

## INTERVIEW COOPERATION AND PROCEDURAL RESPONSE QUALITY

Su-hao Tu<sup>1</sup>

### ABSTRACT

In the previous studies, response quality has been investigated associated mostly with the characteristics of interviewer, respondent, questionnaires, or modes of data collection but rarely with the process of an interview interaction. From the process perspective, this paper examines the relationship between interview cooperation and procedural response quality. The interview cooperation is based on the interviewer's evaluation of his/her interaction with the respondent. The procedural response quality is based on error- and non-responses derived from interviewer's field performance from a completed questionnaire.

The data collected from two subsets (Part I and Part II) of Taiwan Social Change Survey (TSCS) of year 2000 were analyzed using Hierarchical Linear Model (HLM). The results show that interviewer's education (Part I) or work experience (Part II) has a significant effect on procedural response quality. The significant effect of interview cooperation on procedural response quality is found only in Part I. The HLM analysis also suggests an interaction effect of interview cooperation with interviewer's characteristics (education for Part I and work experience for Part II). In conclusion, survey contents are suggested to be an important factor differentiating the relationship between procedural response quality and interview cooperation.

KEY WORDS: Procedural response quality, interviewer field performance, interview interaction, interview process, interview cooperation.

### 1. INTRODUCTION

Survey response is the product of a peculiar conversation in which the respondent's attributes and perceptions interact with those of the interviewer and the former then determines the amount and quality of the answers s/he is willing to give. During the interchange, non-response (Couper 1998) and invalid response such as uncertain response (Mathiowetz 1998) and non-substantive response (Francis and Busch 1975), usually viewed as indicators of poor response quality, unavoidably arise from any "wrong doing" in either part. Research on response quality has explored the issue via different perspectives and methodological approaches.

From the **respondent's perspective**, an invalid response is a respondent's expression of refusal or uncertainty in answering certain questions. To put it another way, uncertain responses and non-responses may stand for different extents of the respondent's willingness to cooperate (Mathiowetz 1999; McClendon 1991). Four theories have offered reasons for the degree of willingness to cooperate in survey interviews. First, the *rational choice theory* hypothesizes that respondents usually decide whether and what to respond based on their motives and also on the situational constraints. Their final response can be understood as the result of situation-oriented rational actions (Alwin 1991). Second, the *exchange theory* emphasizes a satisfactory process that optimizes the respondent's behavior. Cost benefit calculations help respondents to decide how valid a response gives to a survey question. The higher the cost is, the more the respondent needs to adjust him/herself before s/he is willing to produce a valid response (Alwin 1991).

---

<sup>1</sup> Associate Director, Office of Survey Research, Academia Sinica, 128 Sec. 2 Academy Road, Nankang, Taipei, 11529, Taiwan.  
Email: suhao@gate.sinica.edu.tw

Third, the *cognitive theory* states that the final response depends on the respondent's comprehension of the question and the information it requires. Three capabilities --- clarity of communication, accessibility of the memory, and ease of retrieval --- are involved in order for the respondent to generate an appropriate response. In other words, the response quality depends on the respondent's interpretation of the question, the information available, and the ability to recall (Alwin 1991; Hippler 1989; Groves 1999). Fourth, *the resistance or cooperation model* argues that the respondent's attitudes, previous experience and personality are important factors in the quantity and quality of the response. For example, altruistic respondents are more likely to have helping behaviors and so are more willing to cooperate in survey interviews (Mathiowetz 1998; Groves 1999). To the contrary, those who are self-defensive tend to refuse to answer questions.

From **the interviewer's perspective**, an invalid response arises from the interviewer's failure --- the failure to ask questions properly or to record responses correctly in the **interview process**. Reviewing the records of the interview process, re-interviewing, and counting invalid, non- and error-responses are commonly used to evaluate interviewer's field performance. Sudman (1966) quantifies interviewer field performance by counting errors the interviewer commits in an interview. These include probing behaviors, the number of changes of codes or answers made, that of answers recorded in a wrong place, of incomplete answers, of errors in skip patterns, and of unclear notes. Sudman brings in the important concept of "procedure errors".

