

Testing a Household Roster

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In our presentation we give an example of our practical work at ZUMA. It's not an experiment. It's a story about two tests in which we have evaluated a special kind of household roster. We only focus on the most relevant things.

1. Test 1

The goal of test 1 was the evaluation of all questions of a self-administered paper-and-pencil questionnaire for a special survey project of the Federal Statistical Office Germany. The questionnaire consisted of two parts: Part 1 was a special kind of household roster, part 2 contained old and new questions about the household. In our presentation only part 1 is of interest.

The household roster is a matrix in which the respondent has to fill in the relationships of each other for all members of the household. It consists of 2 pages: On the first page is the fold-out clip, where the respondent has to fill in all members of the household. After that he has to connect the fold-out clip to the matrix. On top of the second page is the instruction text, followed by an example. Underneath you find the explanation of the code numbers for the relationships and further down on this page is the matrix. The respondent has to fill in the code numbers into the clear boxes (see matrix 1 in the appendix). This matrix had been used for years by the Federal Statistical Office Germany in different surveys.

1.1. Method of Test 1

We recruited 15 test persons (quota sample: education, household size with at least 3 persons). These test persons were paid. The pretest interviews were conducted by ourselves. We used our normal procedure to test self-administered questionnaires: The test person should fill in the questionnaire as if he/she would be alone at home. After the test person had completed the questionnaire he/she was asked to report on his/her problems followed by additional probings – question by question. In addition, we tried to find out what kind of problems the test person had to fill in the matrix. But we didn't put too much effort into finding out this because the major interest of our client was the evaluation of the new questions and furthermore we didn't have enough interview-time to explore the matrix extensively.

1.2. Results of test 1

- 6 test persons filled in the matrix correctly.
- 4 test persons didn't fill in anything.
When we asked for the reasons these test persons told us that the whole page would look
 - too complicated
 - too complex
 - too crowded
- 5 test persons filled in the matrix not correctly.

We only explained the correct solution how to complete the matrix to these 5 test persons and asked them why they had problems to fill it in. They couldn't tell specific reasons for their mistakes. They only told things like:

“Oh, I must have misunderstood that.”

“It was too complicated.”

Here are two examples of how the matrix was filled in not correctly:

Example 1: 3-person household (father, mother, child)

	01 (Father)	02 (Mother)	03 (Child)	04
01 (Father)	1 (incorrect) (correct: no code number)			
02 (Mother)	2 (incorrect) (correct: 1)			
03 (Child)	1 (incorrect) (correct: 2)	2 (correct)		
04 ?	1 (incorrect) (correct: no code number)	5 (incorrect) (correct: no code number)		

The test person had filled in 6 code numbers. Only one of them is correct. Surprisingly the test person filled in a code number into a dark box and two code numbers for a not existing fourth person.

Example 2: 3-person household (father, mother, child)

	01 (Father)	02 (Mother)	03 (Child)	04
01 (Father)	01 (incorrect) (correct: no code number)			
02 (Mother)	Box empty (incorrect) (correct: 1)			
03 (Child)	Box empty (incorrect) (correct: 2)	Box empty (incorrect) (correct: 2)		
04				

The test person filled in only one single code number into a “forbidden“ dark box. The code number itself is not correct, all code numbers are only one-digit.

The test persons did not formulate specific problems with the matrix, they only formulated problems they had with elements around the matrix like

- The example should be placed on an extra page.
- The example didn't look exactly like the original matrix.
- It was not clear that the figures in the headline of the matrix represent the persons on the fold-out clip.
- It was not clear that the fold-out clip should be connected to the left side of the matrix.

Having these findings we concluded that changing the elements around the matrix would make it easier to fill it in correctly.

These were our fixings:

- The whole scheme was straightened out.
- The example was now on an extra page and the matrix there looked exactly like the original one.
- The fold-out clip was now directly connected with the matrix.
- To make sure that the persons on both sides of the coordinate system are listed in the same order the first names of the fold-out clip should now be written on the top of the matrix. Therefore the questionnaire should be turned.
- The instruction text was much more detailed than in version 1.

The principle of the matrix (see matrix 2 in the appendix).

With these changes, we hoped that the test persons could now fill in the matrix correctly.

Because of these big changes we decided – together with our client – to conduct a second test.

2. Test 2

The goals of test 2 were:

- Evaluating only the matrix with its elements
- Finding out the specific reasons why test person had filled in the matrix not correctly.

