

# Using Telephone Survey Data to Predict Participation in an Internet Panel Survey

**David J. Roe**  
**Jason Stockdale**  
**Matthew Farrelly**  
**Todd Heinrich**  
*RTI International*

As declines in telephone response rates continue, the need for flexible data collection strategies adaptable to a rapidly changing environment is clear. Advances in technology during the past decade have allowed Internet surveys to become a useful data collection strategy. While concerns surrounding the representativeness of internet surveys among the general population exist, the potential benefits; absence of interviewer bias, convenience, lower costs, and the use of multimedia present an attractive option for collecting data from longitudinal panels and list samples.

A pilot project was conducted to gain insight into collecting data from youth online. The study examined barriers, advantages and the feasibility of converting a longitudinal panel of youth from telephone surveys to online surveys. After completing two longitudinal telephone surveys, 84% of respondents agreed to participate in an Internet Panel. Despite this apparent interest, we were only able to complete on-line interviews with approximately 54% of respondents.

The research presented here will examine whether responses to items in the telephone survey are significant predictors of participation in the web survey. Of key interest are variables which capture information about a respondent's willingness to use the internet and existing habits, such as daily use of a PC, time spent on the internet, connection speed and type and where they access the internet. We would expect to see strong relationships between a respondent's perceived ability to use the internet and their participation in the web survey. However, demographic variable such as age, race, income (if any) and parental influence and oversight may also play a role in limiting participation. By identifying predictors, future data collection efforts can be tailored to assist and encourage those who may face barriers or limitations to participating.

## 1. Introduction

As declines in telephone response rates continue, the need for flexible data collection strategies adaptable to a rapidly changing environment is clear. This is especially true for surveys that attempt to collect data from population subgroups, such as youth. Telephone surveys of youth are becoming increasingly difficult and more expensive to conduct with each passing year. Increased costs associated with reaching the target sample because of their relatively low incidence in the population are making a significant contribution to this difficulty. In addition, telephone studies have been shown to underreport certain risk behaviors among youth, such as but not limited to smoking when compared to self-administered data collection efforts.

Further, traditional self administered surveys of youth, while attractive because they can capture information on large samples, are not without problems. Self administered surveys conducted in school during class time are often viewed as burdensome and are facing increased resistance from schools. In school paper and pencil (PAPI) surveys take away from class time and more often than not, there are many surveys competing for time in the classroom. Given these increasing difficulties, researchers have been turning to new methods for collecting data among youth.

Generally speaking, advances in technology during the past decade have allowed internet surveys to become a useful data collection strategy (Couper 2000). Decreasing costs associated with hardware and software, and advances in speed and ease of use have also contributed to the increased use of the internet as a communication tool (Wright, 2005). Lower operational costs associated with web interviewing are also seen as an advantage (Cobanoglu, Warde and Moreo, 2001; Couper et al., 2007).

Despite the efficiencies and costs savings associated with web data collection, and the increasing popularity and availability of the internet over the past decade, a number of pieces in the literature have been written focused on the digital divide, or the significant differences between the haves and have not's when it comes to computer ownership and internet access. Significant differences in computer ownership and internet access based on age, gender, education and income have been cited, with internet users significantly more likely to be male (although this gap is narrowing), young, white,

well educated and in high income categories (NTIA 2000, 2002; Lenhart et al., 2000; Loges and Joung, 2001; Best, et al., 2001; Rice and Katz, 2003; Fox, 2005; US Census Bureau 2005; Pew, 2007).

While concerns surrounding the representativeness of internet surveys among the general population still exist, the potential benefits; absence of interviewer bias, convenience, lower costs, and the use of multimedia present an attractive option for collecting data from sub populations, longitudinal panels and list samples (Couper, Traugott and Lamias, 2001; Sills and Song, 2002; Orr, 2005). This especially true when the populations of interest are likely to be found online (Wright, 2005). When the fact that currently, high school and college aged students are considered a highly connected population, well aware and in tune with what the web has to offer is combined with the belief that the likelihood of heavy internet usage decreases as age increases, surveying panels of youth on the web becomes even more attractive (Mitra et al., 2005; Assael, 2005).

## **2. Study Background**

The Healthy Youth Panel Survey (HYPS) is a national survey of youth age 13-20 designed to gather information on adolescents' awareness of television advertisements on tobacco use and physical health. In addition, HYPS is designed to measure the effectiveness of an anti-tobacco public education campaign. The survey measures respondents' susceptibility to tobacco use and beliefs about the tobacco industry and the risks of smoking. HYPS also includes questions about respondents' physical health, including illness, diet, and exercise.

