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**Respondent Behavior in Panel Studies**  
**A Case Study of the German Socio-Economic Panel (GSOEP)**

by  
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# Respondent Behavior in Panel Studies - A Case Study of the German Socio-Economic Panel (GSOEP)\*

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## **Abstract**

In the past there have been many empirical studies dealing with the behavior of respondents in interview situations. Most of these refer to data from surveys and describe an interview situation where respondents and interviewer meet only once. The advantage of this study is the possibility of investigating both respondent behavior over a long period of time and the change in behavior in cases where the respondent meets the interviewer several times and becomes familiar with him. For this study we use the database of the German Socio-Economic Panel (GSOEP). The GSOEP is a longitudinal survey containing socio-economic information on private households in the Federal Republic of Germany. It provides a wealth of methodological information about the survey methods utilized and the characteristics of the interviewer. The paper will focus on the analysis of response styles, item-nonresponse and social desirability.

## **Zusammenfassung**

Die vorliegende Untersuchung beschäftigt sich mit dem Befragtenverhalten und Interviewereinflüssen im Sozio-oekonomischen Panel (GSOEP). Gegenüber vielen anderen Studien zu Befragten- und Interviewereffekten bezieht sich diese Studie auf eine Wiederholungsbefragung und nicht auf eine einfache Querschnitterhebung. So besteht die Möglichkeit, das Befragtenverhalten über einen längeren Zeitraum zu beobachten und auch Verhaltensänderungen zu analysieren, wenn Befragte und Interviewer im Zuge der Panellaufzeit mehrmals aufeinander treffen. Analysiert werden Befragteneffekte wie Response Styles, Item-Nonresponse und soziale Erwünschtheit.

*Keywords:* Respondent behavior; Interviewer effects; Respondent effects; Panel analysis

*JEL classification:* C81

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## 1 Introduction

Since the survey interview is a major source of research data in the social sciences, it is not surprising that there is a large literature on the quality of survey data focused specifically on respondents and interviewer effects. Although in the last decade panel studies have become more popular, most studies in this subject area deal only with cross-sectional data and describe an interview situation where respondents and interviewer meet only once.

The following paper therefore focuses on a case study of the German Socio-Economic Panel (GSOEP). The advantage of this study is the possibility of investigating both respondent behavior over a long period of time and the change in behavior in situations where the respondent meets the interviewer several times and becomes familiar with him.

The GSOEP database is a longitudinal representative survey containing socio-economic information on private households in the Federal Republic of Germany (Wagner/Burkhauser/Behringer 1993). The DIW (German Institute for Economic Research) is responsible for running the GSOEP study. The first wave of data, which was collected in the old Federal Republic of Germany in 1984 contains 5,921 households. Supplementary samples have been added to the original sample: a sample of East German residents (in 1990) and one of immigrants (in 1994/95). All household members aged 16 and older are surveyed. The GSOEP provides a wealth of methodological information about the survey methods utilized and the characteristics of the interviewers (cf. Schräpler/Wagner 2001). This paper will focus on the analysis of response sets, item-nonresponse and social desirability. The statistical methods used are panel models and multilevel methods.

## 2 Explaining respondent effects in surveys

The large body of literature on respondent and interviewer effects shows that both respondent and interviewers can be recognized as a potential source of error in surveys. Various respondent and interviewer characteristics have been thought to have an impact on data quality. The interview situation has to be recognized as a social process where the respondent is an actor who interprets the situation as it concerns his own goals. The respondent's definition of the situation decides whether his answer is in line with the facts or serves another goal. There are, of course, many possible alternative respondent behaviors in an interview situation (cf. Kahn/Cannel 1957, p. 129ff.), but for the survey research the following are considered to be particularly important:

1. The respondent refuses to participate (nonresponse).
2. The respondent agrees to participate but refuses to supply individual answers like his income (item-nonresponse).

3. The respondent agrees to participate but supplies answers independent of the question content and with such answer systematically pursues his own goals (social desirability, acquiescence).
4. The respondent tends to select a certain response category disproportionately (response styles)
5. The respondent agrees to participate and endeavors to answer all questions in accordance with the facts.

In order to understand respondent behavior and decide for one of these alternatives, it is essential to know the motives of the respondent. The usual theoretical approaches to explain respondent behavior belong to either the field of symbolic interactionism (cf. Kahn/Cannel 1968; Phillips 1971, 1973; Atteslander/Kneubühler 1975; Holm 1974 and Steinert 1984) or rational choice theory (RC) (cf. Esser 1990). The application of RC theory to respondent behavior states that respondents to a survey "choose" their answers, and that the choice depends on which of the possible replies appears to be the best choice. The choice thus depends on what the respondents presume to be the consequences of certain behavior or answers judging from visible or assumed features of their situations; on how the respondents assess the situation with regard to these assumed consequences; and on how they evaluate these consequences in the face of their own preferences (Esser 1993, p. 293-294). Thus after assessing the situation and evaluating the consequences of possible actions the individual selects a specific action on the basis of certain rules. In rational choice theory, especially in the form of the evaluation-expectation -theory (SEU), individuals choose those alternatives which promise the realization of certain goals. It is assumed that as a central aim actors attempt to attain social acknowledgment or avoid disapproval (cf. Phillips 1971, 1973).

Critics of the RC -model argue that individuals neither calculate their actions nor maximize their subjective expected utility as a result of "bounded rationality" (cf. Simon 1957, 1982; Riker/Ordeshook 1973, p. 21-23). Actors are not able to make complex calculations and thus use various techniques to simplify action situations. In fact, most of the time individuals use techniques like habits or frames to simplify action situations.

A *habit* is defined as an automatic, unreflected reaction without goal-means calculations, a "more or less self-actuating disposition or tendency to engage in a previously adopted or acquired form of action" (Camic 1986, p. 1044; Esser 1993, p. 299). Habits can be understood as bundles of sequential reactions triggered by certain environmental stimuli. They are a result of "rational dealing" with bounded rationality as concerns, the choice of means for the solution of everyday problems (Esser 1993, p. 305).

Another possibility for actors is to simplify the goal structure of situations. Individuals simplify the situation and the evaluation of information in the decision-

making process by specifying a *frame* containing one dominant goal that is characteristic of the specific situation. Situations often are typified by processes of associations and recollections, individuals attempt to interpret their selective perception of the visible and invisible characteristics in such situations and choose a model from previous experience. The frame thus generated is then the goal which determines the specific choice of the action or the actuation of a routine (Esser 1993, p. 305.). All other aims are filtered out by the frame.

Following Fazio (1990), Esser (1996) suggests a connection between frames and habits and the conditions for the use of routines like habits and calculated actions. Briefly, the scheme in figure 1 points out that there are two selection stages, a choice of a model and a choice of mode.