For Sudman, the procedure errors are usually used to evaluate interviewer quality. In fact up to today what the previous studies have not explicated is the extent to which the procedure errors are implied by the quality of the interaction between interviewer and respondent. From the **interaction perspective**, "interaction quality" between the interviewer and the respondent in the interview process can be treated as an important indicator of response quality. Better interaction quality is assumed to bring about more valid responses. The previous studies investigated response quality from its association with the characteristics of interviewers, respondents, questionnaires, and/or the modes of data collection. Nevertheless, they still ignored the dynamic dimension of an interview interaction, where both sides' behaviors might have an impact on each other's next behavior and final decision.

The dynamic dimension of an interview interaction was suggested be an important factor of the survey response (Dijkstra and Van Der Zoumen 1982; Hox et.al. 1991). However, the question of how to bring the concept of interaction quality into modeling its effect on the dynamic concept of response quality has not yet been fully answered. In order to answer the question, this paper attempts to investigate the quality of respondent-interviewer interaction and procedural response quality. In this pioneer study, interview cooperation is assumed to indicate the quality of interview interaction, while the evaluation of interviewer field performance from the initial interview indicates procedural response quality.

More explicitly, this paper tries to answer the following questions. Is there positive relationship between interview cooperation and procedural response quality? To what extent does the positive relationship exist? How does, after controlling for the characteristics of interviewer and respondent, situational and task variables, the interview cooperation affect the procedural response quality? Does the effect change for questions of a different nature?

## 2. METHODOLOGY

Data used in this paper are from Taiwan Social Change Survey (TSCS) of year 2000. The survey in effect consisted of two parts --- Part I concerned with media communication, globalization, political and economic issues, and Part II social interaction and mental health issues --- and was conducted on two separate

multistage probability national adult samples at the same time. Originally Part I has 1960 completed interviews, and Part II 1895 completed interviews. However, there are only around 30 percent of the interviews checked by field directors for procedural response quality. Therefore, 30 percent of the interviews for both parts are included in the present study. Data by interviewers that have fewer than 5 completed interviews checked for procedural response quality are excluded in the final analysis. That is, Part I in this study contains 704 respondents interviewed by 60 interviewers and Part II 814 respondents interviewed by 70 interviewers.

Table 1 shows that characteristics of respondents and interviewers for Part I and Part II are similar. Almost half of the respondents are female. Gender ratio (male over female) for Part II is higher than that for Part I. About eighty percent of the respondents are married. Respondents' average year of education is around ten years. The respondents in Part II are more educated than those in Part I. The average respondent age is about forty-four. Around 60 percent of the interviewers are female. Most are students (68% for Part I and 66.3% for Part II). About one quarter are married. The average interviewer age is less than 28 years old, and average education is a little less than 16 years, reflecting the fact that more than 65% are college students. Interview experience is the number of times prior to this the interviewer has participated in surveys carried out in Office of Survey Research (OSR), Academia Sinica on Taiwan. The interviewers have, on average, very little experience (.5 time) as interviewers.

**Table 1: Sample and Interviewer Description**

	PART I				PART II			
	%	Mean	S.D.	N <sup>1</sup>	%	Mean	S.D.	N <sup>1</sup>
<b>Respondent</b>								
Female	49.3			704	47.2			841
Married	81.7			704	81.9			840
Education (years)	9.99	4.82	704		10.51	5.55	841	
Age(years)		44.24	15.17	693		44.78	14.91	833
<b>Interviewer</b>								
Female	58.7			704	60.5			841
Occupation				704				841
Student	68.0				66.3			
Housekeeper	2.0				8.8			
Other	30.0				24.9			
Married	27.0			704	23.1			841
Work Experience(times)		0.49	0.91	704		0.34	0.81	841
Education (years)		15.98	1.05	704		15.75	1.53	841
Age(years)		27.71	9.27	704		27.87	9.88	841

1.Total valid cases.

