

AN EXPERIMENTAL STUDY OF SEVERAL FACTORS AFFECTING RATE AND NATURE OF RESPONSE TO A MAIL SURVEY OF BEGINNING TEACHERS

By: Ward S. Mason, and Robert J. Dressel, U. S. Office of Education
and Robert K. Bain, Purdue University

It has long been known that many features of questionnaire design and mailing procedure can influence the response rate in mail surveys. Length, color of paper, format, and type of stamp are a few of those which have been studied. 1/ Some of these effects seem to hold generally for different populations, while others seem to be specific, or else evidence is lacking on the generality of the effect. While such matters as format and color of paper may seem trivial at first, anything which affects rate of response is an important factor. Probably the major problem of mail surveys is that of obtaining a high and representative response. 2/ Yet mail surveys have many advantages, and if this problem can be overcome there is much to recommend them. 3/

Because rate of response is related to the validity of survey results, it is important that data regarding mechanical features of questionnaires which affect response rate continue to be accumulated. It is with this in mind that the present paper was written.

In the spring of 1957 the U. S. Office of Education was planning a national survey of beginning public school classroom teachers. 4/ A sample was developed in which each beginning teacher in the country had a ten percent chance of being included. A pretest of the form was to be conducted. Given the importance of obtaining a very high rate of response, there were two aspects of questionnaire design which it was desired to test in terms of their effect on response rate: length, and mode of addressing.

Length. There is already considerable evidence that length of questionnaire may have an effect on response rate, although some findings suggest that interest and other factors may be more important. 5/ Of course, if one takes extreme examples, it is highly probable that a relationship will hold between length and response rate; it is hard to imagine the conditions under which one could obtain the same rate of response in a given population with a one-page questionnaire and with a fifty-page questionnaire. But the practical question facing the survey director is not "Is there a statistically significant relationship between the abstractions of questionnaire length and response rate?" but rather "For this population and a survey covering this topic, will there be a 'practical' difference in response rate between a questionnaire of length A and one of length B?" "Practical" is a word of varied meanings, but it relates here to such topics as the precision desired in the results and the relative costs of processing questionnaires of different length. In the present instance, the question was whether there would be an appreciable difference in response rate for a form of

six pages and a form of eight pages in a survey of beginning public school teachers. The six-page form had 62 items of information, the eight-page form, 92 items.

Mode of Addressing. In the conduct of mail surveys there are two standards which are seemingly contradictory. On the one hand, other things being equal, it is usually thought desirable to have the respondents participate on an anonymous basis. A number of studies have shown that different responses are sometimes obtained under anonymous and non-anonymous conditions. 6/ In investigating some topics, such as sexual behavior, this problem may be deemed to be of sufficient importance to warrant taking elaborate precautions to conserve anonymity while providing a means of matching data. 7/

The other consideration is that it is usually desirable to be able to identify respondents, either for purposes of data-matching, for follow-up studies, or for being able to mail follow-up requests in order to increase the response.

Several methods have been devised of "eating your cake and having it, too." 8/ Such methods should be carefully considered if it is felt that the anonymity factor will really make a difference in the research in question.

There is one method which is intermediate between complete anonymity and having the respondents' name on the questionnaire: that is to put a code number on the questionnaire and have an office file in which the code numbers are matched to names and addresses. Such a procedure has the appearance of anonymity, although little thought is required for the respondent to realize that such a file stands behind the code number appearing on the form, particularly after he has received a follow-up request. Still, it may be reassuring to some people to know that their name does not appear on the form itself, where anyone who works on processing the data may make the connection between respondent and reply. The chief difficulty with this method is in controlling mailings. Extreme care must be exercised to see that forms with code numbers are matched correctly with envelopes having names and addresses. A mistake can be disastrous, and the matching process is an extremely inefficient operation which becomes quite impractical when the sample N is large. Since the N for the survey of beginning teachers was to be over 10,000, this factor was a serious matter. If the teacher's name and address appear on the form, then the mailing operation is facilitated because the form can be placed in a window envelope by machine methods in what is a fast and efficient operation. At the same time sample control is facilitated because respondents can be readily identified.

It was therefore determined that one of the factors to be tested in the pretest was the mode of addressing the form. Half the pretest sample members were to receive forms on which were found the teacher's name and school address plus a series of code numbers, while the other half was to receive a form which was identified only by a set of code numbers. (The case of complete anonymity was not tested.) For forms with code numbers only, the respondent's name and address appeared on the cover letter (which was separate from the form). Both forms contained assurances that the forms would be seen only by a few survey staff members and that only summary results would be published. In addition, those having their name on the form were told that their name and address appeared on the form only in order to facilitate mailing.