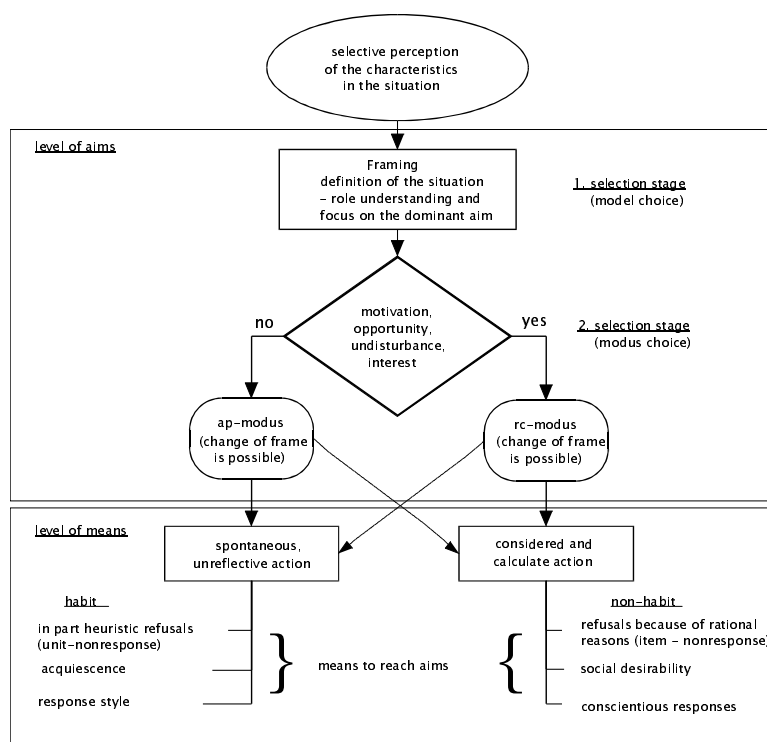


FIGURE 1: *Two step choice model*

In an interview, for example, after the selective perception of the characteristics of the situation (e.g., interviewer characteristics), we hope that the actor activates the "role of the respondent" as a frame with the general goal "possible declaration of true information" determining a specific choice of action. The action set which becomes significant for the actor in this case is different than the one that would prevail if the frame "need of social approval" or "interrogation" had been implemented.

After activating a frame and choosing a model for the specific situation, the actor has to decide whether to act automatically (ap-mode) and routinely in the

form of a spontaneous and unreflected action (habit) or to make a calculation (rc-mode) and act on the basis of reflection and seek a better alternative rather than immediately choosing the routine. While the advantage of former mode is its relative simplicity and low information costs, there is also the risk of opportunity costs for rash unconsidered actions. Whether an actor makes the effort to reflect in the latter mode depends primarily on his opportunity to do so. Sufficient time and serenity are required for reflection. Moreover, it would appear that some motivating force is necessary to induce individuals to engage in reasoning. In some cases, one such force appears to be the fear of invalidation (Fazio 1990, p. 90). In low-cost situations like interviews, however, opportunity costs are so low the respondent must be motivated by the interviewer or have a special interest in the outcome.

On the side of calculated action, for example, activating the desirable frame "role of the respondent" with the aim "possible declaration of true information" requires certain cognitive conditions and understanding by the respondent, as well as the respondent's motivation to continue the interaction and supply an answer that corresponds to his true attitude (cf. Kahn/Cannel 1968). Similarly, if the respondent chooses another frame such as "need of social approval", with the goal "receiving social acknowledgement", certain other conditions relating to the mode of reflection are necessary. It can be shown that in this case the characteristics and behavior of the interviewer are perceived by the respondents and generate or modify his statements concerning to their attitudes. In this study socially desirable behavior will be recognized and analyzed for subjective and objective statements over several waves of panel data.

On the side of routine action, a supplementary analysis of response styles is possible. This behavior is defined as a disproportional tendency to select a certain response category.

### **3 An empirical explanation of respondent effects in the GSOEP**

#### **3.1 The statistical model: Three wave multivariate-multilevel logit**

Studies of respondent and interviewer effects generally combine both respondent and interviewer variables. Typically, interviewer variables are disaggregated to the level of the dependent variable, i.e., the respondent level, and both interviewer and respondent variables are combined in one regression model (cf. Hox 1994, p. 303). Because in surveys the respondents are not usually assigned randomly to interviewers, and because each interviewer questions several respondents, the assumption of independent sampling is violated and the unmeasured interviewer variation results in error terms correlated between respondents. Above all, this

violation leads to underestimated standard errors of the regression parameter such that the estimates itself become inefficient.

The survey data have a hierarchical structure: the respondents are nested within interviewers, where the respondent level is said to be the lower and the interviewer level the higher level. The appropriate method of analysis is the use of hierarchical or multilevel models that allow estimation of both the interviewer variance and the effects of explanatory variables measured at the interviewer and the respondent level (cf. Hox 1994; Pannekoek 1991; Hill 1991). In the literature for this statistical models a variety of names appear, including: mixed models (Longford 1987), mixed-effects models (Gibbons/Hedeker 1998), multilevel models (Goldstein 1995), random coefficient models (Longford 1995) and hierarchical models (Bryk/Raudenbush 1992). These models generally involve linear regression models that allow the possibility of considering some parameters other than the residuals to random rather than fixed.

For the following applications the hierarchical structure is caused by a multiple nesting of the longitudinal data. Level 1 represents the repeated measurement of the response variable at time points  $i = 1$  ( $t_0$ , cf. wave 11),  $i = 2$  ( $t_1$ , cf. wave 12) and  $i = 3$  ( $t_3$ , cf. wave 13). Level 2 consists of  $j$  respondents and level 3 represents the aggregate level, which is formed by  $k$  interviewers.

For person  $j$  and interviewer  $k$  a dichotomous variable  $y_{ijk}$  is observed at the time points  $i = 1, 2, 3$  and  $z_{ijk}$  is the vector of indicator variables for time  $i$ :

$$\left. \begin{array}{l} z_{1jk} = 1 \quad \text{if } t = 1994 \\ z_{2jk} = 1 \quad \text{if } t = 1995 \\ z_{3jk} = 1 \quad \text{if } t = 1996 \end{array} \right\} \text{otherwise } 0$$

We use a multivariate logistic model with three levels (cf. description in Engel 1998, p. 186):

$$y_{jk}^{(i)} = \sum_{i=1}^I \pi_{jk}^{(i)} + \sum_{i=1}^I z_{ijk} u_{jk}^{(i)} \quad (1)$$

whether the intercept  $\beta_{0k}^{(i)}$  is only allowed to vary on the interviewer level at the time points  $i = 1, 2, 3$  and the other coefficients ( $\beta_h^{(i)}$ ) are specified as fix parameters, the probability  $\pi_{jk}^{(i)}$  for each time point  $i$  is:

$$\pi_{jk}^{(i)} = \left\{ 1 + \exp \left( - \left( \beta_{0k}^{(i)} z_{ijk} + \sum_{h=1}^H \beta_h^{(i)} z_{ijk} x_{h,ijk} + v_{0,k}^{(i)} z_{ijk} \right) \right) \right\}^{-1} \quad (2)$$

$y_{jk}^{(i)}$  is an indicator for a specific respondent behavior  $j$  (e.g. response style, item-nonresponse) in concern with interviewer  $k$  at time  $i$ .  $x_{h,ijk}$  represent values for covariates  $x_h$  ( $h = 1, \dots, H$ ) of person  $j$  and interviewer  $k$ . Because of the necessary structuring of variance of  $y$  on level 1 the variables  $x_h$  are linked to the dummies  $z_{ijk}$ . The variance of the intercept  $\beta_{0k}$  is specified as random on level

3 (interviewer level) and is estimated as  $v_{0,k}^{(i)}$ . The random variation between the respondents on level 2 is estimated as the variance/covariance  $u_{jk}^{(i)}$ . Since these are dependent binomial variables<sup>1</sup>, the residual variances  $\sigma_{u_i}^2$  and covariances  $\sigma_{u_{ii}}$  must be estimated.

## 3.2 Response styles: A motivation problem

The first analysis is focused on a bias form which is often called a variant of acquiescence and is designated as "response style" (Schuman/Presser 1981). The term "response style" is defined as a disproportional tendency to select a certain response category (Herzog/Bachman 1981 used the term "straight line responding" in their study) regardless of content, and acquiescence as a generalized tendency to be agreeable in a rather passive, submissive way (Rorer 1965, p. 134). Both forms of bias can lead to a distortion of the results of an interview. This analysis is restricted to response styles and focuses on subjective indicators like indicators for life-satisfaction (11-point -scale), which are the most likely to be subject to bias<sup>2</sup>.