The web survey examined here is a longitudinal follow-up with youth who have continued to participate in a telephone version of the interview over the past few years. The most recent version of the survey was conducted as a web pilot project to gain further insight into collecting data from youth and young adults on-line.

The HYPS surveys are a spin-off of the Legacy Media Tracking Survey (LMTS), which was traditionally a Crosssectional RDD survey of youth. Prior to HYPS, a total of nine independent waves of this national telephone survey were completed, with each wave about six to eight months apart. RTI International coordinated the ninth wave of

this survey, which had a field period of November 2003 through January 2004.

Following the ninth LMTS wave, youth were recruited to remain as part of a longitudinal panel; the first HYPS survey conducted in the fall of 2004. Following a fairly significant period of down-time, HYPS respondents were contact for a second wave of longitudinal data collection in the summer of 2006. The purpose of this effort was two fold; to examine significant changes in attitudes of interest over time and, to gauge interest in participating in a web panel during future efforts.

The response to a question asked to gauge willingness to participate in a web version of the survey was encouraging. During the second longitudinal telephone survey in June and July of 2006, 84% (N=807) of respondents expressed interest in and submitted that they were willing to participate in the next round of the survey on the web.

Despite this apparent interest, when the next wave of the survey was made available to the panel in August of 2006, approximately 54% (N=433) of respondents who expressed interest actually completed an online survey. While better than results found in a study by Flemming and Sonner (1999) where only one third of respondents who provided an email address in a preceding telephone survey completed a follow-up web survey, the results were somewhat surprising. The short downtime between the telephone and web surveys (potentially contributing to the maintenance of good contact information), the use of personalized emails to increase response rates (Heerwegh, 2005), and continued use of a cash incentive for participation were all thought to be positives when the potential response rate of the pilot effort was considered.

### **3. Research Questions and Analysis Plan**

Given the sharp difference between expressed willingness to participate and actual completions, it became clearly important to begin to investigate the potential reasons for the response rate that was achieved. To do this, we will examine one main research question further divided into three parts:

- Are responses to items in the telephone survey significant predictors of participation in the web survey, both in terms of willingness to participate and actually completing the web interview?

- Did demographic variables such as age, race and education play a significant role in participation?
- Do measures of parental influence and lifestyle significantly affect participation?
- Are there relationships between a respondent's perceived ability to use the internet and their participation in the web survey?

In terms of demographics, the research is interested in examining whether or not any of the demographic variables often cited as contributing to the digital divide play a role within one specific subgroup; youth. That is to say, do the traditional arguments about the digital divide hold for youth (to the extent we can examine them)?

Further, do variables that speak to an adolescent's home structure and lifestyle, such as living with both parents, current smoking status, etc., contribute to both their willingness to participate in and actual completion of a web survey?

Also of key interest are variables which capture information about a respondent's willingness to use the internet and existing habits, such as daily use of a PC, time spent on the internet, connection speed and type and where they access the internet. We would expect to see strong relationships between a respondent's perceived ability to use the internet and their participation in the web survey (Liaw, 2002).

To answer the research questions above, we begin by conducting a bivariate analysis among willing respondents in the HYPS telephone study and completed web interviews in the HYPS pilot web study. This analysis cross-tabulated the proportion of respondents within each of the variables of interest listed in table 1 in order to identify significant influences on willingness to participate and completion of the web pilot survey. The analysis performs Chi-Square tests on each of the proportions compared. As an additional step, regression models were created to take all of the independent variables into consideration in an effort to examine whether or not any significant relationships displayed in the bivariate analyses remain when controlling for other independent variables. The conventional alpha levels of  $p < .05$ ,  $p < .01$  and  $p < .001$  were used to determine statistical significance for all analytic procedures.

## 4. Results

Table 2 displays the differences in willingness to participate among various demographic variables. These variables will provide some insight as to whether the demographic factors most frequently associated with the digital divide among the general population play a role among this subgroup of youth and young adults. Based on these results, age, race,

