THE MEASUREMENT AND MAGNITUDE OF NONRESPONSE IN U.S. CONSUMER TELEPHONE SURVEYS[1]

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Due to the absence of hard data and the lack of standardization with respect to nonresponse terminology and reporting procedures, U.S. commercial survey researchers have been unable to obtain an accurate assessment of the nature and extent of the nonresponse problem. However, the results of two recent studies conducted by the author among leading U.S. based market and public opinion research firms revealed that nonresponse is one of the major problems now confronting the commercial survey research industry. This paper discusses the results of the two studies and their implications.

1. INTRODUCTION

Survey researchers in Canada, the United States, and in many European countries have expressed concern recently about the growing problem of nonresponse and its impact on data quality (Platek, 1977; Vidgerhous, 1979; Bailar and Lanphier, 1978; Frankel, 1977; Sandstrom, 1977; and van Westerhoven, 1978). These researchers often cited numerous uncontrollable factors such as changing lifestyles, increased female participation in the labour force, privacy related concerns and lack of availability of high quality interviewers as being reasons why it has become more difficult and costly to achieve the high response rates that were once obtained ten to fifteen years ago.

In the United States there has been a considerable amount of discussion about declining response rates in household probability selected surveys. This is especially true within governmental agencies, most notably the

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[1] Adapted from "The Nonresponse Problem in Consumer Telephone Surveys," and "Toward the Development of Industry Standards for Response and Nonresponse Rates". Both papers can be obtained from the Marketing Science Institute, 14 Story Street, Cambridge, MA 02138, U.S.A.

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Bureau of the Census, where highly precise population estimates are required. However, there has been less concern expressed within the commercial research sector. One reason for this is that while there has been some discussion about declining response rates, there is very little evidence to support the contention that a major decline has actually occurred. This lack of evidence is due to two factors (1) the absence of a consensus among market and public opinion researchers as to how various response and nonresponse rates should be interpreted, defined and/or calculated and (2) a general reluctance on the part of many commercial organizations to report response and nonresponse rates for surveys that they conduct. As a result, no accurate assessment has been made of the nonresponse problem confronting commercial researchers on an industry-wide basis. However, due to the evident need and importance of a better understanding of the nonresponse problem and its impact on managerial decision-making, the Marketing Science Institute supported two research studies which provided hard data from which an improved assessment was obtained.

This paper presents the results of these two recently completed studies conducted among major users and suppliers of consumer research in the U.S. These studies focused on (1) the measurement of nonresponse, and (2) the nature and extent of nonresponse in consumer telephone surveys.

2. THE MEASUREMENT PROBLEM

In the U.S. where the majority of survey interviewing is conducted by telephone, there are no uniformly accepted standardized definitions or methods of calculation for various response and nonresponse rates. Such terms as "response rate", "completion rate", "cooperation rate", "contact rate", "refusal rate", "nonresponse rate", and "noncontact rate" are used by social scientists and survey statisticians to characterize the outcome of a data collection effort. However, as recently noted by the Federal Committee on Statistical Methodology (1978), these and other terms are frequently used with different meanings and the same phenomenon is sometimes called by more than one term. As a result, there is a great deal of confusion with respect to what particular rates actually signify.

The development of industry-wide standards and reporting procedures has been called for by researchers in varying disciplines. For example:

> The confusion regarding the interpretation of response rates will continue until a standard definition is adopted by survey researchers. In the interim, in the interest of ethics, and to establish a base of comparative data to facilitate future methodological investigations, reports of survey results should explicitly state the definition of response rate employed (Kviz, 1977, p. 255).
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> There are considerable differences between investigators as to the precise definitions of components of response rates. The problems are apparent in personal and mail interviews and become horrendous when considering telephone surveys. Even in personal interviews alternate definitions result in substantial differences in rates. Bailar finds that definitional differences may affect the rate by as much as 25 percentage points. The major conclusion from this discussion is the recommendation that standard definitions be developed (Cannell, 1977, p. 13).
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> Discussions of survey methodology are severely limited by the lack of well-recognized, precisely defined and broadly accepted definitions of survey outcomes. Few surveys adequately describe and apply criteria either for determining eligibility of respondents or for establishing response rates. As a result, reported response rates are often misleading and frequently overstated (Shosteck and Fairweather, 1979, p. 210).

