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Miscellanea

Under the heading Miscellanea, essays will be published dealing with topics considered to be of general interest to the readers. All contributions will be refereed for their compatibility with this criterion.

The Educational Bias of Mail Questionnaires

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1. Introduction

Early studies in the United States found a relationship between response rates for mail questionnaires and level of the respondent's education. Those with higher educations were more likely to answer a mail questionnaire than those with less education. See Suchman et al. (1940), Franzen et al. (1945), Baur (1947), Clausen et al. (1947), Wallace (1954), Donald (1960), Scott (1961), Suchman (1962), Robins (1963), Roeher (1963), Nuckols (1964), Ognibene (1970), Gannon et al. (1971), and Dillman (1978). Empirical results from four large Scandinavian surveys verify these findings. Those without higher educations take longer to complete and are less likely to return the questionnaires. In this way, the mail questionnaire acts as a selection mechanism that excludes certain groups from participating in surveys. Thus, results from social surveys using mail questionnaires are affected by a large nonresponse bias that leads to the underrepresentation of the attitudes and characteristics of the less-educated. To reduce this bias, mail questionnaires should be complemented by telephone or personal interviews.

2. The Survey Data

Data from one Swedish and three Danish surveys illustrate the effect education has on response behavior. Response rates increase as a result of follow-up interviews and estimates change as data are incorporated from the successive collection stages.

The four social surveys concern different populations and different topics, namely (1) the housing for Danish youths in 1981 (Jensen (1983)), (2) day-care for Danish preschoolers in 1975, (3) vocational training for Danish youths in 1977, and (4) education and occupation among Swedish youths in 1980.

All four surveys used essentially the same data collection methods. In the first phase, data were collected through mail questionnaires with one or two reminders, resulting in response rates of about 70 % – 75 %. In the second phase, telephone or personal interviews of nonrespondents raised the final response rates to about 85 % – 90 %. (In the Swedish survey the follow-up interview was conducted for a random subsample of the primary nonrespondents.)

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3. The Discriminatory Effect of the Printed Forms

For many people, reading, understanding, and completing a questionnaire is an obstacle to survey participation. This is confirmed by the results in Tables 1–3 which show the rates of mail response by level of education for all respondents in the three Danish surveys. These response rates range from 69 % – 78 % for those with lower educations and from 90 % – 95 % for those with higher educations. These differences between the educational groups are statistically significant. Note that only half of those who did not complete the questionnaire were later interviewed. For the three Danish surveys, information is not available about the educational level of the final nonrespondents. The results in Tables 1–3 apply to those responding, i.e., to about 85 % of the sample.

The results from the Swedish survey shown in Table 4 concur with the results from the three Danish surveys. For the Swedish survey, information about the respondents' plans for further education (measured by admission to upper secondary school) is available for the total sample. If we look at the respondents only, we see that of those admitted to further studies, 93 % responded by mail whereas of those not planning on further education, 80 % responded by mail. Note that these figures are similar to the Danish results. For the total sample, the corresponding mail response rates are 89 for those planning on further education and 67 % for those not planning on further education. This clearly shows that those who are admitted to higher education have a greater propensity to complete the questionnaire and reply by mail.

The effects of education are also reflected in the rates at which respondents return their questionnaires. Those who found it difficult to complete the questionnaire procrastinated and did not return it until after having received the second reminder. See Table 5. For the Danish 1981 Survey of Housing, 19 % of the less-educated respondents had returned their questionnaires within a week of receiving the second reminder compared to 43 % of the more highly educated respondents.

The Swedish survey also dealt with youths, 17 years of age. Of those respondents admitted to further education, 79 % returned their questionnaires within three weeks whereas 59 % of those respondents not pursuing further studies had returned their questionnaires within three weeks. The corresponding figures for the Danish study were 71 % for the more highly educated respondents and 40 % for the less-educated respondents. In the Swedish study, the difference in return rates is not so pronounced between the two groups. One explanation is that the questionnaire for the Swedish study was easier than that used in the Danish survey. On the whole, the two surveys show the same pattern and the Swedish results indicate that this pattern does not change when one looks at the return rates for the total sample.

4. The Educational Bias in Estimates

Unfortunately, it is not possible to assess the nonresponse bias for survey variables. It is possible, however, to calculate the effect that follow-up interviews have on estimates of educational level and illustrate their possible effects on variables associated with educational level.

Table 6 shows estimates of educational level for respondents at each stage of data collection for the Danish 1981 Survey of Housing. Had the mail collection not been followed up by interviews, the estimates of the relative sizes of the educational groups would have been 22 %, 46 %, and 32 %. After the follow-up data was incorporated, the estimates changed to 26 %, 46 %, and 28 % or 29 %, 46 %, and 25 % depending on the assumptions made regarding different response

Table 1. Response behavior by educational level among respondents[1] in the 1981 Danish Survey of Housing for Young People (16–25 years old)

Length of schooling	Replied by mail %	Interviewed %	Total[2] %	Number	
Less than ten years	69	32	101	810	(26 %)
Ten years	82	19	101	1 451	(46 %)
More than ten years	90	10	100	900	(28 %)
All respondents	80	20	100	3 161	(100 %)
Total sample	67	16	83	4 063	

[1] 83 % of 4 063 persons in the whole sample.
[2] Excluding 197 persons with education not stated.