**Table 1. Independent Variables for Analysis**

Demographic Variables	Parental Control/ Lifestyle	Computer/Internet Use
<ul style="list-style-type: none"> <li>▪ Age</li> <li>▪ Gender</li> <li>▪ Race</li> <li>▪ Education</li> <li>▪ School Performance</li> <li>▪ Employed Full or Part Time</li> <li>▪ Born in the U.S.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Enrolled in School</li> <li>▪ Lives with Both Parents</li> <li>▪ Regularly Attends Religious Service</li> <li>▪ Has a Bedroom to Oneself</li> <li>▪ Smoked in the Past 30 Days</li> </ul>	<ul style="list-style-type: none"> <li>▪ Have Own Personal Computer &amp; Internet</li> <li>▪ Use a PC Anywhere</li> <li>▪ Go Online for Email or Internet</li> <li>▪ Online at least Once a Day</li> <li>▪ Use a High Speed Connection</li> <li>▪ Where Online Most Often (location)</li> </ul>

employment and being born in the US seem to play no significant role in affecting willingness to participate. Looking at gender, a significantly greater proportion of males than females expressed a willingness to participate in the survey. Differences in education are also significant, with a greater proportion of respondents with at least some college experience being significantly more willing than those with less education. This is an interesting finding, due to the fact that within this group, age is so closely related to education level, one would expect to see equally significant relationships. However, this is not the case. It is important to note however, that the significance of education is likely inflated by the low number of respondents with a college degree (N=4). Despite this, the differences between those who've graduated high school and those who have not yet reached high school are likely still significant.

Related to education, the self reported variable asking respondents to rate their school performance also appears significant, with a greater proportion of those who report being better or much better than average students expressing a willingness to participate in the web interview.

**Table 2. Demographic Variables by Willingness to Participate**

	<b>% Within Groups Willing to Participate in the Web Panel</b>
<b>Age</b>	
13-14	86.4
15-17	82.2
18-20	87.4
<b>Gender**</b>	
Male	87.4
Female	81.2
<b>Race</b>	
White	85.8
African American	79.4
Hispanic	81.7
Other	85.6
<b>Education**</b>	
No High School	76.7
Some High School	83
HS Grad or GED	83.3
Some College	93.8
College Grad	100
<b>School Performance***</b>	
Much Better or Better than Average	88.5
Average	76.7
Worse or Much Worse than Average	68.3
<b>Employed Full or Part Time</b>	85.1
<b>Born in U.S</b>	84.6

\*\* Difference between categories is significant at  $p < .01$  based on Chi-Square tests

\*\*\* Difference between categories is significant at  $p < .001$  based on Chi-Square tests

Differences in willingness to complete among variables representing parental influence and lifestyle are displayed in table 3. In examining these dichotomous variables, we see that significantly greater proportions of those who were enrolled in school, living with both parents, and had their own bedroom were willing to participate. It is possible that youth who are enrolled in school and have two parent relationships may be instilled with a greater sense of structure and involvement, thus leading to their increased willingness to continue to provide information and stay involved in the study, while having one's own bedroom may instill a sense of privacy that encourages participation. Table 3 also shows that those respondents who had smoked in the past 30 days (current smokers) were significantly less willing to participate in the next wave of the study than their non-smoking counterparts, an occurrence likely associated with the negative image given to smoking and tobacco in the advertisements that are key to the survey. In addition to the advertisements, which are explicit, it is plausible that for smokers, who seem to be pushed further and further from the mainstream in today's culture via advertising, legislation, etc., participating in a survey that asks a variety of questions about tobacco use, the tobacco industry and attitudes towards smoking could be less than desirable.

**Table 3. Parental Influence and Lifestyle Variables by Willingness to Participate**

	<b>% Within Groups Willing to Participate in the Web Panel</b>
<b>Enrolled in School***</b>	85.7
<b>Lives with Both Parents**</b>	87.8
<b>Regularly Attend Religious Service</b>	85.2
<b>Have a Bedroom to Oneself*</b>	85
<b>Smoked in the past 30 days*</b>	77.1

\* Difference between categories is significant at  $p < .05$  based on Chi-Square tests  
 \*\* Difference between categories is significant at  $p < .01$  based on Chi-Square tests  
 \*\*\* Difference between categories is significant at  $p < .001$  based on Chi-Square tests

Table 4 illustrates differences in willingness to participate based on computer ownership and internet use. When it comes to equipment and access, significantly

greater proportions of youth who have their own computer not used by anyone else, those who use a computer anywhere and those who go online to send and receive email or surf the internet were willing to participate. These results are not very surprising, as we would expect that youth who are “connected” would be interested in participating in a survey conducted online. Interestingly, there was no significant difference when it came to willingness to participate, between youth with high speed connections and their counterparts who used dial-up internet access. One might assume that youth with traditionally slower dial-up connection might be less willing to participate in a survey on the web due to perceived burden, but this was not the case. In addition to connection type, the location where respondents most frequently access the internet was also insignificant.