**Interview cooperation** is the indicator of the quality of interviewer's rapport with respondents (Weiss 1968, cited in Mangione et. al. 1992). The indicator is measured by interviewer's perception of respondent's cooperativeness based on a 4-point scale including five questions which are respectively how often the respondent refuses to answer the question, how often s/he expresses impatience, how trustful s/he is to the interviewer, how unserious s/he is in answering questions, and how cooperative s/he is with the interviewer. In order to translate interviewers' perception scales into one variable for final analysis, the items concerning the refusal tendency, impatience and unseriousness were reversely coded so that the score from 1 to 4 for all the items represent low degrees of cooperativeness to high degrees. Five item-scores were summed up based on reliability test (Cronbach's Alpha is more than .73 for two Parts) (Table 2).

**Procedural response quality** is derived following Sudman's method and defined as the composite of five dimensions of response quality. They are the numbers of changed answers, irrelevant answers, uncodable answers, wrong skip patterns and item non-responses which are counted by field directors when they double-checked the questionnaires collected from initial interviews. To derive the indicator of the quality

of procedural response quality, each type of error is assigned a weight varying from 1 to 5 according to Sudman (Sudman, 1966).

Explicitly, 1 is assigned to changed answer and wrong skip pattern, while 5 to irrelevant answer, uncodable answer, and missing information on background or core question. The scores for each error are thus the product of the number of each error type and the assigned weight. Moreover, in order to compare the procedural response quality indicator across surveys, a standard score of this indicator is computed with equation (1) (Sudman, 1966). After the computation, the higher the scores are, the higher the procedural response quality is.

$$5 + 2(\text{mean score} - \text{score}) / \text{standard deviation of score.} \quad (1)$$

**Control variables** include (1) demographic variables of the respondent (gender, marital status (coded as “married” or “unmarried”), education (in years) and age) and those of the interviewer (gender, marital status, education, age, occupation (coded as “student” or “else”), (2) and interview experience) (Bradburn et. al.1979; Singer 1983; Hox 1991; Presser et. al. 1992; Groves 1987), and (3) situational variables (the presence of others and self/interviewer- administrated interview) (Dijkstra and Van Der Zoumen 1982). The presence of others is a dichotomous variable indicating whether anyone else other than the interviewer and the respondent was present during the interview. Self/interviewer-administrated interview is also a dichotomous variable noting whether the questionnaire was filled out by the interviewer or the respondent.

However, the age variables are excluded from both analyses because they are highly correlated with their respective education variables, with younger ones are mostly college students and older ones are high school graduates. Interviewer occupation is also excluded since it is highly correlated with interviewer marital status. The interviewers in this study are mainly unmarried students and some non-students who are mostly married. Situational variables are also excluded because they have low and insignificant correlation coefficients with the response quality variable.

A two-level hierarchical linear model (HLM) (Bryk and Raudenbush 1992) is used to take into account the similarities in error patterns and perception patterns made by an interviewer. HLM is a powerful tool for analyzing naturally hierarchical survey data, in which interviewers cannot be randomly assigned to respondents for economical concerns.

### 3. RESULTS

#### 3.1 Interview Cooperation

The interview cooperation is derived from the interviewer’s perception of respondent cooperativeness measured by interviewers’ response to 5 questions regarding respondents’ attitudes toward interviews and interviewers. Data from both Parts show similar patterns in interviewer’s perceptions of respondent’s cooperativeness (Table 2). In general, most of the respondents (Part I vs. Part II) tend not to refuse to answer certain questions (77.4% vs. 80.3%), to be patient with interviewers (90.5% vs. 93.2%), to trust interviewers (93.3% vs. 96.3%), to take his/her response serious (84.5% vs. 90.0%), and to cooperate with interviewers (96.2% vs. 97.9%) in the interview.

