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Effects of Response Functions in Survey Interviews on Evaluations of Job Qualifications

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Abstract

Many sources of systematic errors in survey-interviews have been suggested. In this paper a new suggestion is made. When respondents evaluate different stimuli of the same topic an individual response pattern can be detected in survey-interviews. This individual response pattern might be a possible source of systematic error in addition to situational factors. The analysis shows that variation in individual response patterns is a more important source of systematic errors in survey-interviews than situational factors.

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Introduction

There are many different ways of collecting data in the social sciences, such as methods based on observing people's behaviour, analyzing the content of written texts or interviewing people in a survey. The most frequently used method of collecting data is the survey-interview. It was found, for example, by Wahlke (1979) that about 50 percent of the analyses in 180 articles on political behaviour published in "The American Political Science Review" had been based on survey data.

In spite of the popularity of the survey-interview it has been criticised because various sources of bias and error are possible. Necessary conditions for a succesful interview have been formulated by Cannell and Kahn (1968). They distinguish three broad concepts : the accessibility of the required information to the respondent, the cognition by the respondent of what is required of him, and the motivation on the part of the respondent to answer the questions accurately. Even if these three conditions are realized, there remain many sources of bias and error.

A distinction can be made between random and systematic errors. Random errors are due to chance. For systematic errors a source can be located which is associated with a systematic effect on the answers of respondents. Many possible sources have been suggested for systematic errors in survey interviews.

That the perception of opinions of significant others could affect the response is mentioned by Hyman (1954). One significant other in the interview situation who could effect the response is the interviewer. Many studies show that responses are effected by characteristics of the interviewer. For an overview of the studies to these effects see for example : Boyd and Westfall, 1965, 1970; Cannell and Kahn, 1968; Dijkstra and Van der Zouwen 1977, 1982; Dijkstra, 1983; Hyman, 1954;Sudman and Bradburn, 1974; Weiss, 1975.

Some characteristics of the respondent that affect the response have been mentioned by Van der Zouwen and Dijkstra (1982): age, gender, educational level, need for approval, agreeing tendency, perceived topic, threat and perception of differences in social desirability of the alternatives.

Other effects are caused by the context-related characteristics of survey questions. Four aspects can be distinguished: the degree to which the topic arouses anxiety, the degree to which the topic arouses a concern with social desirability, the salience of the topic, and the wording of the question. For the effects of these characteristics we can refer to Delamater, 1982 and Schuman and Presser, 1981.

Another individual source of error variance is the response-set (Jackman, 1973). She concludes, however, that the response set, formulated as 'an education-related acquiescense response-bias', has very little to do with the respondent's true attitude.

Although many sources of systematic error have been mentioned, the effects are small, compared with random errors and the processes which produce the systematic errors are unclear.

One possible reason for the fact that the systematic knowledge about the errors in survey questions is still very limited might be that the errors have only been located in single questions or between composite scores. In a single question it is not possible to show the pattern on the basis of which the responses might be biased. When a set of judgements, all on the same dimension, are analyzed another systematic response effect can be detected (Saris,1984). This systematic pattern in the response is defined as the response function. In psychophysics the relationship between physical stimuli and the judgements obtained from respondents has been studied (see Wegener, 1982 for an overview). In these studies many judgements of different sorts of stimuli have been collected to show the relationship between the stimuli and the sensations. Different measurement procedures have been used. The well known category scale is used, for example, by Parducci (1982). Magnitude estimation is used by Stevens, e.g., Stevens (1975). Later on more modalities were used to express the judgements. That line production can also be used in survey research has been demonstrated by Lodge and Tursky (1979) and by Van Doorn, Saris and Lodge (1983).

From this type of study the conclusion can be drawn that the results depend on the measurement procedure, the number of categories, the spacing of the stimuli, the comparison mode and the range of the stimuli (Marks,1982). These effects even occur on an aggregated level for all respondents. Furthermore individual variation in judgements has been found in psychophysical research (Stevens and Guirao, 1964; Luce and Mo, 1965; Pradhan and Hoffman, 1963; Curtis and Rule, 1982; Birnbaum, 1982).

When social scientists doing survey research use the same measurement procedures it is obvious that all errors which have been detected in psychophysical research will be present in survey research as well. They are, however, not detected due to the fact that only single questions about the topics are asked. To show that these errors do have an impact on the results of survey research it is necessary that, instead of just one question, a whole set of questions on the same topic are judged by the respondents. This makes it possible to determine the impact of the variation in response behaviour on the results.

In this paper we want to determine the contribution to error variance by situational factors and by an individual systematic error. This study will be based on data collected in survey-interviews, directed by the authors (Bruinsma, et al., 1976).