Table 2. Response behavior by educational level among respondents[1] in the 1977 Danish Survey of Basic Vocational Training among Students and Exstudents

Length of schooling	Replied by mail %	Interviewed %	Total[2] %	Number	
Less than ten years	74	26	100	1 320	(25 %)
Ten years	81	19	100	3 831	(72 %)
More than ten years	87	13	100	172	(3 %)
All respondents	80	20	100	5 323	(100 %)
Total sample	73	17	90	6 109	

[1] 90 % of 6 109 persons in the whole sample.
[2] Excluding 150 persons with education not stated.

Table 3. Response behavior by educational level among respondents[1] in the 1975 Danish Survey of Day-care for Preschool Children

Length of schooling	Replied by mail %	Interviewed %	Total[2] %	Number	
Less than ten years	78	22	100	1 745	(49 %)
Ten years	89	11	100	1 350	(38 %)
More than ten years	95	5	100	428	(12 %)
All respondents	84	16	100	3 523	(100 %)
Total sample	73	14	87	5 125	

[1] 87 % of the parents to 5 125 children in the whole sample.
[2] Excluding 231 families with education not stated.

Table 4. Response rates in the 1980 Swedish Survey of Pupils leaving the 9-year Comprehensive School in 1979 by admission to the integrated upper secondary school

Admission to upper secondary school	Respondents					Non-respondents	Total sample	Number
	Replied within by mail			Interviewed[1]	Total			
	2–3 weeks	4–7 weeks	–7 weeks					
	Percent of the number of respondents							
Not admitted	59	21	80	20	100			2 311
Admitted to								
Non-theoretical course programmes	70	17	87	13	100			1 190
Theoretical course programme[3]	79	14	93	7	100			1 621
	Percent of the total sample size							
Not admitted	50	17	67	18 (54)[2]	85	15	100	3 000
Admitted to								
Non-theoretical course programmes	65	16	81	12 (64)	93	7	100	1 320
Theoretical course programmes[3]	76	13	89	7 (67)	96	4	100	1 680

[1] Weighted by the inverse of the subsampling fraction.
[2] Response rates among those subjected to follow-ups.
[3] 3–4 years course programmes, 2-year theoretical general studies and 2-years nursing studies.

Table 5. Rapidity of mail response by educational level among respondents[1] in the 1981 Danish Survey of Dwellings for Young People (16–25 years old). Percent

Length of schooling	Replied by mail within					Median response time[3]
	1 week	2–3 weeks	4> weeks	Interviewed	Total[2]	
Less than ten years	19	21	29	32	101	18
Ten years	29	23	30	19	101	14
More than ten years	43	28	19	10	100	10

[1] See note 1 in Table 1.
[2] See note 2 in Table 1.
[3] Number of days until questionnaire returned by mail.

Table 6. The effect of follow-ups on estimates of educational levels in the 1981 Danish Survey of Housing for Young People (16–25 years old). Percent

Estimates based on	Length of schooling			
	Less than ten years	Ten years	More than ten years	Total
Mail responses				
– 1 week	16	44	40	100
– 3 weeks	19	44	37	100
All responses	22	46	32	100
All responses				
Unadjusted[1]	26	46	28	100
Adjusted[2]	29	46	25	100

[1] Assuming the same overall response probability for all educational groups.
[2] Assuming the same response probability in the interviews for all educational groups.

Table 7. The effect of follow-ups on hypothetical estimates of admission to the integrated upper secondary school in the 1980 Swedish Survey of Pupils leaving the 9-year Comprehensive School in 1979. Percent

Estimates based on	Not admitted to upper secondary school	Admitted to		Total
		Non theoretical studies	Theoretical studies	
Mail responses				
– 3 weeks	21	33	46	100
– 7 weeks	22	34	44	100
All responses[1]	26	34	40	100
Total sample	27	33	40	100

[1] Adjusted estimates based on the assumption of identical interview response probability for all groups.

probabilities. It is my conjecture that this change represents a reduction and not an increase in the nonresponse bias. The Swedish results shown in Table 7 support my view.

5. Discussion

In surveys based on mail questionnaires, the questions must be simple, easily understood, and directed towards a population that is familiar with completing printed forms. Nevertheless, it is to be expected that mail surveys can lead to biased results since those who are not comfortable with printed matter are reluctant to complete mail questionnaires. To avoid this bias, mail surveys should always include follow-up interviews.

Often researchers underestimate the difficulties some respondents have in completing printed forms. On the other hand, interviews are more costly than mail questionnaires. Subsampling among nonrespondents is a reasonable trade-off between the more costly measures that reduce nonresponse and keeping survey costs as low as possible. Hansen and Hurwitz (1946) showed that information from a subsample of the primary nonrespondents yields unbiased estimates. In practice, though, the bias cannot be completely eliminated because there will be some nonresponse in the follow-up interviews too. See Lyberg (1983) and Swensson (1983).

Another way of reducing nonresponse is by prolonging the data collection period and intensifying the follow-up measures. For example, nonrespondents are sent numerous reminders and are exposed to different methods of persuasion. While an intensive pursuit of nonrespondents can lower the total nonresponse, the resulting data quality is not necessarily improved. In an evaluation study, Lyberg (1981) shows that the relative net error was 217 % for responses obtained through intensive persuasion compared to 16 % for responses given without persuasion. In this case, the intensive effort to achieve high response rates resulted in responses of such poor quality that the estimates suffered rather than benefited from the increase in response rates.

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