**Table 2: Interviewer's Perceptions of Respondent's Cooperativeness (in %)**

	PART I				N	PART II				
	More	→		Less		More	→		Less	N
1. Refusal Tendency	18.6	4.0	0.4	77.0	704	16.8	3.0	1.8	78.5	841
2. Patience	76.6	13.9	7.0	2.6	704	80.6	12.6	5.5	1.3	841
3. Trustfulness	35.7	57.6	6.1	0.6	701	44.2	52.1	3.2	0.5	841
4. Seriousness	63.8	20.7	14.2	1.3	704	64.5	25.5	8.6	1.4	840
5. Cooperativeness	50.7	45.5	3.3	0.4	704	58.9	39.0	1.4	0.6	840
	8401.									
	Cronbach's Alpha=.80					Cronbach's Alpha=.73				

Comparatively, the perceptions of respondent's strong tendencies of refusal (16.8% or 18.5%) are higher than other perceptions of interview cooperation. Concerning other perceptions, very few of the interviewers (less than 3%) felt that their respondents expressed impatience all the time throughout the interview. If we divide the degree of trustfulness into high and low, Table 2 shows that very few of the respondents seemed to distrust interviewer (6.9% for Part I and 3.7 % for Part II) from the interviewer's perspective. On the other hand, about one-fifth to one-quarter of the interviewers reported that their respondents were not thinking much before answering a question.

By contrast Part I respondents are more rejecting, more impatient, less trustful, less cooperative, and more serious than Part II respondents during the interview. This may be related to the content and format of the questionnaires. The length of part I questionnaires seem to be higher than that of Part II in terms of the number of main questions. If we consider the number of skip patterns and answers in full length, Part I is shorter than Part II. However, the difference in the length of questionnaires is not much. Most of the questions in Part I concerns the attitudes toward political participation, election, democracy, party and ethnicity, which are still very sensitive to most of the Taiwanese. To the contrary, Part II concerns education, family, mental health and personal life with less proportion of attitudinal items. The big difference in the proportion of attitudinal questions and the question content between two parts seems to reasonably explain why part I respondents tend to be less cooperative and have lower quality of interaction with interviewers.

### 3.2 Procedural Response Quality

Table 3 indicates similar results between Part I and Part II. The average number of each type of error is less than 1. The reason behind few errors might be as follows. Field directors in OSR have all been trained to supervise interviewer performance by double-checking the completed questionnaires for at most seven years. At the same time, interviewers (mostly students) are not only trained to record respondent's answer as accurate as possible, but also are always informed prior to interview that their work will be evaluated by a cautious procedure.

**Table 3: Procedural Response Quality**

	PART I				PART II			
	Mean	S.D.	N	% <sup>1</sup>	Mean	S.D.	N	%
<b>1. Changed Answers</b>	<b>0.94</b>	<b>1.88</b>	<b>704</b>	<b>33.9</b>	<b>0.91</b>	<b>1.71</b>	<b>841</b>	<b>36.1</b>
<b>2. Irrelevant Answers</b>	<b>4.26E-02</b>	<b>0.32</b>	<b>704</b>	<b>2.6</b>	<b>0.18</b>	<b>1.39</b>	<b>841</b>	<b>4.4</b>
<b>3. Uncodable Answers</b>	<b>0.74</b>	<b>1.30</b>	<b>704</b>	<b>35.9</b>	<b>0.93</b>	<b>1.68</b>	<b>841</b>	<b>37.5</b>
<b>4. Wrong Skip Patterns</b>	<b>0.41</b>	<b>1.03</b>	<b>704</b>	<b>23.0</b>	<b>0.37</b>	<b>0.97</b>	<b>841</b>	<b>19.6</b>
<b>5. Missing on Background Information</b>	<b>9.66E-02</b>	<b>0.37</b>	<b>704</b>	<b>7.5</b>	<b>0.10</b>	<b>0.42</b>	<b>841</b>	<b>7.4</b>
<b>6. Missing Information on Core Questions<sup>2</sup></b>	<b>0.45</b>	<b>1.04</b>	<b>704</b>	<b>26.4</b>	<b>0.31</b>	<b>0.79</b>	<b>841</b>	<b>19.3</b>

1. The percentage of the interviews with errors or missing answers.

2. Core questions are the questions concerned with main themes of each survey, for example, the questions concerning political participation, election, democracy, party and ethnicity in Part I and the questions concerning education, family, mental health and personal life in Part II.

Looking into the distribution of each error type for both Parts, less than ten percent of the answers are irrelevant or missing on background information. Over sixty percent of the answers have never been changed or have been codable. Less than a quarter of answers show wrong skip patterns and missing information on core questions.

