INTERVIEWER CHARACTERISTICS AND PERFORMANCE ON A COMPLEX HEALTH SURVEY

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The relationship between interviewer characteristics and the quality of data they collect has long been of interest to survey researchers. An issue worthy of particular attention is whether or not interviewers with more experience and education are better able to elicit complete information from respondents than are other interviewers. Since it may be difficult and expensive to field an experienced and educated interviewing team, it is important to try to determine whether such interviewers actually perform better than those interviewers with less formal education and professional interviewing experience.

Research on the relationship between education and interviewers' performance has been sparse. Sheatsley (1951) reported that college educated interviewers performed slightly better than other interviewers but the difference was small and not statistically significant. Singer et al. (1983) reported that college educated interviewers had lower nonresponse rates but here again the results were not statistically significant.

Findings concerning data quality and interviewers experience also have not produced consistent results. Booker (1951) reported no clear evidence for concluding that interviewing experience was a factor in the results obtained from a British household survey. Sheatsley's analysis (1951) of interviewers at the National Opinion Research Center found that past interviewing experience was associated with higher interviewer quality rankings. However, in an analysis of Sheatsley's data, Hyman concluded that this association could be due as much to selective turnover (with the better interviewers remaining longer) than to beneficial effects of the experience itself (Hyman 1954:300). More recent studies also show dissimiliar results. Cleary et al. (1981) report that experienced interviewers are better able to obtain data on a mental health survey while Singer et al. (1983:74) conclude of that "beyond a year the benefit of experience levels off and may even decline".

Data and Methods

The current investigation examines the effect of education and experience, as well as interviewers' age, race and social class on completeness of reporting. The study uses data from the 1977 National Medical Care Expenditures Survey (NMCES) to determine which interviewer characteristics are associated with more complete reporting on the expenditures made for hospital stays, visits to physicians and other providers of medical care, and prescription drugs. NMCES was one of the largest health surveys ever conducted by the Federal government and includes data from a national household survey of 14,000 randomly selected households in the non-institutionalized population. Five major interviews were conducted with each respondent during 1977 and early 1978 to collect data about their health care use and expenditures. Respondents were asked to provide detailed data about episodes of disability, health insurance coverage, visits to various types of medical providers, use of hospital and prescription drugs and some economic and demographic data. Approximately half of the households in the survey were interviewed by the field staff of the National Opinion Research Center (NORC) while the other half were interviewed by employees of the Research Triangle Institute (RTI). At the conclusion of the household survey a mail questionnaire was sent to all interviewers who had participated in the 5 major rounds of the survey. They were asked basic demographic data about age, race, education, interviewing experience, as well as their attitudes about selected methodological procedures used on the NMCES. An 84 percent response rate was obtained on the interviewer survey. The size of the survey offers advantages over other studies of interviewer effects which have generally used much smaller samples of interviewers. Thus, Cleary et al. base their findings on 14 interviewers while Riessman compares the performance of 22 NORC interviewers with that of six physicians. Freeman and Butler examine 33 interviewers while Singer et al. (1983) examine data from 35 NORC interviewers. The present study is based on 206 interviewers with usable data.

Data from the interviewers were linked to the actual responses they obtained from respondents during the household survey. The training of NMCES interviewers was influenced by the research of Oksenberg, Vinokur and Cannell (1977) which stressed the importance of having interviewers elicit a true commitment from survey respondents to report accurately and completely. Heavy emphasis was placed on motivating respondents to maintain health diaries, keep medical bills, and review computer generated summaries of their health expenses for omissions or corrections.

In this analysis our measures of interviewer performance are the item nonresponse rates to questions that sought to elicit the total charges associated with particular types of care. First we present findings on item nonresponse by interviewers characteristics. We then explore the same problem using a multivariate analysis adding a series of variables measuring characteristics of the interviewer's caseload. Controlling for the characteristics of an interviewer's caseload is necessary because poor and elderly respondents often have difficulty reporting their health care expenses since frequently they are paid by third party payers such as Medicare and Medicaid. Only interviewers who remained for all five rounds of interviewing are included in our analysis. This may result in an understatement of non-response, since poor interviewers may have been fired, or quit, prior to the conclusion of interviewing.

Findings

Younger interviewers (20-39) had greater non-response rates on questions about expenditures

than did older interviewers (50 years and older) (Table 1). Interviewers 20-39 years of age had a 43 percent item nonresponse rate for hospital expenditures compared with 36 percent for interviewers over age 50. Younger interviewers also failed to obtain cost data on 29 percent of the medical provider visits and 28 percent of the prescription drugs. Those over age 50 failed to obtain this data for only 21 percent of medical provider visits and 19 percent of prescription drugs.

Self-perceived social class was not associated with expenditure nonresponse rates. Interviewers with 17 years or more of education surprisingly had higher item nonresponse rates than other interviewers on hospital expenditures and prescription drugs. There was no significant difference on medical provider expenditures.

Experience was generally not associated with ability to obtain complete expenditure data, except that, surprisingly the most experienced group, with 15 years or more of experience, actually had higher item non-response rates than less experienced interviewers.