In the GSOEP the questions about satisfaction range from  $< 0 >$  (completely dissatisfied) to  $< 10 >$  (completely satisfied). To date questions are asked in all waves about satisfaction with several individual parts of life and with life as a whole. These always are located en bloc at the beginning of the questionnaire, except for the items about life as a whole, which stand at the end. For reasons of comparability, this analysis deals only with those six items which consistently have been part of the questionnaire in all waves<sup>3</sup>. In addition only persons that have answered all six selected questions are considered.

After data collection the components of content and style are so mixed that the detection of response styles is difficult, as there is no objective criterion by which they can be identified. Observable are only preferences for certain categories of a scale. Of course, this is not a sufficient condition for a response style (as they may be reasonable) but an important requirement. This criterion may be used as a pessimistic estimation for an existing response bias. The proportion of respondents exhibiting response styles cannot be greater than the proportion showing preferences for certain categories. In this sense the former is an estimation of the maximum bias.

In the next step it is important to establish the minimum frequency which characterizes a preference for a certain category as a response style. In table 1 the preferences for a certain category were counted if a respondent answered in

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<sup>1</sup>Often binomial distributed residuals on level 1 are assumed. Nevertheless they may be extra-binomial and can be estimated with the program MLnwiN (Rasbash et al. 1999).

<sup>2</sup>A comparison between *response styles* and *acquiescence* for the data in the GSOEP is provided in Schr apler (1997).

<sup>3</sup>These are the following six items: satisfaction with health, household income, housing, labor, leisure and life as a whole.



more than 83% of the questions (5 of 6) with the same category.

TABLE 1: *Same category of scale in more than 83% of the questions (at least 5 of 6 questions with the same category) in per cent.*

category	wave										
	1	2	3	4	5	6	7	8	9	10	11
10	6.1	4.3	3.3	3.2	2.8	2.6	2.3	2.6	2.0	2.0	2.0
9	0.8	0.7	1.1	0.7	1.0	1.2	0.9	1.3	1.4	1.0	0.9
8	1.3	2.3	2.5	2.2	2.7	2.7	2.8	3.0	3.9	3.7	2.9
7	0.5	0.6	0.8	0.6	1.1	0.7	0.8	0.8	1.0	0.9	0.8
6	0.1	0.1	0.2	0.0	0.2	0.1	0.2	0.3	0.2	0.2	0.1
5	0.6	0.6	0.6	0.7	0.9	1.1	0.7	0.5	0.6	0.5	0.5
4	-	-	0.0	0.0	-	-	0.0	-	0.0	-	0.0
3	-	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.1
2	-	-	0.0	0.0	0.0	0.0	-	-	-	0.0	-
1	-	-	-	0.0	-	-	-	-	-	-	-
0	0.1	-	-	-	-	-	-	-	-	-	0.0
total	9.5	8.6	8.5	7.4	8.7	8.4	7.7	8.5	9.1	8.3	7.3
0 - 4	0.5	0.6	0.6	1.1	0.9	1.0	1.0	0.8	0.8	0.9	1.4
0 - 5	4.0	4.3	5.0	5.4	5.2	5.8	5.3	5.0	5.2	5.7	5.8
5 - 10	85.5	85.4	84.4	83.6	83.3	83.1	83.8	84.1	86.1	83.9	82.2
6 - 10	63.8	64.2	64.7	64.3	62.6	63.5	63.3	65.7	69.7	65.7	63.5
N	4825	4470	4357	4353	4133	4025	4029	4043	3946	3803	3693

Source: GSOEP 1984 - 1994 Sample A (own calculation)

In this case in almost all waves about 8 to 9% of the respondents had a preference for a certain category. The number of respondents with preferences is relatively stable over time. In the first waves, the category < 10 > dominates as a style, constituting over the half of all styles. The preference for this extreme value decreased from wave to wave, while the share for category < 8 > increased continuously over time.

Next we look at a bivariate description. Figure 2 shows the distribution of the share of stereotypical answers over interviews of various duration, using pooled data from waves 1 through 11 of West-German respondents. The mean duration for the questionnaire in Sample A was about 30 to 35 min. (Schräpler 1999). The development of the curve suggests that the shorter the interview duration, the higher the share of response styles. The influence of the variable "duration of the interview" may be an indication that the routine and stereotypical answers are primarily a result of an interview held quickly and less carefully, in such cases it may be that the motivation of the respondent and/or the interviewer is too poor. This interpretation is in line with Herzog/Bachman (1981, p. 554), who argue that "these patterns suggest that respondents did not stop reading altogether; rather, when they found a large set of relatively less interesting items they tended to slip into a comfortable 'groove' that allowed them, in effect, to skip on to the next questions."

Another curve in figure 3 demonstrates the development of the share of response styles as related to the "years of care by the same interviewer". A slight increase of routines over the years of care is evident, while the share of routines in

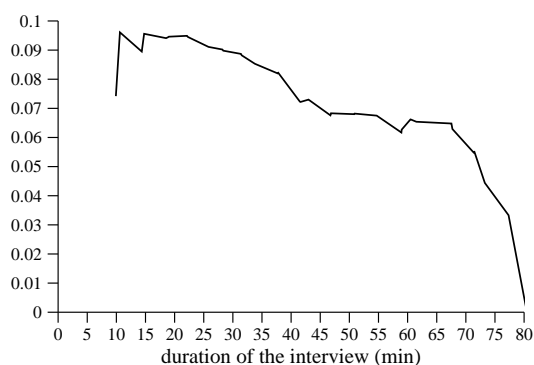


FIGURE 2: *Distribution of the share of stereotype answers by the duration of the interview in the years 1984 - 1994, Sample A*

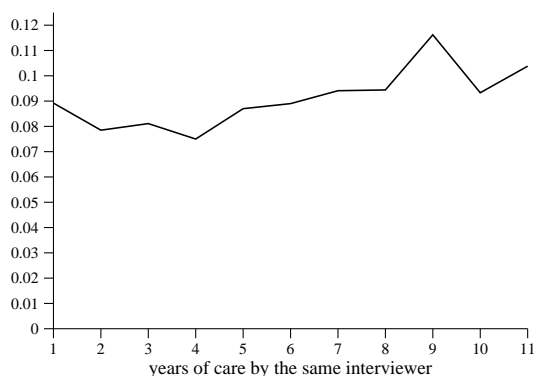


FIGURE 3: *Distribution of the share of stereotype responses by the years of care and by the sum of participation (1984 - 1994, Sample A)*

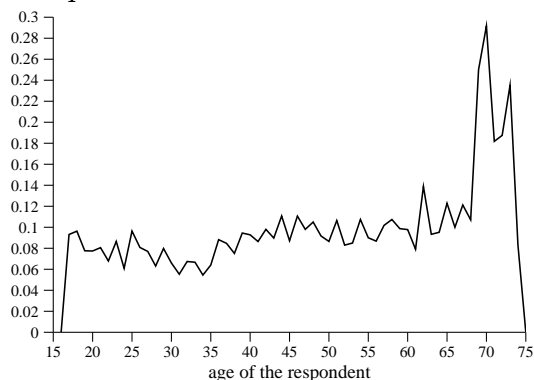


FIGURE 4: *Distribution of the share of stereotype responses by the age of the respondent in the years 1984 - 1994, Sample A*

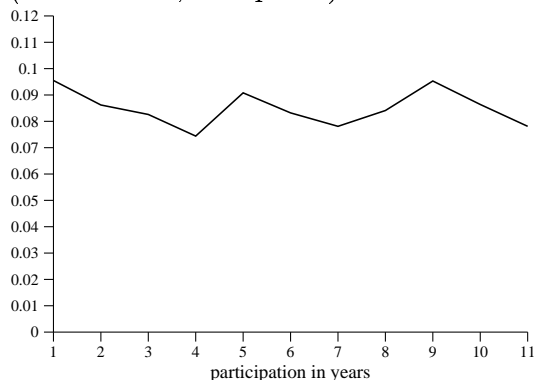


FIGURE 5: *Distribution of the share of stereotype responses by the years of participation in Sample A (1984 - 1994)*

the case "years of participation" remains constant over time (figure 5). In a panel study like the GSOEP the respondents often meet their interviewer several times and become familiar with him. This probably causes a smaller social distance between respondent and interviewer and slightly changes the respondent behavior in the interview situation. A familiar situation may lead to careless interviewing.