In this study three different job qualities have been evaluated. The respondents were asked to evaluate the job performance of a variety of hypothetical persons with

different degrees of the qualities 'Years of Experience', 'Formal Education' and 'Leadership'. This is called the 'General Job Evaluation'. Subsequently the respondents made an evaluation of their own qualities. This is the 'Own Job Evaluation'. The evaluations were measured by categorical judgements and by magnitude estimation.

In a previous paper (Bruinsma, et al., 1980) it was shown that there is a difference between the evaluations of the characteristics of the General Job and the Own Job if they refer to the same job. We expected that the respondents might answer differently on their Own Job Evaluation,obtaining as much advantage as possible from these evaluations. This response might be affected by their perception of opinions of significant others. It was assumed that the most significant other in this case would be the management. The information, with respect to evaluation by the management, was asked from the respondent.

The results of the analysis demonstrated that in this case the effect of the most significant other on the Own Job Evaluation could not be detected.

Consequently no explanation was found for the considerable difference between the General Job Evaluation and the Own Job Evaluation.

In this study we want to suggest two possible effects : (i) effects of situational factors and (ii) effects of variation in response functions.

The Data

Survey-interview data were collected from a sample of a population of workers at a Dutch steel factory. The sample contained 505 respondents.

An important topic in this study is work classification. The research on the classification of workers is in general based on sixteen different dimensions (Hazewinkel,1967). In this study only those dimensions which in earlier projects had been found to be most important, according to the workers, were analyzed. The three most important dimensions were: years of experience, formal education and number of subordinates or leadership. For each aspect of the work classification the respondent was asked to compare one of eight levels of the qualification for a single worker with a standard stimulus.

The interviewers were trained to put the card with the standard stimulus in front of the respondent. Then they shuffled the other cards on which the stimuli were presented and showed the top one next to the standard. The respondent made a categorical and a magnitude judgement. These judgements were written down by the respondent. The interviewer then took away the first stimulus and presented the next stimulus for comparison with the standard. The other stimuli were judged in the same way. For each topic the

evaluation of the eight judgements was measured by a category scale and by magnitude estimation.

Experience is measured, for example, by asking the respondents how qualified workers are if they have experience in the factory of 1,2,3,4,6,10,15 or 20 years. The standard for this topic is four years. The standard for Education is technical school and two courses organized by the company. For the topic Leadership, the standard is leadership with a number of subordinates of five.

A full description of the measurement procedure has been given in Saris et al.(1977).

Effects of situational factors

In order to study the two possible sorts of effects the general model shown in figure 1 will be used. The analysis is done across individuals while only those respondents are included in the analysis for whom the personal characteristic (for example the number years experience) was identical to one of the General Job characteristics presented.

In this model z1 and z2 represent sources of errors. In this formulation of the process z1 could represent the specific individual variation of each respondent which makes his responses different from the average judgement. The factors which produce the difference between the general judgement and the conscious judgement of the Own Job are represented in z2.

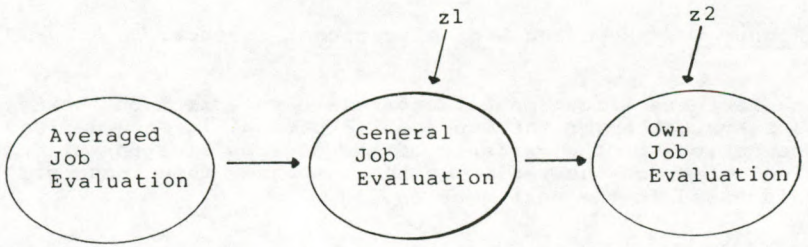

Figure 1 : The general model for the evaluation of job characteristics.

The first possible source of error is located in the situational factors. Several situational factors, or evaluations of situational factors, are analysed for their effects on the General and the Own Job Evaluation. The situational factors are : function classification, years of experience, number of subordinates, evaluation of own education, evaluation of own leadership capacity, evaluation of work circumstances, level of formal education, career possibilities and number of company-organized courses participated in. The effects of these factors can be introduced as shown in figure 2.

