Consumer Surveys vs. Electronic Measures for Single-Source Data

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MRI viewing data were compared to Nielsen ratings across 84 programs to determine whether one system could serve as a single-source surrogate for the other. Exposure to TV program was determined among owners/users for 17 categories identified by both MRI and NTI, constituting single-source data. Since these categories were common to both MRI and NTI, this allowed a test of the comparability of each system on a single-source basis.

The findings showed that MRI and NTI are reasonable surrogates on the absolute level of program viewing on a product-specific basis. But they are poor surrogates when it comes to the relative performance of a program compared to the total population by product category. Since relative performance of a program for a user/owner group is an important criterion of media selection, this raises questions about whether one system can be regarded as a single-source surrogate for the other. Possible reasons for these disparities are explored.

THE ISSUE OF ESTABLISHING a single-source data system to *electronically* link TV exposure to buyer behavior as a basis for selecting TV programs has lain dormant since the demise of Nielsen's Home Scan and Arbitron's Scan America in the early 1990s. Advertising agencies do not deny the desirability of linking TV exposure to buyer-graphics. The simple fact is that they have come to rely on consumer surveys rather than electronic measures for such data. The foremost sources for buyer-graphics today are MRI and Simmons.

OBJECTIVES

Agencies find such data useful in the "upfront" media-buying process to give their media buyers guidelines on desirable programs for key product categories. Even though the actual negotiations are conducted on Nielsen's standard age-sex demographic categories, buyergraphics are a key component of the media buyer's information. Obviously, media buyers would prefer that the networks did not have this information at their fingertips in order to maintain the advantage in their negotiating position.

Given the reliance on MRI and Simmons for buying-to-program linkages, it is reasonable to investigate the degree to which these systems serve as surrogates for electronic measures in providing single-source data. Nielsen's Television Index (NTI) collects ownership and usage data on a small number of product categories, for example, automobile ownership by type, VCR and home computer ownership, subscription to long distance carriers, and a handful of other categories. The limited scope of these categories suggests that NTI's purpose is not to establish a single-source capability but to enrich the demographic profiles of programs with ownership and usage data.

To the extent that NTI and sources such as MRI and Simmons have a number of product categories in common, the degree to which the two systems come up with similar results in the buyer-to-program relationship can be tested. This is the purpose of this study.

There were few matches between Simmons and NTI based on common product category data collected. Yet there were 17 such matches between MRI and NTI. These matches provide an opportunity to test the efficacy of MRI and NTI as surrogate single-source data systems. The analysis sought to answer two questions:

1. Do consumer survey data (MRI) and electronically derived data (NTI) serve as surrogate single-source data systems?
2. As a corollary, can MRI and NTI data serve as directional surrogates in selecting the best programs to target specific product owner/user groups?

BACKGROUND

Before turning to the question of MRI as a single-source surrogate for NTI, it might be reasonable to ask why the industry rejected electronic single-source systems and came to rely on survey data for buyergraphics.

Interviews with 20 leading advertising and media research executives provide some answers (Assael and Poltrack, 1996.) The problems reflected shortcomings in single-source systems and the ingrained nature of the media-buying process. Executives cited the following shortcomings of single-source systems:

1. Sample sizes were too small to define many targeted groups.
2. A consistent relationship between product purchases and media exposure was not established and would require a database that ran over a number of years.
3. Purchase data did not appear to do a better job of predicting program performance than demographics.

Support for a single-source system

There is ample evidence for the shortcomings of demographics as a surrogate for purchase behavior to support the need for a single-source system. One study found that TV buying did not seem to reflect usage for a targeted product category (Currim and Shoemaker, 1990). A study of six product categories and twenty-one TV programs found that media selection by traditional age/sex demographics could not be used as a surrogate for selection by purchase behavior (Assael and Poltrack 1991, 1993). An analysis using the same database reinforced the validity of single-source data by concluding that purchase behavior was superior to demographics in predicting subsequent media exposure based on prior-year program selections (Assael and Poltrack, 1993).

Given these findings, it is possible that had the industry sustained an ongoing single-source system the first two problems cited above, sample sizes and the stability of the data, would have eventually been resolved, and the third would have been found to be spurious.

The media-buying process

Lack of support for a single-source system rested not only in the shortcomings of the systems at the time, but in the nature of the media-buying process.

To make investment in a viable single-source system cost-effective, it would have had to be used in one of two ways: first, using purchase profiles for programs as a replacement for demographics in the upfront buys; second, using purchase data in the allocation of program time after the upfront buys. Apparently, *justifying investment in a single-source system solely on the basis of providing more information to media buyers was not sufficient. Some systemic change would have had to take place to justify further investment.* Yet any such systemic change was unlikely given the ingrained nature of the media-buying process. Media buyers needed to rely on the "common coin of the realm"—traditional age-sex demographics—as a basis for upfront negotiations to guarantee bulk buys of media time. Makegoods associated with these negotiations had to be in the same currency. As one media planner put it:

> Straight single source can't be managed because you don't have a common yardstick. You have to view media buying on a commodity basis.
>
> (Assael and Poltrack, 1996)

As a result, electronic single-source systems died out and agencies came to rely on survey data supplied by MRI and Simmons to associate programs to buyergraphics.

METHOD

NTI determines TV program ratings by a number of product categories. In recent years, NTI has broadened the number of categories reported in their system. As a result, a larger number of product categories are now common to both NTI and MRI. Such data are *single source*, since both program and behavioral data are collected by the same system.

The 17 product classifications common to both MRI and NTI are:

1. Own compact pickups
2. Own full-size pickups
3. Own a minivan
4. Own full-size van
5. Own compact SUV
6. Own full-size SUV
7. Own/lease one car
8. Own/lease 2+ cars
9. Own any imported vehicle
10. Own any domestic vehicle
11. Own a VCR
12. Own 1–2 TV sets
13. Own 3+ TV sets
14. Own home computer
15. Long distance carrier is AT&T
16. Long distance carrier is MCI/Worldcom
17. Long distance carrier is Sprint

NTI data were compared to MRI data for each of these 17 product categories across 84 prime-time network TV shows chosen by network executives.

NTI data are based on ratings obtained from People Meters and represent average program ratings for individual owners/users in each product category. Ratings are obtained by determining the program minutes watched per person divided by the minutes of programming available, and then aggregating the data for the owner/user group. NTI data were collected for the month of November 1999, with a sample size of 15,027 respondents.

MRI data are based on consumer recall from self-administered questionnaires. Respondents are asked the number of times the program was watched in the last month for weekly shows and the number of times watched in the last week for daily shows. The data represent the percent of respondents viewing *any* program in the last month or week among product category owners/users. MRI data were also collected during November 1999. Respondents who did not mail in a questionnaire by the end of the month received a follow-up in early December with a cutoff date for receipt of January 7, 2000. This resulted in a sample size of 7,209 respondents.

To ensure comparability, NTI program ratings for November 1999 were correlated to NTI program ratings for November 1999 to January 2000 for each of the 84 programs. The correlation across 84 programs was .96, meaning that NTI data in November could serve as a surrogate for NTI data for the same period as the extended MRI collection period (November–January.)

MRI and NTI data were correlated using two sets of data. First, average MRI viewing was correlated to NTI ratings for each of the 17 product categories across the 84 programs ($n = 84$). Second, program data were transformed into a viewer concentration index that divided the rating for the product category by the rating of the program for the total population. This index represented the degree to which owners/users of each category were more or less likely to watch the program compared to the total audience. For example, according to MRI, 26.8 percent of minivan owners watched *Monday Night Football* compared to 24.4 percent of the total population producing a viewer concentration index of 110. Similarly, the Nielsen rating for *Monday Night Football* among minivan owners is 5.2 percent compared to 6.5 percent for the total population, producing an index of 79. Obviously, in this case, the two data systems were not comparable in estimating the value of advertising on *Monday Night Football* to target minivan owners.

RESULTS

When MRI viewership data are compared to NTI ratings by product category across the 84 programs, results appear to be fairly consistent (see Table 1). Results range from a correlation of .48 for own full-size vans to .79 for own a compact SUV. These correlations appear to be fairly high for two data systems using different measurements of viewership. They also appear to be high given the sample sizes by category (see Table 3). The lower correlation between programs for full-size vans is clearly a function of sample size, with an ownership incidence in MRI of

TABLE 1
Correlations of Program Ratings for NTI to MRI Based on Level of Viewership ($N = 84$ TV Programs)

	% Viewing Correlated to NTI Rating	
	R	R^2 (%)
1. Own compact pickups	.71	50
2. Own full-size pickups	.74	55
3. Own minivans	.68	46
4. Own full-size vans	.48	23
5. Own compact SUVs	.79	62
6. Own full-size SUVs	.65	42
7. Own/Lease 1 vehicle	.65	42
8. Own/Lease 2+ vehicles	.76	58
9. Own any imported vehicle	.76	58
10. Own any domestic vehicle	.74	55
11. Own a VCR	.74	55
12. Own 1–2 TV sets	.70	49
13. Own 3+ TV sets	.73	53
14. Own home computer	.76	58
15. Long distance carrier is AT&T	.74	55
16. Long distance carrier is MCI/Worldcom	.68	46
17. Long distance carrier is Sprint	.64	41

less than 1 percent and in NTI of 2.8 percent. Yet the correlation for full-size SUVs is .65 with an ownership incidence of 2.6 percent for MRI and 3.6 percent for NTI.

When MRI and NTI viewing data by product are indexed against average viewing for the program (that is, by the viewer concentration index), the relationships start breaking down. *Correlations between Nielsen and MRI are very low,* as seen in Table 2. The average correlation for the 17 classifications is .38, meaning that on average, one data set explains less than 15 percent of the variance in the other for TV exposure by product category. The explained variance is less than 10 percent for 9 of the 17 classifications. Correlations are over .50 for only 6 of the 17 categories.