Non-white interviewers had higher non-response rates on each of the three measures of item non-response. As we will show, however, this is a function of the fact that their caseload included a relatively high proportion of difficult respondents.

It should be emphasized that the data we have presented are not the result of a controlled experiment. Interviewer assignments were not random; they were made based on RTI and NORC supervisor's judgments about how to allocate resources to facilitate timely collection of quality data. Thus, non-white interviewers may have been given assignments in primarily non-white areas where a relatively high proportion of the population was poor and dependent on public assistance programs. Experienced interviewers may have also been more likely to draw tougher caseloads, with a relatively high proportion of poor and elderly respondents. Such respondents often do not know the actual cost of service since it may be paid directly through public insurance programs. It should also be noted that we are not assessing the accuracy of the expenditures information collected, but simply whether or not data was collected from each respondent.

In order to control for the variation in interviewers assignments, multivariate analyses were conducted to determine the effect of interviewer characteristics on ability to obtain complete expenditure data when characteristics of the interviewers caseload were used as controls. The control variables included the proportion of each interviewers caseload over 65 years of age, the proportion of cases in which the household head had less than 11 years education, the proportion of the caseload that is nonwhite and the proportion of the caseload with a household income of less than twice the poverty line. Caseload variables were computed separately for each of the three equations. In each case the denominator for the item nonresponse rate is limited to the number of persons actually having at least one hospital

stay, medical provider visit or prescription drug, respectively.

The results of the multivariate analysis indicate that neither education nor interviewing experience are associated with lower item nonresponse rates for any of the three kinds of expenditures. In fact, the coefficient for experience is in each case positive, although not statistically significant. Race and social class were also not significantly related to item nonresponse on any of the expenditure variables. Thus, the fact that non-white interviewers had higher nonresponse rates can indeed be attributed to the characteristics of their caseload.

Age is the only interviewer characteristic that is clearly associated with interviewer performance. Older interviewers appear to obtain lower item nonresponse rates on each of the three expenditure measures. This, of course, is not a function of their experience since experience is also used as an independent variable in the three equations. In addition to using age in the regression equations in its ordinal form, we also ran three separate equations using three age dummy variables; 20 to 30 years old, 40 to 49 years old, and 50 and older, to see if a non-linear relationship existed for age with the dependent variable (data not shown). No significant differences existed between the youngest age group or the oldest age group and the group ages 40 to 49 (the omitted group), however, the sign of the oldest age group was negative, and the youngest group was positive, indicating a possible linear relationship.

As expected, interviewer caseload characteristics affect item nonresponse. Interviewers with a caseloads composed largely of nonwhite respondents had significantly higher item nonresponse rates on hospital, medical provider visit and prescription drug expenditure data. In addition interviewers whose caseloads comprised higher proportions of low income and poorly educated respondents had higher rates of missing charge data for hospital stays. Our findings suggest that obtaining data from these population groups is difficult, regardless of the characteristics of the interviewer.

Summary and Discussion

Our findings clearly indicate that neither education nor previous interviewing experience are associated with better interviewer performance. Age is the only interviewer characteristic associated with interviewer performance.

In this study we have used as our measure of interviewer performance the ability of the interviewer to obtain charge data on health care expenditures. This is a relatively difficult task since it generally requires eliciting from the respondent a commitment that goes beyond merely answering simple factual questions. Successful interviewers were able to convince respondents to maintain diaries and keep receipts for the entire one-year period. These procedures facilitated the collection of complete expenditure data. On this measure of performance, experience apparently means little, but perhaps this should not be surprising. In

most surveys, interviewers are given little feedback on measures such as item nonresponse. Usually item nonresponse rates are not calculated for individual interviewers and when they are, it is probably done as part of a methodological analysis that is not completed until long after the field period has ended. Experienced interviewers know that they are likely to be evaluated primarily on two items: their refusal rate and their cost per case. Accordingly, there may therefore be a tendency to direct most of their efforts to these goals rather than toward other survey objectives for which they are not held accountable.

It is unclear why older interviewers were more effective at obtaining health expenditure data than were younger interviewers. Sheatsley (1951) found that interviewers 30 to 39 years old produced better performance ratings than did interviewers who were either below 25 years or above 50 years of age. (Sheatsley 1951, p. 212). Cleary et al., however, concluded that responses to psychological symptom scales were positively related to interviewer age. Cleary hypothesizes that "older, more experienced interviewers are more likely to feel comfortable in the interview situation." (p.190). Although we did not find that experience made a difference in non-response rates, it is possible that older interviewers do view themselves as "more professional" which may have a positive effect on their performance.

