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# Call Screening - Is It Really a Problem for Survey Research?

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# **CALL SCREENING**

## **IS IT REALLY A PROBLEM FOR SURVEY RESEARCH?**

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Advances in computer technology and the expansion of telephone coverage in recent decades have greatly enhanced our ability to conduct public opinion research over the telephone with increasing ease and cost effectiveness. However, more recent innovations—such as telephone answering machines (TAMs) and caller identification services (Caller-ID)—threaten our ability to conduct valid and reliable survey research via the telephone by undermining the representativeness of the resulting sample. With these devices potential respondents now have more information to use in deciding whether or not to answer the telephone. While the problem of nonresponse is not a new one, it remains a central concern of public opinion researchers.<sup>1</sup> But are problems such as the rising level of nonresponse really the result of the growth of new call-screening technologies, or has call screening become a convenient scapegoat for problems whose origins lie elsewhere?

In this article we examine the relationship between call screening and issues related to nonresponse by focusing on the use of telephone answering machines and Caller-ID services as call-screening devices. While much has been written about the problems associated with telephone answering machines (see, e.g., Oldendick and Link 1994; Piazza 1993; Tuckel and Feinberg 1991; and Xu, Bates, and Schweitzer 1993), there have been far fewer studies of the impact of Caller-ID services on the conduct of public opinion surveys. Tuckel and O'Neill (1996) found in a national, face-to-face survey that Caller-ID subscribers were more likely to be under age 65, separated or divorced, employed full-time, black, have larger numbers of children living at home, and more likely to be involved in political and social activities than were respondents who do not use or

1. At the 1999 annual meeting of the American Association for Public Opinion Research, for example, there were six panels (and at least 17 presentations) devoted to this topic.

have access to such services or devices. They also reported that a substantial portion of Caller-ID subscribers are also TAM owners; yet, those who have Caller-ID but not a TAM differed in some important respects from those who have both devices. For example, those who only have Caller-ID tended to be much less enthusiastic about survey participation than were Caller-ID subscribers who are also TAM owners. Yet, their findings provide some room for optimism for survey researchers, concluding that Caller-ID subscribers are more likely to use this service to identify annoying callers rather than to screen all incoming calls. The obvious objective for survey researchers is to avoid falling into the former category.

The research presented here builds on and extends this work in several ways. First, we provide a current profile of those in South Carolina who report using Caller-ID, a TAM, or both to screen their unwanted telephone calls. Second, we offer an analysis of the types of listings that are displayed on Caller-ID units and whether these listings make respondents more willing or more hesitant to answer the telephone. Finally, we examine the effects of screening practices on several measures of nonresponse, including the number of attempts it takes to complete surveys by telephone, the number of days on which calls were attempted, and the likelihood of encountering a refusal before obtaining a completion with a selected respondent. While our findings differ in some respects from those of Tuckel and O'Neill, our conclusions are much the same: while call-screening behavior does not currently appear to hinder survey research efforts significantly, it does not do much to help them, either.

## Data and Method

The findings are based on pooled data from two telephone surveys of the adult (age 18 and over) population in South Carolina conducted between April and June 1998. Random digit-dialing methods were used to select a random sample of households. Respondents within households were selected using a variant of the last birthday method (see Oldendick et al. 1988; O'Rourke and Blair 1983). Households were contacted a minimum of six times before a final disposition was assigned. Supervisors re-contacted households in which an interview was initially refused. After two refusals, no additional contacts were made. Combined, the surveys contain information about the call-screening behavior and call histories of 2,458 respondents.<sup>2</sup>

2. The first study was a statewide omnibus survey of 874 state residents focusing on issues such as the evaluation of certain state agencies, mandatory seat belt laws, and attitudes toward health care services. The second was a statewide survey of 1,584 state residents focusing on the use of alternative medical practices. Completion rates were calculated by

To estimate the prevalence of call screening through the use of Caller-ID and TAMs, respondents in both surveys were asked if their household subscribed to a Caller-ID service and if they owned a TAM. Those saying “yes” were then asked how often—all of the time, some of the time, rarely, or, never—anyone in their household used these devices to screen-out unwanted telephone calls. Those who said that the Caller-ID unit was used “all of the time” or “some of the time” to screen calls were categorized as “Caller-ID screeners.” Likewise, those who said their TAM was used all or some of the time to screen calls were categorized as “TAM screeners.”

