

CODING OF OCCUPATIONAL CATEGORIES: A COMPARISON  
BETWEEN EXPERT AND SURVEY RESPONDENT CODERS

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INTRODUCTION

To reduce some of the cost of the National Medical Care Expenditure Survey (NMCES), a large scale national study conducted in 1977 and 1978, (NCHSR), April 1981; NCHSR, June 1981), respondents coded household occupations themselves rather than have them coded by trained coders, the usual survey procedure. This decision was based on the results of a number of studies that showed that survey respondents could, in fact, do such coding, and achieve a rate of agreement with trained coders from 55 to 100 percent of the time depending on the occupational category (Winch et al, 1969; Eckhart and Wenger, 1975; and Taylor, 1976). However, the study directors also decided to do an experimental study in a sampling unit in the New York SMSA with about 1300 working respondents to assess the extent of agreement between respondent and expert coders. This paper reports the results of that experiment.

The studies alluded to also examined the question of whether a proxy could classify another person's occupation with a reasonable degree of accuracy and whether one could code one's own occupation in a fashion similar to a trained coder. We examine both of these questions, and also compare proxy with self-coding. We do this because in many studies of health use and expenditures, such as the Health Interview Survey (HIS) and the National Medical Care Use and Expenditure Survey (NMCUES) one household respondent frequently serves as the spokes person for the household and provides information for all members of the household. In this paper we seek to provide answers to the following questions:

1. What is the extent of agreement between self-coders and trained coders, and between proxy and trained coders?
2. Does agreement vary by type of occupational category considered?
3. Does agreement vary by the order of presentation of the occupational categories?
4. Does agreement vary if the respondent is first asked to code the appropriate occupation and then to name the occupation and provide a description of the duties, or vice versa?
5. Does agreement vary depending upon the social and demographic characteristics of the respondent?

METHODS

The experimental study followed the procedure adopted for the NMCES as a whole, but added two design features. The standard practice in NMCES was as follows: All respondents of working age were shown one of four cards, Cards H-K, each of which contained the eleven Census occupational categories, broadly defined, with examples of specific occupations within each category (Chart

1). The sole difference between the cards was the order in which the occupational categories were listed. This was done to ascertain any possible response bias. The respondents were then asked to select an appropriate occupational category into which the occupation fell, and to give the number of the category to the interviewer who then recorded the number on the interview schedule. In the experimental group half of the respondents were asked first to name the occupations in the household and to describe the duties of the occupation, and then code the occupation (Version A), with the procedure being reversed for the remaining half (Version B). Subsequently, trained persons used the occupation name and described duties to code the occupation. Agreement between the two sets of codes was determined by subtracting one code from the other. A difference of zero was deemed agreement; else no agreement. Thus, the agreement variable was a zero/one dummy variable with a value of one signifying agreement between the self and expert coder and a value of zero, no agreement. Version A was expected to show more agreement than Version B because respondents had more opportunity to think about the occupation prior to coding.

Aside from the presentation order and version, sex, race, education, and family income were also used in the analysis. Sex was included because Taylor (1976) showed that women were more accurate in self-coding than men, and we wished to see if a similar result would be obtained. The other variables are essentially proxies for generalized knowledge. The expectation was that the greater the knowledge the higher the agreement. Race was included because we hypothesized that nonwhites would be heavily represented in the lower prestige occupational categories and, therefore, would more likely than whites to classify their occupation as the professional coder would.

In the survey household respondents could answer questions not only for themselves, but about other members of their household. For this reason we distinguished between persons who answered all questions for themselves and those who had all their information obtained from proxy reporters. We hypothesize that self reporters would more likely agree with the trained coders than would the proxy reporters, since the self-reporters would presumably have more accurate knowledge of their occupation than anyone else.

FINDINGS

Overall

In the coding of occupations, household respondents achieved a rate of agreement with the trained coders of 72 percent, within the range of what other studies have reported, but agreement varied widely by occupational groups, from a low of 46 percent within the laborer category to a high of 82 percent within the Service category. (Table 1)

### Proxy versus Self-Reporting of Occupation.

No significant difference overall was observed between the ability of self-coders and the proxy coders to code their occupations, but for clerical occupations, self-coders showed greater agreement than proxy coders, 80 to 67 percent respectively. (Table 1)

### The order of the categories.

The order of the categories (Cards H-K), made little difference in the probability of agreement between trained and respondent coders, an indication that this type of response bias was negligible. (Table 2)

### Version

As expected, overall agreement was somewhat higher for Version A (75 percent) where respondents were asked first to list the duties of the occupation being discussed and then to code the occupation, than for Version B (69 percent), where the procedure was reversed. (Table 2) But this difference is largely due to the substantially higher agreement within the professional, sales and crafts categories in Version A compared with Version B (82 versus 66 percent, 74 versus 64 percent, and 76 versus 60 percent, respectively).