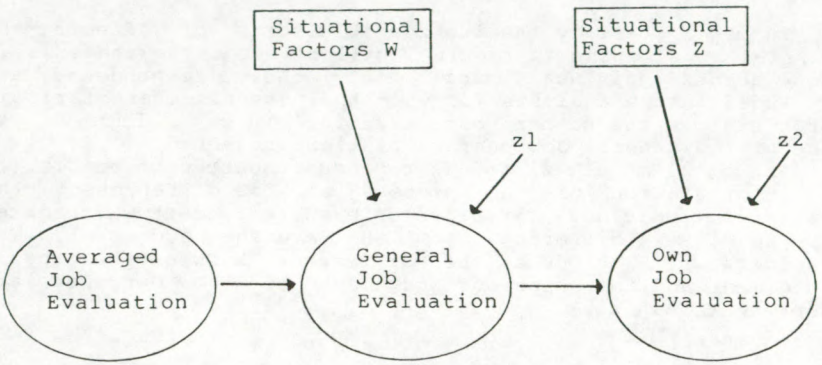

Figure 2 : The effects of situational factors.

If these situational factors have an effect on the General Job Evaluation or the Own Job Evaluation, it should lead to reduction of the variance of the sources of error z1 and z2. The effect of the variation in response functions will be discussed in the next section.

Variation in Response Functions

There is also another possible explanation of the errors which will be presented in this section. If an analysis is done across stimuli for each set, the relationship between the averaged evaluation (group scale) and individual judgements can be studied. Figure 3 presents the results for three respondents.

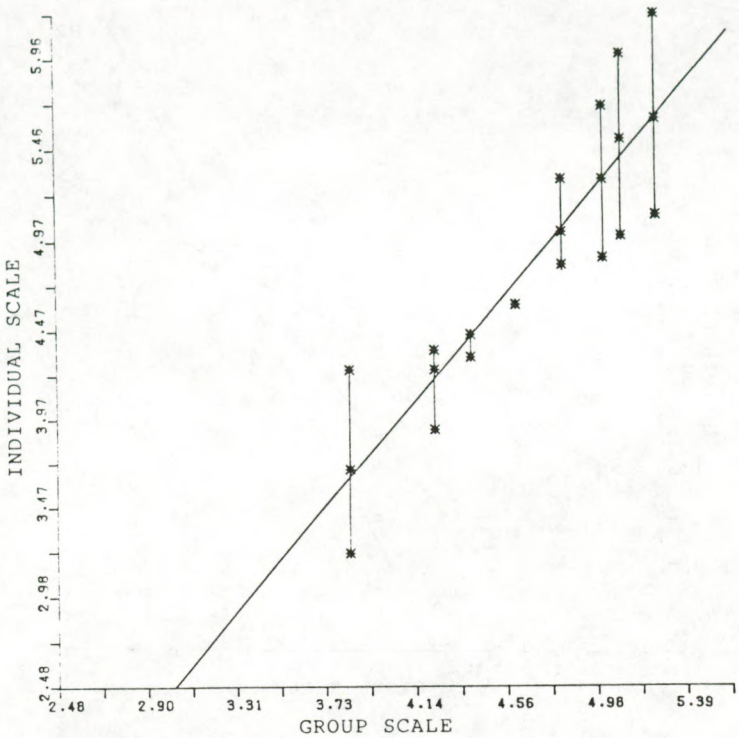

Figure 3 : Relationships of the scores of three respondents on eight stimuli of the topic Experience to the group scale. The relationship is given by the best fitted line.

It seems that the size of the random error, shown by the variation around the line, is large. However, it is possible that respondents have the same opinions but express them in a different way. A respondent can use extreme responses to express his opinion but he can also give understatements. For example, some respondents can use numbers within a small range while other respondents with the same opinion use numbers within a large range. The pattern of this response behaviour can be demonstrated with the response function. For the same three respondents as in figure 3, the response functions on the topic Experience are given in figure 4.