**Table 4. Computer and Internet Use Variables by Willingness to Participate**

	<b>% Within Groups Willing to Participate in the Web Panel</b>
<b>Have Own Personal Computer &amp; Internet***</b>	87.7
<b>Use a PC Anywhere***</b>	85.6
<b>Go Online for Email or Internet***</b>	88.4
<b>Online at least Once a Day***</b>	91.1
<b>Use a High Speed Connection</b>	88.7
<b>Where Online Most Often?</b>	
Home	89.6
School	82.8
Work	87.5
Someplace Else	83

\*\*\* Difference between categories is significant at  $p < .001$  based on Chi-Square tests

Turning to web survey completion, table 5 shows that not only did a significantly greater proportion of males than females complete the survey, but the level of significance is even greater when compared to willingness to participate. There were no

significant differences when it came to level of education, and perceived performance in school played a significant role in web completions, with a greater proportion of respondents who reported doing much better or better than average completing the web survey.

**Table 5. Demographic Variables by Web Survey Completion**

	<b>% Within Groups Who Completed the Web Survey</b>
<b>Age</b>	
13-14	54.9
15-17	55.1
18-20	51.2
<b>Gender***</b>	
Male	59.3
Female	47.9
<b>Race</b>	
White	55.5
African American	52.8
Hispanic	44
Other	57.1
<b>Education</b>	
No High School	42.4
Some High School	57
HS Grad or GED	49.1
Some College	51.1
College Grad	50
<b>School Performance***</b>	
Much Better or Better than Average	59.2
Average	40.1
Worse or Much Worse than Average	42.9
<b>Employed Full or Part Time</b>	52.2
<b>Born in U.S</b>	53.7

\*\*\* Difference between categories is significant at  $p < .001$  based on Chi-Square tests

While multiple variables related to parental influence, lifestyle and computer ownership and internet use were significant in regards to willingness to participate, fewer variables displayed significant differences when it came to those who actually completed the web survey. Only living with both parents and going online at least once daily were shown to be significant in tables 6 and 7.

**Table 6. Parental Control and Lifestyle Variables by Web Survey Completion**

	<b>% Within Groups Who Completed the Web Survey</b>
<b>Enrolled in School</b>	54.2
<b>Lives with Both Parents*</b>	55.6
<b>Regularly Attend Religious Service</b>	55.4
<b>Have a Bedroom to Oneself</b>	53.4
<b>Smoked in the past 30 days</b>	44.1

\* Difference between categories is significant at  $p < .05$  based on Chi-Square tests

**Table 7. Computer and Internet Use Variables by Web Survey Completion**

	<b>% Within Groups Who Completed the Web Survey</b>
<b>Have Own Personal Computer &amp; Internet</b>	54.5
<b>Use a PC Anywhere</b>	54.3
<b>Go Online for Email or Internet</b>	54.1
<b>Online at least Once a Day**</b>	57.1
<b>Use a High Speed Connection</b>	53.7
<b>Where Online Most Often?</b>	
Home	55.8
School	47.6
Work	42.8
Someplace Else	43.2

\*\* Difference between categories is significant at  $p < .01$  based on Chi-Square tests

The tables to this point illustrate that when analyzed independently, a good number of demographic, parental influence and lifestyle and computer and internet use variables have a significant relationship with a respondent's expressed willingness to participate, but a fair amount less play a significant role when it comes to completing the survey.

The question that must be asked next is whether or not these significant relationships remain when we control for other factors. Tables 8 and 9 present the results of regression models that took all of the independent variables of interest into consideration to see which variables, under these models, affected a telephone respondents' likelihood of being willing to participate in, and complete the web survey.

Tables 8 and 9 show that when it comes to willingness to participate and completing the web survey, gender remains significant, with males having a significantly increased likelihood to both be willing to participate and complete when compared with females. Self reported school performance remains a significant factor for both willingness and completion, while education is no longer a significant influence for willingness to participate. Living with both parents significantly increases the likelihood of being willing to participate, though it no longer significantly affects completing the web survey.

While not examined in the bivariate analysis, weekly wages earned was included in the multivariate model. Although rounded and displayed with an odds ratio of 1, respondents who earn more money are less likely to complete the web survey. This is not a surprising finding, as one would imagine that as salary increases, so does job responsibility, or at the very least, hours worked per week. This in turn could affect not only the amount of time available for completing a survey during free time (or lack thereof), but could also diminish the value and impact of a token incentive offered for completing the survey.

Tables 8 and 9 also illustrate that those who go online and within them, those who go online once daily (at least) are significantly more likely to express a willingness to participate in a web survey. These variables had no significant effect on completing the

web survey. Further, where students go online had no significant effect on willingness to participate or completing a web interview.

