

# MAIL RESPONSE RATE IMPROVEMENT IN A MIXED-MODE SURVEY

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The Tennessee Valley Authority has conducted a biennial survey of residential consumers since 1979. This series of surveys is designed to provide information to support a variety of activities within the agency, including load forecasting, rate analysis, and program design. Survey questions include space heating fuel and equipment, air-conditioning, major appliances, and residence and occupant characteristics. Most of the surveys are based on stratified random samples of approximately 3,000, selected from approximately 2.9 million consumers served by 160 local electric utilities distributing TVA power in an 80,000-square-mile area including most of Tennessee and parts of Georgia, Alabama, Mississippi, Kentucky, Virginia, and North Carolina. Larger samples of 7,000 to 9,400 consumers are periodically used as a check on the accuracy of the findings from the smaller scale surveys.

Because of the importance of having accurate data to support various agency functions, a mixed-mode design has been used since the inception of the survey effort to ensure a high response rate. An initial mailing of questionnaires is followed by a second mailing which includes a revised letter and an additional copy of the questionnaire. Then, a telephone follow-up of nonrespondents is conducted and finally, an in-person effort is pursued with a randomly selected one-half sample of the remaining nonrespondents. The weighted response rates achieved using these procedures have routinely been in excess of 90 percent. While this mixed-mode design has been extremely effective in achieving the agency's objective of providing high quality data, data collection costs have been consistently high.

An effort was undertaken to reduce these costs in the 1990 TVA Residential Survey while preserving the high survey response rate. The emphasis was upon increasing the mail response rate in order to minimize costs associated with the telephone and in-person follow-up efforts. While some consideration was given to using an experimental design to assess the impact of various response rate improvement strategies, it was alternatively decided to concentrate upon achieving immediate cost savings using a variety of techniques.

## Efforts to Improve the Response Rate

In the TVA residential surveys, the relative success of the three modes of data collection is determined by the success of the first stage mail component. As shown in the accompanying table, the mail completion rates for the 1979 through 1988 surveys were rather idiosyncratic, ranging from 48.6 to 57.2 percent. As the most cost efficient of the three data collection modes, an increase in the mail return rate could potentially reduce total survey costs while maintaining the existing completion levels.

Various modifications to the existing data collection plan were considered in an effort to reduce survey costs. These included gaining prior commitment for survey participation (Anderson, 1986; Childers and Skinner, 1979); using a return deadline (Henley, 1979); personalization of cover letters (Dillman and Frey, 1974; Kawash and Aleamoni, 1971); and various strategies for post card and letter follow-up (Futtrell and Lamb, 1981, Etzel and Walker, 1974; Colton, Kane, Estes, and Eltoft, 1990; and Boser, 1990). In 1988, Fox, Crask, and Kim reported a meta-analysis of experimental studies which examined the influence of ten factors on mail survey response rates, concluding that six factors tended to increase response rates: university sponsorship, prenotification by letter, stamped return postage, post card follow-up, first class outgoing postage, and questionnaire color.

Two of the factors discussed by Fox, Crask, and Kim were ultimately introduced in the 1990 Residential Survey and a third factor was also modified from previous surveys. In addition, the physical appearance of the questionnaire was redesigned.

Prenotification letter: In past TVA residential surveys, the first contact with potential respondents was their receipt of a questionnaire and a cover letter. This practice was modified in the 1990 survey. One week before the first mailing of the questionnaire, each sampled consumer was sent a first-class letter on TVA letterhead advising of their random selection to complete a questionnaire and explaining the use of the resulting survey data by TVA. It was hoped that this letter would create some anticipation for the receipt of the questionnaire and also provide some advance notice to TVA about

insufficient addresses, address corrections, and vacant residences.

**Reminder letter:** Data collection methodology for the previous TVA surveys included a second mailing of the questionnaire with a new cover letter to sampled consumers not responding within three weeks of the first mailing. In the 1990 survey, a reminder letter on TVA stationery was sent approximately one week after the first mailing to all sampled consumers, asking them to complete and return their questionnaires if they had not already done so. Three weeks later, a second copy of the questionnaire with a revised cover letter was mailed, as in past surveys. The objective of the reminder letter was to fulfill the functions of the second mailing in previous surveys, but to stimulate response before it became necessary to mail a second copy of the questionnaire.