Comparatively, the difference in the frequency of each error type between Part I and Part II varies from .3 to 7.3 percent as observed in the following. First, the frequency of missing on background information between Part I and Part II is not much difference (7.7% vs. 7.4%). This can be reasoned by the questions designed in both Parts. Second, there are less changed and uncodable answers in Part I than in Part II for about 2%. The reason may be as discussed earlier, although the length of questionnaires between two parts is almost the same, in terms of total number of answers including skip patterns, Part I is shorter than Part II.

Third, there are more irrelevant answers and wrong skip patterns in Part I than in Part II. The difference for irrelevant answers and wrong skip patterns is about for about 3%. The greatest difference between two parts is the non-response to core questions. The missing information on core questions is more common in Part I than in Part II (respectively 26.6 % and 19.3%). The difference in irrelevant answers, wrong skip patterns and missing information on core questions between two Parts may be derived from the difference in the content of the questionnaires. Regardless of the background information and the items appear in both questionnaires, Part I contains the diverse topics with sensitive issues such as the identity of political party and ethnicity, while Part II the topics related to social interaction and mental health. Therefore, more sensitive questions designed in Part I than in Part II could be the source of the increase of error or ambiguous answers.

### 3.3 Two-level HLM Model of the Effect on Response Quality

The construction of HLM model starts with the selection of independent and control variables with low collinearity. Respondent's gender (R-sex), marital status (R-marriage), and education (R-educ), and interviewer's perception of respondent cooperativeness (Cooperate) were put in the level-1 model as shown in equation (2) meaning that those variables respectively have direct main effects on procedural response quality. (Y is the procedural response quality, while R is the error term with a normal distribution).

$$Y = B_0 + B_1*(R\text{-sex}) + B_2*(R\text{-marriage}) + B_3*(R\text{-educ}) + B_4*(Cooperate) + R \quad (2)$$

In level-2, the intercept (B<sub>0</sub>) and four regression coefficients (B<sub>1</sub> to B<sub>4</sub>) from level-1 are further modeled by interviewer variables (I-experience, I-marriage, I-sex and I-educ).

$$B_0 = G_{00} + G_{01}*(I\text{-experience}) + G_{02}*(I\text{-marriage}) + G_{03}*(I\text{-educ}) + G_{04}*(I\text{-sex}) + U_0 \quad (3)$$

$$B_1 = G_{10} \quad (4)$$

$$B_2 = G_{20} \quad (5)$$

$$B_3 = G_{30} \quad (6)$$

$$B_4 = G_{40} + G_{41}*(I\text{-experience}) + G_{42}*(I\text{-educ}) + U_4 \quad (7)$$

In equation (3), the four interviewer attributes have main effect on procedural response quality. Equation (7) means that there is interaction effect on procedural response quality. That is, interviewer's work experience and education respectively interact with their perception of respondent cooperativeness.

The results show that, for Part I survey, respondent's marital status, interviewer's perception of respondent cooperativeness, and interviewer's education has respectively a direct and significant effect on procedural response quality (Table 4). The quality of procedural response tends to degrade when married respondents are interviewed. The more education interviewers have, the higher the response quality is. The interviewers who feel their respondents cooperate with them are more likely to achieve high quality of the procedural response.

Further for Part I as shown in Table 4, the interaction of interviewer education with interviewer's perception of respondent cooperativeness is found significant at .05 significance level and negative. The negative interaction effect implies that holding all other variables constant, although as an interviewer's perception of the respondent's cooperativeness increases by one unit, the procedural response quality increases by .194, however, as the interviewer's education year is increased by one year, this perception effect is discounted by .011 unit. This may be regarded as a small setoff from the coefficient of .287 where interviewer education is used to model the  $B_0$ .

For the random part, in Part I, a lot of variation remains unexplained both in the variance of interviewer effect and in the variance of perception of respondent cooperativeness ( $X^2$  is significant at .001 significance levels respectively). The results reconfirm the importance of interviewer effect on the quality of survey data argued by many survey researchers (Hox 1991, Hox 1994). On the other hand, the results draw our attention to the role interviewer's perception of respondent cooperativeness play in their field performance/response quality.

