

Reporting the Frequency and Duration of Household Tasks by Elderly Respondents: The Effect of Different Interview Strategies on Data Quality

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Abstract

In a survey after physical activities and fall incidents among elderly people, the interviewers used in more than half of the interviews an interview strategy that substantially deviates from the wording of the questionnaire. In the deviating ‘partial’ strategy the interviewer actually decomposes the broad questions of the questionnaire into smaller, and hopefully easier to answer, sub-questions. Whether this decomposition leads to better data quality still remains an issue. On the one hand, it leads to less rounding off and less overestimation of the average time spend on household tasks, and thus to more precise and accurate data. On the other hand, the correlation between the estimation based on the questionnaire, and that based on a 7-day diary, is lower than with the prescribed ‘integral’ strategy. So the integral strategy gives a better prediction of the differences among respondents regarding the time they spend on the performance of household tasks. It also leads to the most efficient process of data collection, requiring less than half of the time needed for the use of the partial strategy.

Keywords: Elderly respondents, Household tasks, Decomposition of questions, Interview strategy, Data quality, Efficiency of the data collection.

1. Introduction

Detailed self-report questions are hard to answer especially for elderly respondents (Schwarz et al., 1998; Knäuper et al., 1997). So one would expect that questions, posed to elderly respondents (65+) about the frequency and duration of their performance of household tasks during the last two weeks, lead to question-answer sequences resulting in much item non-response and many inadequate, that is, irrelevant and incomplete, answers.

However, contrary to that expectation, in a survey after physical activities and fall incidents among elderly people, hardly any item non-response, nor inadequate answers, was reported. In order to explain the difference between the expected and the actual

interview process, we focused the analysis on the behavior of the interviewers.

It turned out that they used different interview strategies to help the respondents to come up with relevant and complete answers. In the ‘integral’ strategy, the interviewer – in accordance with the questionnaire – poses questions about frequency and duration of entire groups of household tasks. In the ‘partial’ strategy, the interviewer – deviating from the questionnaire – rephrases the questionnaire and poses the questions about frequency and duration for each individual task separately, therewith making the questions easier to answer. The ‘mixed’ strategy is a combination of these two interview strategies.

In this paper it is investigated how often each of these three strategies is used, and analyzed what the effect of the employment of these different strategies is on the efficiency and the quality of the data collection.

2. The Context of the Data

The topic of the survey, from which part of the data is used here, is “the prevention of fall accidents in older persons” (Stel, 2003). It has been shown in the literature that the performance of physical activities is an important factor in the reduction of falls and fractures (Graafmans, Bouter and Lips, 1998). For that reason, a couple of instruments were used in this survey to measure these activities (see Stel et al., 2004).

One of these instruments is called the LAPAQ, a paper and pencil questionnaire for face-to-face interviews that covers the frequency and duration of walking outside, bicycling, gardening, light and heavy household activities, and a maximum of two sport activities during the previous two weeks.

Another instrument used for measuring physical activities is a 7-day activity diary that was completed during 7 consecutive days. Every evening of that week the respondent answered questions about the physical activity of that day. The questions covered the duration

of walking inside and outside, bicycling, gardening, light and heavy household activities, and sport activities. Part of the data from the diary is used to assess the accuracy of the data obtained with the questionnaire.

The survey was performed within the framework of LASA, the Longitudinal Aging Study Amsterdam (Deeg and Westendorp-de Serière, 1994). For this survey, respondents were recruited from 1509 men and women, aged 65 years and older as of January 1 in 1996, and who participated in a follow-up study on falls within LASA. Subjects who completed the third data-collection cycle within LASA in 1998/1999 and fell at least once between January 1998 and January 1999 (n=328) were eligible for this additional study, as well as a random sample of 196 respondents who did not fall during this year.

Of the 524 eligible subjects, 85 did not participate (14 deceased, 34 refused, 31 were not capable, and 6 could not be contacted). Of the 439 participants in the study, there were four non-participants of the LAPAQ: one was bedridden and three used an electrical wheelchair for transportation. Furthermore, 401 respondents filled in the 7-day diary.