**Third Mailing:** An additional change in survey procedures involved a third mailing to nonrespondents from the first two mailings for whom telephone numbers could not be obtained. This provided an additional opportunity for these individuals to respond, and also reminded consumers that the survey was continuing. In past surveys, there was no contact with nonrespondents without locatable telephone numbers from the time of the second mailing until an interviewer might appear at their home, a period of up to eight weeks.

**Questionnaire Redesign:** Extensive efforts were undertaken to redesign the physical appearance of the questionnaire. In past TVA residential surveys, the questionnaire cover was printed in black type on white paper with some yellow detail. Relatively thin paper was used for both the cover and interior pages in order to minimize mailing costs, and the questionnaire was prepared as an 8-1/2-inch by 11-inch booklet. As in the past surveys, the questionnaire was again printed as a booklet, but the booklet size was halved to 4-1/4 inches by 5-1/2 inches. The cover was printed in black on yellow cover stock, and quality white paper was used for the interior pages. Inside the questionnaire, the use of white space was reduced, while graphics and various type fonts were added.

### **Findings**

The modifications to the questionnaire and the changes in survey procedures substantially improved response to the mail component of the survey, as shown in the accompanying table. In previous TVA residential saturation surveys, the highest mail response rate was 57.2 percent in 1979, compared

with 64.4 percent in this effort. The 1990 response rate appears even more significant in view of the fact that the mail response rate of 48.6 percent in the 1988 survey was the lowest in the history of the TVA saturation survey program. The introduction of the third-wave mailing yielded 90 completed questionnaires, or responses from 18.6 percent of the outstanding nonrespondents.

The increased mail completion rate had several important implications for the survey. The desired cost savings were achieved because fewer telephone interviews were attempted. As shown in the attached table, telephone interviews added 15.4 to 22.9 percent of the total response in the surveys performed from 1979 to 1988, but only 11.4 percent in the 1990 effort. Similarly, the field completion rate of 8 percent was the second lowest in the history of the saturation survey program. Due to the extremely high response rate achieved by TVA biennial surveys over the past decade, the higher mail response rate did not translate into a significantly higher overall response rate. Rather, TVA was able to maintain its historically high response rate in the 1990 survey while shifting a considerable portion of the data collection effort away from higher cost telephone and in-person interviewing.

Also, the increased mail response rate did not occasion any degradation of the quality of survey data. Data retrieval is routinely performed in TVA saturation surveys for five to seven "key" items, such as primary heating fuel and equipment, but the additional mail response did not increase the proportion of mail questionnaires requiring data retrieval. It also appears that the increased mail completion rate reduced nonresponse to the income question on the survey. Respondents to the mail component of the survey have historically been more likely to provide income information than those who participate by telephone or personal interview, and the improvement in response to this important question was particularly valuable for various forecasting applications of survey data. These results indicate that response rate improvement is possible even with surveys of the general population, such as the TVA residential saturation survey.

Overall, the changes introduced to reduce survey costs were considered sufficiently successful to be continued in future TVA surveys, including an upcoming saturation survey in 1992. Additional research is planned to explore other possibilities for mail response rate improvements in TVA residential surveys.

## RESPONSE RATE BY MODE OF DATA COLLECTION:

### TVA RESIDENTIAL CUSTOMER SURVEYS, 1979-1990

Data Collection Mode	1979	1981	1982	1984	1986	1988	1990
<b>MAIL</b>							
<b>First</b>	24.2%	21.3%	21.4%	24.8%	22.8%	22.9%	44.2%
<b>Second</b>	33.0	28.7	28.2	31.9	29.4	25.7	17.2
<b>Third*</b>	-	-	-	-	-	-	3.0
(Subtotal)	(57.2)	(50.0)	(49.6)	(56.7)	(52.2)	(48.6)	(64.4)
<b>TELEPHONE</b>							
(Subtotal)	18.7 (75.9)	18.0 (68.0)	18.2 (67.8)	15.4 (72.1)	21.4 (73.6)	22.9 (71.5)	11.4 (75.8)
<b>FIELD (Half Sample)</b>	7.4	11.6	12.4	11.7	10.2	11.3	8.0
(Actual Subtotal)	(83.3)	(79.6)	(80.4)	(82.5)	(83.8)	(82.8)	(83.8)
<b>WEIGHTED TOTAL</b>	<b>89.6%</b>	<b>91.3%</b>	<b>92.7%</b>	<b>93.0%</b>	<b>94.1%</b>	<b>94.1%</b>	<b>91.8%</b>

\*The 1990 survey introduced a third mailing to nonrespondents (to the first two mailings) for whom telephone numbers could not be obtained.

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