### Sociodemographics, order, and version controlling for reporting status

While the order of the categories and the version had little effect upon the extent of agreement could sex, race, and generalized knowledge (income, and the education) of the respondent affect the results? The analysis was done through ordinary least squares multiple regression, so that the effect of each of these variables would be assessed, controlling for the others. In addition to the sociodemographic variables, the order of listing of the occupation, as represented by the Cards, the Version, and the reporting status of the respondent (proxy versus self-coded only) were also entered into the analysis. The dependent variable was a two valued measure of agreement between household and trained coders with "0" representing no agreement and and "1" representing agreement. The analysis was done for the entire sample and for each of the occupational groups.

When a regression was performed on the entire sample, none of the variables entered in the equation were significant, except for the service worker variable (Table 3).

The regression results show that the variables used have little effect on the extent of agreement for the total sample, as indicated by the  $R^2$  of .01, but that within some of the occupational groups the model had a better fit, e.g., an  $R^2$  of .27 the crafts category, .36 for transport operatives, and .46 for the laborers category.

### Blue-Collar Versus White-Collar Occupation, Controlling for Reporting Status.

While agreement between self-coders and trained coders was not significantly higher in the overall sample than between proxy and trained coders, reporting status might make a difference within broader occupational categories. Were self-coders or proxy coders then more likely to classify occupations correctly as "blue collar"

or "white" collar, when other variables were considered?

In the overall sample, "blue collar" status and education were the only variables associated with agreement between respondent and trained coders. Proxy coding status was not significant. (Table 5)

### SUMMARY AND CONCLUSIONS

Respondents can code their own occupation or those of other family members, agreeing with trained coders about 72 percent of the time. Agreement, however, varied somewhat by occupation; agreement was highest in the service worker category (about 82 percent) and lowest in the managerial/administrative and laborer categories (about 46 percent). Proxy coders overall did not do significantly worse than self-coders (70 to 74 percent respectively). The only variable that significantly predicted agreement is education, a result consistent with other studies.

What then accounts for the differences in agreement observed between the respondent (either proxy or self) and trained coders? Our view is that the discrepancies stem from the occupational classification itself. The categories are so ambiguous and abstruse that from 30 to 50 percent of the time household respondent cannot determine the correct coding category. For example, the occupations of eighteen respondents coded as accountants by the trained coders were not coded that way by the household respondents. Despite the fact that Census classifies accountants as professionals, five of the 18 respondents classified the occupation as managerial/administrative, seven as clerical workers, and two as service workers. Respondents were not asked if the person whose job they were discussing was a "certified accountant," but were asked simply to describe the duties of the occupation. If the respondent said that the duties were "accounting," such a response could mean almost anything, e. g., that the person was a bookkeeper or a manager making financial decisions. Bookkeepers are classified as clerical workers; the difference between some bookkeepers and some accountants is exceedingly small as are the differences between some professionals and managers/administrators. In short, the "accountants" coded as clerical workers or managers/administrators by the household respondents may really have the "correct" code.

The respondents also had difficulty in properly categorizing the occupation of janitor which the Census Bureau classifies as a service worker. Six respondents, however, coded it into the laborer category, a not unreasonable classification. Since janitors do, in fact, perform manual labor. Clearly, one cannot expect the average person, in contrast to the trained coder, to know the fine distinctions between occupations that are the basis of the Census classification. Therefore, any significant improvement in the coding ability of respondents is unlikely to be achieved.

Based on these study findings, researchers concerned with a good measure of occupational classification should think carefully about whether an overall agreement rate of 72 percent between household and trained coders is sufficiently high for their needs.