Furthermore, figure 4 suggests that there is also a strong age effect. Older respondents, especially those with over 60 years of age, tend toward stereotype responding.

To control for further respondent and interviewer variables, it is appropriate to apply a panel regression model in a next step. Table 2 shows the estimates of a

multivariate 3-level logit model for response styles in wave 9, 10 and 11. The sample contains 9,015 observations with information about 4,183 respondents and 255 interviewers. The estimates correspond with the results of the description curves above. They indicate significant influence by situation variables like interview duration and years of care. In addition, a strongly significant effect is apparent in the dummies for the older respondents. The methodological literature often sets forth the argument that elder respondents form a problematic group because their disengagement and lower motivation. It this is confirmed by our study.

The random variation between the respondents on level 2 is estimated as the variance/covariance  $u_{jk}^{(i)}$ . Since these are dependent binomial variables, the residual variances  $\sigma_{u_i}^2$  and covariances  $\sigma_{u_{i,i'}}^2$  must be estimated<sup>4</sup>. The correlation between the response styles results in  $r_{12} = 0.176$ ,  $r_{23} = 0.158$  and  $r_{13} = 0.145$ , which is rather low<sup>5</sup>. It follows that this respondent behavior is not a stable personality trait over time, but a temporary habit caused by a motivation deficit.

The variance of the intercept  $\beta_{0k}$  is specified as random on level 3 (interviewer level) and is estimated as  $v_{0,k}^{(i)}$ . This interviewer variability is in all equations highly significant. We can calculate its share of the entire error variance, often called intraclass correlation or interviewer effect, with

$$\rho_{int}^{(i)} = \frac{\sigma_{v_i}^2}{\sigma_{u_i}^2 + \sigma_{v_i}^2}$$

and get the values  $\rho_{int}^{(1)} = 0.294$ ,  $\rho_{int}^{(2)} = 0.296$  and  $\rho_{int}^{(3)} = 0.413$ . Although there is no significant interviewer variable in our model, this high intraclass correlations suggests, that the respondent behavior toward response styles also depends on the interviewer. It may be that response styles are a motivation problem for both the respondent and the interviewer.

### 3.3 Item-Nonresponse and income questions

Income statements belong to what are known as “fact statements” which generally are less susceptible to bias than subjective statements. On the other hand, they also belong to the category of sensitive questions whose content is connected to personal and intimate information. Under certain conditions the respondent may regard the declaration of his income as unpleasant and refuse the income statement. Even if up to this point he has chosen up the frame ”role of respondent” with the goal ”declaration of true information”, he may change the

<sup>4</sup>The corresponding model with binomial variance has a value for  $-2*\log$  likelihood of 1663.41. This the improvement  $\Delta\chi_{(3)}^2$  is 8.16 and in the case of  $df=3$  and  $\alpha = 5\%$  significant ( $8.16 > 7.81$ ).

<sup>5</sup>The correlation result from

$$r_{i,i'} = \frac{\sigma_{u_{i,i'}}}{\sqrt{\sigma_{u_i}^2} \times \sqrt{\sigma_{u_{i'}}^2}}$$

TABLE 2: *Estimates of the multivariate 3-level logit-model for response styles in wave 9, 10 and 11*

	wave 9		wave 10		wave 11							
	$\hat{\beta}^{(1)}$	s.e.	$\hat{\beta}^{(2)}$	s.e.	$\hat{\beta}^{(3)}$	s.e.						
FIXED EFFECTS												
intercept $\beta_{0k}$	-1.673	0.716	***	-1.596	0.697	***	-2.518	0.774	***			
<i>respondent</i>												
sex (1 - men)	0.167	0.126		0.001	0.135		-0.054	0.140				
age (year)	0.010	0.005	*	0.009	0.006		0.015	0.006	***			
sum participation	-0.752	0.276	***	-0.178	0.212		-0.087	0.200				
sum squared	0.070	0.025	***	0.012	0.017		0.006	0.014				
<i>interviewer</i>												
sex (1 - men)	0.089	0.153		0.096	0.161		0.141	0.187				
age (year)	0.001	0.007		-0.014	0.007		-0.007	0.008				
<i>situation</i>												
duration (min)	-0.008	0.006		-0.011	0.006	*	-0.013	0.008	*			
care by the same interviewer (years)	0.034	0.025		0.053	0.025	**	0.047	0.025	*			
<i>data collection methods</i>												
self admin. (Ref)												
face-to-face	-0.034	0.139		0.305	0.149	*	0.200	0.164				
mix	0.181	0.194		0.151	0.223		0.370	0.216				
RANDOM EFFECTS												
<i>Level 2 (respondents)</i>												
$\sigma_{u_i}^2$	$\hat{\sigma}_{u1}^2$	s.e.		$\hat{\sigma}_{u2}^2$	s.e.		$\hat{\sigma}_{u3}^2$	s.e.				
	0.955	0.025	***	0.978	0.026	***	0.952	0.026	***			
$\hat{\sigma}_{u_{i'}}$	$\hat{\sigma}_{u12}$	0.170	0.020	***	$\hat{\sigma}_{u23}$	0.152	0.021	***	$\hat{\sigma}_{u13}$	0.138	0.021	***
<i>Level 3 (interviewer)</i>												
$\sigma_{v_i}^2$	$\hat{\sigma}_{v1}^2$	s.e.		$\hat{\sigma}_{v2}^2$	s.e.		$\hat{\sigma}_{v3}^2$	s.e.				
	0.397	0.112	***	0.412	0.120	***	0.669	0.164	***			
$\hat{\sigma}_{v_{i'}}$	$\hat{\sigma}_{v12}$	0.490	0.096	***	$\hat{\sigma}_{v23}$	0.573	0.115	***	$\hat{\sigma}_{v13}$	0.461	0.106	***
-2* LogLikelihood	1655.25											
persons	4183											
interviewer cluster	255											
N	9015											

Source: GSOEP 1992 - 1994, Sample A (own calculation)

frame after evaluating the consequences in the face of his own preferences. In rational choice theory, individuals choose those alternatives which promise the realization of certain goals like the attainment of social acknowledgement or the avoidance of disapproval. In this context, respondent behavior can be explained by a cost-benefit analysis.

Table 3 shows several possible costs and benefits which have to be taken into consideration by the respondent. In the first place, the benefit of a response is apparent if the survey serves a meaningful purpose for the respondent. Often it is useful to emphasize the scientific or a public sponsor of the survey. The costs of a response are mainly connected with the fear of negative consequences. Perhaps in some cases there is a risk of data abuse. But more often social costs are concerned, which arise from admitting to a deviation from a public norm, or from a norm generated by the interview situation. On the other hand, refusals to respond can be interpreted as a violation of a courtesy norm which might leads to additional costs for the respondent. He has to justify himself to the interviewer.