If media buyers are to assess a program based on consumer usage or ownership, the relative value of that show must be evaluated against the sample average. It is true that a show might be desirable because of high ratings across the board, but targeting requires assessing the relative merits of a show compared to the total population. In this context, MRI and NTI cannot be regarded as surrogate single-source systems.

WHY THE DISPARITY?

The fact that MRI and NTI cannot be regarded as surrogate single-source systems does not speak to the validity and reliability of either system. Two questions arise about the disparities in Table 2. First, are sample sizes sufficient by category to compare viewer concentration indexes for each system? It is possible that such comparisons are not statistically reliable for categories with low purchase/ownership indexes. Second, are the two databases comparable?

Reliability of viewer concentration indexes

Low incidences of product ownership might produce viewer concentration indexes that are highly variable, limiting the likelihood of a relationship between two data sets. To test this possibility, correlations were split into three groups in categories with low, medium, and high incidence of product ownership. The results are presented below:

Product Incidence (across MRI and NTI)	No. of Product Categories	Average Correlation
.8% – 5.6%	3	.11
8.7% – 12.5%	5	.37
24.8% – 90.7%	9	.47

These results suggest some effects of sample size. Comparisons between the two databases may be spurious for categories with very low incidences. But average correlations of .37 and .47 for the remaining two categories are not sufficiently high to validate one data set as a single-source surrogate for the other.

Data comparability

A key measure of data comparability is the common criterion of product ownership for the 17 categories. Table 3 shows the incidence of usage/ownership in the MRI and NTI samples for the 17 categories. (NTI data are reported at the household level to avoid multiple reports of us-

TABLE 2
Correlations of Program Ratings for NTI to MRI Based on Viewer Concentration Index (N = 84 TV programs)

	% Viewing Correlated to NTI Rating	
	R	R^2 (%)
1. Own compact pickups	.13	2
2. Own full-size pickups	.18	3
3. Own minivans	.54	29
4. Own full-size vans	.11	1
5. Own compact SUVs	.74	55
6. Own full-size SUVs	.17	3
7. Own/Lease 1 vehicle	.22	5
8. Own/Lease 2+ vehicles	.49	24
9. Own any imported vehicle	.80	64
10. Own any domestic vehicle	.39	15
11. Own a VCR	.69	48
12. Own 1–2 TV sets	.11	1
13. Own 3+ TV sets	.17	3
14. Own home computer	.81	65
15. Long distance carrier is AT&T	.56	31
16. Long distance carrier is MCI/Worldcom	.25	6
17. Long distance carrier is Sprint	.05	>1

TABLE 3
Incidence of Product Ownership

	MRI (n = 7,209) (%)	NTI (n = 5,203) (%)
1. Own compact pickup	10.8	11.3
2. Own full-size pickup	8.7	10.9
3. Own minivan	10.0	12.2
4. Own full-size van	.8	2.8
5. Own compact SUV	10.9	11.0
6. Own full-size SUV	2.6	3.6
7. Lease/Own 1 vehicle	24.8	50.6
8. Lease/Own 2+ vehicles	64.4	28.1
9. Own any imported vehicle	32.4	37.3
10. Own any domestic vehicle	70.7	76.4
11. Own a VCR	69.4	90.7
12. Own 1 or 2 TV sets	47.8	54.6
13. Own 3+ TV sets	45.0	45.4
14. Own home computer	49.0	52.9
15. Long distance carrier AT&T	54.9	59.2
16. Long distance carrier MCI/Worldcom	12.5	12.3
17. Long distance carrier Sprint	5.2	5.6

age and ownership per household, resulting in a sample size of 5,203 households.)

When one examines the incidence of product ownership, some gross differences emerge. How does one explain a disparity of 69 percent ownership of VCRs recorded by MRI versus 91 percent for NTI, or an astounding difference of 64 percent ownership of 2+ cars for MRI versus 28 percent for NTI.

Such differences could be due to (1) category definitions, (2) sample selection, or (3) computational procedures that differ substantially between the two systems. Let us examine each in turn.

Product category definitions

The question regarding VCRs was the same for both MRI and NTI. A VCR is a VCR. But when it comes to the automotive category, the questions were different. MRI asks for *vehicle* ownership whereas NTI determines *car* ownership. Vehicles include trucks and SUVs, whereas cars exclude those categories. Further, MRI asks the question directly whereas NTI determines car ownership by observation. If one were to add trucks and SUVs to the NTI numbers for households with 2+ cars, the total would be 64.9 percent, almost identical to the MRI data.

Sample selection

The difference in VCR ownership remains to be explained, leaving the issue of sample selection and computational methods. As noted, the NTI sample is composed of 5,203 metered households. The data for November 1999 represented 15,027 individuals, or about an average of three individuals per household. Selection of households is by a multistage stratified area probability sample of U.S. housing units, with each unit having an equal chance of selection.

MRI selects households on a random probability basis stratified by income and geographic region, with a respondent 18 or over selected per household on a random basis. Approximately 25,000 respondents are chosen in this manner for the MRI national study. The data for this analysis were derived from MRI's "upfront survey" to obtain TV exposure. To obtain this information, 24,613 questionnaires were mailed to respondents in the national study, and 7,209 were returned and validated for a response rate of 29 percent.

Nonresponse bias in the upfront survey could be a factor in accounting for differences between the two systems given a 71 percent nonresponse level in the MRI database. On the other hand, the reliability of people meters has also been questioned (Stoddard, 1987) based on the potential for wearout in using the meter and the use of the meter by children and teens.

Sample characteristics for the two systems compared to census data do not seem to suggest that one is superior to the other (Table 4). NTI has almost no representation among Asian-Americans. Both NTI and MRI seem to seriously underweight households with income under $20,000, with NTI being more seriously deficient in this regard. Conversely, both samples overweight upscale households. These differences alone are unlikely to cause the disparities in VCR ownership in Table 3.

Computational procedures

Differences in results between the two systems in Table 2 could be due to the way TV exposure is measured or to the means of classifying product usage or owner-

TABLE 4
MRI and NIELSEN vs. Census Classifications (%s)

	MRI	NTI	Census
Age			
Less than 25		37.4	35.3 (1998)
25–34	15.8	13.5	14.3
35–44	14.8	16.2	16.5
45–54	14.6	13.3	12.8
55–64	19.5	8.6	8.4
65+		10.9	12.7
Sex			
Male	48.0	48.3	48.8 (1998)
Female	52.0	51.7	51.2
Race			
White	83.7	86.6	82.5 (1998)
Black	11.4	11.6	12.7
Asian		.8	3.8
Other	4.9	1.0	.9
HH w/No children	60.9	62.3	66.1 (1998)
Household Income			
Under $20,000	20.1	15.0	26.5 (1997)
$50,000+	43.6	41.4	36.5
*Region***			
Northeast	19.8	21.0	19.0 (1999)
East Central		13.1	16.3
West Central		16.0	13.1
South	35.2	32.2	35.4
Pacific		17.7	16.1

*Figures adjusted to reflect fact MRI collects data from 18+ only.
**Comparable regions from MRI are only Northeast and South.

ship. As we saw, correlations between MRI's percent viewing and NTI's program ratings were surprisingly close by category across 84 programs (Table 1).

One standard available for gauging the ownership data in Table 3 is census data. Census data for VCR ownership was 84.6 percent in 1998. An independent estimate puts VCR ownership at 90 percent in 2000 (*Research Alert*, 2000). On this basis, NTI is clearly closer to the mark. One serious problem with the manner in which MRI data are reported is that they do not distinguish between nonresponse and no product ownership. Using the 1998 census figure of 84.6 percent ownership for VCRs applied to the MRI sample, of 7,209 respondents, approximately 6,100 should have cited VCR ownership. But only 5,179 cited such ownership. So of 2,030 respondents that did not cite ownership, a projected total of 920 probably owned a VCR but did not answer the question. This would represent 45 percent of the no response category.

If the incidence of product ownership in the MRI database is questionable, this may also explain disparities between MRI and NTI.

CONCLUSION

MRI and NTI are reasonable surrogates in regard to the absolute level of program viewing on a product-specific basis. But *they are poor surrogates for each other when it comes to the relative performance of a program compared to the total population by product category.* As a result:

1. Survey methods cannot be regarded as surrogates for electronic measures in selecting TV programs to target specific product owner/user groups.
2. Even in terms of directional guidance, survey data cannot be regarded as a surrogate for electronic measures in selecting programs to target product owners/users relative to the total population. This is certainly true for the nine product categories in Table 1 where the explained variance was less than 10 percent.

These findings do not address the relative reliability of MRI and NTI data. There are legitimate questions regarding the measurement of ownership incidence for MRI and the reliability of people meter data for NTI. The key finding is that MRI and NTI do not provide surrogate single-source data.

The issue of data fusion

The desirability of single-source data has resulted in greater interest in the issue of data fusion in the United States. Fusing two data systems based on some common parameters between them would be a surrogate for a single-source system as long

as any such fusion could be reasonably validated. Interest in the issue is reflected in a workshop sponsored by The ARF in December 2000.

This article suggests that, at present, *there is no viable single-source system available*. The disparity between the MRI and NTI data systems does not provide encouragement for pursuing data fusion, since any such fusion would require two validated databases that do not show sharp disparities across common dimensions.

Where does that leave us? There seems to be two options. One, pursue electronic measures. In this regard, NTI could further expand usage and ownership categories, thus becoming a single source for a broader set of media decisions. Given the mission of Nielsen Media Research, this is unlikely.