The previously described references all indicate the need and importance of industry standards. Bailar and Lanphier (1978) cite specific examples of incorrectly reported and calculated rates:

> In a telephone survey, the reported response rate was 76%. It was called a completion rate and was defined as the proportion of useable listings resulting in a completed interview. Unuseable listings included: unpublished phone number, no telephone or couldn't find number, telephone out of order or disconnected, duplicate listings, and not needed for quota ... About 15% of the total sample selected was persons difficult to reach by telephone. These cases should not have been excluded in calculating response rates. Also, about 17% of the sample was not needed for quota. If this 17% was really a random subsample of the entire sample, then it should have been properly excluded. However, this 17% was not a random sub-sample, it was comprised of left-over and hard-to-reach cases. The true response rate was of the order of 50% (p. 52).

> One mail survey was reported to have a response rate of 90% which would be extraordinarily high for a mail survey. The survey organization had provided backup samples for each cell. Some cells had had several substitutions. Probabilities of selection were never recalculated but the actual response rate was approximately 56% (p. 52).

Some individual companies and organizations have developed their own internal definitions for various terms and, hence, have been able to track rates over time. These trends, however, are very seldom reported and, even if they were, the absence of standardization would prevent any conclusions to be drawn on an industry-wide basis.

In 1978, efforts began to bring about standardization with respect to the calculation, interpretation and reporting of response and nonresponse rates. These efforts are described in the following sections.

2.1 Research Design - Measurement of Nonresponse

Intitiating the drive toward standardization were two organizations - the Council of American Survey Research Organizations (CASRO) and the Marketing Science Institute (MSI). The former organization now represents the 64 major U.S. market and public opinion research firms, while the latter organization is a nonprofit research organization supported by 40 leading U.S. based manufacturing and service corporations.

Since the literature revealed that alternative definitions were in use, it was agreed that it would be of value to initially conduct a descriptive survey to determine current industry practice with respect to interpretation and calculation of particular rates. To obtain the desired information a short questionnaire was developed. This questionnaire focused on telephone surveys, the dominant mode of data collection within the U.S.

The main body of the questionnaire contained actual contact and response data from three different telephone surveys (directory, random digit and list). For example, for the telephone directory sample, the following data were provided:

Response Outcome	Frequency
Disconnected/nonworking	426
No answer, busy, not at home	1,757
Interviewer reject (language, hard of hearing, ...)	187
Household refusal	153
Respondent refusal	711
Ineligible respondent	366
Termination by respondent	74
Completed Interview	501
	n=4,175

Each respondent was asked to calculate four rates: response, completion, contact and refusal. These terms frequently appear in the literature and, collectively, encompass many important dimensions of a data collection effort.

2.1.1 Sample Selection

Questionnaires were mailed to representatives (typically company presidents) of fifty research firms in CASRO and to market research directors or staff members in fifteen selected MSI companies.[1] In the MSI subsample, some respondents duplicated the questionnaire for other individuals within their organization and for selected research companies that conducted surveys for them.

2.1.2 Data Collection

Data collection took place during July, 1979, with each respondent being sent a special delivery envelope which included the questionnaire. Further, to increase the response, a follow-up letter was mailed one week after the original mailout. Out of the 65 research firms and MSI companies, 36 responded. However, because multiple responses were obtained from some MSI companies, the total number of questionnaires available for analysis was 55. The actual composition of the sample is shown in Table 2.1.1.

1 At the time the study was conducted there were only fifty member firms which were members of CASRO.

TABLE 2.1.1

Sample Composition

Source	Number Mailed	Number Responding	Number of Returns
MSI	15	9	28
CASRO	50	27	27
	65	36	55

2.2 Results

As expected, there was a substantial amount of variation with respect to how various response and nonresponse terms were calculated. This can be seen in Table 2.2.1 which presents percentile values for the four rates using the telephone directory sample data.