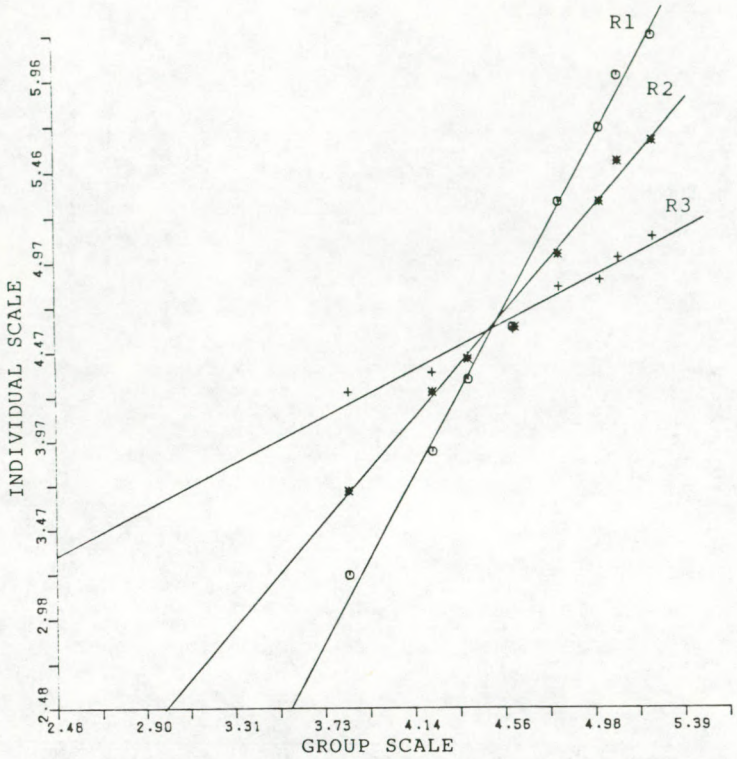

Figure 4 : Relationship of group scale to individual scores of three respondents.

This figure shows that each repondent has a unique pattern of answering that is very systematic way. This means that a part of the errors in figure 3 can be attributed to differences in response functions. These response functions can be expressed in an equation with, for each respondent, an individual intercept 'a' and a slope 'b'. This analysis suggests,following the literature (Orth, 1983; Saris, 1984), that for each respondent we obtain an interval scale with different parameters. These individual scales can be transformed to a common scale in the following way. First the parameters are computed using equation (1)

$$GS_j = a_i + b_i * S_{ij} + e_{ij} \qquad (1)$$

where GS is the averaged group score for the item j, a and b are respondent specific parameters, S is the response of respondent i on stimulus j and the "disturbance" term e expresses the random error of the response function.

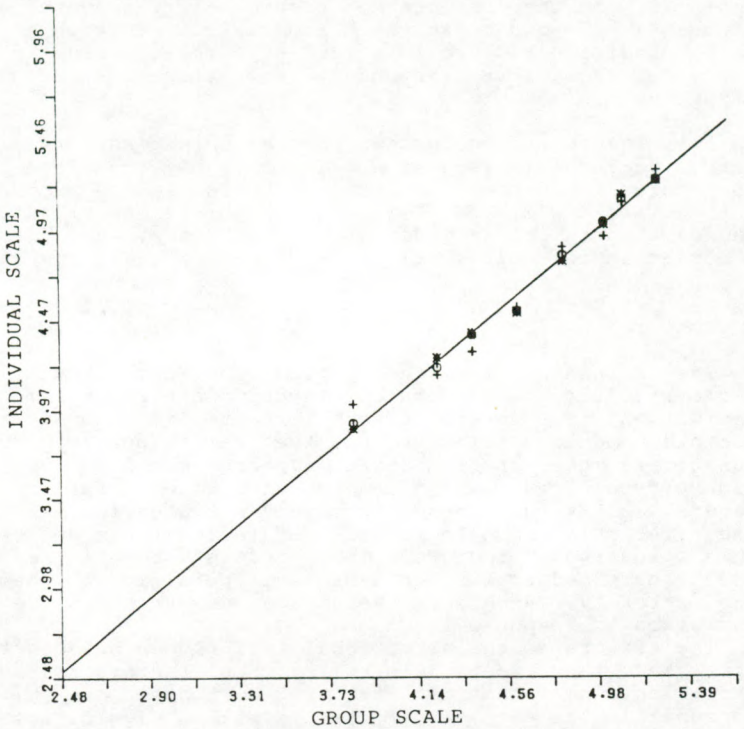

Figure 5 : Relationship group scale with transformed individual scores of three respondents.

When there is consensus between the respondents for the three topics, Experience, Education and Leadership, we use the a and b of the function to correct for the individual response pattern. The median r-square between the individual and the group scores is .873 for the topic Experience (N=503), for the topic Education it is .860 (N=504) and for the topic Leadership it is .862 (N=505). We can conclude that there is quite a high concensus between respondents concerning these topics. Thus it is justified to use the individual parameters a and b to transform the scores of

the judgements for any one topic. The formula to transform the scores is given by the equation

$$TS_{ij} = a_i + b_i * S_{ij} \qquad (2)$$

where TS is the transformed score of respondent i for stimulus j, a and b are the parameters of equation (1) and S is the individual score on stimulus j. The transformed scores for the same three respondents as in figure 4 are given in figure 5.

In this figure it can be seen that by this transformation the error variance is reduced considerably. By transformation of the scores in this way it must be possible to reduce the error variance z1 and z2 if the hypothesis is correct. Given these theoretical arguments we will test the different theories in the next section.