**Table 8. Full Regression Model – Willingness to Participate**

		<b>Willing to Participate</b>
		<b>Odds Ratio</b>
Age (compare to 15 to 17)	13 to 14 year olds	1.43
	18 to 20 year olds	1.21
	Male	1.64*
Race (compare to White, Non-Hispanic)	African American, Non-Hispanic	0.97
	Hispanic	1.03
	Other Race, Non-Hispanic	0.94
	Born in US	1.84
	Enrolled in School	1.35
School Performance (compare to Average)	Much better or better	1.85**
	Much worse or worse	0.54
Education (compare to HS Grad or GED)	No High School (0-8)	0.73
	Some High School (9-11)	1.17
	Some College or Technical School	2.94
	College Graduate or Higher	
	Missing Education	0.14
	Employed for wages	0.97
	Weekly wages earned	1
	Smoked in past 30 days	0.65
	Lives with both parents	2.44**
	Attends church regularly	1.02
	Has a bedroom to oneself	1.21
	Personal computer (not used by others)	1.38
	Use a PC at home, school, anywhere else	0.75
	Go online to access the internet or to email	8.69**
	Go online at least once daily	1.99**
	Use a high-speed connection type	0.93
Where online (compare to Home)	Where online: School	0.68
	Where online: Work	0.42
	Where online: Other	1.32

Significant at: \* 0.05, \*\* 0.01

**Table 9. Full Regression Model – Web Survey Completion**

		Completed Web Survey Odds Ratio
Age (compare to 15 to 17)	13 to 14 year olds	1.18
	18 to 20 year olds	1.4
	Male	1.64**
Race (compare to White, Non-Hispanic)	African American, Non-Hispanic	0.98
	Hispanic	0.64
	Other Race, Non-Hispanic	1.13
	Born in US	0.9
	Enrolled in School	0.78
School Performance (compare to Average)	Much better or better	2.23**
	Much worse or worse	1.03
Education (compare to HS Grad or GED)	No High School (0-8)	0.43
	Some High School (9-11)	0.55
	Some College or Technical School	0.71
	College Graduate or Higher	0.63
	Missing Education	
	Employed for wages	1.25
	Weekly wages earned	1.00*
	Smoked in past 30 days	0.81
	Lives with both parents	1.3
	Attends church regularly	1.12
	Has a bedroom to oneself	0.67
	Personal computer (not used by others)	1.21
	Use a PC at home, school, anywhere else	1.18
	Go online to access the internet or to email	1.35
	Go online at least once daily	1.35
	Use a high-speed connection type	0.96
Where online (compare to Home)	Where online: School	0.82
	Where online: Work	0.38
	Where online: Other	0.93

Significant at: \* 0.05, \*\* 0.01

## 5. Discussion

Given the sharp difference between expressed willingness to participate in a web survey during telephone data collection and the actual completion rate in said web survey, it became important to investigate whether or not responses to items in the telephone survey were significant predictors of participation in the web survey, both in terms of expressed willingness to participate and completing the web interview.

The results presented here show many more significant relationships when between the independent variables investigated and willingness to complete. Variables from the telephone interview associated with demographics, parental influence and lifestyle and computers and internet access all played roles in determining whether or not a telephone survey respondent would be willing to participate in the next wave of the panel via a web survey. Despite these significant relationships displayed in bivariate analysis, many of the significant relationships fall away when control for other variables is applied.

In comparison with willingness to participate, completion, for the most part, seems to be random with only gender and self reported school performance remaining significant influences when other factors are controlled for.

Given these results, it is important to continue to search for reasons for such a relatively low response in light of such highly expressed willingness to participate. Future research must investigate other factors, one of which is social desirability. It is entirely possible that some of those who expressed interest in the web survey during telephone data collection were simply being accommodating at the end of the interview. When the time came to actually participate in the web interview, the less intrusive self administered format may have lent itself to a diminished feeling of obligation when compared to its telephone counterpart, thus leading to higher nonresponse to the web survey.

Other operational factors should also be taken into consideration. Were panel members simply burned out at this point, growing disinterested in the survey and its topics? Did the time of year the data was collected contribute to low response rates? Was there a need to increase the incentive that had stayed the same across all waves of data collection? All of these factors should be examined in future investigation to gain

insight into what, from an operational standpoint could be driving response rates when a telephone panel is converted to the web.

The interest in operational factors, while important, should in no way negate the significant differences that do remain in the multivariate analyses. While panel burnout, time of year and social desirability are all important, researchers must pay attention to the significant gaps that still exist. Most important among these is addressing the fact that those who do not have a PC are least likely to be willing to join a web panel. If research is to move forward truly embracing the use of the internet for data collection, perhaps researchers themselves must consider steps to diminish any divide that exists among panel members in an effort to maintain that panel when a major mode shift, such as telephone to web, occurs.

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