

# Modeling the Difference in Interview Characteristics for Different Respondents

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## Abstract

The survey process as measured by paradata may be different for different respondents. Those initially reluctant to participate may be convinced by the interviewer to cooperate, or the reluctance may produce attrition. Difficulty to contact respondents may be related to interviewer effort and busy respondent schedules, or it may be a form of reluctance. This paper will use mixed models to attempt to identify subsets of respondents whose paradata relates differently to survey outcomes and measures of survey quality.

**Key Words:** Survey, paradata, interviewer

## 1. Introduction

The Consumer Expenditure Survey (quarterly) is a household survey which provides part of the “market basket” of consumer expenditures, which are the basis of the CPI as well as other indices. Sampled housing units in the Quarterly are interviewed for 5 consecutive quarters. These interviews are referred to as “time-in-sample” (TIS) 1 to 5.

A very useful feature was added in 2005 to collect detailed call history data (Bates, 2004). The interviewer records times and outcomes of attempted contacts, problems or concerns reported by reluctant households, and strategies used to gain contact or overcome reluctance. This provides a very rich source for studying the interview process, which is only lightly used in this study.

Dixon (2006) found that estimates of nonresponse bias weren't impacted much by the addition of call history variables. Those interviews which required a larger number of calls where the interviewer changed modes had lower expenditures (-39.4). This effect was partially offset by those interviews that required more calls but where respondents who reported no problems had higher expenditures (27.0). Those interviewers who reported "no strategy" for attempted contact ended up with lower expenditures (-66.2) and those who changed modes during the contact process ended up with higher expenditures.

Multilevel models have been used to examine effects of interviewers on survey outcomes (Tucker and Dixon, 2000). The current study will investigate if there are patterns of differences in the interview process and the interview outcome. This relationship may be different because several factors; differences in personal style of the interviewer (some strategies may work better for some interviewers than for others), differences in the local characteristics (urban vs other), and differences in the respondents.

## 2. Data Sources

The Call History Instrument used in conjunction with the Consumer Expenditure Survey (quarterly) will be combined from 2006 through 2008 to provide the paradata for this study. Since interviewers were one of the levels of analysis those interviewers which only had a few interviews were excluded from the analysis. Many were probably supervisors stepping in where needed. The interviews from the second interview were used for the bulk of the data, with refusals in that or subsequent interviews used as an outcome variable. 97317 households were used for the analysis, with 617 interviewers. Interviewers which had fewer than 5 households or didn't provide CHI data were excluded.

## 3. Methods

A mixed model (using MPlus) was used to examine if interviewer effects varied in terms of the relationship between paradata and survey refusal. The paradata consisted of the outcomes of each attempted interview. The coefficients for each interviewer were explored using a two-stage density based cluster analysis (SAS 9.1). The patterns selected from the cluster analysis were examined for differences in household characteristics.

## 4. Results

The most common concern expressed by respondents was “busy” (Table 3), followed by “schedule difficulties”, and “not interested”, which was also most predictive of a refusal outcome. Other notable concerns were “time the interview takes” and “privacy concerns”.

The multilevel model showed moderate effects for interviewers (variance of 0.156 with a standard error of 0.066) in terms of their coefficients relating respondent concerns to refusal. The logistic models for the relationships between concerns and refusal (Table 1), shows some strong effects. The univariate logistic models showed positive relationships between most of the concerns and refusal during some of the interviews. “Family issues” (issues, which was not significantly related to refusal) and “intends to quit” are the two related to not refusing. The multivariate model showed some coefficients which reversed direction or became non-significant when adjusting for the other variables. The univariate estimates could be interpreted as the relationship between those concerns and refusal, while the multivariate estimates could be interpreted as the unique relationship of those concerns beyond the other concerns. The combination gives a more complete picture of the relationship between concerns and refusal. The most common concern “busy”, showed a strong relationship with refusal, but didn't contribute anything beyond the other variables. “Not interested”, which also was a frequent concern (almost 10% of cases) had a strong relationship with refusal even after adjusting for the other variables. Counter to expectations, the concern “planning to quit” (quit) showed a strong negative relationship to refusal. This might have been related to increased efforts by the interviewer to persuade the respondent to stay with the survey.