Research Design

The responses for the topics Experience, Education and Leadership are measured by a category scale and by magnitude estimation. To determine the effects of the situational factors and the effects of the variation in response functions, the program Lisrel (Joereskog and Soerbom, 1978) can be used because we have two indicators for both the General Job Evaluation and the Own Job Evaluation. To analyse the effects for each topic we first tested the model without the situational factors. These models were also tested for the transformed scores. This makes it possible to determine the error variance of the endogenous variables due to the variation in response functions.

The effects of the situational factors can be detected by analyzing the two models with these factors as exogenous variables. The situational factors we chose are given in appendix 1. The situational factors with a significant effect were kept in the model. The correlations of the variables with significant effects for each topic are included in the correlation matrices printed in appendix 2. The reduction in error variance by the situational factors can be computed for the original and for the transformed scores. The possibilities in comparing the results are summarized in table 1.

	without situational factors "simple model"	with situational factors "full model"
original scores	I	II
transformed scores	III	IV

Table 1. Four possibilities to measure the reduction in error variance.

These analyses made it possible to compare the effects of the situational factors and the effect of the variation of the response functions on the error variance. For the original scores a comparison between I and II can be made, that is between the model without the situational factors (simple model) and the model with the situational factors (full model). The differences in error variance are due to the situational factors. The effect on the error variance due to the differences in response functions can be detected by comparison of I and III. Another possibility is to compare III with IV and II with IV to detect the effect of the situational factors and the effect of the variation in response functions on the error variance. In this study we present all results, but the evaluations will be based on comparisons of cells I and II and I and III, because they give the best indication of the effects of one factor independent of the other. In this way we can detect how much error variance can be explained maximally by these two possible sources.

Results

In order to compute the effects of the situational factors and the effects of the variation in response functions on the error variances, the models can be compared as shown in table 1. The results for the three topics are summarized.

Experience

For the original and the transformed scores a model without the exogenous variables (the "simple model") has been tested which has a good fit to the data. Also the models with all the exogenous variables (the "full models") fit well. In table 2 the goodness of fit statistics are given for these models.

	Chi-square	df	Probability
Simple model original scores	.62	1	.431
Simple model transformed scores	.25	1	.614
Full model original scores	29.39	28	.393
Full model transformed scores	12.14	28	.996

Table 2. The goodness of fit statistics of the models for the Experience data, N=115.

In the models for the transformed scores one degree of freedom is lost because of correcting for negative variance of the number score of the Own Job Evaluation.

In these models the error variance of the variables General Job Evaluation and Own Job Evaluation is estimated. In table 3 these estimates of the unexplained variance of the General Job Evaluation (psi 22) and of the Own Job Evaluation (psi 33) are shown.

	simple model		full model	
	psi 22	psi 33	psi 22	psi 33
Original scores	.388	.280	.318	.274
Transformed scores	.149	.251	.123	.251

Table 3. The unexplained variance coefficients for the General and Own Job Evaluation of the quality Experience.

In the models with the original scores the unexplained variance of the General Job Evaluation decreases from 38.8 to 31.8 percent by including the exogenous variables in the model. They reduce the unexplained variance by seven percent. The unexplained variance of the Own Job Evaluation remains about 28 percent. We can conclude that the exogenous variables do not reduce the unexplained variance of the Own Job Evaluation.

In the simple model of the transformed scores, the unexplained variance of the General Job Evaluation is 14.9 percent. The unexplained variance for the original scores was 38.8 percent. We see that the transformation reduces the unexplained variance by 23.9 percent. So the total unexplained variance of the measurement error is reduced 61.6 percent by the transformation.

The transformation of the scores of the Own Job Evaluation reduced the unexplained variance (psi 33) in the simple model by 2.9 percent which means a reduction of the total variance

of the measurement error of the Own Job Evaluation by 10.35 percent.

The transformation of the Own Job Evaluation scores does not lead to the same results as the transformation of the General Job Evaluation scores. The total variance is reduced by the transformation but the error variance less due to the fact that the error variance in the Own Job Evaluation has an error component that is due to other factors.

Education

The results of the test of the models for the topic Education are presented in table 4.

	Chi-square	df	Probability
Simple model original scores	.62	1	.431
Simple model transformed scores	3.47	1	.062
Full model original scores	27.05	16	.041
Full model transformed scores	18.31	16	.306

Table 4. The goodness of fit statistics for the models with the Education data. N=223.

Also for these models there is quite a good fit to the data. The full model for the original scores gives a probability of .041.

The coefficients of the unexplained variance of the General Job Evaluation (psi 22) and the Own Job Evaluation (psi 33) are given in table 5.

	simple model		full model	
	psi 22	psi 33	psi 22	psi 33
Original scores	.502	.673	.498	.547
Transformed scores	.219	.713	.243	.573

Table 5. The unexplained variance coefficients for the General and Own Job Evaluation of the quality Education.