On the basis of such a cost-benefit analysis, some authors express the expect-

TABLE 3: *Costs/Benefits for the decision response/item-nonresponse*

	benefits for the respondent	costs for the respondent
item-nonresponse	<ul style="list-style-type: none"> <li>- generally aversion to declare intimate facts in surveys</li> <li>- critical distance to public and academic institutions</li> </ul>	<ul style="list-style-type: none"> <li>- violation of a courtesy norm and defense costs</li> </ul>
response	<ul style="list-style-type: none"> <li>- fulfillment of a courtesy norm</li> <li>- support of academic science</li>   <li>- loyalty to a public institution</li> </ul>	<ul style="list-style-type: none"> <li>- fear for negative consequences</li> <li>- deviation from a social norm</li> <li>- deviation from a situation generated norm</li> <li>- objective effort too high (e.g. for self-employee)</li> </ul>

Source: own arrangement

tation that especially persons with very low income will tend to refuse to respond (cf. Wagner/Motel 1996, p. 497). If there is a large deviation between one's own income and the internalized standard income the respondent has an incentive to withhold his response due to pressures of social desirability. The refusal of a particular response nevertheless depends on the additional justification costs. These costs may vary with the interview situation. In postal or self-completed questionnaires it is much easier for the respondent to refuse an answer than in face-to-face interviews where the interviewer asks the respondent directly. Moreover, the interview situation is also determined by the characteristics of the interviewer and by the relationship between respondent and interviewer. When they first meet, the tendency to refuse may be stronger than on a later occasion.

In the first step we take a look at the development of the item-nonresponse rate for the gross-income question among employed persons in the GSOEP in Sample A (West-Germans)<sup>6</sup>.

Table 4 shows a decrease from about 13 percent in the first two waves to approximately 8 percent after 12 years. The reported gross-earnings item-nonresponse rate is quite low in an international and national comparison (Madow et al. 1983, p. 24). After agreeing to be interviewed, the respondent usually is willing to answer most questions. Moreover, in the GSOEP the respondents know that all of their answers are completely confidential, there should be no reason to fear data abuse. However, special problems occur in the case of the income question for self-employed respondents. The income question is not designed to elicit estimates of business profits during a monthly accounting period. Thus it is not surprising that the self-employed have the highest nonresponse rates (about 20 - 30%) in the GSOEP.

<sup>6</sup>The annual question for all employed respondents asks:

"How high were your earnings last month?"

If you received any additional payments last month, e.g. holiday money or back-pay please do not include these. Also allowance for children do not include. However, do include money earned for overtime."

TABLE 4: *Item-Nonresponse-rate for the gross-income question from employed persons in Sample A (in per cent)*

year	employed respondent	without gross income statement	%
1984	5017	640	12.8
1985	4709	622	13.2
1986	4520	526	11.6
1987	4525	499	11.0
1988	4309	469	10.9
1989	4213	427	10.1
1990	4128	446	10.8
1991	4160	494	11.9
1992	4013	433	10.8
1993	3952	371	9.4
1994	3796	306	8.1
1995	3780	304	8.0
total	51122	5537	10.8

Source: GSOEP 1984 - 1995 Sample A (own calcul.)

In the next the distribution of item-nonresponse is to be examined in detail. Schupp/Wagner (1996) have shown that item-nonresponse for gross income partly depends on the data collection method in the German Socio-economic Panel. The GSOEP represents a “method-mix”. The survey is carried out mainly by face-to-face interviews (face). Respondents also may complete the questionnaire by themselves and receive help from the interviewer only when needed (self). There are also a few cases of participation by mail. In figure 6 it can be seen that face-to-face interviews have the lowest, and questionnaires by mail the highest item-nonresponse rates. This was to be expected and corresponds to the cost-benefit analysis.

In the case of mail participation there are no justification costs for the respondent in refusing to answer because there is no control by the interviewer. In face-to-face interviews, however, these costs are higher than in the case of self-completed questionnaires. In terms of the RC -theory we can interpret this as an isolation from negative consequences:

1. *Isolation from justification costs:* Special data collection methods like self-completed questionnaires and postal interviews facilitate the refusal of an answer when the respondent has no need to justify himself to the interviewer.

To show the influence of income brackets on item-nonresponse we use a three-piece classification of vocational position (table 5). Due to the special

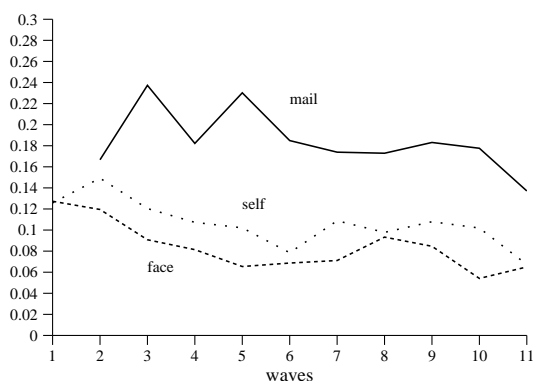


FIGURE 6: *Share of item-nonresponse by data collection methods from 1984 - 1994, Sample A.*

problems for the self-employed and trainees, they are excluded from the following analysis. The development of the share of item-nonresponse as related to the

TABLE 5: *Classification of the vocational position*

	vocational position	occupation
LOW	worker	unskilled worker, semiskilled worker
MEDIUM	worker	skilled worker, foreman, master,
	employee	industry- and works foreman, employee with simple activity, qualified activity
HIGH	official	minor and lower-grade civil service
	employee	high qualified activity, executive function
	official	high and senior service

vocational position is demonstrated in figure 7. Whereas in the first wave hardly any difference is apparent in the three categories, the following waves show a divergence between the low vocational position on the one side and medium and high positions on the other. For unskilled and semi-skilled workers the item-nonresponse rate remains at a high level, while the rate for the respondents with better income falls off rapidly. On the basis of RC- theory we can offer two combined explanations for this findings:

2. *Confidence building*: In the case of a first-time contact between the respondent and the interviewer, the social distance is rather high. Additional contacts between them increase trust, encouraging answers to sensitive questions like the income statement, and decrease the fear of negative consequences like data abuse. This holds for low, medium and high vocational positions.

3. *Social desirability*: In addition to the impact of confidence- building there is another incentive for low- earning respondents in need of social approval to refuse their income statement. This entails a high refusal rate for unskilled and semiskilled workers over time.

The impact of social desirability may vary according to other distinguish- ing characteristics of the interview situation. Figures 8, 9 and 10 show the share of item-nonresponse by vocational position and gender of the interviewer.

Respondents with low vocational status have much higher refusal rates in connection with female interviewers than with males. It seems that the gender of the interviewer has a strong influence on the behavior of respondents in low positions. An explanation for this effect may be that the incentive to refuse is higher in the case of a female than a male interviewer and/or that it is easier for the respondent to refuse his statement to a female interviewer. Moreover, figures 11 and 12 show the refusal rate to be a quadratic function by the age of the respondents. Especially in the first waves and in the case of female interviewers, younger and older respondents have higher rates of item-nonresponse than middle- aged respondents.

Again, to control for further respondent and interviewer variables we use a multivariate regression model. Table 6 shows the estimates of a 3-level logit model for item-nonresponse in waves 1 through 4. The sample contains a total of 13,366 observations with information about 5,862 respondents and 427 interviewers. The estimates confirm the results of the description above: the probability of refusing to answer the income question after the first wave is highest for respondents in low positions, or those with low income. Female interviewers experience significantly more refusals than male interviewers in all waves. There are also significant situation variables: the first contact with an interviewer led to higher item-nonresponse rates in wave 2 and 3, in wave 4, a self- completed questionnaire affected response rates. In addition there is a gender effect for respondents: female respondents have a stronger tendency to refuse than males.

The random variations between the respondents on level 2 are dependent binomial variables and the residual variance  $\sigma_{u_i}^2$  and covariance  $\sigma_{u_{ii'}}$  have to be estimated. The correlations between the response variables are calculated as  $r_{12} = 0.421$ ,  $r_{23} = 0.440$ ,  $r_{34} = 0.493$ ,  $r_{13} = 0.329$ ,  $r_{14} = 0.387$  and  $r_{24} = 0.386$ .

The variance of the intercept  $\beta_{0k}$  is specified as random on level 3 (interviewer level) and the interviewer variability is significant in all equations. For the intraclass correlations we get the values  $\rho_{int}^{(1)} = 0.663$ ,  $\rho_{int}^{(2)} = 0.714$ ,  $\rho_{int}^{(3)} = 0.703$  and  $\rho_{int}^{(4)} = 0.553$ . This indicates a strong interviewer influence on item-nonresponse to gross- income inquiries.