One of the potential limitations of this research is that the people in whom we are most interested—those who screen their calls all of the time and only respond to callers they recognize, and cannot, therefore, be reached through a telephone survey—would not be reached by the methods used in this study.<sup>3</sup> Given this limitation, a more complete understanding of the use of these devices requires data collected from both telephone and face-to-face surveys.

## Comparison of Caller-ID and TAM Screeners

Among the population examined here, just over one-in-four (26.7 percent) reported having some type of Caller-ID service or device, while nearly two-thirds (64.9 percent) said they have a TAM.<sup>4</sup> The potential threat to survey research does not come, however, from simple ownership of these technologies but, rather, from the behavior of those who use these devices to screen their incoming calls—with the assumption that calls from survey researchers may be among those calls that are screened out. Table 1 shows the demographic characteristics associated with self-reported Caller-ID and TAM screening behavior. The first three columns represent the percentage of individuals who use Caller-ID exclusively, a TAM exclusively, or both devices to screen their incoming calls. The fourth column provides

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dividing the total number of completions + partial completions by the number of completions + partial completions + refusals + ill/senile/not available during fielding period + the estimated number of households among the never-answered numbers. The completion rates for these two studies were 70.2 percent and 66.1 percent, respectively, averaging 67.3 percent overall.

3. Another factor potentially limiting the generalizability of these results is the population from which these samples were drawn—South Carolina adults. South Carolina differs from the population of the United States on a number of characteristics, particularly being less urban and having a higher percentage of minorities. To the extent these factors are related to call screening, the results reported here may differ from those of survey researchers conducting studies nationally or in other states.

4. TAM ownership has increased dramatically among this population in recent years, growing from 39 percent in a November 1992 survey (see Oldendick and Link 1994) to nearly 65 percent in 1998.

a cumulative look at the percentage who use one or the other or both devices to screen-out unwanted calls.

It is interesting that the demographic characteristics of those who said they rely on Caller-ID exclusively to screen their calls differed significantly from those who say they only use a TAM for call screening. Younger respondents, blacks, those with three or more adults in the household, and those with children under the age of 18 living in the household (with the presence or absence of children being the important correlate, not the actual number of children) are more likely to say they rely solely on Caller-ID to screen calls. In contrast, white respondents and those with higher levels of education were more likely to say they use a TAM, and not Caller-ID, to screen unwanted calls. Looking at those who indicated they use both Caller-ID and TAM to screen their calls, age was the distinguishing characteristic. Younger respondents were significantly more likely than older respondents to say they used both devices to screen calls.

Table 1 also provides an overview of the demographic characteristics associated with call screening more generally, that is, those who use Caller-ID, a TAM, or both to screen calls. Younger respondents, those with higher levels of education, and those with one or more children in the household were much more likely to indicate that they screen their calls than were those in other demographic groups.

In short, while age is an important correlate of call-screening behavior generally, the specific demographic characteristics associated with the exclusive use of Caller-ID or TAMs as screening devices are quite different. It appears, therefore, that rather than simply increasing the potential problems to survey research already associated with TAMs, Caller-ID has actually diversified the demographic profile associated with call screening and, arguably, expanded the potential threat to sample representativeness posed by these technologies.

### **Caller-ID Listings and Their Contribution to Nonresponse**

While self-reports of call screening provide a start to understanding the effects of these new technologies on survey research, we need to examine such behaviors more directly. We do so here from several perspectives. First, we wanted to find out what respondents who have Caller-ID might be responding to when they receive an incoming call. To do so, all of those who said they subscribe to a Caller-ID service were asked what listing appeared on their unit to identify our call. (All calls were made from the Columbia campus of the University of South Carolina—a state institution.) To our surprise, over one-third (36.2 percent) said they didn't

know because they were not in the part of the house where the unit was located, or they picked up the telephone before the listing could register on their display. In other words, while they had access to a Caller-ID service, these respondents did not use the device to screen our calls.

Also of some surprise was the listing offered by those who read the display. Among those who were in a position to read what was shown on their display, reference to the “University of South Carolina” only appeared 14.7 percent of the time. The university was almost twice as likely to be displayed simply as a state government agency or “SC state government” (as was reported in 26.6 percent of the cases). For over half of these respondents, however, the display offered no specific listing, identifying our office as being either “out of area” (20.1 percent) or “listing unknown” (34.2 percent). Just under 5 percent said that their particular service provides only a number for incoming calls and not the specific identity of the caller. These differences in listings appear to be related to the specific telephone market providing the Caller-ID service.