Two, double-source methods could be refined to better target owner and user groups based on demographics. A double-source approach would require using a source like MRI to develop demographic profiles of user groups and match them to demographic profiles of program viewers from NTI. This would require MRI to distinguish between nonrespondents and nonusers. A concern regarding this approach is that a prior study found that profiles of heavy users could serve as surrogates only for certain product categories. Such double-source data could not be generally relied on (Assael and Poltrack, 1994).

In short, reliable single-source data are still eluding us. The ultimate solution is for the media and advertising community to undertake a long-term joint effort to establish such a system. JAR

. . . reliable single-source data are still eluding us. The ultimate solution is for the media and advertising community to undertake a long-term joint effort to establish such a system.

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The Vanishing Respondent in Telephone Surveys

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This article examines recent changes in the two major components of nonresponse: inaccessibility of potential respondents and unwillingness of potential respondents to participate in an interview. It considers possible reasons for the increasing difficulty of establishing contact with potential respondents and also considers changes during the last few years in the number of potential respondents who generally refuse to participate in telephone surveys and the demographic correlates of these refusers. Finally, it discusses strategies for reducing the further erosion in response rates and implications of the findings as they bear on the future of telephone survey research.

As is well-known, response rates to telephone surveys have undergone a steep decline over the last several decades (see, e.g., Brehm, 1993; Groves and Couper, 1998). This decline adds considerably to the costs of administering these surveys and, more importantly, calls into question the generalizability of the results.

For the most part, survey researchers attribute the long-term decline in response rates to the growth in the number of potential respondents who refuse to participate in a survey. There is evidence, however, that in recent years the increase in refusal rates has tapered off and, in some instances, even slightly reversed direction. This positive development, though, has been offset by the increasing difficulty on the part of survey researchers to establish contact with potential respondents.

Understanding the precise reasons for nonresponse is obviously important for the future conduct of telephone survey research. Within this context, Steeh et al. (2001) point out: "... much of the recent research literature has focused on the unwillingness of chosen respondents to be interviewed in face-to-face surveys and how this can be overcome." To the extent that the rising rate of nonresponse, though, is due to the "noncontactability" of potential respondents, different strategies than those employed in the past need to be fashioned to counteract this trend. Understanding the reasons for nonresponse is also important in order to accurately estimate nonresponse bias. The direction and magnitude of the bias owing to a high noncontact rate may be wholly different from the direction and magnitude of the bias that intrudes as a result of a high refusal rate. For this reason, it is necessary to decompose the nonresponse rate into its different parts. As Groves and Couper (1998) stress: "Considering only the overall response rate ignores the possible counteracting biases of different types of nonresponse."

This article examines recent changes in the two major components of nonresponse: inaccessibility of potential respondents and unwillingness of potential respondents to participate in an interview. The article first considers possible reasons for the increasing difficulty of establishing contact with potential respondents. These include: (1) the proliferation of telephone numbers dedicated exclusively to fax machines and/or computers; (2) widespread access to the Internet using a nondedicated phone line; and (3) the ownership of call-screening devices and the extent to which potential respondents use these devices to screen unwanted calls. The article next considers changes during the last few years in the number of potential respondents who generally refuse to participate in telephone surveys and the demographic

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correlates of these refusers. The final section of the article discusses strategies for reducing the further erosion in response rates and implications of the findings as they bear on the future of telephone survey research.

DATA AND METHOD

The results of this study are based upon two nationwide surveys of face-to-face interviews conducted by Roper Starch Worldwide (now RoperASW). Respondents in the first survey were interviewed in their homes between October 14–21, 1995, and in the second survey were interviewed in their homes between August 5–19, 2000. The surveys consisted of 1,997 and 2,004 respondents, respectively. In both cases the sampling methodology consisted of a multistage, stratified probability sample of interviewing locations. (For a detailed exposition of the methodology, see Appendix I.)

INACCESSIBILITY OF RESPONDENTS

Dedicated fax and computer telephone lines

Survey researchers have observed that over the past few years there has been a noticeable increase in the proportion of telephone numbers that consistently yield either a "no answer" and/or a "busy" dialing disposition. As Piekarski (1999) notes: "Researchers are reporting only a slight increase in disconnects and businesses in list- assisted RDD samples. What they have reported is a significant increase n the number of No Answer and Busy dispositions, even after multiple attempts."

One major reason given for this phenomenon is the growth in the number of esidential telephone lines dedicated exlusively to fax machines or computers. o measure the incidence of this type of elephone line, we asked respondents in the August 2000 survey the following question: "Does anyone in your household have a telephone line that is used solely for a personal computer or a fax machine?" Overall, 14.7 percent of the respondents from homes equipped with telephones answered this question affirmatively (see Appendix II: A). As would be expected, ownership of a dedicated fax/modem line was greater among higher socioeconomic status individuals: 23.5 percent of those who earned a college degree or post-graduate degree and a whopping 40.1 percent of those with household incomes of $75,000 or more. Another factor related to ownership of a dedicated fax/modem line was household composition. Households consisting of three adults or households with older children (13 to 17 years of age) were more likely to possess this type of telephone line (22.6 percent and 23.4 percent, respectively). Also, residents of the Pacific region were more likely to possess this type of telephone line (22.9 percent).

The growth in the number of dedicated fax/modem lines adds to the cost of administering telephone surveys because repeated call attempts consistently produce either a "no answer" and/or a "busy" dialing disposition. Theoretically, though, the use of dedicated fax/modem lines should not restrict the accessibility of owners of these lines since they should be reachable on a different household line.

Parenthetically, the increase in the number of dedicated fax/computer phone lines also has a significant bearing on the calculation of contact and completion rates. Calculation of these rates requires an estimation of the eligibility status of residential telephone numbers. However, the status of dedicated fax/computer lines is usually indeterminate. To the degree that the numbers attached to these lines are still considered "eligible" (though they are never answered), they serve to artificially deflate the contact and completion rates. For an extended discussion of this point, see Pierkarski (1999).

Despite these problems, a greater challenge for survey researchers resides with individuals who do not have a dedicated fax/modem line but have Internet access. It is to this topic we turn next.

Internet access but not on a dedicated computer line

By definition, owners of dedicated computer lines come from multi-line households. But what about single-line households that have internet access? Individuals from these households may be particularly difficult to reach because, in addition to the conventional reasons for using the telephone, they may be "tying up" the phone with computer-related activities.

According to the August 2000 survey, roughly one-quarter of respondents (26.1 percent) come from households without a dedicated computer or fax line but with internet access (see Appendix II: A). These individuals tend to be middle-aged, white non-Hispanic, married (especially with children), have a college or postgraduate education, and come from the upper-income strata. They also tend to be suburban dwellers and have a particularly heavy presence in the New England region.

Impact of fax/Internet usage

To appreciate more fully the significance of the above findings, we can conduct a simulation of the effect of fax and internet usage (with and without a dedicated phone line) on response rates. In carrying out this exercise, let us assume the following starting parameters: (1) the sample list consists of 5,000 telephone numbers; (2) the completion rate for a given call attempt is 5 percent; and (3) four call attempts are made before a final disposition

is reached. Given these parameters, the number of completed interviews over the course of the calling period would total 927. Now let us assume that 15 percent of the numbers dialed for a given call attempt are assigned to dedicated fax/modem lines. (The 15 percent figure corresponds to the overall sample average of households with dedicated fax/modem lines presented in Appendix II: A.) Mathematically, this would translate into completing just 797 interviews. Secondly, let us assume that an additional 5 percent of the numbers dialed would be "tied up" because of internet usage on non-dedicated lines. [This 5 percent figure assumes that roughly one-fifth of the households with internet access without a dedicated fax/modem line (26.1 percent in Appendix II: A) would be using the phone during a given calling attempt.] Together, then, 20 percent of the numbers dialed would be inaccessible to surveyors. This would mean that only 753 interviews would be completed during the calling period instead of 927 and furthermore necessitate a greater number of dialings.

Ownership of call-screening devices

The penetration level of telephone answering machines continued to increase over the past five years. Two-thirds of American households (66.5 percent) now own these devices, which represents a 7 percentage point gain since 1995 (see Table 1). What is noteworthy, though, is the phenomenal growth in Caller-ID subscribers during this same time period. Subscribers to this service now number close to half of the population (45 percent), and their ranks have swelled from just a tenth of the population—a 34.8 percentage point change.

Consistent with the results of previous studies (Oldendick and Link, 1994; Tuckel and O'Neill, 1995; Council for Marketing and Opinion Research, 1999), answering machine owners are disproportionately under 60 years of age, better educated, and from higher income families (see Appendix II: B). Moreover, they tend to reside in large-size cities or their surrounding suburbs and have a heavy concentration in the Mid-Atlantic and Pacific regions.

Subscribers to Caller-ID service also are more likely to be under 60 years of age. They are also (but to an even greater degree) more likely to have children living at home. Compared with answering machine owners, though, a higher-than-average proportion are African-American, never married or separated/divorced, have just some college, reside in medium-size cities, and have a large numerical presence in the East South Central and West South Central regions.

A segment of the population that is particularly important to scrutinize is Caller-ID subscribers who do not own an answering machine. These individuals have the capacity to screen their calls while not even affording survey researchers the opportunity to leave a message about the survey. Within the last five years, this segment has grown in size from just 2.5 percent to 11.2 percent of all respondents from households with telephones. Overrepresented in this segment are white Hispanics (16.3 percent), full-time homemakers (16.1 percent), inhabitants of medium-size cities (20.6 percent), and residents of the East South Central region (23.6 percent) or the Mountain region (24.6 percent).