The unexplained variance of the General Job Evaluation in the simple model is 50.2 percent and in the full model 49.8 percent. When we add the exogenous variables to the model they reduce the unexplained variance only by .4 percent.

The correction of the scores reduces the unexplained variance from 50.2 to 21.9 percent in the simple model. The reduction of the total unexplained variance attributed to the transformation is 56.37 percent.

The unexplained variance of the Own Job Evaluation in the simple model is 67.3 percent. With the exogenous variables in the model the unexplained variance is 54.7 percent. In the models with the transformed scores, the unexplained variance is about 4 percent higher. Also for this quality the reason may be that the error is due to other factors.

Leadership

The results of the test of the models for the job quality Leadership are shown in table 6.

	Chi-square	df	Probability
Simple model original scores	.71	1	.399
Simple model transformed scores	.14	1	.708
Full model original scores	25.15	23	.343
Full model transformed scores	24.10	23	.398

Table 6. The goodness of fit statistics for the models with the Leadership data, N=50.

For the Experience model two corrections for negative variances were necessary.

The coefficients of the unexplained variance of the General and Own Job Evaluation are presented in table 7.

	simple model		full model	
	psi 22	psi 33	psi 22	psi 33
Original scores	.599	.673	.531	.624
Transformed scores	.461	.802	.440	.771

Table 7. The unexplained variance coefficients for the General and Own Job Evaluation of the quality Leadership.

Transformation of the General Job Evaluation scores reduced the unexplained variance from 59.9 to 46.1 percent. The total reduction of the unexplained variance of the General Job Evaluation by the transformation of the scores in

the simple model is 23 percent.

For the Own Job Evaluation, however, the transformation is responsible for an increase of the unexplained variance. The reason may be that the workers evaluate their own leadership on other work aspects so that a transformation based on their evaluation of other leadership stimuli does not reduce the error variance. These errors are unrelated to the response behaviour of respondents.

Conclusions and Discussion

Two possible effects on Evaluation of Job Qualifications in survey-interviews have been tested. The effects of situational factors and of variation in response functions have been analyzed. For the General Job Evaluation the reduction of the total error variance only by the situational factors, or only by the transformation process, is given in table 8.

	source of error	
topic	situational errors	response functions
Experience	18.0% (.388, .318)	61.6% (.149, .123)
Education	.8% (.502, .498)	56.4% (.219, .243)
Leadership	11.4% (.599, .531)	23.0% (.461, .440)

Table 8. Maximal reduction of the total error variance of the General Job Evaluation by the two possible sources of error, in percentages of the total error variance. The unexplained variance coefficients for the simple and for the full model are given in parentheses.

In this table we see a considerable reduction in the total error variance by transforming the scores for the response functions. The error variance can be reduced much more by transforming the scores for the response functions than by the situational factors.

On the other hand it was seen that the error variance in the conscious judgement of the Own Job is not reduced by the transformation process. A possible explanation is that in the ralationship between the General Job Evaluation and the Own Job Evaluation the variation in response functions might even contribute to the correlation between the judgements, due to the fact that they are affected by the same parameters. Transformation of the scores for both variables takes out this common cause of variation in the variables. Therefore the explained variance can even increase by the transformation.

This does not mean that there is not a systematic error component in the Own Job Evaluation. The problem is, however, that this error can not be demonstrated in the presented analysis. If only the effect of the averaged score on the Own Job Evaluation is analyzed in a model of the original and the transformed scores for the three topics, the same effect can be demonstrated. The results are given in table 9.

	Topics		
	Experience	Education	Leadership
	psi 33	psi 33	psi 33
original scores	.446	.773	.804
transformed scores	.306	.716	.816

Table 9. Reduction of the error variance of the Own Job Evaluation by transforming the scores.

This table shows that transformation also can effect the error variance in the Own Job Evaluation. This effect is not so strong as the effect on the error variance of the general job evaluation.

The reason for this is that in the Own Job Evaluation other error factors also play a role, independent of response behaviour. Therefore the effect of the response pattern is relatively small, but nevertheless also present, at least for two of the three topics.

The reduction in error variance by transforming the scores for the response functions is only possible if there are differences in response functions. For the topic Experience the parameters of the response functions are given in figure 6.

This figure shows that there is indeed a considerable variation in the response function parameters for this category as well as for magnitude judgements. This finding makes our explanation of errors in survey research more plausible. This explanation holds for magnitude estimation as well as for the more common category judgements.