Did our “university” listing (or “state government” listing for that matter) help or hinder our efforts to reach households with Caller-ID? Those who could read the listing on their display units were asked if the listing made them more hesitant or more willing to answer the telephone, or if it made no difference. As shown on table 2, overall 17.5 percent of those with Caller-ID and who could read the listing on their unit said it made them more hesitant, while 13.3 percent indicated it made them more willing to answer the telephone. Yet, for a large majority of these individuals (69.2 percent) the particular listing made no difference at all. The effects of the listing are even smaller when we consider the responses in the context of the entire sample. Among the entire sample, 2.4 percent indicated that the listing on their Caller-ID unit made them more hesitant to pick up the telephone, 1.8 percent said it made them more willing, and 9.6 percent said it made no difference.

Among those who said the listing made a difference one way or the other, respondents were significantly more likely to say that they were more hesitant to answer the telephone when they saw that the number was either “out-of-area” or “listing unknown.” In our particular case, therefore, we appear to have been helped—at least marginally—by being identified as either “University of South Carolina” or “SC state government.” It is important to recognize that these findings are probably not generalizable to other populations or to other research organizations. The reasons for this are twofold. First, the listing displayed on the Caller-ID unit is generally a function of (1) the way in which the research organization is listed (or identified) by their telephone carrier, (2) the way in which the research organization’s identity is listed by the respondent’s telephone carrier, and (3) the type of Caller-ID device or service the respondent

**Table 1.** Demographic Characteristics Associated with Call Screening in South Carolina

	Caller-ID Only	TAM Only	Both TAM and Caller-ID	Either or Both TAM and Caller-ID	Average Number
Total	9.9	18.7	8.6	37.2	2,225
Sex:					
Male	8.9	18.4	9.2	36.5	875
Female	10.5	18.9	8.4	37.8	1,344
Race:					
Black	15.1***	14.1**	8.6	37.8	489
White	8.3	20.2	8.5	37.0	1,686
Age:					
18–29	14.7***	18.6	10.7***	44.0***	425
30–44	13.2	20.2	11.8	45.2	695
45–64	6.9	19.6	8.0	34.5	660
65 or older	4.5	15.3	2.8	22.6	433
Education:					
High school	10.7	14.0***	7.4	32.1***	1,046
College	9.3	23.0	9.7	42.0	1,169

Income:						
<\$30,000	10.6	18.7	7.8	37.1	832	
\$30,000+	10.3	21.1	11.0	42.4	1,020	
Adults in household:						
One	8.9**	19.8	8.1	36.8	709	
Two	9.0	19.4	8.8	37.2	1,169	
Three or more	14.9	14.2	9.5	38.6	345	
Children in household:						
None	6.6***	19.4	8.1	34.1***	1,377	
One or more	15.3	17.5	9.5	42.3	848	
Area: <sup>a</sup>						
Urban	6.6	24.5	7.9	39.0	210	
Suburban	11.5	21.5	9.2	42.2	258	
Rural	12.0	18.1	7.3	37.4	297	

NOTE.—Given the large number of cases in this pooled data set, more stringent criteria ( $p < .01$ ) were used for determining statistical significance.

<sup>a</sup> Urbanicity question included on Omnibus Survey only. TAM = telephone answering machine.

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .



**Table 2.** More Hesitant or More Willing to Answer Based on Caller-ID Listing

Listing on Caller-ID	Of Those Who Saw Listing			Number
	More Hesitant	More Willing	No Difference	
Overall	17.5	13.3	69.2	308
Specific listings:**				
University of South Carolina	5.9	17.6	76.5	51
South Carolina state government	13.8	20.7	65.5	87
Out-of-area	26.9	9.0	64.2	67
Listing unknown	22.3	7.8	69.9	103

NOTE.—This table is based on the 13.8% of the total sample who indicated that they had a Caller-ID unit and were able to read the listing on their unit. It excludes those who do not have Caller-ID, those who did not see the listing, and those who have the type of Caller-ID service that only displays the telephone number for an incoming call.