Uses of call-screening devices

Respondents in both the October 1995 and August 2000 surveys were asked a battery of questions to learn about their patterns of utilization of call-screening devices. One question posed to Caller-ID users was the importance of three possible reasons for why they subscribed to this service. These reasons were: (1) "to have a record or log of recent calls made to your home," (2) "to identify the phone numbers of annoying callers," or (3) "to screen calls when you are at home." The results displayed in Table 2 show that the main reason why individuals in both years say they subscribe to Caller-ID is to be able to identify the phone numbers of bothersome callers. Particularly noteworthy here is that the importance ascribed to screening calls has risen more than the other two factors over time. (The change of 4.6 percentage points, though, was only statistically significant at the .10 level for a one-tailed test.)

Of paramount importance to survey researchers is to know the frequency with which potential respondents use the answering machine or Caller-ID to screen their calls. Tables 3a and 3b present the frequency of screening by each of these devices for both survey years. Inspection of Table 3a shows that the frequency of screening via the answering machine does not appear to have undergone any appreciable increase over the past five years. In fact, looking at those who say they screen

TABLE 1

Ownership of Call-Screening Devices: 1995–2000 (Based on Those Who Have a Telephone)

Percent Who Say They Have In Their Household	1995	2000	Percentage Point Difference
A Telephone Answering Machine	59.5% (1832)	66.5% (1864)	+7.0
Caller-ID	10.2% (1828)	45.0% (1864)	+34.8

TABLE 2
Importance of Reasons for Subscribing to Caller-ID: 1995–2000 (Based on Those Who Subscribe to Caller-ID)

Reason	Percent Who Say	1995	2000	Percentage Point Difference
To have a record or log of recent calls made to your home	Very important	40.3%	38.4%	−1.9
	Somewhat important	30.1%	34.1%	+4.0
	(Total Important)	70.4%	72.5%	+2.1
	(*n*)	(186)	(839)	
To identify the phone numbers of annoying callers	Very important	63.6%	48.4%	−15.2
	Somewhat important	20.6%	33.7%	+13.1
	(Total Important)	84.2%	82.1%	−2.1
	(*n*)	(184)	(839)	
To screen calls when you are at home	Very important	48.6%	41.8%	−6.8
	Somewhat important	24.3%	35.7%	+11.4
	(Total Important)	72.9%	77.5%	+4.6
	(*n*)	(185)	(839)	

"always" or "most of the time" (i.e., the "frequent screeners"), the percentages have actually shifted slightly downwards. A much different story unfolds, though, when examining frequency of screening via Caller-ID (see Table 3b). Here we observe that, among those who have Caller-ID but do not own an answering machine, the percent that screen frequently has climbed 15 percentage points during the last five years. Furthermore, among their counterparts who do own an answering machine, the percent that screen frequently has risen more than 8 percentage points during this time frame. *In absolute terms, roughly two-thirds of Caller-ID subscribers (whether or not they have an answering machine) now report screening either "always" or "most of the time."* Coupled with the finding presented earlier that nearly one-half of the total population has Caller-ID, this last-mentioned finding translates into a substantial proportion of potential respondents engaged in the practice of call screening on a frequent basis.

The practice of call screening, of course, does not mean that potential respondents will necessarily filter out calls initiated by survey research organizations. It may very well be the case that, in general, the public is positively disposed toward calls sponsored by survey research organiza-

TABLE 3A
Frequency of Call Screening via the Answering Machine: 1995–2000 (Based on Those Who Have a Telephone)

	Owns an Answering Machine But Does Not Have Caller-ID			Both Owns an Answering Machine and Has Caller-ID		
requency	1995	2000	Percentage Point Difference	1995	2000	Percentage Point Difference
lways	20.0%	12.2%	−7.8	27.7%	19.7%	−8.0
lost of the time	14.0%	19.0%	+5.0	15.6%	20.7%	+5.1
requent screeners	34.0%	31.2%	−2.8	43.3%	40.4%	−2.9
ome of the time	22.7%	19.7%	−3.0	24.1%	24.3%	+0.2
ot very often	16.9%	23.5%	+6.6	13.5%	16.1%	+2.6
ever	25.7%	24.5%	−1.2	19.1%	18.4%	−0.7
on't know	0.5%	0.0%	−0.5	0.0%	0.8%	+0.8
otal *n*)	(933)	(609)		(141)	(629)	
otal %	100.0%	100.0%		100.0%	100.0%	

. . . roughly two-thirds of Caller-ID subscribers (whether or not they have an answering machine) now report screening either "always" or "most of the time."

tions. Whatever the sentiments of the public are regarding survey participation, though, the names of most survey organizations (particularly those in the private sector) and the field services which often do the actual calling on their behalf are generally not recognized by members of the public. Not only are the names usually unfamiliar to the public but the numbers associated with these names often appear as "out of area" on Caller-ID display units. Thus, it is important to determine the likelihood of potential respondents answering the phone when an unrecognized number shows up on their Caller-ID display unit.

Table 4 shows that the likelihood of answering the phone among Caller-ID users when an unrecognized number appears has declined noticeably over the past five years. The percent who offered responses of "almost certain to answer" or "very likely to answer" has dropped by over 20 percentage points during this time interval. Caller-ID users are now much more inclined to say they are only "somewhat likely to answer" or "very unlikely to answer."

Characteristics of frequent screeners

To construct a profile of frequent screeners we employed two separate measures. The first measure divides the number of individuals who report they screen "always" or "most of the time" by the number of answering machine owners or Caller-ID subscribers in a given group. The second measure divides the number of individuals who report they screen "always" or "most of the time" by the *total number of sampled members* in a given group—whether or not they own an answering machine or are Caller-ID users. In essence, this second measure takes into consideration the fact that the distribution of answering machine owners or Caller-ID subscribers is uneven in the total population.

The data (see Appendix II: C) show that, overall, 42.9 percent of owners of answering machines or Caller-ID subscribers are "frequent screeners" (using our first measure). The data reveal that the propensity for screening is greatest among the following social-demographic groups: those aged 18 to 29, Hispanics, African-Americans, never marrieds, homemakers, those in the $15,000–$30,000 income bracket, one-adult households, and households with young children. These results parallel to a certain degree those found by

TABLE 3B

Frequency of Call Screening via Caller-ID: 1995–2000 (Based on Those Who Have a Telephone)

	Has Caller-ID But Does Not Own an Answering Machine			Both Has Caller-ID and Owns an Answering Machine		
Frequency	1995	2000	Percentage Point Difference	1995	2000	Percentage Point Difference
Always	36.4%	44.0%	+7.6	35.2%	35.1%	−0.1
Most of the time	13.6%	21.1%	+7.5	20.4%	29.1%	+8.7
Frequent screeners	50.0%	65.1%	+15.1*	55.6%	64.2%	+8.6*
Some of the time	25.0%	18.7%	−6.3	15.5%	18.6%	+3.1
Not very often	9.1%	9.1%	0.0	14.8%	8.6%	−6.2
Never	15.9%	6.2%	−9.7	11.3%	8.1%	−3.2
Don't know	0.0%	1.0%	−1.0	2.8%	0.5%	−2.3
(Total *n*)	(44)	(209)		(142)	(629)	
Total %	100.0%	100.0%		100.0%	100.0%	

*$p < .05$ (one-tailed)

TABLE 4

Likelihood of Answering the Phone When the Caller-ID Unit Displays an Unrecognized Number: 1995–2000

Likelihood of Answering the Phone	1995	2000	Percentage Point Difference
Almost certain to answer	30.1%	18.0%	–12.1
Very likely to answer	25.3%	16.9%	–8.4
Almost certain/Very likely to answer	55.4%	34.9%	–20.5*
Somewhat likely to answer	14.0%	22.4%	+8.4
Somewhat unlikely to answer	16.7%	16.3%	–0.4
Very unlikely to answer	10.2%	18.6%	+8.4
Have an answering machine and would use it to screen the call	2.2%	5.7%	+3.5
Don't know	1.6%	2.0%	+0.4
(Total *n*)	(186)	(839)	
Total %	100.0%	100.0%	

*$p < .001$ (one-tailed)

Link and Oldendick (1999) in their study of screening behavior in South Carolina (based on a telephone survey). These authors also found that younger-aged respondents and those from households with children were more likely to screen frequently using either an answering machine or Caller-ID.

In addition, contextual factors play a role with frequent screening being more prevalent in large-size cities and their surrounding suburbs, medium-size cities, and the Mid-Atlantic, East South Central, and West South Central regions. Not surprisingly, individuals with the Call Blocking feature and those who say they are either "somewhat" or "very" unlikely to answer the phone when an unrecognized number appears on their Caller-ID display unit are disproportionately found among the ranks of frequent screeners.

Employing our second measure, we find that one-third of the sampled members (33.2 percent) fall into the category of frequent screeners. As we might expect, many of the same characteristics of frequent screeners using our first measure apply here as well. Again, we find younger-aged respondents, minority members, never marrieds, homemakers, and households with young children to be overrepresented among those who screen always or often. Similarly, residents of large-size cities and suburbs, medium-size cities, and inhabitants of the Mid-Atlantic, East South Central, and West South Central regions have a greater-than-average representation among frequent screeners. Using our second measure, we also find a heavy concentration of frequent screeners among households with older-aged children and, importantly, among the most affluent group of respondents.