TABLE 2.2.1

Telephone Directory Sample Calculations

	Percentiles					
Rate	Minimum	25%	50%	75%	Maximum	Range
Response	12	23	30	44	90	78
Contact	22	43	45	48	53	31
Completion	12	12	23	26	61	49
Refusal	7	25	43	51	65	58

The largest amount of variability existed for the "response rate". Of the 55 respondents, only 40 specified a response rate calculation. Those not doing so said either that they were not sure how it should be done or that they never computed the rate.

From the 40 responses came a total of 29 different calculations in this one survey. The three most commonly used definitions occurred only three times each and the rates calculated ranged from a low of 12% to a high of 90%. The most frequently specified calculations are shown in Table 2.2.2.

The most surprising finding occurs with respect to the numerator term. Looking at the first two definitions reported in the table suggests that the response rate is being used to measure how successful the data collection effort is in contacting selected respondents. This interpretation of response rate in telephone surveys was expressed in one way or another by almost half of the sample respondents.

TABLE 2.2.2

Most Frequently Used Definitions
for Response Rate Calculations

Calculations	Value
$\frac{\text{Household refusals + Rejects + Inel. + Term. + Compl. Int.}}{\text{All Selected}}$	48%
$\frac{\text{Rejects + Refusals + Inel. + Term. + Compl. Int.}}{\text{All Selected}}$	44%
$\frac{\text{Completed Interviews}}{\text{All Selected}}$	12%
**********	
Minimum value reported:	
$\frac{\text{Completed Interviews}}{\text{All Selected}}$	12%
Maximum value reported:	
$\frac{\text{Refusals + Ineligibles + Terminations + Compl. Int.}}{\text{Rejects + Refusals + Ineligibles + Terminations + Compl. Int.}}$	90%
(n = 40)	

These data also explain, in part, why it is not surprising to find numerous studies now reporting extremely high response rates at the same time many industry observers are expressing concern about how difficult it is to contact respondents and about the growing reluctance of the American public to participate in surveys.

It should be noted that three of the respondents used the following definition to calculate the response rate:

$$\frac{\text{Completed interviews}}{\text{Known eligibles} + [(\text{Incidence rate}) \times (\text{Respondents whose eligibility is unknown})]}$$

The above term approximates the traditional definition

$$\frac{\text{Completed interviews}}{\text{Number of eligible respondents selected}}$$

if one is willing to make the assumption that the incidence rate among accessible and cooperative respondents is reasonably close to the incidence rate of all nonrespondents in the survey. Unfortunately, there is a lack of empirical evidence to suggest the conditions under which this assumption is most likely to be satisfied. Even if it is satisfied in certain situations, problems still remain since there is no agreement as to how the term "incidence rate" should be defined operationally. This was clearly evident in the present study as each of the three sample members defining response rate in the traditional manner gave a different method of calculation for the incidence rate term.

Results for the other rates did not vary as much as the response rate. However, they did vary considerably. This was true in all three types of surveys for which respondents were asked to specify particular calculations. Detailed results can be found in Wiseman and McDonald (1980).

2.3 Creation of a Task Force

Based, in part, upon the survey results and the evident need for industry-wide standards, the CASRO Board of Directors recently established a Task Force which has been given the charge "to develop a uniform formula for

measuring completion rates in survey research for all modes of data collection, that is, mail, telephone and personal interview." The Chairman of this sixteen member Task Force is Lester Frankel, Executive Vice-President of Audits and Surveys, Inc., and former President of the American Statistical Association. The membership includes distinguished statisticians and survey researchers from the Bureau of the Census, other governmental agencies, CASRO, MSI, and academia. Deliberations have begun and a final report is likely to be issued within the next year. It is anticipated that the recommended definitions, interpretations, and calculations will be widely publicized and adopted by the Bureau of Census, other governmental agencies and hopefully by commercial and academic survey researchers.

