived advantage of using laptops appeared to be fairly high among the young respondents. Conversations with Boy Scout Executives, scoutmasters, volunteer leaders, parents and scouts led to the conclusion that a group of laptops brought in to a scout meeting specifically for Boy Scout use was extremely untraditional and intriguing for many of the scouts. The presence of the laptops alone represented a contrast to their otherwise natural setting and nature-related discussions and activities. Perhaps this interest compelled respondents to answer each question and take their time with the survey process. Therefore, these young respondents may have been more inclined to skip this question if their levels of novelty associated with the use of technology for the data collection process had not been so high. Perhaps over time as technology becomes more fully integrated into adolescent daily life and schools are implementing the use of computers as heavily as businesses, younger respondents' levels of interest in completing survey forms online may resemble more closely their interests in completing other types of survey forms.

The amount of time needed to complete the survey form was analyzed by using the recorded ending time minus the beginning time of the survey process, excluding any follow-up questions regarding respondent experiences. As expected, the amount of time taken to complete the survey task was lowest for the interview

methodology. The difference between the interview and paper and pencil methodologies is significant ($t=1.97, p < .05$) and is summarized in Table 4. Also as expected, the differences between the interview and electronic form methodologies is significant ($t=4.0, p < .01$). Furthermore, there was an unanticipated significant difference among the text-based forms of paper and pencil and electronic form with significantly longer time reported for electronic form respondents ($t=2.09, p < .05$). These findings provide support for H4.

Table 4: Differences in Respondent Time for Adolescent Males (H4)

Respondent Time	Paper and Pencil (minutes)	Interview (minutes)	Electronic Form (minutes)
Mean →	13.88	11.85	17.32
Paper and Pencil		$t = 1.97$ $p < .05$	$t = 2.09$ $p < .05$
Interview			$t = 4.00$ $p < .01$

The difference in response time between paper and pencil and electronic form methods may have been smaller if the completeness of answer variable had been closer between the two methods. Furthermore, the novelty of using laptop computers appeared to have an impact here as well, particularly among adolescents. Respondents seemed to spend more time in the process and take the time to complete their “work”.

Analysis of variance was conducted using the adolescent respondent experiences data to determine if there are significant differences in levels of fatigue, boredom and satisfaction among the three data collection methodologies. Results (Table 5) indicate that there are no significant differences with regard to respondents’ levels of fatigue resulting from their participation among all three methodologies, thus providing no support for H5.

Table 5: Differences in Fatigue Levels for Adolescent Males (H5)

Respondent Time	Paper and Pencil (mean*)	Interview (mean)	Electronic Form (mean)
Mean →	2.17	1.83	2.05
Paper and Pencil		Not significant	Not significant
Interview			Not significant

* scale where 1 = strongly disagree and 5 = strongly agree

From observation, each data collection methodology appeared to produce fatigue; however, the descriptions given from informal conversations among the respondents varied by data collection methodology, particularly for the adolescent sample. For example, paper and pencil respondents appeared to tire from having to write “so much” in a test-type environment (at a desk, head down, reading a questionnaire and answering questions). The interview respondents did not have to read; however, some of them appeared to tire from listening carefully to an interviewer in a one-on-one environment for over 10 minutes. While electronic form respondents seemed to enjoy the experience of being able to use a laptop to answer the questions, they also appeared to view the task as “a lot of work”, with one respondent even commenting that he was surprised he wasn’t getting paid for his efforts. Therefore, each data collection methodology appeared to produce levels of fatigue; however, the differences might be more of a matter of kind or source (from reading, from listening, from typing) than degree or level.

Among all three data collection methodologies, interview respondents rated their levels of boredom lowest. Levels were significantly lower for interview compared to the paper and pencil method ($t=2.28, p < .05$) (Table 6). Furthermore, interview respondents rated boredom levels lower compared to ratings from electronic form respondents ($t=1.83, p < .10$). The less interactive methods of paper and pencil and electronic form methodologies produced levels of boredom that were not significantly different from each other. Therefore, results provide no support for H6.

Table 6: Differences in Boredom Levels for Adolescent Males (H6)

Respondent Time	Paper and Pencil (minutes)	Interview (minutes)	Electronic Form (minutes)
Mean →	2.48	1.98	2.36
Paper and Pencil		t = 2.28 p < .05	Not significant t = 1.83 p < .10
Interview			

* scale where 1 = strongly disagree and 5 = strongly agree

From personal observation, the use of a laptop for data collection among adolescent respondents in particular appeared to produce some levels of excitement; however, adolescents also seemed to view the research task as work-related and somewhat mundane. It appears that the interactive nature of using an interviewer to ask the questions for the respondent resulted in less bored respondents.

The interview data collection methodology had the highest level of satisfaction followed by paper and pencil and then electronic form methodologies. Results (Table 7) indicate that there is a significant difference in post-participation satisfaction ratings between the interview and electronic form methodologies (t=2.76, p < .01). Furthermore, satisfaction ratings are marginally significantly higher for interview respondents compared to paper and pencil respondents (t=1.85, p < .10). Therefore, findings provide support for H7.

Table 7: Differences in Satisfaction Levels for Adolescent Males (H7)

Respondent Time	Paper and Pencil (mean)	Interview (mean)	Electronic Form (mean)
Mean →	3.38	3.79	3.18
Paper and Pencil		t = 1.85 p < .10	Not significant t = 2.76 p < .01
Interview			

* scale where 1 = strongly disagree and 5 = strongly agree

It is possible that social influence theories may have a place in explaining the strong preferences for in-person communication methods over other less personal, text-based formats. Social influence theories suggest that individuals in communication situations may sense influence from social relationships, message context, or message content when selecting the appropriate communication media for certain communication tasks (Webster and Trevino 1995). Furthermore, persons involved in communication scenarios may sense these influential factors either consciously or unconsciously (Cano, Boles, Bean 2005, Minsky and Marin 1999). Hence, the social environment of the research surroundings may have influenced participant’s levels of response quality.