SURVEY NONCOOPERATION

Attitudes toward survey participation

The foregoing data indicate that the barriers for establishing contact with potential respondents have become more impermeable over the past five years. If and when contact is established, the next barrier, of course, is to secure the cooperation of potential respondents. To measure attitudes toward survey participation, we included a question in both surveys about willingness to be interviewed in a telephone survey. Respondents were read a series of statements and asked which one came closest to characterizing how they felt when asked to participate in a telephone survey. The statements ranged along a five-point continuum going from "I like to participate in telephone surveys because they give me the opportunity to offer my opinion," at one end to "I really don't like telephone surveys, so I usually refuse to participate" at the opposite end.

It is clear from the data in Table 5 that Americans evince little enthusiasm for participating in telephone surveys. Only a small fraction (7.3 percent) are positively inclined, about a half (49.8 percent) are either ambivalent or say their participation is conditional upon the survey's topic, and close to two-fifths (38.9 percent) are negatively disposed. Perhaps running counter to expectations, the data also show there has been only a slight shift toward a more negative attitude in the last half decade. The number who are either positively inclined or ambivalent declines by just 5.3 percentage points and the bulk of these now fall into the "depends on what the survey is about" category.

Refusals

A key concern of survey researchers is to identify those demographic groups that are most likely to have negative attitudes toward survey participation (DeMaio, 1980; Goyder, 1987; Groves, Cialdini, and Couper, 1992; Brehm, 1993; Groves and Couper, 1998). The data (presented in Appendix II: D) show the following groups to be disproportionately made up of reluc-

TABLE 5

Willingness to Participate in a Telephone Survey: 1995–2000 (Based on Those Who Have a Telephone and Omitting Those Who Said They Had Never Been Called to Participate in a Telephone Survey)

Attitude toward Telephone Surveys	1995	2000	Percentage Point Difference
I like to participate in telephone surveys because they give me the opportunity to offer my opinion.	8.3%	7.3%	−1.0
It doesn't matter much to me one way or the other if I am asked to participate in a telephone survey.	12.6%	10.8%	−1.8
I don't particularly care for telephone surveys but I usually agree to participate.	18.0%	15.5%	−2.5
Whether or not I participate in a telephone survey usually depends on what the survey is about.	19.6%	23.5%	+3.9
I really don't like telephone surveys, so I usually refuse to participate.	38.2%	38.9%	+0.7
Don't know/no answer.	3.3%	4.0%	+0.7
(Total *n*)	(1608)	(1681)	
Total %	100.0%	100.0%	

tant participants: those 60 years of age and over (42.6 percent), Hispanics (43.8 percent), the most affluent (47.6 percent), individuals who do not provide information about household income (47.8 percent), one-adult households (43.5 percent), residents of large cities (43.4 percent) and their surrounding suburbs (45.5 percent), and those in the New England (50.5 percent), East South Central (45.9 percent), Mountain (44.2 percent), and Pacific (48.9 percent) regions. Coinciding with expectations, a higher proportion of those with unlisted versus listed telephone numbers tend to be hostile toward participation.

With respect to age, household composition, and urbanism, these findings tend to be congruent with the survey research literature. This literature has generally found older individuals (DeMaio, 1980; Goyder, 1987), people living in one-adult households (Groves and Couper, 1998), and residents of densely populated areas (DeMaio, 1980; Groves and Couper, 1998) to be less inclined to participate in surveys. The finding that individuals from the highest income households tend to be less amenable to survey participation may be somewhat surprising. Yet other studies (Brehm, 1993; Groves and Couper, 1998) show this finding is not necessarily an aberration. Moreover, there are grounds for understanding why, over time, affluent individuals may have become more resistant to survey requests. In general, higher-income individuals have been targeted more by telemarketers than others in the population. Perhaps in response to the numerous sales calls they have received, they have become less receptive to gran ing interviews over the phone.

With regards to users of call-screeni devices, a higher proportion of answeri machine owners than nonowners a negatively oriented toward telephone su vey participation. Surprisingly, thoug there is little difference in either the pr portions of Caller-ID subscribers vers nonsubscribers or those with the Ca Blocking feature versus those without th feature who harbor unfavorable attitude

One of the most important findings Appendix II: D is that *only a slight diffe ence exists between the proportions of freque screeners versus infrequent screeners wh say they generally refuse to be interviewe* What this suggests is that there is n inherent link between orientation towa survey participation and screenin behavior.

TELEPHONE SURVEY RESPONSE RATES

In the preceding pages we have noted tha a sizable proportion of Americans have in ternet access at home either via a ded cated computer line or a regular line. Fu thermore, we have documented the rise i the number of respondents who repo both owning call-screening devices an the increased tendency to use these de vices to screen calls on a frequent basi Lastly, we have observed a slight growth in the percentage of the public who ex press reluctance to grant a telephon interview.

These self-reported data should trans late into lower contact rates and perhaps modest diminution in cooperation rates i telephone surveys in recent years. To se if there is a convergence between our dat and actual contact and cooperation rates we present below a brief overview of re sponse rates over time.

Summarizing trends in response rate for several major government or univer sity-sponsored surveys during the year

prior to 1990–93, Groves and Couper (1998) conclude that, while the evidence about overall response rates is somewhat equivocal, cooperation rates, in general, have undergone a decline in the United States. They speculate that response rates would have fallen considerably more if greater efforts had not been expended on preserving the same or higher-level contact rates. The authors write that: "... efforts to maintain response rates at relatively constant levels may have increased over time. This is especially evident in the CPS [Current Population Survey] trend, which suggests that increased calling efforts have contributed to the reduction of the noncontact portion of nonresponse" (1998).

More contemporary data are supplied by Steeh et al. (2001), who examined nonresponse trends for the Survey of Consumer Attitudes (SCA) during the period 1980–1999 and for the Georgia State Poll during the period 1995–1999. With respect to the Survey of Consumer Attitudes, they note that the substantial rise in refusal rates which characterized the 1960s and 1970s abated in the two decades thereafter. Contrary to expectations, the *average* "nonrefusal" rate was not appreciably greater in the years 1995–1999 than for the time span covering the entire period 1980–1999. However, fitting a curve to the more recent data reveals "an increase followed by a slight downturn" in the nonrefusal rate. Somewhat different patterns of nonresponse are observable in the Georgia State Poll. Refusal rates actually undergo a decline during the years 1995 to 1999. This positive development, though, is offset by an upswing in the noncontact rates (again followed by a slight decline). The authors note that the trade-off between declining refusal rates and rising noncontact rates is most pronounced in the Atlanta metropolitan area. In the concluding section of their article, they provide the following stark assessment: "Unfortunately, the trade-off in types of nonresponse, most evident in the Atlanta metropolitan area and presumably other metropolitan areas in the United States, will undoubtedly spread in future years to less urbanized places. Furthermore, it appears that this increase in noncontacts in a metropolitan area is not due to a growing percentage of call attempts that access an answering machine but instead to the growing percentage of attempts that do not access anything and result in a 'no answer' or 'busy' outcome" (2001).

Taken together, these studies suggest that, until recently, the long-term decline in response rates was mainly due to an increase in refusal rates. Moreover, this decline in response rates would have been even more severe during this time period had not greater efforts been made to maintain contact rates at a respectable level. In the current era, though, despite these efforts, contact rates are now spiraling downwards.

It should be borne in mind too that the trend data cited above are taken from government or university-sponsored surveys which possess a high degree of perceived legitimacy. If anything, therefore, these data probably understate the decline in response rates in general, and contact rates in particular, in the current time period. Within this context, it is worthwhile noting that for the period 1995 to 1999 the average response rate achieved by the Survey of Consumer Attitudes was 65.85 percent and the corresponding rate for the Georgia State poll was 36.75 percent. Both of these percentages are markedly higher than the response rates typically achieved by surveys conducted in the commercial sector. *According to the Council for Marketing and Opinion Research (2001), the current average response rate (based on 473 industry surveys) is 23.75 percent and the comparable figure for RDD surveys (based on a sample size of 227) is a meager 12.23 percent.*

There is also considerable anecdotal evidence that attests to the dramatic decline in response rates in the private sector. Discussing the rationale behind the recent advent of Web TV polling, Michael Lewis (2000) writes: "In the past decade, the response rate to telephone polls has fallen from as high as 40 percent to 15 percent. If the 15 percent of our population still willing to be polite to people who interrupt their dinners were representative, this trend would not be a problem for pollsters. But they aren't, so it is." Echoing this same sentiment, William Safire (2000) comments: "The word 'respondent' sends shudders through the nose-counting community. The dirty secret of political surveys is this: As recently as 1984, the response rate to pollsters' questioning was 65 percent; that is, two out of three people reached would answer. Pollster friends whisper to me that the response rate is now down to 35 percent... What does this remarkable refusal rate tell us? It means that two out of three Americans are guarding their privacy with answering machines or Caller ID, or are telling pollsters to 'stop bothering me at dinnertime.' Also, because we suspect that a response puts our private opinions on a telemarketer's data base, we are now much less likely to cooperate with pollsters." And an interview with former presidential pollster Stanley Greenberg by Nancy Polk (2000) produces this sobering assessment: "Dr. Greenberg believes that the traditional method of polling by telephone is on the way out. Often his staff must make 20 calls to reach one human. With the advent of fax machines and answering machines, voice mail and screening and the strong aversion people have to being called by strangers, he says, 'Vote polling is in trouble'... He predicts that Internet

polling will become commonplace within two to four years."

DISCUSSION

The findings that have emerged in this study can only be viewed as troubling to telephone survey researchers. The evidence that has been adduced here points clearly to major obstacles that now impede the ability of survey researchers to establish contact with potential respondents and to secure their cooperation. We have found that a sizable bloc of Americans have a dedicated fax/modem line (14.7 percent) and that an additional quarter (26.1 percent) have internet access at home although not on a dedicated line. We have also observed that two-thirds of Americans own a telephone answering machine and close to half subscribe to Caller-ID. What is perhaps most alarming is that of those who have either of these call-screening devices (77.7 percent of the adult population), two-fifths (42.9 percent) say they screen their calls either "always" or "most of the time." Moreover, the percentage of these "frequent screeners" is noticeably higher among those who use Caller-ID as opposed to the answering machine as a screening mechanism.