2.1. Method of Test 2

It was a kind of usability test. 16 test persons were recruited by a Quota sample (education, household size with at least 3 persons). They were paid. The interviews were conducted by ourselves in the cognitive lab and video-taped. We observed the complete behaviour of each test person and explored problems intensively.

The test person had to read-aloud all instructions. Most of the test persons stopped reading aloud when they had a problem with the instruction text. However: Most of the test persons felt distracted in their concentration through reading aloud. Therefore some of them read the whole instruction once more without reading aloud. The requirement to read aloud while thinking seems to have a negative effect on the task performance, especially in the case of high task complexity. Test 2 produced new findings which we didn't expect.

2.2. Results from Test 2:

- 5 test persons filled in correctly
- 11 test persons filled in not correctly

The results showed no improvement compared to test 1.

Here is an example of how the matrix 2 was filled in not correctly:

Example 3: 3-person household (mother, child, child)

	1 (Mother)	2 (Child)	3 (Child)	4
1 (Mother)				
2 (Child)	Box empty (incorrect) (correct: 2)			
3 (Child)	Box empty (incorrect) (correct: 2)	2 (incorrect) (correct: 3)		
4 ?		2 (incorrect) (correct: no code number)	3 (incorrect) (correct: no code number)	

The test person had filled in 3 code numbers which were all not correct. Surprisingly again the test person filled in code numbers for a fourth not existing person in the household.

2.2.1. Our findings about the matrix

Because of the direct observations in the lab and intensive probings like:

“How did you proceed to fill in the boxes?”

“How did you decide to write code x into the box?”

We found that most of the test persons had big problems to solve this task and we detected the main reason why they had these big problems: Most of them didn't or couldn't understand the basic principle of such a coordinate system and were not able to work with it. We are pretty sure that they wouldn't have been able in any case...

...regardless of which instruction

...regardless of which layout

...regardless of which examples given

We suppose that the main reasons for the problems of these people could be

- a poorly developed kind of spatial perception
- a poorly developed kind of visual literacy

2.2.2. Our findings about the changed elements:

Instruction-text too long, too less structured, too complicated.

- The instruction to “turn” the matrix was misunderstood.
- The example was read not at all or was not helpful.
- The fold-out clip was not filled in or the test person saw no connection to the matrix.
- No names were filled in into the headline of the matrix.

These findings looked very frustrating to us because we wouldn't have expected that all of our solutions concerning the elements around the matrix would cause so many problems in practice.

3. What about the future application of the matrix?

The results of test 2 showed that the matrix can't be used in a self-administered paper-and-pencil questionnaire. The only way – in our opinion - to get information about the relationships of all household members would be to decompose the matrix into single questions about each household member and ask these questions with the aid of a computer. But because the survey must be conducted with a self-administered paper-and-pencil questionnaire the project group decided that the matrix will no longer be used. An important reason for this decision were the video tapes which the members of the project group had looked over. There is now only a simple roster left in which each household member has to be filled in together with his/her relationships.

4. Conclusion

In our opinion the results of the two tests contain two interesting aspects:

- How different methods can produce different results
- The need for testing your solutions in a second test

4.1. First aspect: How different methods can produce different results

Let's have a look back on the two methods:

Method of Test 1	Method of Test 2
A cognitive test: Only collecting problems	A kind of usability test: Finding out the reasons why test persons had problems with the matrix
We didn't detect the central problem with the matrix.	We detected the central problem with the matrix: Most of the test persons didn't understand the basic principle of such a coordinate system and were not able to work with it.

The goal of the method used in test 1 was: Testing the whole questionnaire, therefore the matrix wasn't evaluated very intensively. Result: We didn't get specific reasons why the test persons had problems with the matrix.

The goal of the method used in test 2 was: Testing the matrix intensively. Result: We got the specific reasons why the test persons had problems with the matrix.

It seems to be obvious, that the reason for these different results is, that the method used in test 1 wasn't an adequate method to evaluate the matrix in a satisfying manner.

4.2. Second aspect: The need for testing your solutions in a second test

The second test had shown that our solutions after test 1 had not been satisfactory. But what would have been worse: Without testing the matrix a second time it would have been a part of the main study.

4.3. What we have learned from these two tests:

- Be sure that the evaluation method is adequate concerning the evaluation goals. Sometimes it's not easy, but think about it before you start.
- If at all possible, test your solutions in a second (or third) round, especially in the case of high complexity tasks.

Appendix 1. MATRIX Test 1
(Next page.)