**Table 4: Two-level HLM of the Effect on Procedural Response Quality**

Fixed Effect	PART I			PART II		
	Coefficient (S.E.)	df	X <sup>2</sup>	Coefficient (S.E.)	df	X <sup>2</sup>
<i>Respondent level</i>						
Respondent Gender (male)	.110	.065		.020	.110	
Respondent Marital Status (married)	-.141***	.042		-.146	.100	
Respondent Education (yrs)	.002	.008		-.001	.001	
Interviewer Perception of Respondent Cooperativeness (IPC)	.194*	.079		.090	.128	
<i>Interviewer Level</i>						
Work Experience (times)	.038	.164		.414*	.161	
Marital Status (married)	.290	.165		-.080	.194	
Gender (male)	-.212	.188		.068	.194	
Education (yrs)	.287***	.085		.052	.160	
Interviewer Education x IPC	-.011	.005		-.005	.008	
Work Experience x IPC	-.005	.009		.022*	.007	
Intercept	.255	1.341		3.945	2.49	
<b>Random Effect</b>						
Variation of Response among Interviewers			54	91.08***		64 76.29
Variation of IPC			56	99.58***		66 47.29

1. \*P<.05 \*\*P<.01 \*\*\*P<.001

2. IPC=Interviewer Perception of Respondent Cooperativeness

By contrast, the model of procedural response quality of Part II shows no significant respondent effect as in the model of Part I. In the interviewer level, interview experience has a positive effect on procedural response quality. The more experience the interviewer has, the higher the quality of procedural response is. We also find an interaction effect in which the effect of interview experience is also conditioned by the interviewer's perception of respondent cooperativeness. The negative effect is another setoff effect from the coefficient of .414 where interviewer's work experience is used to model the  $B_0$ . As for the variance components in Part II, the data show no significant variation among interviewers or the perception of cooperativeness.

#### 4. CONCLUSION

This study examines the relationship between procedural response quality and interview cooperation based on the HLM analyses of two subsets data from 2000 General Social Survey. The results firstly indicate that respondent effect is only found in Part I as well as in terms of marital status. Response quality is low when married respondents are interviewed. However, the effect of marital status is not found significant in Part II concerning insensitive questions such as family and personal relation. This finding might imply that married respondents are more likely than their counterparts to be sensitive when answering questions concerning politics.

Second, it is found that interviewer effect on procedural response quality is significant across datasets, with interviewer education found significant in Part I, and interviewer's work experience in Part II. The positive effect of interviewer's education implies that interviewer's education plays an important role in increasing the quality of respondent's answer to sensitive questions as political issues they record. On the other hand, the positive effect of interviewer's work experience implies that interviewer's work experience is an important factor helping him/her to acquire high quality of respondent's response to questions concerning insensitive issues other than political issues.

Third, cooperation effect is found significant across two Parts. The main effect of interview cooperation is found significant only in Part I, while interaction effect in both Parts. The positive main effect implies that

for the questionnaires concerning political issues, the quality of response is significantly dependent on respondent's cooperation with his/her interviewer. In addition to main effect, interview cooperation also exerts interaction effect with interviewer's education on response quality in Part I. The negative interaction effect implies that the cooperation effect would decline with the increase of interviewer's education, and vice versus. On the other hand, although no cooperation main effect is found in Part II, the interaction effect of cooperation with interviewer's work experience is found significantly affecting response quality. Different from Part I, for Part II, the interaction effect implies that the effect of interviewer's work experience would decrease with the increase of cooperation between respondent and interviewer.

In sum, the procedural response quality is affected by marital status and interview cooperation on the respondent level as well as education on the interviewer level when the interview is concerned with sensitive issues. As to the interview concerned with insensitive issues, respondent effect disappears. However, one thing for sure is that cooperation effect is indeed crucial in improving response quality. Inconsistent results between the two surveys suggest that the respondent, interviewer or cooperation effect might change for questions of different natures. Survey contents might be an important factor differentiating the relationship between procedural response quality and interview cooperation.