3. THE MAGNITUDE OF NONRESPONSE

Five years ago, Day (1975) enumerated various threats being faced by marketing researchers and areas in which research was warranted. Due to the absence of hard data, Day suggested that "... the top priority should be assigned to documenting the seriousness of the (nonresponse) problem in terms of accepted and reasonably standardized industry-wisde measures of the components of nonresponse rates." He also indicated that attention should be given to understanding the nature and extent of the biases inherent in data obtained in surveys that achieved a low response rate.

More recently, Platek (1977) noted the importance of obtaining a high response rate by indicating that the sampling variance of population estimates is inversely proportional to the response rate. Thus, for example, estimates based on a simple random sample with an 80% response rate will have a sampling variance of 12.5% higher than the variance of corresponding estimates with a 90% response rate.

Once again, due to the importance of obtaining data from which an improved understanding of the nature and extent of the nonresponse problem could be achieved, many member firms in CASRO and MSI agreed to participate in a 1978 study which sought to answer the following three questions:

What response rates are being achieved in consumer telephone surveys?

What methodological procedures are currently being used and which of these are correlated with response rates?

What are the characteristics of surveys that achieve "high" response rates and how do they differ from surveys that achieve "low" response rates?

The Research Design for this study is given in 3.1.

3.1 Research Design - Magnitude of Nonresponse

Thirty-two companies (25 CASRO and 7 MSI) participated by agreeing to complete a four page Tally Sheet for each consumer telephone survey that they conducted over a specified six-week period beginning in March, 1978. The Tally Sheet allowed for standardized reporting and contained three pages of methodological (e.g., number of callbacks, source of sample, sample size) and subject matter (product category) questions and one page for recording the number of selected sample respondents that fell into twelve mutually exclusive response and nonresponse categories (e.g., "Number of completed interviews", "Number of terminations", and "Number of respondent refusals").

3.2 Results

A total of 182 useable Tally Sheets was received. As noted previously, each participating firm was asked to supply information for all consumer telephone surveys conducted over the specified six-week period. Some firms did not send Tally Sheets for all their surveys because of confidentiality considerations or time constraints. Thus, while the data base contains information on 182 surveys, the total number of surveys in the relevant population and the specific selection procedure used by participating companies in deciding whether or not to submit a Tally Sheet for a particular survey are unknown. These factors must be considered when interpreting the survey results.

Three major findings emerged. These were:

The median percentage of selected sample respondents not contacted was 40%.

The median percentage of contacted sample respondents who refused participation was 28%.

The median response rate was 30%.

The relative frequency distribution for the response rate is given in Table 3.2.1. As can be seen, only 12% of the studies achieved a response rate of over 60%.

TABLE 3.2.1

Response Rates for Surveys in the Data Base[1]

Response Rate	Percent of Surveys
Less than 20%	29.5
21 - 40%	41.6
41 - 60%	16.8
Over 60%	12.1
	100.0

Median: 29.9%
(n = 156)

However, an examination of the data revealed that there were methodological variables correlated with the response rate. The one that explained the most amount of variability, by far, was the maximum number of attempts specified to contact the designated respondent/household. Table 3.2.2 presents response rates categorized by this variable. It also shows that in over one third of all surveys, only a single attempt was made. Further, in approximately 53% of the surveys no more than one callback was specified.

[1] Response rate was defined as: $\frac{\text{Completed interviews}}{\text{Estimated number of eligible respondents selected}}$
The table reflects the fact that due to incomplete reporting, response rates could be calculated for only 156 of the 182 surveys in the data base.

TABLE 3.2.2

Response Rates Categorized by Maximum Number of Attempts Specified to Contact Designated Respondent/Household

Maximum Number of Attempts[1]	Median Response Rate	n
1	17.5%	55
2	26.4%	21
3	34.5%	37
4	48.8%	20
5 or more	67.5%	10

[1] The table excludes 39 surveys in which either the maximum number of attempts was not specified or the response rate could not be calculated due to missing data.