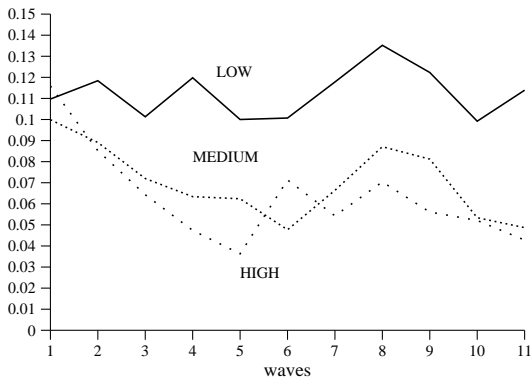


FIGURE 7: *Share of item-nonresponse by occupational state from 1984 - 1994, Sample A.*

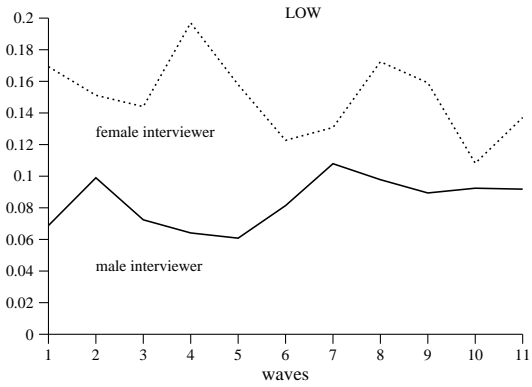


FIGURE 8: *Share of item-nonresponse for low occupational state by sex of the interviewer*

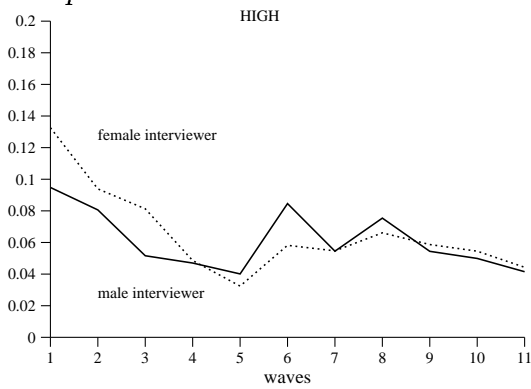


FIGURE 9: *Share of item-nonresponse for medium occupational state by sex of the interviewer*

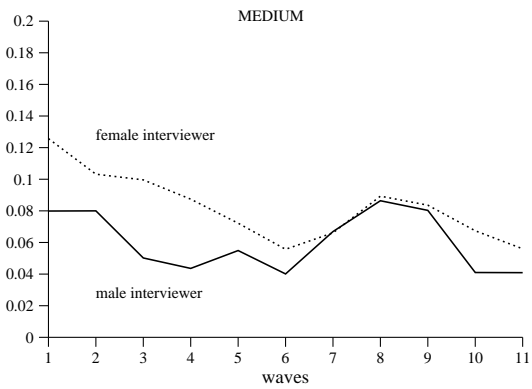


FIGURE 10: *Distribution of the share of item-nonresponse for high occupational state by sex of the interviewer*

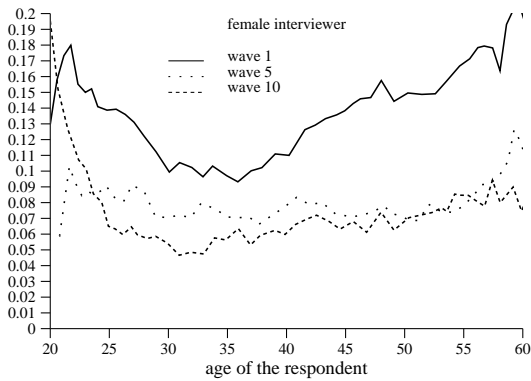


FIGURE 11: *Distribution of the share of item-nonresponse by the age of the respondent and for female interviewer (local estimated)*

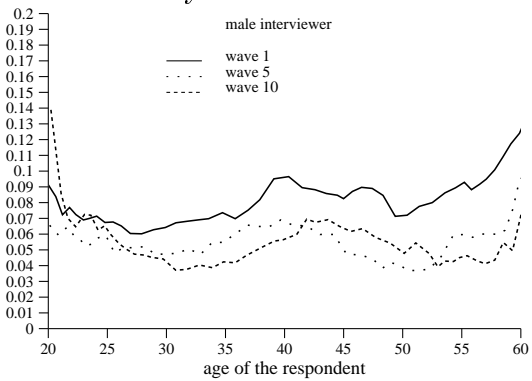


FIGURE 12: *Distribution of the share of item-nonresponse by the age of the respondent and for male interviewer (local estimated)*

TABLE 6: Estimates of the multivariate 3-level logit-model for item-nonresponse in wave 1, 2, 3 and 4

	wave 1 $\beta(1)$	s.e.	wave 2 $\beta(2)$	s.e.	wave 3 $\beta(3)$	s.e.	wave 4 $\beta(4)$	s.e.				
intercept $\beta_{0k}$	-0.451	0.478	-1.071	0.777	**	-1.471	0.713	-1.004	0.701			
FIXED EFFECTS												
<i>respondent</i>												
sex (1 - men)	-0.218	0.095	**	-0.236	0.099	***	-0.270	0.109	***	-0.319	0.121	***
age (year)	-0.084	0.024	***	-0.081	0.026	***	-0.090	0.029	***	-0.073	0.032	***
age squared	0.001	0.000	***	0.001	0.000	***	0.001	0.000	***	0.001	0.000	***
medium position (ref.)												
low position	0.151	0.116		0.403	0.116	***	0.398	0.125	***	0.400	0.137	***
high position	0.242	0.128	*	0.037	0.136		-0.070	0.155		-0.302	0.187	*
<i>interviewer</i>												
sex (1 - men)	-0.570	0.151	***	-0.314	0.175	***	-0.645	0.182	***	-0.778	0.172	**
<i>situation</i>												
first contact with the interviewer	-	-		0.172	0.107	*	0.310	0.144	**	0.142	0.197	
sum participation (years)	-	-		0.180	0.318		0.309	0.171	*	0.029	0.115	
<i>data collection methods</i>												
self admin.	0.030	0.108		0.104	0.114		-0.032	0.121		0.375	0.124	**
RANDOM EFFECTS												
<i>Level 2 (respondents)</i>												
$u_1$	$u_1$	s.e.		$u_2$	s.e.		$u_3$	s.e.		$u_4$	s.e.	
$u_1$	0.806	0.019	***									
$u_2$	0.335	0.017	***	0.784	0.019	***						
$u_3$	0.263	0.019	***	0.347	0.016	***	0.793	0.020	***			
$u_4$	0.325	0.021	***	0.320	0.018	***	0.411	0.017	***	0.875	0.022	***
<i>Level 3 (interviewer)</i>												
$v_1$	$v_1$	s.e.		$v_2$	s.e.		$v_3$	s.e.		$v_4$	s.e.	
$v_1$	1.583	0.178	***									
$v_2$	1.311	0.163	***	1.956	0.219	***						
$v_3$	1.396	0.169	***	1.678	0.193	***	1.882	0.230	***			
$v_4$	0.728	0.147	***	1.165	0.166	***	1.246	0.176	***	1.082	0.182	***
-2* LogLikelihood												
interviewer cluster												
persons												
N												

Source: GSOEP 1992 - 1994, Sample A (own calculation)

### 3.4 Subjective questions on concern about crime

Within the scope of studies toward "quality of life" and against the background of the concept of empirical research of welfare subjective indicators are becoming increasingly popular. Objective living conditions and subjective well-being were treated as two central dimensions for individual welfare (cf. Habich 1996; Schupp/Habich/Zapf 1996; Glatzer/Zapf 1984).