In order to test both factors--length and mode of addressing--four forms were designed as follows:

- Form A: long form-name and address on form
- Form B: long form-code number on form
- Form C: short form-name and address on form
- Form D: short form-code number on form

A judgment sample was developed for the pretest by asking a series of school districts to submit the names and school addresses of their beginning teachers. The sample of 741 teachers obtained in this way was drawn from various sections of the country and from school districts of various sizes, though it was weighted rather heavily in favor of large districts. The four

forms were assigned systematically, sending form A to the first name on the list, form B to the second, etc. Because of the time pressures under which the study was conducted, it was necessary to make the initial mailing in three installments, as responses were received from school districts. Nonrespondents in the first group of 278 teachers received two follow-up requests; the second group of 51 received two follow-ups, and the final group of 411 received only one follow-up.

Before presenting the results it would be well to describe one further feature of the sample. We had requested the names and addresses of beginning teachers from the school districts, but we could not be sure that the names submitted did not include some nonbeginning teachers. Consequently, it was necessary to include on the teacher questionnaire several screening questions to determine whether the teacher belonged in the population being sampled. Those whose answers indicated that they did not belong were asked to return the questionnaire without completing the other questions. The forms received are therefore of two types: those for members of the sample and those for nonmembers of the sample. The task of the nonmember was obviously much simpler in that he had to fill out only three items. On the other hand, the nonmember might be less inclined to return the questionnaire, thinking that a reply was not needed. It is therefore important to look at the results for the two groups of teachers separately.

Rate of Response. The results of the experiment are shown in table 1.

Table 1--Mailout and receipt of four forms of a questionnaire for beginning teachers

Mailout and receipt	All forms	Form A long addressed	Form B long coded	Form C short addressed	Form D short coded
Total mailed	741	186	185	185	185
Received	613	153	150	154	156
Members of sample ...	<u>534</u>	<u>129</u>	<u>131</u>	<u>141</u>	<u>133</u>
Nonmembers of sample.	<u>79</u>	<u>24</u>	<u>19</u>	<u>13</u>	<u>23</u>
Not received	128	33	35	31	29

The null hypothesis that there were no differences in response to the four forms was tested with the use of chi square, comparing total received with the not-received group. No significant differences in response were found either among the four forms, between the two long forms and the two short forms, or between the two addressed forms and the two coded forms. Furthermore, even if such differences had been found to be statistically significant through the use of a much larger sample, they are so small as to be of little practical significance. In percentage terms, the difference between the two long forms and the two short forms is only 2 percent,

and there is no difference between the two addressed forms and the two with code numbers.

Because of the fairly large number of teachers who disqualified themselves from membership in the population, a further check is necessary to be sure that this result holds also for the subgroup composed of those who do belong in the population being studied. Of course, we can distinguish between sample members and nonmembers only among those who responded, and consequently cannot do a test comparing respondents and nonrespondents among sample members only. However, because of the way in which the forms were

assigned in the sample, it is possible to assume that nonmembers were randomly distributed by type of form. Therefore a chi square was computed for which the actual frequencies were the number of sample members who responded to each form, and the expected frequencies were derived from the total mailout figures. Again, the results were not statistically significant, either for all four forms or when combining them by length or type of address. However, similar calculations for nonmembers of the sample yielded a chi square significant at the .05 level. Thus, it appears that in this particular case there may be a relationship between form design and response among teachers for whom the form is not intended, even though there is no evidence of such a relationship among those who belong in the population being studied.

In view of the fact that no statistically significant differences were found for respondent sample members, the decision was made in the final study to use a form comparable to form B, i.e., eight-page form with the questions from form B as revised in the light of the pretest results, with the name and address of the beginning teacher appearing on the form. This form was mailed to 10,012 beginning teachers throughout the country on March 28, 1957. Questionnaires were received over a three-month period until the end of June, and some teachers received as many as five follow-up requests. Replies were received from 89 percent of the teachers on the mailing list, a highly satisfactory result which minimized the problem of nonresponse bias and one which justified the use of the form chosen on the basis of the pretest experiment.

Comparability of Response. So far, we have been concerned only with response rates: what proportion of sample members replied among those receiving each form. Another question is whether the form design is related to the characteristics or replies of the respondents. Such differences could arise in either of two ways: either the subsample of individuals who reply to one form is different, at least in part, from the subsample which would reply to another; or the same individuals reply to each form, but their replies are affected by the form design. Of course, in a given instance, both factors could be operating simultaneously.