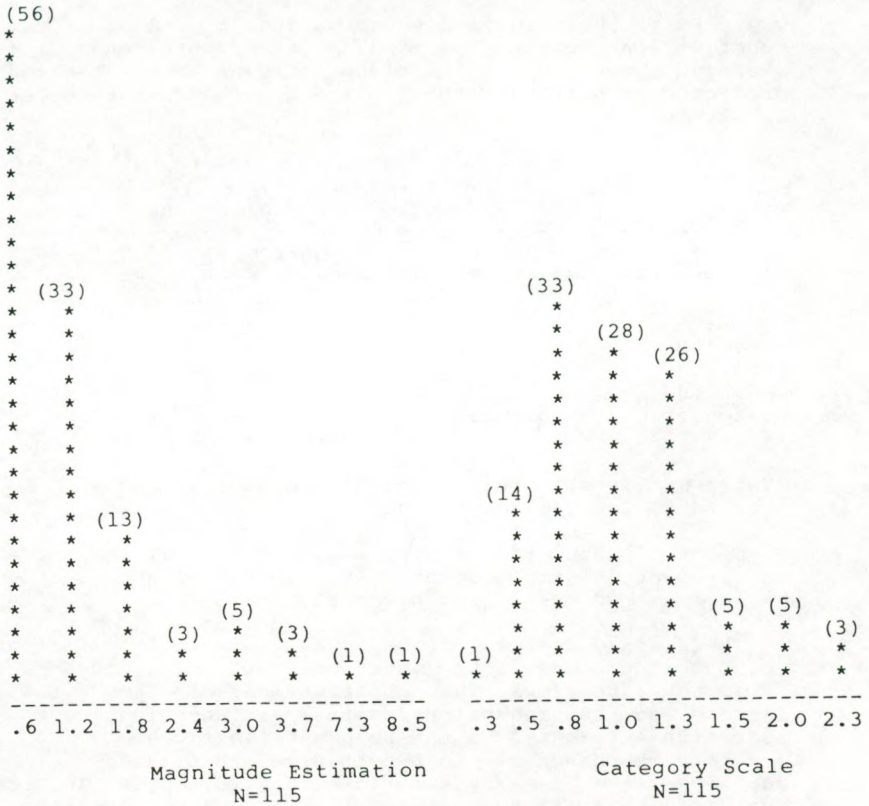

Figure 6 : The distribution of the parameters b of the response functions of the topic Experience.

Assuming that respondents have the same opinion, but that they have a different way of expressing their opinions, it would be possible to describe the relationship between the observed and the mean score by a linear function with the individual response parameters a_i and b_i. If this assumption is correct we can use the parameters a_i and b_i and the mean scores to predict the scores for each respondent in the following way.

$$PS_{ij} = a_i + b_i * GS_j$$

where PS is the predicted score, a and b are the response function parameters to predict the score and GS is the averaged score. The correlations between the observed and predicted scores and the explained variance for the General Job Evaluation are given in table 10.

	General Job Evaluation					
	Experience		Education		Leadership	
	r	r-square	r	r-square	r	r-square
predicted scores:						
magnitude	.96	.92	.88	.78	.82	.67
category	.96	.92	.89	.79	.83	.69

Table 10. Relationship of predicted scores with the General Job Evaluation.

Table 10 shows that the general job evaluation score can be predicted quite accurately by the response function parameters and the averaged score.

These analyses lead to the conclusions that variation in response functions is an important source of systematic error in survey-interviews. The contribution of the situational factors to the reduction in error variance is less than the reduction attributed to the response functions.

It seems reasonable to hypothesize that also for other questions the same systematic error will exist. In order to evaluate these errors one has to ask many questions with respect to the same topic. In that way the individual response function can be determined and the errors can be reduced.

In the above mentioned procedure it is possible that too much variation in the judgements has been taken out. The possibility exists that a part of the variation is due to differences in opinions. But, in the procedures used here, this distinction can not be made. Further research is required to determine the contribution of the response pattern and differences in opinions to the error variance.

In the psychophysical literature directions can be found to study this problem (see for example: Rule and Curtis, 1982 and Birnbaum, 1982).

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Appendix 1.

Situational Factors

- Years of Experience
- Level of Formal Education
- Number of Company-organized Courses attended
- Function Classification
- Department of the Factory
- Number of Subordinates
- Age of the Worker
- Frequency of Giving Orders to Subordinates
- Contact with Co-workers
- Work Sphere
- Safety Work Circumstances

- Level of the Salary
- Career Possibilities
- Availability of Additional Courses
- Status of the Job among Co-workers
- Autonomy of the Job
- Possibility for Self-realization
- Evaluation of Own Leadership Capacity
- Evaluation of Own Education
- Evaluation of Own Work Circumstances
- Evaluation of Own Experience

Appendix 2.