8. Summary, conclusions, and implications

In summary, our findings indicate mixed results in that the hypotheses were not entirely supported by the results as shown below.

Figure 1: Summary of Findings

Hypotheses	Results
H1: Completeness of answers will be equivalent across face-to-face interviews, paper and pencil questionnaires and electronic form data collection methodologies.	Not supported. Interview method produced a significantly lower average number of responses compared to other methods.
H2: : Face-to-face interviews will produce lowest response distortion among all data collection methodologies.	Supported. Interview method provided less distorted responses compared to other methods.
H3: Interviews will produce the lowest levels of item omission among all data collection methodologies.	Not supported. There were no significant differences among the three methods with regard to item omissions.
H4: Electronic forms and paper and pencil questionnaires	Supported. There were significant differences between methods with regard to survey completion time.
H5a: Electronic forms will produce the lowest levels of	Not supported. There were no significant differences

fatigue among all data collection methodologies. H5b: Face-to-face interviews and paper and pencil questionnaires will produce the highest levels of fatigue among all data collection methodologies.	with regard to levels of fatigue felt across methods of data collection.
H6a: Electronic forms will produce the lowest levels of boredom among all data collection methodologies. H6b: Face-to-face interviews and paper and pencil questionnaires will produce the highest levels of boredom among all data collection methodologies.	Not supported. Electronic forms did not produce the lowest levels of boredom. Face-to-face interviews and paper and pencil did not produce the highest level of boredom.
H7a: Face-to-face interviews will produce the highest levels of satisfaction among all data collection methodologies. H7b: Paper and pencil questionnaires and electronic forms will produce the lowest levels of satisfaction among all data collection methodologies.	Supported. Personal interview method had the significantly highest level of satisfaction among all methods.

While the academic literature contains numerous studies with young respondents (e.g., Clark, Martin, and Bush 2001; Dotson & Hyatt 2005), there are no studies that evaluate the implications of using various data collection methodologies with young respondents. As shown in Figure 1, the findings provide empirical evidence that the personal interview method yields superior response quality measures and is the most favored data collection methodology among adolescent male respondents. While electronic means for data collection are expected to provide many benefits for researchers, our research suggests that adolescent males prefer more personal methods. Indeed, of the four hypotheses tested in relation to data quality, only two were supported. Of the remaining three hypotheses related to behavior outcome, only one was supported.

Since there are many ethical considerations to take into account when research involves minors, it is particularly important to develop an understanding of their response characteristics so that researchers can be as efficient as possible with adolescent samples. For example, these findings suggest that researchers wishing to gather accurate, truthful, undistorted responses from adolescents might consider using a method that is more personal in nature. Research using electronic means for this type of objective may result in inaccurate conclusions and require additional samples of adolescents, which is inefficient for the academic community and for potential adolescent research subjects.

9. Limitations and directions for future research

The adolescent sample chosen, boy scouts, are presumed to have a fairly homogeneous moral structure, which may be partially associated with their membership in scouts. While the study intentionally sought a varied mix of socio-economically and ethnically diverse selection of boy scouts, the sample frame of scouts may limit the amount of difference found in the results. Therefore, future research efforts might include non-scout adolescents to determine the impact of scouting involvement toward response to participation in various data collection methods. Furthermore, adolescent female respondents were not included in this study since their inclusion would add another dimension to the research and expand it beyond the desired scope. Hence, results may not provide the best indicator for adolescents as a general group since the sample excluded females and non-scouts.

Data collection was conducted during scout meetings which started as early as 6 p.m. and ended as late as 9 p.m. on either Monday or Tuesday evenings. Due to limited space and logistics, we allowed only a small quantity of scouts to participate in the research study at any one time. Therefore, if scouts had agreed to participate, they would need to stop their scouting activity, participate in the research study, and then return to their previous activity. Although efforts were made to ensure an environment conducive to research participation, the interruption of scouting activities and then completion of research tasks and then return to scouting activities may have given the participants a feeling of information overload (Cohen 1978) or they may have felt overwhelmed. Stated fatigue levels were not extremely high; however, respondents did express some levels of fatigue.

This study does not take into account the practical budgetary concerns of using different data collection methodologies, which may be another factor for researchers and managers to consider in their selection of an appropriate data collection methodology. For example, face-to-face interviews under most circumstances are substantially more expensive compared to surveys administered via electronic forms or hardcopy

questionnaires. These factors may be considered in future research efforts to develop a more comprehensive list of benefits and disadvantages to employing various data collection methodologies.

The age category of the respondent group ranges from 11 years of age to 17 years of age. While this age range may seem substantial from a maturity perspective, analysis reveals that differences between the younger adolescent group (13 years and younger) and older adolescent group (15 to 17 years of age) are not significant. Furthermore, this relatively large age category remained intact for our purposes also due to the defined consumer socialization range for adolescents per Roedder John (1999). Further dividing adolescents beyond this level for the particular variables of response quality did not appear to produce meaningful results.

Additional survey response factors might provide a more comprehensive view of adolescent respondents' response factors in data collection efforts. For example, researchers may wish to assess levels of thoughtfulness involved in respondent participation as an exploratory effort or perhaps levels of involvement with the research task or research subject.

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