In order to explore this question, respondents to the four forms were compared on a number of characteristics. These included size of school, age of respondent, salary, education, education of father, career plans, life goals, feeling of adequacy in the human relations aspects of the job, and five different satisfactions items. None of the differences by either length or mode of addressing proved to be statistically significant except one: on the average, those returning short forms had a gross annual salary \$143 higher than those returning long forms. Such a difference would be expected on the basis of chance alone fewer than two times in a hundred. However, when mode of addressing

is controlled, the finding is replicated only for coded forms; the difference in salary found for those returning long and short forms is not statistically significant for those having forms containing their name and address.

Although this result creates a suspicion that there may be a difference in the mean salaries of these two groups, such a result would have to be duplicated in an independent study before it could be entertained seriously. For among all the tests of significance computed in connection with this paper (with the exception of the relation of form design to response for those who were not members of the sample), it was the only result which achieved statistical significance, and we would expect some tests to be significant by chance alone.

Summary and Conclusions. In a pretest of a study of beginning public school teachers an experiment was conducted to determine the effect of two factors, length of form and mode of addressing, on the rate of response and type of response. It was concluded that for this population an eight-page questionnaire with name and address of the respondent appearing on the form would produce a response not significantly different in rate or type from that of a six-page form identified by only a code number, or any other combination of these factors. There was some evidence that when forms were inadvertently sent to individuals who did not belong in the population being studied, rate of response is related in slight degree to these factors of form design.

The findings of this experiment were quite favorable relative to the survey of beginning teachers. On the one hand, the ability to place the respondent's name and address directly on the questionnaire without influencing the results greatly facilitated the mailing and processing of questionnaires. On the other hand, the use of an eight-page rather than a six-page form meant that it was possible to obtain approximately 33 percent more information. More information was important not only for its own sake but because it allows a much more thorough analysis of the interrelationships among variables.

It is worthwhile to raise the question of whether these findings can be generalized to other studies involving mail questionnaires, for it may be that they are limited by some of the features of this particular survey. For example, the beginning teachers studied had a high educational attainment and were relatively homogeneous in this respect. Although it is not known what image the U. S. Office of Education has among teachers, it may be rather safely assumed that, on the whole, sponsorship by this agency exerted a favorable influence. The study was conducted in the interest of the teaching profession, and thus in the self-interest of the respondents. Questionnaires were returned in franked envelopes addressed to the Commissioner of Education. All of these factors undoubtedly contributed to the

relatively high response rate of 83 percent, 9/ and a high response rate tends to minimize the possibility of bias in rate of response, although not necessarily in type of response. A final factor, the influence of which is problematic, is the restriction of the study to a population of young adults. If any of these conditions

had been different, it is, of course, possible that the results would have turned out otherwise. It is hoped that other similar studies may be undertaken with different values for each of these variables as conditions, which will enable us to accumulate evidence on the generalizability of these findings.

1/ Mildred Parten, Surveys, Polls, and Samples: Practical Procedures, Harper & Brothers, New York, 1950, p. 383 ff.

2/ Morris H. Hansen and William N. Hurwitz, "The Problem of Nonresponse in Sample Surveys," Journal of the American Statistical Association, Vol. XLI (1946), p. 517-529.

3/ Lawrence E. Benson, "Mail Surveys Can be Valuable," Public Opinion Quarterly, Vol. 10, p. 234-241.

4/ This study was made as part of the regular research program of the U. S. Office of Education. Acknowledgement is made to Dr. Herbert S. Conrad, former Director of the Education Statistics Branch, for review of the manuscript and administrative aid.

5/ Parten, op. cit., p. 385-386.

6/ However, it is not self-evident that data obtained under the anonymous condition are more valid. Cf. Jack Elinson and Valerie T. Haines, "Role of Anonymity in Attitude Surveys," American Psychologist, 5 (July, 1950), p. 315; W. C. Olsen, "The Waiver of Signature in Personal Reports," Journal of Applied Psychology, 20, (1936), p. 442-450.

7/ Erik Manniche and Donald P. Hayes, "Respondent Anonymity and Data-Matching," Public Opinion Quarterly, 21 (Fall, 1957), p. 384-388.

8/ Ibid.; Don Cahalan, "Effectiveness of a Mail Questionnaire Technique in the Army," Public Opinion Quarterly, 15 (Fall, 1951), p. 575-578; Kenneth Bradt, "The Usefulness of a Post Card Technique in a Mail Questionnaire Survey," Public Opinion Quarterly, 19 (Summer, 1955), p. 218-222.

9/ The response rate in the final survey was 89 percent.