Overall variation among NMCES interviewer performance was very high. For example, while 17 percent of the interviewers had item nonresponse rates for hospital expenditures that were below 20 percent, 12 percent of the interviewers had missing charge data for 60 percent or more of the hospital stays mentioned by their respondents. This variation can probably not be attributed to differential training since all interviewers received several weeks of identical training using verbatim training guides. Our analysis indicates that variance in performance is also not a function of education and experience. Age is correlated with performance but class and race are not. In general performance cannot be predicted on the basis of most interviewer characteristics that are easily measured. Much more research is indicated and we believe such studies are feasible. The majority of studies on interviewer effects are small, relatively costly, controlled experiments. It is possible, however, to incorporate studies of interviewer effects into most large-scale surveys by recording basic demographic data about the interviewer and developing analyses which control for variations in interviewer assignments. Such studies would be relatively inexpensive and offer larger samples than those done in the more controlled investigations. Supplementary information from the interviewer could then be collected which would focus on personality traits and job attitudes. We do not suggest that these "piggy-back" studies should replace controlled experiments but rather that they be used to supplement controlled studies which by necessity are based on small samples. The findings from both types of studies could lead to more efficient procedures for interviewer selection and training as well as better resource allocation decisions about survey staffing.

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Table I. Characteristics of NMCES interviewers and percent of various expenditure
information which interviewers failed to obtain.
(NMCES; 1977)

Characteristic	Frequency (n)	Average interviewer item nonresponse rate for hospital expenditures	Average interviewer item nonresponse rate for medical provider expenditures	Average interviewer item nonresponse rate for prescription drug expenditures
Age of interviewer				
20-39	28	.43	.29	.28
40-49	65	.37	.23	.20
50 and older	113	.36	.21	.19
Perceived social class of interviewer[a]				
Low (2+3)	12	.41	.25	.19
Middle (4)	80	.38	.22	.20
Higher (5+6+7)	114	.37	.24	.22
Education of interviewer				
9-12 yrs	54	.38	.23	.20
13-14 yrs	67	.35	.23	.20
15-16 yrs	67	.37	.24	.20
17 or more	18	.44	.24	.25
Experience of interviewer				
No experience	26	.39	.24	.22
1 to <5 yrs	56	.37	.24	.21
5 to <10 yrs	53	.37	.24	.19
10 to <15 yrs	46	.32	.18	.17
15 yrs or more	25	.50	.28	.28
Race of interviewer				
White	195	.37	.23	.20
Other	11	.46	.30	.32

[a]Based on interviewer self rankings on a scale of 1 to 7 with 1 being the lowest and 7 the highest.
SOURCE: National Medical Care Expenditures Survey, National Center for Health Services Research.
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Table 2. The effect of interviewer and caseload characteristics on item nonresponse for hospital, medical provider, and prescription drug expenditures. (NMCES; (1977)

	Dependent Variables					
	Percent of Expenditure Data with Missing Charge Information for[a]					
Interviewer Characteristics	Hospital Stays (N = 176)		Medical Provider Visits (N = 176)		Prescription Drugs (N = 179)	
	Parameter	t value	Parameter	t value	Parameter	t value
Age[b]	-.0370	-2.31*	-.0428	-3.49*	-.0364	-3.12*
Social Class[c]	.0000+	0.00	-.0004	0.39	.0002	0.25
Education[e]	.0047	0.38	-.0003	0.03	.0005	0.06
Experience[e]	.0128	1.71	.0074	1.29	.0067	1.24
Race[f]	-.0740	-1.05	-.0488	-0.90	-.0142	-0.28
Caseload Characteristics g						
Proportion caseload Age 65+	.0735	0.72	-.1064	-0.75	-.0961	-0.80
Proportion caseload with household head having <11 years education	.2041	2.76*	.1317	1.66	.1438	2.10*
Proportion caseload with household income <2 times poverty line	.1820	2.53*	.1621	1.77	-.0607	-0.84
Proportion caseload nonwhite	.2494	3.92*	.1947	3.37*	.3118	5.70*
Constant	.2578	2.88*	.2712	4.03*	.2687	4.12*
R[2]	.27		.26		.29	

Definitions

Missing data rates - proportion of an interviewer's hospital stay, medical provider visit or prescription drug events for which there was missing charge data.

a. Interviewers

b. Age - 1. <20; 2. 20-29; 3. 30-39; 4. 40-49; 5. 50-59 6. 60+

c. Interviewer's Experience
    1 = no experience; 2 = <1 yr; 3. 1<3 yrs; 4. 3<5 yrs; 5. 5<10 yrs; 6. 10<15 yrs;
    7. 15<20 yrs; 8. more than 20 yrs.

d. Interviewer's social class - Interviewer's self ranking of social class on 7 point scale
    with 1 being lowest and 7 being highest.

e. Interviewer's education - 1. 1<9 yrs; 2. 9-12 yrs; 3. 13-14 yrs; 4. 25-16 yrs;
    5. 17-18 yrs; 6. >18 yrs.

f. Race - 1 = non-white; white omitted - dummy variable

g. Case load variables -
    Caseload variables are computed separately for hospital, medical provider and prescription
    drug events. Thus, for caseload age, we compute the proportion of the interviewer's caseload
    made up of people over 65 years of age. In the first equation this is limited to people who
    had hospital stays. The second equation considers only those cases in which medical provider
    visits were reported and the third equation is limited to cases where use of prescription drugs
    was noted.

* significant at .05 level

SOURCE: National Medical Care Expenditures Survey, National Center for Health Services Research.
DIC/MBNE5YA6:06/11/84