\*\*  $p < .01$ .

is using. These factors will vary considerably among different research organizations, populations, and geographic areas. Second, each respondent's reaction to the displayed listing is based, in part, on his or her recognition of the identity of the incoming call. Among the population surveyed in this study, the research organization (the University of South Carolina) is a familiar institution. Calls to this same population, however, by a less well-known or recognized research organization would probably elicit a different response by the respondent. The same would be true if researchers at the University of South Carolina surveyed a population that was not as familiar with the institution. Thus, while further efforts are needed to determine the generalizability of the specific findings presented here, the data do seem to indicate that there may be some advantage in having a specific listing appear on a Caller-ID unit rather than being unrecognized. Our assumption is that respondents are generally more wary of the unknown.

### Effects of Call Screening on Attempts to Obtain a Completion

Finally, we examine whether call screening with Caller-ID or telephone answering machines significantly affects the efforts by survey researchers

to complete interviews by telephone. We do so by examining three indicators of potential nonresponse from the call histories associated with the completed interviews: the number of attempts it took to complete an interview, the number of days on which calls were made before a completion was obtained, and the likelihood of encountering a refusal in the course of trying to complete an interview. The findings are important for both nonresponse concerns and for practical considerations. If call screening increases the difficulty of completing a survey (by increasing the number of call attempts, days in the field, or refusals), the amount of time it takes to complete projects and ultimately the expense of conducting survey research could increase significantly.

Self-reports of call-screening behavior do not appear, however, to be significantly related to the number of attempts it took to obtain a completed interview or the number of days over which calls were made (see table 3). The findings from the multivariate analyses indicate that age and income (and number of adults in the household in the case of number of days) are significantly related to the number of attempts and days it took to complete interviews, but self-reports of call-screening behavior—using either Caller-ID or TAMs—were not. It took a greater number of attempts to complete interviews with younger respondents and those with higher incomes. Likewise, calls needed to be made on a greater number of days to reach these same respondents and those households with fewer adults. Yet, while the models demonstrate significant demographic correlates with increased numbers of call attempts and days called, their predictive power is minimal as denoted by the small  $R^2$  values in each instance.

Finally, logistic regression procedures were used to examine the relationship between call-screening behavior and the likelihood that someone in the household initially refused to be interviewed before a completion was obtained. Although these two variables are not as closely (or obviously) related as in the case of increased numbers of attempts or days called, it is assumed that those who screen their calls will be less likely to want to be interviewed. As shown in table 4, we found this not to be the case. Once again, self-reports of call screening did not significantly affect the likelihood that someone would initially refuse to be interviewed. The only factor having a significant effect was income. The chances of having someone refuse before a completion could be obtained increased among those with higher incomes.

While this evidence generally indicates that call screening—either by Caller-ID or TAMs—does not appear to affect significantly the efforts of survey researchers to obtain completions with selected households, one additional piece of data tempers this conclusion and may help to identify how these technologies can pose a problem for survey researchers: the completion rate for those with these devices. As reported earlier, the average completion rate for these two studies was 67.3 percent. Yet, for house-

**Table 3.** Effects of Call Screening on Number of Attempts and Number of Days to Complete and Interview (Ordinary Least Squares Regression)

	Number of Attempts			Number of Days		
	OLS Coefficient	Standard Error	Significance	OLS Coefficient	Standard Error	Significance
Screen with Caller-ID	.33	.24	.172	.40	.20	.042
Screen with TAM	.39	.21	.064	.28	.17	.105
Sex (female)	-.12	.19	.538	-.08	.16	.625
Race (black)	.03	.23	.891	-.06	.20	.772
Age	-.02	<.01	<.001***	-.18	<.01	<.001***
Education	≤.01	.03	.907	<.01	.03	.978
Income	.10	.03	<.001***	.09	.03	<.001***
Number of adults in household	-.19	.13	.135	-.25	.10	.018
Have children in household	-.18	.21	.383	-.25	.18	.155
Constant	4.94	.67	<.001***	4.22	.56	<.001***
$R^2$	.02			.03		
$N$	1,801			1,801		
Mean (dependent variable)		4.59			3.74	

NOTE.—Given the large number of cases in this pooled data set, more stringent criteria ( $p < .01$ ) were used for determining statistical significance.

Dependent variables: number of attempts (range 1–35); number of days (range 1–34). Independent variables: screen with Caller-ID (0 = no, 1 = yes); screen with TAM (0 = no; 1 = yes); sex (0 = male; 1 = female); race (0 = white; 1 = black); age (range 18–96); education (range 0–22); income in increments of \$10,000 (range 1–15); adults in household (range 1–7); children in household (0 = none, 1 = one or more). TAM = telephone answering machine.