Given to the above implications, further examination on survey content, interviewer effect, and other effects is still needed. In doing so, we may need to consider another way of measuring response quality and interview cooperation, other control variables, and more level of HLM for data analysis. First, the response quality in this study is collected from supervisor's checklist of only six types of final error or non-response. In the future, we need to define procedural errors not only in static terms but also in dynamic conception. In doing so, the errors should be collected from each taped interview. Second and similar to the first, interview cooperation in the future needs to be collected from actual interaction between interviewer and respondent. Again, qualitative data analysis of taped interview should be used to produce actual process evaluation of interview cooperation. Third, additional variables such as regional difference and supervisor characteristics may need to be included in the future study. In doing so, refining the current HLM will be needed. Three-level hierarchical model is suggested.

## REFERENCES

- Alwin, D. F. (1991), "Research on Survey Quality", *Sociological Methods and Research*, 20, 1, pp. 3-29.
- Bradburn, Norman, Seymour Sudman, and Associates (1979), *Improving Interview Method and Questionnaire Design*, San Francisco: Jossey-Bass.
- Byrk, Anthony S. and Stephen W. Raudenbush (1992), *Hierarchical Linear Models: Applications and Data Analysis Methods*, Newbury Park: Sage Publications.
- Couper, M.P. (1997), "Survey Introductions and Data Quality", *Public Opinion Quarterly*, 61,2, pp. 317-338.
- Dijkstra, W., J. and van der Zouwen, (eds.) (1982), *Response Behavior in the Survey-interview*. New York: Academic Press.
- Francis, J. D. and L. Busch (1975), "What We Now Know about "I Don't Knows"", *Public Opinion Quarterly*, 39, 2, pp. 207-218.
- Groves, R.M. (1987), "Research on Survey Data Quality", *Public Opinion Quarterly*, 51, 4, pp.156-172.
- Groves, R. M. and M. P. C. (1998), *Nonresponse in Household Interview Survey*, New York: John Wiley & Sons, Inc.

- Groves, R. M. (1999), "Survey Error Models and Cognitive Theories of Response Behavior", in M. G. Sirken et. al. (eds.) *Cognition and Survey Research*, New York: Wiley, pp. 235-250.
- Hippler, H. J. and N. Schwarz (1989), "No Opinion'-Filters: A Cognitive Perspective", *International-Journal of Public Opinion Research*, 1, 1, pp. 77-87.
- Hox, J. J., Edith D. de Leeuw and Ita G.G. Kreft (1991), "The Effect of Interviewer and Respondent Characteristics on the Quality of Survey Data: A Multilevel Model", in Biemers P. P. et. al. (eds.) *Measurement Errors in Surveys*, New York: John Wiley & Sons, pp. 439-461.
- Hox, J. J. (1994), "Hierarchical Regression Models for Interviewer and Respondent Effects", *Sociological-Methods-and-Research* 22, 3, pp. 300-318.
- Mangione, Thomas W., Floyd J. Fowler, Jr. and Thomas A. Louis(1992), "Question Characteristics and Interviewer Effects", *Journal of Official Statistics*, 8(3): 293-307.
- Mathiowetz, N. A. (1998), "Respondent Expressions of Uncertainty", *Public Opinion Quarterly*, 62, pp. 47-56.
- Mathiowetz, N. A. (1999), "Respondent Uncertainty as Indicator of Response Quality", *International Journal of Public Opinion Research*, 11, 3, pp. 289-296.
- McClendon, M.J. (1991), "Acquiescence and Recency Response-Order: Effects in Interview Surveys", *Sociological Methods and Research*, 20,1, pp. 60-103.
- Presser, S. and S. Z. (1992). "Attributes of Questions and Interviewers as Correlates of Interviewing Performance", *Public Opinion Quarterly*, 56, pp. 236-240.
- Singer, E. et. al. (1983). "The Effect of Interviewer Characteristics and Expectations on Response", *Public Opinion Quarterly*, 47, pp. 68-83.
- Sudman, S. (1966), "Quantifying Interviewer Quality", *Public Opinion Quarterly*, 40,3, pp. 664-667.