The cluster analysis of the coefficients indicated 3 clusters. The first cluster contained 84% of the interviewers and would have dominated any analysis which

ignored interviewer effects. “Not interested” was most strongly related to refusal, while “No concerns” was most related to cooperation. The first cluster differed from the other clusters in having a lower relationship with “survey doesn’t apply to me” (notapp). The interviews were more likely to be done primarily by personal visit rather than telephone compared with the other clusters.

The second cluster contained 2.34% of interviewers. It had interviewers who were more successful at overcoming concerns about being “too busy”, but were less successful at overcoming concerns about the survey “not applying to me” (notapp) or “planning to quit” (quit). Note that the relationship at the household level between planning to quit was negative, at the interviewer level it becomes positive, indicating that differences in interviewers and the composition of the households they contact would be expected to produce different results. The second cluster interviewers had a higher percentage of households which planned to quit, so it would be interesting to see if it is the households or the interviewers where the effect is taking place. The second cluster had a slightly higher proportion of household which owned their own home, but a lower percentage which used records to respond to the expenditure questions. The respondent was also less likely to be male than for the other clusters.

The third cluster had 13.66% of interviewers. They which were more successful at dealing with “privacy”, but had more difficulty with respondents which “broke appointments” (noshow), “didn’t understand the survey” (question), “not apply to me” (notapp), or were “hostile” (hostile). The respondent was more likely to use records than the other clusters.

Name	Bivariate Estimate(SE)	Multivariate Estimate	Two-Tailed SE	Est/SE	PValue
NOTINT	1.016(0.057)	0.472	0.072	6.579	0.000
HUNGUP	2.927(0.191)	1.617	0.223	7.233	0.000
HOSTILE	1.612(0.163)	0.640	0.214	2.990	0.003
VOLUNTAR	1.099(0.068)	-0.266	0.098	-2.721	0.007
PRIVACY	1.916(0.111)	0.776	0.142	5.464	0.000
ANTIGOV	0.520(0.080)	-0.300	0.105	-2.862	0.004
QUESTION	1.214(0.187)	0.166	0.256	0.647	0.518
NOTAPP	2.359(0.143)	1.405	0.168	8.388	0.000
OTHHH	0.627(0.120)	-0.151	0.163	-0.928	0.353
SAMEINF	0.685(0.257)	-0.225	0.324	-0.693	0.488
BUSY	0.898(0.084)	-0.108	0.113	-0.960	0.337
NOSHOW	0.464(0.067)	-0.275	0.091	-3.014	0.003
SCHEDULE	1.776(0.079)	0.860	0.100	8.572	0.000
TIME	1.226(0.136)	0.729	0.194	3.769	0.000
MEMBER	1.024(0.123)	0.229	0.158	1.447	0.148
ISSUES	-0.464(0.433)	-0.812	0.521	-1.558	0.119
SAMEFR	1.440(0.528)	0.141	0.799	0.176	0.860
TOOPERS	0.580(0.174)	-0.564	0.236	-2.392	0.017
TOOMANY	0.108(0.358)	-1.281	0.464	-2.761	0.006
TOOLONG	2.002(0.171)	1.008	0.221	4.559	0.000
QUIT	-1.833(0.056)	-1.538	0.065	-23.532	0.000

**Table 2;** Bivariate Logistic coefficients relating concerns to refusal aggregated at the interviewer level

	Cluster1	Cluster2	Cluster3	Overall
notint	5.91	8.53	6.23	6.02
busy	1.16	-2.77	1.18	1.06
time	0.60	-1.41	2.20	0.78
noshow	-0.09	0.49	4.72	0.64
schedule	-0.96	-5.64	0.68	-0.84
voluntary	4.22	4.82	7.17	4.67
privacy	2.65	4.22	2.40	2.65
antigov	4.22	1.01	4.56	4.19
question	-0.25	-1.55	3.00	0.20
notapp	0.97	7.95	5.36	1.79
hungup	4.64	8.04	4.02	4.64
hostile	5.18	2.44	7.67	5.48
othhh	2.29	-1.61	2.93	2.29
member	-0.53	-1.41	0.44	-0.41
issues	0.69	-2.77	0.44	0.57
samefr	-0.55	0.28	0.56	-0.37
sameinf	-0.66	-1.43	-2.19	-0.91
toopers	0.84	0.50	0.09	0.72
toomany	0.08	0.19	-0.92	-0.07
toolong	-0.56	0.80	-0.83	-0.56
quit	2.64	9.14	2.53	2.79
noconc	-3.64	-5.43	-3.40	-3.65
other	-0.86	-3.76	1.51	-0.58