Finally, we have noted that the vast majority of Americans report being either ambivalent or hostile toward telephone survey participation. Negative attitudes toward survey participation, though, have not risen significantly in the last five years. These findings, which are based upon self-reported attitudes and behavior, are consistent with response rate trend data, which we have reported on above. These trend data show that refusal rates are not continuing to rise as steeply as beforehand (and may even be declining) but that noncontact rates are trending upwards. The data also show that the problem of nonresponse is particularly acute for surveys conducted in the private sector.

A multiplicity of reasons can be offered for why the nonresponse rate (particularly the noncontact component) has been trending upwards over the past several years. One explanation we have discussed is simply mechanical in nature. Individuals with internet access using a dedicated phone line are not reachable on that line and those with internet access on a nondedicated line are more difficult to reach. In accord with expectations, individuals with internet access tend to be of higher socioeconomic status than the population as a whole (see Figure 1). A second, related explanation is the advent of technology such as the answering machine and Caller-ID that facilitate call screening. While individuals may not be using this technology for the express purpose of filtering out survey requests, the mere availability of this technology makes it easier to do so. Also, as individuals become more accustomed to the practice of call screening (whatever their original motivation), they may demonstrate less selectivity in the calls they choose to screen.

Beyond these mechanical, technological-based explanations, though, are more deep- seated reasons why people are making themselves less accessible to surveyors. Individuals may be trying to guard against the intrusions of modern-day life that is becoming increasingly complex and fast paced. Even though individuals may not be negatively disposed toward survey requests per se, the fact that surveyors often interrupt the dinner hour or that they are mistaken for telemarketers means that survey requests frequently become defined as "intrusions."

In this context, it is important to note the increasing ubiquity and, in certain instances, the questionable practices of telemarketers. A study conducted by the Council for Marketing and Opinion Research (1999) shows that the median number of sales calls rose from 8 to 20 in just the time span between 1995 and 1999. Perhaps more disturbing, though, is that half of the respondents in this study reported "sugging" activity—that is, the practice on the part of telemarketers to make sales calls under the pretense of conducting an opinion or market survey.

Not surprisingly, therefore, we find that frequent screeners tend to be disproportionately drawn from: (1) households with children, (2) affluent families, and (3) residents of densely-populated areas (see Figure 1). These groups are more likely to be "protective" of their time at the dinner hour, or targeted by telemarketers, or, in general, more apt to adhere to a faster-paced lifestyle.

Still another explanation for the rising nonresponse rate is rooted in concerns over privacy. Increasingly, respondents are reluctant to disclose information of a personal nature (to telephone surveyors or others) that may be used in ways over which they have no control or in ways they do not approve. Trend data gathered by the Council for Marketing and Opinion Research (September 2001) buttress this point. The percentage of respondents who agree with the statement, "Organizations that conduct polls/surveys can be trusted to protect my rights to privacy," has dwindled from 51.3 percent in 1995 to just 29 percent in 2001. Again, it is not surprising to find (as shown in Figure 1) that the affluent are overrepresented among the ranks of both the frequent screeners and the refusals.

All in all, it appears that we are now entering into a transition phase in which the telephone survey is losing its status as the most popular mode of survey data gathering. Just as the telephone survey itself eclipsed face-to-face interviewing in people's homes, it seems likely that the telephone survey will become just another

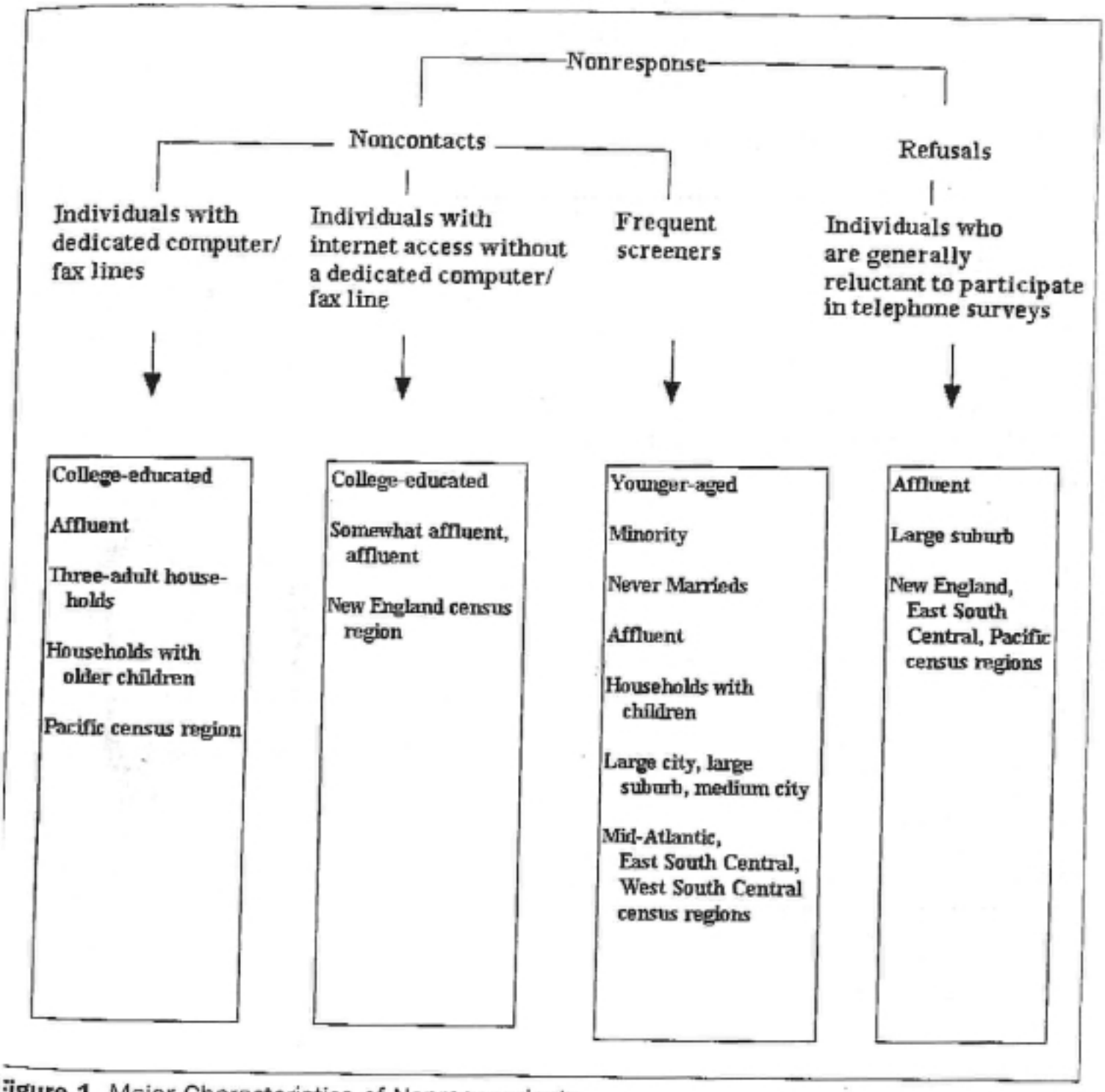

Figure 1 Major Characteristics of Nonrespondents

ne of the panoply of data-gathering echanisms or that the internet survey ill gradually replace the telephone sur-ey as the dominant methodology.

In the meantime, there are a number of initiatives that can be taken to help prevent the further erosion in response rates in telephone surveys. Two strategies that have been found to be effective in combating rising refusal rates are improving the quality of interviewing and making several attempts to convert initial refusals (Steeh et al., 2001). Since the problem of nonresponse, though, now seems to be rooted more in the inaccessibility

. . . it seems likely that the telephone survey will become just another one of the panoply of data-gathering mechanisms or that the internet survey will gradually replace the telephone survey as the dominant methodology.

of potential respondents, greater focus needs to be placed on this component of nonresponse.

One strategy for helping to overcome the problem of "noncontactability" is to make numerous callback attempts. Piekarski and Cralley (2000), for example, report that "significant improvement in response rates can be achieved by utilizing a more rigorous calling methodology that includes more than 4 call attempts and multiple attempts at refusal conversion." In their study, at least 10 callback attempts were made before reaching a final disposition. Additionally, up to five attempts were made in an effort to convert initial refusals. A further benefit attached to this strategy is that the information derived from the added callbacks can be used to estimate with greater exactitude differences between respondents and nonrespondents (see Colombo, 2000).

A second strategy is to offer a prepaid incentive with an accompanying letter (see Singer et al., 2000). Prepaid incentives presumably could be used to offset both the refusal and noncontact components of nonresponse. As Steeh et al. (2001) observe, receipt of an incentive might not only induce a potential respondent to consent to be interviewed but also to make himself or herself more accessible to surveyors. The problem with this strategy is that, at present, it can only be used in surveys in which sampled members' addresses are known in advance.

Another strategy that could be implemented (brought to the authors' attention by William Cook, The ARF) would be to develop the "brand awareness" of a survey research organization's name so that when it appeared on a respondent's Caller-ID display unit, it would be recognized and possibly legitimized. Enhancing public awareness of an organization's name might help to reduce the noncontact rate. Recall that two of the findings that emerged in this study were: (1) there was no relationship between frequency of call screening and attitudes toward survey participation, and (2) respondents were reluctant (and increasingly so) to answer the phone when an unrecognized number/name appeared on their Caller-ID display unit. Accordingly, if survey research organizations, acting either individually or collectively as members of a consortium, could increase their visibility, this could help counter the problem of contacting respondents.