Analysis of variables correlated with the refusal rate revealed that the two most highly correlated variables were interviewer related. More specifically, in surveys where callback appointments were made by interviewers when a respondent indicated that it was a bad time for an interview, the median refusal rate dropped significantly. The median rate also fell when interviewers did not readily accept an initial refusal, but rather attempted to convert the reluctant respondent by doing such things as pleading, begging, and stressing the importance of the individual's participation. Specific results for these two variables are given in Table 3.2.3. More detailed results for the entire study can be obtained in Wiseman and McDonald (1978).

TABLE 3.2.3

Refusal Rates Categorized by Interviewer Effort Variables[1]

Variable	Median Refusal Rate	n
Callback Appointments		
Made	27.5%	104
Not Made	39.2%	62
Effort Made to Convert by Pleading, Begging, etc.		
Made	21.8%	32
Not Made	35.7%	134

[1] Refusal rate = $\frac{\text{Respondent refusals + Household refusals}}{\text{All sample elements contacted}}$. This table excludes 16 surveys in which either the refusal strategy was not specified or the refusal rate could not be calculated due to missing data.

4. IMPLICATIONS

How valid are the results of studies in which a low response rate is achieved? It is not possible to answer this question because we do not generally know the degree to which respondents differ from nonrespondents on the variables of interest. It may be that those individuals who are difficult to reach or who are unwilling to be interviewed share the same general attitudes, opinions, preferences, etc., as do individuals who are readily accessible and who are willing to be interviewed. If this be the case, then the potential consequences of a low response rate are substantially reduced. If, however, significant differences do exist between respondents and nonrespondents then survey results, no matter how large the sample size, are likely to be of greatly reduced value to decision- or policy-makers.

Little is known about the characteristics of nonrespondents. However, in recent studies, differences were found on a number of dimensions among those who were readily accessible and cooperative, those who were hard-to-reach and those who initially refused participation, but later agreed to cooperate.

Table 4.1 compares the findings of these studies. Overall, they suggest that refusers are very much different than hard-to-reach individuals. Such a result was also obtained by Platek (1977) in his analysis of nonrespondent characteristics in the Labour Force Survey. For example, Platek found:

> In terms of average unemployment rate, the "No one at home" households were very much like the respondent households, while refusal households had higher, and "Temporarily absent" households had a lower unemployment rate as compared to the responding households (p. 17).

Thus, as noted by van Westerhoven (1978), a strategy that involves a large number of callbacks without including any extra effort to convert initial refusers is one that may actually make the sample less representative even though the response rate will be higher. Clearly, more research is needed in this area.

5. CONCLUSIONS

In response to a number of uncontrollable environmental factors, commercial survey researchers now place heavy reliance on the telephone for data collection. Telephone surveys offer advantages over personal interviewing with respect to time and cost considerations. However, it appears that these advantages may also be disadvantages. This is because it is now possible for decision and policy-makers to obtain large quantities of information rather quickly and inexpensively. These particular characteristics are very appealing and important to such people in constant need of data. These users of survey data, either knowingly or unknowingly often impose stringent time and cost constraints on research managers who in turn impose similar pressures on research suppliers. The suppliers are able to meet client specifications in terms of cost and time only by paying little, if any, attention to potential nonresponse problems. That is, by making substitutions in the sample, by making no callbacks, by letting the phone ring only four times before hanging up, by not attempting to convert reluctant respondents and by not using alternative means to secure data from those with unlisted or no telephone, most surveys can be completed inexpensively and on time. But, the question that has not been asked enough is, "How good are the data?"

TABLE 4.1

Characteristics of Nonrespondents

Source	Population	Method of Interviewing	Topic of Survey	Characteristics of Refusers	Characteristics of Hard-to-Reach
Dunkelberg and Day (1973)	National Survey, head-of household; conducted in 1967	Personal Interview	Consumer finances	-	Younger Better educated Higher income Urban
The Data Group, Inc. (1977)	National survey, female head-of-household	Telephone	Purchasing behaviour/ life style	Older Less active socially	Younger Employed full-time Higher income Socially active
van Westerhoven (1978)	National survey, (Netherlands) female head-of-household	Personal Interview	Purchasing behaviour/ life style	Older Lower social class Make fewer purchases	Working women Age: 35-49 1-2 person household Fewer small children
O'Neil	Chicago area, household study	Telephone	Attitudes toward crime and police	Blue Collar Less educated Older Less social participation	-
Thompson (1979)	U.S. Coast Guard national survey of boat owners	Telephone	Boat Ownership	-	Own significantly fewer boats