Subjective welfare can be represented by positive and negative measures. The GSOEP questionnaire takes both aspects into account. While the questions about satisfaction can be seen as a positive measure of welfare, the periodical questions about worries represent a negative aspect. The selected question "concern about the development of criminality in Germany" was asked in wave 11, 12 and 13. The frequency of the item values is shown in table 7.

TABLE 7: *Frequency for the statement "concern about the development of criminality in Germany" in Sample A*

	<i>wave 11</i>		<i>wave 12</i>		<i>wave 13</i>	
	N	%	N	%	N	%
great concern	3413	51.8	3276	50.3	3434	53.9
some concern	2883	43.7	2853	43.9	2656	41.7
no concern	297	4.5	374	5.8	280	4.4
total	6593	100.0	6503	100.0	6370	100.0

Source: GSOEP 1995 - 1997 Sample A (own calculation)

In Sample A, about 50% of the respondents have great concern about the development of crime, and only 4 to- 5% no concern. Because the GSOEP does not include any scale to measure respondent behavior according to social desirability in the form of a need for social approval (cf. Crowne/Marlow 1960; Reinecke/Schmidt 1993), we are able to explain the responses only with content variables and with methodological variables to control these statements for further influences.

Results of the latest research show that the tendency to respond in a socially desirable manner depends in equal measure on the personality of the respondent, the item itself and the interview situation. Systematically, social desirability effects (SD) are to be found only in clearly structured situations (for example, as a reaction to the gender and age of the interviewer) and occur only if the particular goal dimension is weakly anchored and if a deviating response does not entail any costs (Esser 1993, p. 312).

First, the statement "concern about the development of criminality in Germany" is not an objective and testable characteristic. Thus it can be assumed that this item is susceptible to a tendency to respond in a socially desirable manner. From this it follows, secondly, that there are no obvious costs for deviating in the

direction of social desirability. And thirdly, the interview situation is structured by visible interviewer characteristics.

Therefore we can proceed on the assumption that the respondent attempts to anticipate the interviewer's attitude on the basis of these characteristics and, in the case of a high need of social approval, gives his answer in the desirable direction.

In figure 13 it is evident that the share of "great concern" increases with the age of the respondents, particularly in big cities. This applies to male and female respondents. This could be justified as an increase of vulnerability contingent on age. The caution of the elderly could be interpreted as a rational consequence of a perceived vulnerability (cf. Greve/Hosser/Wetzel 1996).

Nevertheless, the next figure 14 also shows a strong increase in concern directly related to the age of the interviewer. Also apparent is that female interviewers receive more "great concern" statements than male interviewers.

We can assume that the actualization of norms in the interview situation can be explained by the age and gender of the interviewer. The elderly and women are often described as more sensitive and vulnerable than younger people and men. Respondents with a need for social approval anticipate the interviewer's attitude on the basis of both characteristics and supply their answer in the desirable direction, in this case biased towards "great concern".

Again a multivariate model is used to investigate the influence of social desirability. We control for socio-demographic characteristics like age, gender and education for both the respondent and the interviewer. In addition we use dummy variables for "big city" and "face-to-face -interview" and a continuous variable for "years of care by the same interviewer". Table 8 shows the estimates of a 3-level logit model for "great concern" in waves 11, 12 and 13. The sample contains a total of 14,642 observations with information about 5,757 West -German respondents and 240 interviewers.

The estimates correspond to the results of the description: the probability of the statement "great concern" is higher for female respondents and in big cities. Furthermore the probability increases with the age, and declines with the education of the respondents. All respondent variables are significant and the signs are as expected.

But in our case the far more interesting parts of the model are the estimated coefficients of the interviewer variables. The estimates for age, education and gender of the interviewer correspond with the estimates of the same characteristics for the respondents. The probability of "great concern" rises with the age of the interviewer and drops with his education. This is a clear indication for the impact of social desirability: a number of the respondents answers in the anticipated socially desirable manner.

One can also observe a minor panel effect. As shown in figure 15 the share of "great concern" increases slightly with years of care by the same interviewer. This influence also can be recognized in the multivariate model.

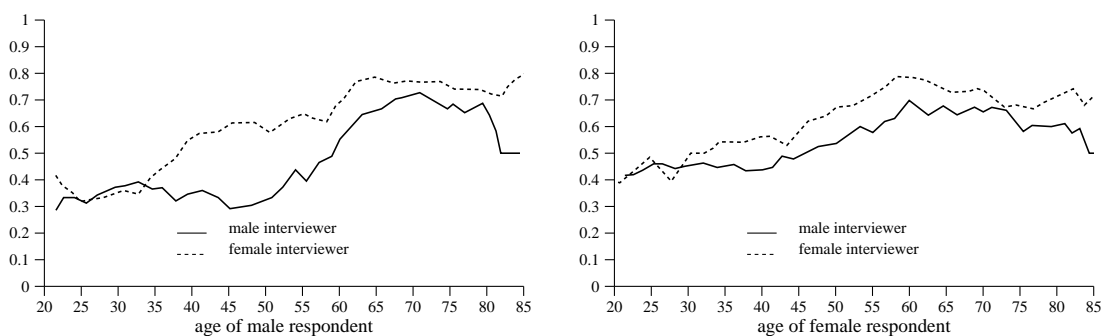


FIGURE 13: *Share for "great concern" - from male and female respondents in big cities in Sample A in year 1995 by the age of the respondent. Local estimated.*

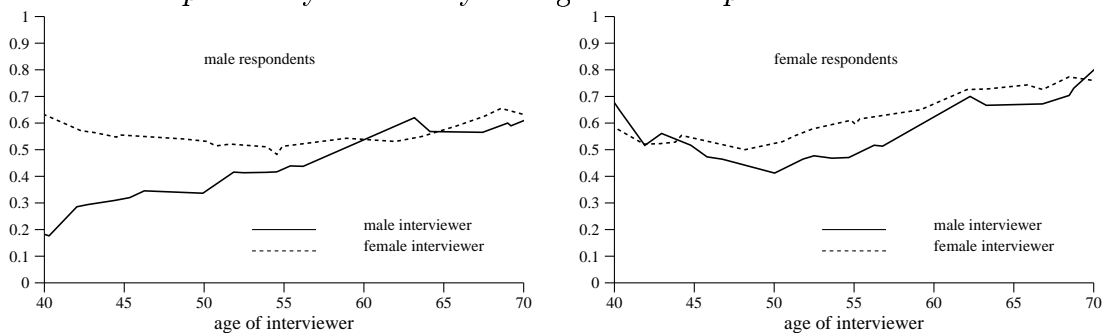


FIGURE 14: *Share for "great concern" - from male and female respondents in big cities in Sample A in year 1995 by the age of the interviewer. Local estimated.*

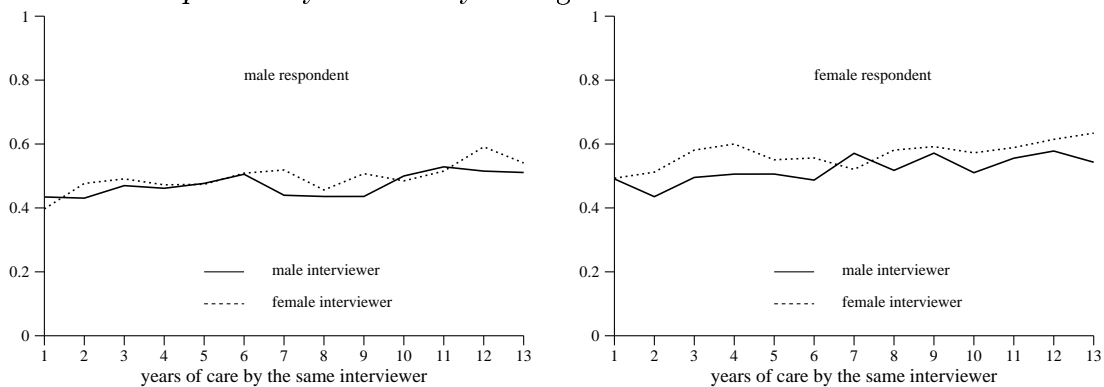


FIGURE 15: *Share for "great concern" - from male and female respondents in Sample A by the years of care in year 1995 - 1997. Local estimated.*

Again, the random variation between the respondents on level 2 are dependent binomial variables. The correlations between the response variables result in  $r_{12} = 0.357$ ,  $r_{23} = 0.350$  and  $r_{13} = 0.331$ . The interviewer variability (level 3) is significant in all equations. For the intraclass correlations we calculate the values  $\rho_{int}^{(1)} = 0.277$ ,  $\rho_{int}^{(2)} = 0.292$  and  $\rho_{int}^{(3)} = 0.301$ .