**Please put this fold-out clip to
the left of page 6.**

This is filled in by the institute	Code number	Please write in block letters
	01	
	02	
	03	
	04	
	05	
	06	
	07	
	08	
	09	
	10	

Relationships between members of your household to each other

Please fill in the following table how the members of your household are related to each other. Leave the fold-out clip with the first names of the members open and fill in the adequate figure. Our example shows you how it works.

A household is composed of five persons: the couple Jan and Petra, their children Felix and Julia and Petra's mother named Eva. In this example, the entries of the first persons (Jan's) relationships look like this:

Petra is Jan's wife = 1
Felix is Jan's and Petra's son = 2
Julia is Jan's and Petra's daughter = 2 as Felix's sister = 3
Eva is Jan's mother-in-law = 7, Petra's mother = 5, Felix's and Julia's grandmother = 8

		01	02	03	04	05
<i>Jan</i>	01					
<i>Petra</i>	02	1				
<i>Felix</i>	03	2	2			
<i>Julia</i>	04	2	2	3		
<i>Eva</i>	05	7	5	8	8	

Relationships between members of the household to each other

- 1= spouse, partner
- 2= child
- 3= brother / sister
- 4= grandchild
- 5= father / mother
- 6= son-in-law / daughter-in-law
- 7= father-in-law / mother-in-law
- 8= grandfather / grandmother
- 9= other relatives, persons who are related by marriage
- 88= other persons who are not related or related by marriage

Code number	01	02	03	04	05	06	07	08	09	10
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										

Appendix 2. MATRIX Test 2

Indications for completing the fold-out clip

Please write the first names of all persons who live in the household down in the white fields. The person who completes the questionnaire, puts her/his name in the first place. Please do also fill in your first name if you live alone. If the household consists of **several** persons, fill in the first names of all persons in the following **order**:

- spouse / partner
- children
- other related persons
- not related persons

Please leave this fold-out clip open for filling in this table.

	Code number	First name
		<i>Please write in block letters</i>
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	

Who lives in the household?

1 How many persons do live in your household at present?

Please fill in the number of persons.

Number of persons

2 What kind of relationships do persons who live in the household have to each other?

Please open the fold-out clip on the left side of the questionnaire and fill in the first names of all persons of the household in the given order. Please complete the following table then. To do this, please turn the questionnaire first and then write down the first names of all members of your household in the white fields. Keep the same order as on the fold-out clip on the left side.

Afterwards, please turn the questionnaire back again and fill in the adequate numbers for the kinds of relationship (look at the list next to the table).

Now you start with the second person on the fold-out clip and fill in the white field how he/she is related with the first person on the top. Then, please fill in what kind of relationships the third person has with the first and second person on top. Do this for all persons written down on the fold-out clip.

There is an example on the right side which shows you how to complete the table.

First name	Relationships between members of the household to each other								
	1	2	3	4	5	6	7	8	9

11= spouse, partner
 12= child
 13= brother / sister
 14= grandchild
 15= father / mother
 16= son-in-law / daughter-in-law
 17= father-in-law / mother-in-law
 18= grandfather / grandmother
 19= other relatives, persons who are related by marriage
 88= other persons who are not related or related by marriage

Example for the completion of the table in question 2

Our example household consists of 5 persons: the couple Jan (no.1) and Petra (no.2), their two children Felix (no.3) and Julia (no.4) and Petra's mother named Eva (no.5). For this household you would fill in the table as follows:

You would start with the second person, in our example with Petra. Petra is Jan's wife, therefore you would write a 1 in the field. Afterwards you would fill in the relationships of the third person, here Felix. Felix is Jan's son, hence you would write a 2 in the first field. At the same time, Felix is Petra's son, hence you would also write a 2 in the second field. You would go ahead the same way for the fourth and every other person.

Fold-out clip on the left side of the questionnaire

	First name	Relationships between members of the household to each other				
		<i>Jan</i>	<i>Petra</i>	<i>Felix</i>	<i>Julia</i>	<i>Eva</i>
		1	2	3	4	5
1	<i>Jan</i>					
2	<i>Petra</i>	1				
3	<i>Felix</i>	2	2			
4	<i>Julia</i>	2	2	3		
5	<i>Eva</i>	7	5	8	8	
6						
7						
8						
9						
10						

1= spouse, partner
 2= child
 3= brother / sister
 4= grandchild
 5= father / mother
 6= son-in-law / daughter-in-law
 7= father-in-law / mother-in-law
 8= grandfather / grandmother
 9= other relatives, persons who are related by marriage
 88=other persons who are not related or related by marriage

Thank you for your cooperation.