Table 2. Percent agreement between professionally coded and self-coded occupation. (NMCES: United States, 1977)

U.S. Census Code Category	Card H		Card I		Card J		Card K		Version A		Version B	
	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)
Professional	73	(49)	83	(52)	75	(48)	59	(49)	82	(100)	*	66 (92)
Manager/Administrator	50	(18)	62	(31)	57	(23)	61	(33)	56	(50)		60 (55)
Sales	69	(16)	64	(25)	86	(14)	65	(17)	75	(36)		64 (36)
Clerical	81	(48)	76	(41)	72	(54)	75	(56)	78	(89)		75 (110)
Crafts	82	(22)	71	(34)	45	(22)	79	(19)	76	(55)		60 (42)
Operatives	87	(23)	79	(29)	65	(34)	56	(25)	69	(59)		73 (52)
Transportation Operatives	78	(9)	75	(12)	62	(13)	67	(3)	71	(17)		70 (20)
Services	89	(35)	77	(39)	86	(36)	79	(42)	83	(77)		82 (74)
Laborers	50	(10)	20	(5)	60	(5)	50	(4)	43	(7)		47 (17)
Total	77	(230)	73	(268)	71	(245)	69	(245)	75	(490)	*	69 (498)

\* p less than than or equal to .05

SOURCE: National Center for Health Services Research.

Table 3. Regression estimates for the probability of a match between professionally-coded and respondent coded occupation. (NMCES: United States, 1977)

Characteristics of sample individuals	Total population		Self-coded only		Proxy coded only	
	parameter	t	parameter	t	parameter	t
Intercept	.4385	4.38*	.5613	4.58*	.3745	2.38*
Version A <sup>a</sup>	.0431	1.51	.0543	1.47	.0367	0.81
Card H <sup>b</sup>	.0763	1.85	.0333	0.62	.1273	1.96*
Card I	.0332	0.84	.0244	0.47	.0315	0.51
Card J	.0191	0.47	.0093	0.18	.0273	0.41
Male <sup>c</sup>	-.0322	-0.94	.0378	0.91	-.1629	-2.70*
White <sup>d</sup>	.0138	0.39	-.0097	-0.22	.0628	1.03
Years of Education	.0108	1.85	.0036	0.49	.0190	1.95
Family income	.0000†	1.04	.0000†	0.88	.0000†	0.47
Self-coded only <sup>e</sup> (no proxy)	.0353	1.06				
<u>Occupation<sup>f</sup></u>						
Professional	.0187	0.30	.0623	0.81	-.0198	-0.18
Manager/Administrator	-.1044	-1.51	-.1631	-1.83	.0105	0.09
Clerical	.0699	1.14	.1060	1.40	.0134	0.13
Crafts	.0616	0.86	-.0571	-0.58	.1721	1.59
Operative	.0482	0.71	.0639	0.72	.0535	0.50
Transportation operative	.0902	0.96	.2093	1.27	.0946	0.75
Service	.1801	2.80*	.1424	1.75	.2592	2.45*
Laborer	-.1839	-1.73	-.2361	-1.30	-.1451	-1.02
R <sup>2</sup>		.04		.05		.08

\*significant at p less than or equal to .05. †denotes value between -.00009 and .00009.

<sup>a</sup>"version B" omitted. <sup>b</sup>"card K" omitted. <sup>c</sup>"Female" omitted. <sup>d</sup>"Non-white" omitted.

<sup>e</sup>"coded by proxy" omitted. <sup>f</sup>"sales" omitted.

SOURCE: National Medical Care Expenditures Survey, National Center for Health Services Research.

Table 4. Regression estimates for the probability of a match between professionally coded and respondent coded occupation, by respondent reporting status. (NMCES: United States, 1977)

Characteristics of sample Individuals	Total population		Self-coded only (no proxy coded)		Proxy coded	
	parameter	t	parameter	t	parameter	t
Intercept	.6182	11.01*	.7482	10.92*	.5122	5.92*
Version A	.0312	1.71	.0386	1.64	.0246	0.85
Card H	.0168	0.64	.0193	0.57	-.0071	-0.17
Card I	-.0010	-0.04	-.0027	-0.08	-.0162	-0.41
Card J	.0441	1.69	.0373	1.13	.0369	0.94
Male	.0187	0.90	.0440	1.74	-.0229	-0.64
White	.0227	1.00	-.0066	-0.24	.0593	1.55
Years of Education	.0141	3.96*	.0100	2.25*	.0192	3.26*
Family Income	.0000†	1.31	.0000†	0.50	.0000†	1.39
Blue-collar occupation	.0535	2.52*	-.0316	-1.13	.1550	4.78*
Self-coding only	.0305	1.44	_____	_____	_____	_____
R-squared	.03		.03		.07	

\* significant p less than or equal to .05. † denotes value between -.00009 and +.00009.

SOURCE: National Medical Care Expenditures Study, National Center for Health Services Research.