Fortunately, the concern over nonresponse among commercial research users and suppliers is growing in the U.S. In order to translate this concern into improved methodology, survey researchers must stress the need for and importance of obtaining high quality data to users of study results. Such users may not be aware of the potential magnitude of the nonresponse problem or its negative impact on data quality. A first step in this direction is the standardization of terminology and reporting procedures.

RESUME

Faute de données précises et d'une normalisation adéquate de la terminologie de la non-réponse et des procédures de déclaration, les spécialistes américains de la recherche d'enquête commerciale ont été incapables d'évaluer avec précision la nature et l'importance du problème de la non-réponse. Toutefois, les résultats de deux études récentes effectuées par l'auteur auprès de grandes firmes américaines spécialisées dans l'étude de marchés et les sondages de l'opinion publique ont démontré que la non-réponse est l'un des principaux problèmes de la recherche d'enquête commerciale. Ce document présente les résultats de ces deux études et leurs implications.

REFERENCES

(1) Bailar, B. and Lanphier, C.M., Development of Survey Methods to Assess Survey Practices (Washington: American Statistical Association, 1978).

(2) Cannell, C.A., "Discussion of Response Rates", Proceedings of the Health Survey Research Methods Conference, 1978 (Washington: DHEW Publication No. PHS 79-3207).

(3) Day, G., "The Threats to Marketing Research", Journal of Marketing Research, Vol. 12, 1975, pp. 462-467.

(4) Dunkelberg, W.C. and Day, G.S., "Nonresponse Bias and Callbacks in Sample Surveys", Journal of Marketing Research, Vol. 10, 1973, pp. 160-168.

(5) Frankel, L.R., "Statisticians and People - The Statistician's Responsibility", Journal of the American Statistical Association, Vol. 71, 1976, pp. 9-16.

(6) Kviz, F.J., "Toward a Standard Definition of Response Rate", Public Opinion Quarterly, Vol. 40, 1977, pp. 265-267.

(7) O'Neil, M.J., "Estimating the Nonresponse Bias Due to Refusals in Telephone Surveys", Public Opinion Quarterly, Vol. 43, pp. 218-232.

(8) Platek, R., "Some Factors Affecting Nonresponse", paper presented at the ISI Meetings, New Delhi, 1977.

(9) Sandstrom, R., "The Reduction of Refusal Nonresponse: An Attempt to Design a Model and its Application", paper presented at the ISI Meetings, New Delhi, 1977.

(10) Shosteck, H. and Fairweather, W.R., "Physician Response Rates to Mail and Personal Interview Surveys", Public Opinion Quarterly, Vol. 43, 1979, pp. 206-218.

(11) The Data Group Inc., "Characteristics of Nonrespondents", unpublished paper (The Data Group, Inc., Philadelphia, PA)

(12) Thompson, N.R., "Nonresponse Bias from No Answer/Busy Calls in a Telephone Survey", Proceedings on the Section of Survey Research Methods, (Washington: American Statistical Association, 1979), pp. 250-251.

(13) van Westerhoven, E., "Covering Nonresponse: Does it Pay?", Proceedings of the European Society of Opinion and Market Research - ESOMAR, 1978, (The Netherlands: ESOMAR).

(14) Vidgerhous, G., "Optimizing the Time Schedules and Response Rates in Telephone Interviews - A Study of Seasonal Patterns", Proceedings of the Section on Survey Research Methods, (Washington: American Statistical Association, 1979), pp. 256-261.

(15) Wiseman, F. and McDonald, P., The Nonresponse Problem in Consumer Telephone Surveys, (Cambridge: Marketing Science Institute, 1978).

(16) _____, Toward the Development of Industry Standards for Response and Nonresponse Rates, (Cambridge: Marketing Science Institute, 1980).