Correlation Matrix for the topic Experience
(transformed scores above diagonal)

Y1	Y2	Y3	Y4	Y5	X1	X2	X3	X4	X5	X6
1.000	.933	-.908	.812	-.772	-.907	-.437	-.244	.099	.246	.024
.825	1.000	-.932	.843	-.783	-.840	-.385	-.195	.107	.245	.007
-.768	-.895	1.000	-.804	.817	.844	.379	.232	-.074	-.227	-.014
.714	.831	-.731	1.000	-.904	-.728	-.352	-.213	.076	.224	.003
-.684	-.771	.836	-.880	1.000	.713	.350	.224	-.041	-.203	-.001
-.907	-.738	.689	-.632	.608	1.000	.425	.269	-.077	-.246	-.039
-.437	-.256	.234	-.256	.249	.425	1.000	.523	-.421	-.366	-.008
-.244	-.152	.137	-.177	.172	.269	.523	1.000	-.098	-.376	.040
.099	.063	-.028	.045	-.035	-.077	-.421	-.098	1.000	.360	-.074
.246	.295	-.190	.298	-.209	-.246	-.366	-.376	.360	1.000	-.052
.024	.005	-.004	.002	.038	-.039	-.008	.040	-.074	-.052	1.000

Y1	Averaged Job Evaluation
Y2	General Job Evaluation Category Score
Y3	General Job Evaluation, Magnitude Score
Y4	Own Job Evaluation, Category Score
Y5	Own Job Evaluation, Magnitude Score.
X1	Years of Experience
X2	Function Classification
X3	Number of Subordinates
X4	Evaluation of Own Education
X5	Evaluation of Own Leadership Capacity
X6	Evaluation of Work Circumstances

Correlation Matrix for the topic Education
(transformed scores above diagonal)

Y1	Y2	Y3	Y4	Y5	X1	X2	X3	X4
1.000	.806	-.813	.507	-.404	-.994	.201	-.011	-.285
.644	1.000	-.833	.487	-.341	-.793	.111	-.024	-.196
-.632	-.760	1.000	-.460	.383	.816	-.142	-.000	.267
.481	.546	-.472	1.000	-.717	-.514	.308	-.276	-.342
-.386	-.419	.460	-.818	1.000	.411	-.268	.212	.167
-.994	-.627	.633	-.487	.395	1.000	-.199	.009	.286
.201	.103	-.124	.292	-.254	-.199	1.000	-.102	-.218
-.011	-.044	.056	-.264	.305	.009	-.102	1.000	.144
-.285	-.217	.280	-.361	.230	.286	-.218	.144	1.000

Y1 Averaged Job Evaluation
Y2 General Job Evaluation Category Score
Y3 General Job Evaluation, Magnitude Score
Y4 Own Job Evaluation, Category Score
Y5 Own Job Evaluation, Magnitude Score.
X1 Level of Formal Education
X2 Career Possibilities
X3 Evaluation of Own Leadership Capacity
X4 Function Classification

Correlation Matrix for the topic Leadership
(transformed scores above diagonal)

Y1	Y2	Y3	Y4	Y5	X1	X2	X3	X4	X5
1.000	.770	-.692	.447	-.347	-.845	-.327	-.289	-.026	.170
.754	1.000	-.847	.478	-.398	-.587	-.194	-.282	.027	.214
-.622	-.812	1.000	-.337	.423	.537	.196	.285	-.045	-.122
.396	.533	-.396	1.000	-.843	-.310	-.276	-.135	.033	.323
-.383	-.459	.572	-.776	1.000	.191	.317	.056	-.011	-.294
-.845	-.541	.432	-.252	.213	1.000	.404	.351	-.025	-.063
-.327	-.048	.137	-.105	.198	.404	1.000	.165	.379	-.081
-.289	-.289	.220	-.120	.039	.351	.165	1.000	-.182	.068
-.026	.081	-.021	.080	-.040	-.025	.379	-.182	1.000	-.343
.170	.154	-.103	.246	-.303	-.063	-.081	.068	-.343	1.000

Y1 Averaged Job Evaluation
Y2 General Job Evaluation Category Score
Y3 General Job Evaluation, Magnitude Score
Y4 Own Job Evaluation, Category Score
Y5 Own Job Evaluation, Magnitude Score.
X1 Number of Subordinates
X2 Function Classification
X3 Years of Experience
X4 Number of Courses Participated Organized by the Company
X5 Career Possibilities

Ontvangen: 10-3-84