**Table 3;** Mean rates of Chi responses

	Cluster 1	Cluster 2	Cluster 3	Overall
notint	0.09	0.11	0.08	0.09
busy	0.20	0.28	0.19	0.20
time	0.08	0.10	0.08	0.08
noshow	0.02	0.01	0.03	0.02
schedule	0.13	0.11	0.16	0.13
voluntar	0.05	0.04	0.05	0.05
privacy	0.07	0.08	0.09	0.07
antigov	0.02	0.03	0.03	0.02
question	0.03	0.07	0.04	0.03
notapp	0.01	0.01	0.01	0.01
hungup	0.02	0.01	0.02	0.02
hostile	0.01	0.01	0.01	0.01
othhh	0.01	0.02	0.01	0.01
member	0.03	0.01	0.03	0.03
issues	0.03	0.04	0.03	0.03
samefr	0.00	0.00	0.01	0.01
sameinf	0.02	0.02	0.02	0.02
toopers	0.02	0.02	0.02	0.02
toomany	0.03	0.03	0.04	0.04
toolong	0.02	0.01	0.02	0.02
quit	0.02	0.05	0.03	0.03
noconc	0.69	0.59	0.65	0.68

## 5. Discussion

Other studies have found a relationship between CHI data and refusal on both the National Health Interview Survey and the Consumer Expenditure surveys (Bates 2004, Bates et. al. 2008). This study extended their research to examine differences in the interview experience and subsequent refusal based on the concerns expressed by the respondents.

The studies by Bates (2004), and Henley and Bates (2006) found that the number of concerns was a more important predictor of refusal than particular concerns for the NHIS. They found privacy concerns, the voluntary nature of the survey, “not interested”, and “Survey takes too long” to be the primary concerns for refusers. This study found a similar overall pattern, but added “schedule difficulties” to the list. Some unexpected effects were found with negative relationships to refusal for respondents which had “family issues” (issues) or “intends to quit survey” (quit). The family issues were thought to make the difficult process of reporting expenditures more difficult, but although non-significant, that didn’t seem to be a problem for respondents. The respondent “intending to quit” probably triggered a strong anti-refusal response from the interviewer (which isn’t captured by the CHI instrument), resulting in a decrease in the likelihood of refusal. When aggregated at the interviewer level, the concerns were more predictive of refusal, so interviewers which had a higher proportion of respondents wanting to quit had more refusals. Similarly, “scheduling difficulties” (schedule) showed a positive relationship to refusal at the respondent level, but interviewers who had a higher proportion of scheduling difficulties had fewer refusals.

The cluster analysis had large within cluster variances, so there was a lot of variability between interviewers and their experiences with respondents concerns. The clusters reflect different profiles of concerns and their relationship to refusal. The second cluster represented a small group of interviewers with busy homeowners who didn’t think the survey applied to them. The third cluster reported more privacy and scheduling concerns, and were more likely to refuse after complaining about not having time, breaking appointments, asking questions about the survey, and making hostile comments.

### Limitations and future research

The lack of CHI data for some interviewers (100 out of 97317 households) may mask some of the interaction patterns experienced by the survey participants, but it represents enough of the interactions to be useful. The rarity of some of the concerns pose a problem in modeling, but since they are so rare they don’t present much of a problem for possible new approaches for avoiding refusal.

Future research could include an examination of strategies the interviewers use in persuading reluctant households to see if there are similar groupings in terms of outcomes. The effect of reluctance on data quality may also be of interest, since one of the groups used fewer records in reporting expenditures.

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