In addition to these measures, there is an external development that could help neutralize the problem of "noncontactibility." Individuals in a number of states (13 at present) can register their names with state authorities on a "do not call" list that prohibits telemarketers (but not survey researchers) from contacting them (see Fried, 2000; Stowe, 2000). Telemarketers that call people on the list are subject to stiff fines. Thus far, hundreds of thousands of individuals have availed themselves of the opportunity to register their names. As more states enact legislation authorizing a "do not call list" and the number of registrants continues to multiply, it is possible that over the long run potential respondents' concerns about invasion of privacy by telemarketers will be attenuated and, in the process, respondents may be more receptive to survey requests.

Whatever benefits may be derived from the implementation of the strategies cited above, it is important to keep in mind the general environment in which telephone surveys are being conducted today. The environment is not a hospitable one and poses enormous challenges to telephone surveyors. Unless these challenges can be met, the continued viability of the telephone survey as a data-gathering mechanism is questionable.

LIMITATIONS OF THE STUDY

As noted in the discussion of the methodology, the final stage of the sampling procedure consists of quota sampling at the block level. We would have preferred to have the results of this study based upon probability sampling without quotas. One point, though, should be kept in mind. Whatever bias might enter into the analysis as a result of this limitation is certainly not greater (and, most likely, considerably less) than the bias that would have been attached to a telephone survey. One of the principal objectives of this research is to gauge the extent to which individuals use the answering machine and Caller-ID to screen their calls. Using a telephone survey to gather this type of information would have had a serious drawback. Information pertaining to the practice of call screening would have been restricted precisely to the extent that potential respondents would have eluded telephone surveyors through the use of either of these devices. To take an extreme example, consider those individuals who screen all their calls. In this instance, it is clear that the telephone survey would have been less than an ideal vehicle through which to collect data on these individuals. JAR

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APPENDIX I

The respondents in each survey comprise a representative sample of the population of the contiguous United States, age 18 and over exclusive of institutionalized segments (military barracks, nursing homes, prisons, etc.).

Each survey employed a multi-stage probability sample of interviewing locations. The probabilities of selection at each stage were based on 1990 U.S. Census population data, and detailed Census maps were used to identify and locate the selected areas.

At the first stage, all the countries in the 48 contiguous states and the District of Columbia were rank ordered by population size within 18 strata. The strata were constructed by classifying counties as metropolitan and non-metropolitan within each of the nine Census Geographic Divisions. One hundred counties were then selected with probabilities proportionate to the adult population.

At the second stage, two Census block groups were selected with probabilities proportionate to households after stratifying the block groups by size of place in which located.

At the third stage, within each sample block group, two blocks were selected, again, with probabilities proportionate to size (households), from a cumulative computer listing. The interviewer was assigned a starting point and a path to proceed around each sample block.

Quotas for men and women over and under age 45 were imposed, as were quotas for employed individuals. In addition, it was required that interviewing on half the assigned blocks be conducted after 5 PM on weekdays or on Saturday and Sunday to facilitate fulfilling the employment quota. While the assigned quotas produced the proper number of men and women over and under 45, there were small imbalances when the sample was examined in finer age terms, e.g., too few 18 to 29 years-olds, too many 30 to 44 year-olds. Accordingly, the sample was weighted to achieve the correct proportions of men and women 18 to 29, 30 to 44, 45 to 59, and 60 and over.

APPENDIX II

A. Percentage of Respondents in Different Sociodemographic Groups Who Have (1) a Dedicated Computer or Fax Line or (2) Internet Access but Without a Dedicated Computer or Fax Line: 2000 (Based on Those Who Have a Telephone)

	Individuals with a Dedicated Computer or Fax Line		Individuals with Internet Access but without a Dedicated Computer or Fax Line	
	Percent	Number of Cases	Percent	Number of Cases
Total	14.7%	1842	26.1%	1871
Age				
18–29	13.7%	422	29.1%	436
30–44	18.2%	533	32.8%	540
45–59	19.6%	419	28.6%	423
60 and over	7.3%	468	13.3%	472
Race				
White non-Hispanic	16.4%	1339	29.2%	1361
White Hispanic	13.1%	160	12.4%	161
Black non-Hispanic	9.9%	252	19.3%	254

(continued)

APPENDIX II A. (cont'd)

	Individuals with a Dedicated Computer or Fax Line		Individuals with Internet Access but without a Dedicated Computer or Fax Line	
	Percent	Number of Cases	Percent	Number of Cases
Marital status				
Never married	14.7%	441	28.8%	456
Married	17.3%	1015	29.1%	1022
Separated/Divorced	10.4%	211	25.7%	218
Widowed	4.1%	172	7.6%	172
Level of education				
Non-high school graduate	4.0%	277	11.1%	279
High school graduate	10.5%	658	18.4%	675
Some college	19.0%	490	29.6%	496
College graduate or more	23.5%	413	44..7%	416
Employment status				
Full-time employed	17.9%	979	32.2%	998
Part-time employed	14.6%	213	25.5%	216
Homemaker	14.4%	167	19.5%	169
Retired	7.2%	333	12.8%	335
Household income				
Under $15K	5.4%	147	9.4%	149
$15k–under $30k	5.3%	304	18.0%	311
$30k–under $50k	12.0%	392	27.3%	395
$50k–under $75k	18.3%	197	40.9%	198
$75k or more	40.1%	202	36.6%	202
Don't know/refused	13.8%	600	25.2%	616
Adults in household				
One	5.4%	373	20.4%	378
Two	16.1%	1063	28.0%	1080
Three	22.6%	266	27.5%	269
Four or more	13.9%	137	25.0%	140
Kids in household				
Have kids aged 0–12	15.2%	584	32.4%	590
No kids aged 0–12	14.5%	1253	23.2%	1276
Have kids aged 13–17	23.4%	308	34.6%	312
No kids aged 13–17	13.1%	1503	24.3%	1528

(continued)

APPENDIX II A. (cont'd)

	Individuals with a Dedicated Computer or Fax Line		Individuals with Internet Access but without a Dedicated Computer or Fax Line	
	Percent	Number of Cases	Percent	Number of Cases
Size of place of residence				
Large city	14.4%	257	19.4%	263
Large suburb	15.3%	339	31.3%	339
Medium city	14.6%	233	24.5%	241
Medium suburb	18.3%	208	26.1%	211
Small city	13.3%	165	28.3%	166
Small suburb	14.6%	323	34.9%	324
Small town	12.6%	86	20.9%	91
Rural	13.0%	231	16.1%	236
Geographic region				
New England	10.6%	104	37.7%	106
Mid-Atlantic	11.6%	292	22.6%	292
East North Central	17.9%	336	29.1%	337
West North Central	8.7%	127	20.2%	129
South Atlantic	11.6%	268	24.6%	272
East South Central	13.6%	88	27.0%	89
West South Central	11.1%	226	25.1%	227
Mountain	18.8%	117	27.0%	122
Pacific	22.9%	284	25.9%	297

B. Percentage of Respondents in Different Sociodemographic and Other Groups Who Own Call-Screening Devices: 2000 (Based on Those Who Have a Telephone)

	Have Answering Machine	Have Caller-ID	Have Caller-ID but Not Answering Machine	Have Either Answering Machine or Caller-ID	No. of Cases
Total	66.5%	45.0%	11.2%	77.7%	1864
Age					
18–29	67.5%	52.7%	13.2%	80.7%	431
30–44	73.9%	52.6%	11.1%	85.0%	540
45–59	67.5%	46.4%	12.6%	80.1%	422

(continued)

APPENDIX II B. (cont'd)

	Have Answering Machine	Have Caller-ID	Have Caller-ID but Not Answering Machine	Have Either Answering Machine or Caller-ID	No. of Cases
Age					
60 and over	56.1%	28.0%	8.3%	64.5%	471
Race					
White non-Hispanic	69.2%	45.9%	11.4%	80.7%	1356
White Hispanic	51.3%	37.5%	16.3%	67.5%	160
Black non-Hispanic	67.7%	52.0%	8.7%	76.4%	254
Marital status					
Never married	66.7%	48.8%	11.5%	78.3%	451
Married	71.4%	45.9%	10.8%	82.3%	1021
Separated/Divorced	63.1%	47.5%	13.4%	76.5%	217
Widowed	41.9%	27.3%	10.5%	52.3%	172
Level of education					
Non-high school graduate	41.0%	33.5%	14.7%	56.1%	278
High school graduate	63.0%	43.0%	13.1%	76.1%	670
Some college	74.4%	52.4%	10.9%	85.3%	496
College graduate or more	80.2%	47.5%	6.0%	86.3%	415
Employment status					
Full-time employed	74.1%	51.9%	10.5%	84.6%	996
Part-time employed	62.1%	44.4%	14.5%	76.6%	214
Homemaker	56.5%	38.1%	16.1%	72.6%	168
Retired	52.2%	26.6%	7.8%	60.3%	335
Household income					
Under $15k	45.6%	33.3%	10.9%	56.5%	147
$15k–under $30k	56.1%	40.6%	11.6%	68.1%	310
$30k–under $50k	64.6%	47.8%	14.7%	79.2%	395
$50k–under $75k	75.8%	52.0%	11.6%	87.4%	198
$75k or more	87.6%	53.5%	6.4%	94.1%	202
Don't know/refused	68.0%	43.1%	10.2%	78.3%	612
Adults in household					
One	57.7%	37.8%	9.0%	66.7%	378
Two	70.2%	46.2%	11.0%	81.3%	1077
Three	65.7%	48.5%	14.2%	79.9%	268