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

**Table 4.** Effects of Call Screening on Likelihood of Refusal Disposition (Logistic Regression)

	MLE	Standard Error	Significance
Screen with Caller-ID	-.21	.25	.397
Screen with TAM	-.29	.21	.155
Sex (female)	.27	.18	.141
Race (black)	-.62	.28	.023
Age	<.01	.01	<.001***
Education	.01	.04	.805
Income	.07	.03	.020
Number of adults in household	.05	.12	.670
Have children in household	-.30	.20	.138
Constant	-3.20	.64	<.001
Overall Predicted Correctly (%)		91.9	
Refusals Predicted Correctly (%)		.0	
<i>N</i>		1,802	

NOTE.—Given the large number of cases in this pooled data set, more stringent criteria ( $p < .01$ ) were used for determining statistical significance. MLE = maximum likelihood estimate.

Dependent variable: 1 = refusal disposition in call history; 0 = no refusal disposition in call history. Independent variables: screen with Caller-ID (0 = no, 1 = yes); screen with TAM (0 = no; 1 = yes); sex (0 = male; 1 = female); race (0 = white; 1 = Black); age (range 18–96); education (range 0–22); income in increments of \$10,000 (range 1–15); adults in household (range 1–7); children in household (0 = none, 1 = one or more). TAM = telephone answering machine.

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

holds in which a telephone answer machine was never encountered the completion rate averaged 74.2 percent, while in those households in which at least one attempt reached an answering machine the completion rate was 59.4 percent. Households in which a TAM was encountered had a slightly higher refusal rate (18.6 percent vs. 15.4 percent;  $p < .05$ ), and a much higher rate of “other” final dispositions (21.4 percent vs. 10.4 percent;  $p < .01$ ), particularly “unable to complete during fielding period.” While these data may reflect a faster-paced, on-the-go lifestyle among TAM owners that makes them more difficult to reach, the data are also consistent with a pattern in which owners of screening devices answer the initial call from an unknown number, do not complete the call at that time (e.g., not selected respondent, set a call-back time), but then use a TAM or Caller-ID to avoid the call-back attempt. The extent to which each of these competing explanations accounts for this lower response

rate among TAM households is a question that future research in this area should certainly address.

## Conclusion

Caller-ID services are just the latest form of technology threatening to erect barriers for survey researchers who rely on telephones to conduct their research. Adding to this concern is the finding that the demographic profile of those using this technology is different from that of individuals using telephone answering machines to screen calls. Age is a significant common factor associated with call-screening behavior, with younger respondents being more likely than older respondents to use Caller-ID alone or in combination with TAMs to screen calls and to be more difficult to reach in general (i.e., requiring more call attempts over a longer period of time).

Yet, there are reasons for survey researchers to remain optimistic. First, the fact that we completed these interviews even in households that reported screening their calls all or some of the time indicates that many (if not most) of these households are accessible to survey researchers by telephone. Second, a significant portion of those with Caller-ID did not use the screening device when we called or said that the listing displayed made little or no difference in their willingness to pick up the telephone. Finally, self-reported screening behavior did not significantly increase the number of attempts or number of days it took us to complete interviews with selected respondents, nor was screening behavior significantly related to the likelihood of encountering a refusal before a completion could be obtained.

As noted previously, however, it is probable that an unknown number of nonrespondents to this study might have successfully screened-out calls from our interviewers, thus altering the findings. Yet, several factors increase our confidence in the findings presented here, including the finding that self-reports of screening are not significantly related to indicators of nonresponse; the correspondence of these results to those of Tuckel and O'Neill (1996), whose study was based on face-to-face interviews; and the relatively small number of cases (<1 percent) in which we encountered consistent answering machines (or a combination of TAMs and ring no-answers), which might be indicative of screening behavior.

The conclusions, therefore, are mixed. On the one hand, the incidence of self-reports of call screening are on the rise and the demographics of those who report using Caller-ID or TAMs to screen their calls is increasing as well as diversifying. On the other hand, from a practical standpoint the increasing nonresponse problem (as measured by the number of calls and first-time refusals) does not appear to be driven by an increase in

screening behavior per se, but rather by other more social factors. Nonresponse may be more a product of the faster-paced, on-the-go lifestyle of younger and upper-income-status respondents than it is a desire to screen-out survey researchers.

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