TABLE 8: *Estimates of the multivariate 3-level logit-model for the statement "great concern" about the development of the criminality in Germany*

	wave 11		wave 12		wave 13	
	$\hat{\beta}^{(1)}$	s.e.	$\hat{\beta}^{(2)}$	s.e.	$\hat{\beta}^{(3)}$	s.e.
FIXED EFFECTS						
intercept $\beta_{0k}$	-0.046	0.141	0.063	0.146	0.136	0.148
city	0.359	0.079 ***	0.233	0.081 ***	0.188	0.081 ***
respondent						
sex (1-men)	-0.122	0.057 ***	-0.174	0.057 ***	-0.134	0.057 ***
extended elementary school (R)						
secondary school	-0.278	0.070 ***	-0.296	0.071 ***	-0.293	0.070 ***
final examination	-0.633	0.081 ***	-0.814	0.083 ***	-0.800	0.081 ***
other education	-0.553	0.340 ***	-0.363	0.327 ***	-0.777	0.311 ***
no examination	-0.650	0.153 ***	-0.638	0.149 ***	-0.518	0.155 ***
age < 61 year (R)						
age 61-70 year	0.653	0.091 ***	0.621	0.093 ***	0.562	0.091 ***
age over 70 years	0.530	0.108 ***	0.468	0.103 ***	0.669	0.103 ***
interviewer						
sex (1-men)	0.009	0.108	-0.078	0.110	-0.131	0.112
extended elementary school (R)						
secondary school	-0.164	0.123	-0.171	0.126	-0.080	0.128
final examination	-0.308	0.216	-0.279	0.222	-0.177	0.226
university without final	-0.637	0.255 ***	-0.638	0.272 ***	0.111	0.276
university with final	-0.080	0.187	-0.138	0.189	0.267	0.191
age < 61 years (R)						
age 61-70 years	0.228	0.120 *	0.160	0.119	0.219	0.118 *
age over 70 years	0.593	0.181 ***	0.522	0.185 ***	0.643	0.175 ***
care by the same interviewer (years)	0.007	0.009	0.016	0.009 *	0.013	0.008 *
face-to-face	0.169	0.064 ***	0.097	0.064	0.019	0.064
RANDOM EFFECTS						
Level 2 (respondents)	$\hat{\sigma}_{u1}^2$	s.e.	$\hat{\sigma}_{u2}^2$	s.e.	$\hat{\sigma}_{u3}^2$	s.e.
$\sigma_{u_i}^2$	0.922	0.019 ***	0.919	0.019 ***	0.917	0.019 ***
$\sigma_{u_{ii'}}$	$\hat{\sigma}_{u12}$	s.e.	$\hat{\sigma}_{u23}$	s.e.	$\hat{\sigma}_{u13}$	s.e.
	0.329	0.015 ***	0.322	0.015 ***	0.304	0.015 ***
Level 3 (interviewer)	$\hat{\sigma}_{v1}^2$	s.e.	$\hat{\sigma}_{v2}^2$	s.e.	$\hat{\sigma}_{v3}^2$	s.e.
$\hat{\sigma}_{v_i}^2$	0.353	0.054 ***	0.379	0.057 ***	0.395	0.059 ***
$\sigma_{v_{ii'}}$	$\hat{\sigma}_{v12}$	s.e.	$\hat{\sigma}_{v23}$	s.e.	$\hat{\sigma}_{v13}$	s.e.
	0.310	0.048 ***	0.338	0.050 ***	0.310	0.048 ***
- 2*LogLikelihood				18088.4		
persons				5757		
interviewer cluster				240		
N				14642		

Source: GSOEP 1994 - 1996 Sample A; Interviewer dataset (own calculation)

## 4 Summary and Conclusion

The present study deals with respondent behavior in the German Socio-economic Panel (GSOEP). It is restricted to West-German respondents and uses information from persons in about 6000 households as well as methodological information about the characteristics of the interviewers and the utilized survey methods. The advantage of using the GSOEP is the possibility of investigating the respondent behavior over a long period of time.

After a short theoretical introduction, a detailed description of the identified response effects is presented. The paper focuses on the analysis of response styles, item-nonresponse, and social desirability effects in the case of subjective questions

like concern. The theoretical explanation for such respondent behavior is based on rational choice theory, and the statistical methods used are nonparametric regressions and multivariate multilevel logit models.

First we investigate response effects like stereotypical answers and response styles, defined as the disproportional tendency of a respondent to select a certain response category. For the analysis we use six items to measure satisfaction. The results indicate a small share of respondents, 8 to 9%, which chooses the same category in more than 83% of all cases in all waves. The bivariate description and multivariate estimates show that this behavior decreases with interview duration and increases with years of care by the same interviewer. Moreover, older respondents tend more strongly toward response styles. In summary it can be said that these findings and the low correlation between the stereotypical answers indicate that this behavior is not a stable personality trait over time, but rather a temporary habit caused by a motivation deficit.

In the second analysis we deal with refusals of individual responses. We focus on item-nonresponse in the case of gross -income in the GSOEP and try to find out why respondents refuse to state their income. Over all, the analysis shows quite a low item-nonresponse rate of 10% on average, with this rate decreasing over time. However, we demonstrate on the basis of a three-level classification of respondents' vocational positions that the refusal rate is heterogeneous. For unskilled and semiskilled workers the item-nonresponse rate remains at a high level, while the rate for respondents with better income falls off rapidly. The starting point for the explanation of this behavior is a cost-benefit analysis. We identify three relevant aspects: 1. confidence building, 2. social desirability and 3. justification costs for refusal. In the first wave the fear of negative consequences, like data abuse in the case of sensitive questions, is higher than after additional contacts between the respondent and the interviewer. Therefore with increasing trust the item-nonresponse rate falls off over time. But there is also an incentive for low-earning respondents in need of social approval to withhold their income statement. Depending on additional justification costs (cf. contingency on data collection method, interviewer gender) the refusal rate for these respondents still remains high over the following waves.

In the last analysis we investigate the influence of social desirability on responses relating to subjective questions on concern about crime. We show that a number of the respondents answers in the anticipated socially desirable manner. Female and older interviewers produce more "great concern" responses than other interviewers.

In summary this empirical study could establish some relevant respondent effects. Therefore the question arises as to which are the consequences of invalid respondent behavior. A previous analysis based on the same data (Schräpler 1999) offers a partial answer. In the case of response styles, the respondent behavior caused an increase in both the mean and the correlation between the questions about satisfaction. But a regression analysis shows that the coefficients

of interest are not biased. In the case of the income item-nonresponse, it could be feared that there is a selection bias, because the refusal rates for unskilled and semiskilled workers are higher than the other respondents. In Schräpler (1999), however, the estimates of a probit random effects model with sample selection correction show only minor differences from an income equation model without correction.

This we must conclude that in the GSOEP we can find some invalid response behavior which can be explained, but the good news is that these have only minor effects on substantial analysis.



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