(continued)

APPENDIX II B. (cont'd)

	Have Answering Machine	Have Caller-ID	Have Caller-ID but Not Answering Machine	Have Either Answering Machine or Caller-ID	No. of Cases
Adults in household					
Four or more	63.5%	48.9%	13.1%	76.6%	137
Kids in household					
Have kids aged 0–12	70.8%	53.8%	12.1%	82.9%	589
No kids aged 0–12	64.5%	41.0%	10.9%	75.4%	1270
Have kids aged 13–17	70.5%	54.8%	14.4%	84.9%	312
No kids aged 13–17	66.1%	42.9%	10.5%	76.7%	1521
Size of place of residence					
Large city	69.8%	41.2%	3.4%	73.3%	262
Large suburb	78.8%	48.4%	7.4%	86.1%	339
Medium city	56.7%	57.6%	20.6%	77.3%	238
Medium suburb	66.4%	42.7%	10.9%	77.3%	211
Small city	67.5%	42.8%	14.5%	81.9%	166
Small suburb	62.2%	42.7%	13.3%	75.9%	323
Small town	47.3%	37.4%	9.9%	57.1%	91
Rural	67.5%	41.5%	11.5%	79.1%	234
Geographic region					
New England	69.5%	41.9%	7.6%	77.1%	105
Mid-Atlantic	73.3%	26.4%	2.4%	75.7%	292
East North Central	69.9%	55.7%	11.9%	81.8%	336
West North Central	60.2%	37.5%	11.7%	71.9%	128
South Atlantic	57.8%	48.9%	13.7%	71.9%	270
East South Central	57.3%	70.8%	23.6%	80.9%	89
West South Central	66.8%	62.8%	19.0%	85.8%	226
Mountain	50.8%	57.4%	24.6%	75.4%	122
Pacific	74.3%	25.7%	2.7%	77.0%	296
Dedicated fax/computer line					
Yes	80.8%	63.5%	12.2%	93.0%	271
No	64.2%	42.2%	11.0%	75.2%	1551

APPENDIX II C.

Percentage of Respondents in Different Sociodemographic and Other Groups Who Are Frequent Screeners: 2000 (Based on Those Who Have a Telephone)

	Of Those Who Have Either an Answering Machine or Caller-ID	Number of Respondents	Of Total Sample	Number of Cases
Total	42.9%	1449	33.2%	1871
Sex				
Male	40.7%	683	31.0%	898
Female	44.9%	766	35.4%	973
Age				
18–29	48.6%	348	38.8%	436
30–44	44.2%	459	37.6%	540
45–59	41.4%	338	33.1%	423
60 and over	36.2%	304	23.3%	472
Race				
White non-Hispanic	38.0%	1094	30.6%	1361
White Hispanic	59.3%	108	39.8%	161
Black non-Hispanic	60.6%	194	46.5%	254
Marital status				
Never married	52.1%	353	40.4%	456
Married	38.8%	840	31.9%	1022
Separated/Divorced	45.8%	166	34.9%	218
Widowed	40.0%	90	20.9%	172
Level of education				
Non-high school graduate	44.9%	156	25.1%	279
High school graduate	46.1%	510	34.8%	675
Some college	40.7%	423	34.7%	496
College graduate or more	39.9%	358	34.4%	416
Employment status				
Full-time employed	41.9%	843	35.4%	998
Part-time employed	41.5%	164	31.5%	216
Homemaker	52.5%	122	37.9%	169
Retired	38.6%	377	23.3%	335
Household income				
Under $15K	44.6%	83	24.6%	149
$15k–under $30k	49.3%	211	33.4%	311

(continued)

APPENDIX II C. (cont'd)

	Of Those Who Have Either an Answering Machine or Caller-ID	Number of Respondents	Of Total Sample	Number of Cases
Household income				
$30k–under $50k	45.0%	313	35.7%	395
$50k–under $75k	36.4%	173	31.8%	198
$75k or more	41.6%	190	39.1%	202
Don't know/refused	41.3%	479	32.1%	616
Adults in household				
One	48.8%	252	32.5%	378
Two	41.2%	876	33.4%	1080
Three	43.9%	214	34.9%	269
Four or more	40.0%	105	30.0%	140
Kids in household				
Have kids aged 0–12	48.2%	488	39.8%	590
No kids aged 0–12	40.4%	958	30.3%	1276
Have kids aged 13–17	46.0%	265	39.1%	312
No kids aged 13–17	41.9%	1166	32.0%	1528
Size of place of residence				
Large city	53.1%	192	38.8%	263
Large suburb	55.5%	292	47.8%	339
Medium city	54.9%	184	41.9%	241
Medium suburb	36.8%	163	28.4%	211
Small city	37.5%	136	30.7%	166
Small suburb	32.2%	245	24.4%	324
Small town	26.9%	52	15.4%	91
Rural	28.6%	185	22.5%	236
Geographic region				
New England	37.0%	81	28.3%	106
Mid-Atlantic	62.0%	221	46.9%	292
East North Central	36.7%	275	30.0%	337
West North Central	26.1%	92	18.6%	129
South Atlantic	41.8%	194	29.8%	272
East South Central	65.3%	72	52.8%	89
West South Central	49.5%	194	42.3%	227

(continued)

APPENDIX II C. (cont'd)

	Of Those Who Have Either an Answering Machine or Caller-ID	Number of Respondents	Of Total Sample	Number of Cases
Geographic region				
Mountain	47.8%	92	36.1%	122
Pacific	27.2%	228	20.9%	297
Dedicated fax/computer line				
Yes	42.5%	252	39.5%	271
No	43.1%	1167	32.4%	1551
Listed or unlisted number				
Main telephone number is listed	40.4%	928	31.8%	1180
Main telephone number is not listed	47.7%	476	36.7%	618
Call Blocking				
Yes	58.0%	364	56.1%	376
No	37.5%	1072	27.4%	1466
Likelihood of answering the phone when Caller-ID unit displays an unrecognized number				
Almost certain to answer	35.1%	151	na	na
Very likely to answer	44.4%	142	na	na
Somewhat likely to answer	44.1%	188	na	na
Somewhat unlikely to answer	53.3%	137	na	na
Very unlikely to answer	74.4%	156	na	na

APPENDIX II D. Percentage of Respondents of Different Sociodemographic and Other Groups Who Usually Refuse to Participate in Telephone Surveys: 2000 (Based on Those Who Have a Telephone and Omitting Those Who Said They Had Never Been Called to Participate in a Telephone Survey)

	Percent	Number of Cases
Total	38.9%	1681
Sex		
Male	41.7%	803
Female	36.3%	878

(continued)

APPENDIX II D. (cont'd)

	Percent	Number of Cases
Age		
18–29	34.5%	383
30–44	37.6%	490
45–59	41.0%	388
60 and over	42.6%	420
Race		
White non-Hispanic	40.0%	1258
White Hispanic	43.8%	137
Black non-Hispanic	30.9%	207
Marital status		
Never married	34.6%	399
Married	40.1%	936
Separated/Divorced	40.9%	198
Widowed	40.0%	145
Level of education		
Non-high school graduate	36.2%	224
High school graduate	38.3%	598
Some college	39.6%	465
College graduate or more	40.4%	389
Employment status		
Full-time employed	41.2%	912
Part-time employed	30.8%	195
Homemaker	36.7%	150
Household income		
Under $15k	30.8%	133
$15k–under $30k	31.7%	271
$30k–under $50k	32.9%	362
$50k–under $75k	32.3%	186
$75k or more	47.6%	189
Don't know/refused	47.8%	540
Adults in household		
One	43.5%	336
Two	38.6%	985
Three	34.6%	237
Four or more	37.0%	119

(continu

APPENDIX II D. (cont'd)

	Percent	Number of Cases
Kids in household		
Have kids aged 0–12	34.6%	534
No kids aged 0–12	40.9%	1143
Have kids aged 13–17	38.0%	284
No kids aged 13–17	39.1%	1375
Size of place of residence		
Large city	43.4%	226
Large suburb	45.5%	312
Medium city	36.4%	209
Medium suburb	34.0%	197
Small city	39.1%	156
Small suburb	34.9%	295
Small town	37.2%	78
Rural	37.5%	208
Geographic region		
New England	50.5%	93
Mid-Atlantic	41.0%	271
East North Central	29.5%	322
West North Central	34.1%	123
South Atlantic	29.3%	215
East South Central	45.9%	85
West South Central	40.1%	197
Mountain	44.2%	113
Pacific	48.9%	262
Dedicated fax/computer line		
Yes	42.6%	263
No	37.9%	1386
Listed or unlisted number		
Main telephone number is listed	34.9%	1073
Main telephone number is not listed	46.0%	552
Have an answering machine		
Yes	42.2%	1148
No	31.9%	529
Subscribe to Caller-ID		
Yes	37.0%	782

(continued)

APPENDIX II D. (cont'd)

	Percent	Number of Cases
Subscribe to Caller-ID		
No	40.8%	893
Call Blocking		
Yes	38.2%	353
No	39.2%	1310
Frequent screeners		
Yes (based on those who have answering machines and/or Caller-ID)	41.1%	584
No (based on those who have answering machines and/or Caller-ID)	39.7%	754
No (based on the entire sample)	37.7%	1097
Likelihood of answering the phone when the Caller-ID unit displays an unrecognized number		
Almost certain to answer	40.0%	145
Very likely to answer	27.1%	133
Somewhat likely to answer	23.6%	178
Somewhat unlikely to answer	41.6%	125
Very unlikely to answer	47.6%	143