One year after the third data collection of LASA in 1998/1999, four trained research nurses visited the participants two times at home. During the first visit, they administered among other things the LAPAQ, and they instructed the respondents how to use the 7-day diary. After a week the research nurses visited the participants again to collect the diary.

Most of the interviews were recorded on audiotape. Those parts of the interviews that are about light, respectively heavy, household activities, were transcribed into verbatim protocols, provided that the audio-recordings of these interviews had sufficient sound quality. This resulted in transcripts of fragments of 326 interviews.

3. The Questions about Household Activities

For elderly people, most of the physical activities stem from the performance of domestic tasks (Washburn et al., 1987). So it is important that in interviews on physical activities, an inventory is made about what household tasks the elderly respondents (still) perform, and the frequency and the duration of these household activities.

In the literature a distinction is made between light and heavy household tasks, a distinction that relates to the

amount of energy, expressed in calories, the task requires. That part of the questionnaire we are interested in consists of six questions. For the light household tasks the respondent is asked whether he or she does light household tasks. This ‘task question’ is shown as question Q24 in Box 1 below. If the answer to the task question is ‘yes’, the respondent is asked a ‘frequency question’ (“How many days...?”; Q25), and a ‘duration question’ (“How long per day...?”; Q26).

Box 1. The six questions, selected from the LAPAQ questionnaire

Q24. Do you do light household tasks? With light household tasks we mean washing the dishes, dusting, making the bed, doing the laundry, hanging out the laundry, ironing, tidying up, and cooking meals.

1. no (go to question 27)
2. yes

Q25. How many days did you do light household tasks during the past two weeks?
days

Q26. How long per day did you usually do light household tasks?
hours.....minutes

Q27. Do you do heavy household tasks? With heavy household tasks we mean window cleaning, changing the bed, beating the mat, beating out the blankets, vacuuming, mopping the floor, and chores with sawing, hammering, repairing or painting.

1. no (go to question 30)
2. yes

Q28. How many days did you do heavy household tasks during the past two weeks?
days

Q29. How long per day did you usually do heavy household tasks?
hours.....minutes

This question-answer sequence, that includes these three questions, is followed by a similar sequence, except that the light household tasks have been replaced by heavy household tasks. Thus the main object of investigation in this study - a sequence -, includes three successive questions: a task question, a frequency question and a duration question (see Box 1).

4. The Three Interview Strategies

4.1 Examples of the Strategies

As mentioned above, the interviewers used different strategies to let the respondents come up with relevant and complete answers. In the ‘integral’ strategy, the interviewer – in accordance with the questionnaire – poses questions about the frequency and duration of entire groups of household tasks (i.e., ‘light’ and ‘heavy’ household tasks). Box 2 gives an example of this integral strategy.

Box 2. Example of the integral strategy

I: Do you do light household tasks? With that we mean washing the dishes, making the bed.....
 R: Yes, nobody else does that for me, so..
 I: And how many days have you done light household work?
 R: Washing the dishes every day.
 I: How long will you have been busy with light household tasks? We mean by that washing the dishes, making the bed, doing the laundry, hanging out the laundry, ironing, tidying up, and cooking meals.
 R: No longer than half an hour.

In the ‘partial’ strategy, the interviewer – deviating from the questionnaire – rephrases the questionnaire and poses the questions about frequency and duration for each individual task separately, therewith making the questions hopefully easier to answer (see Box 3).

The ‘mixed’ strategy is a combination of these two questioning strategies. For example, an integral asked frequency question followed by a partial asked duration question.

Box 3. Example of the partial strategy

I: I would like to know how much time you spend on light household tasks. How much time do you daily spend on washing the dishes?
 R: I have a dishwasher. I only put it in there.
 I: But also the cleaning of your cooking ring. How much time do you spend on that daily?
 R: Daily? Half an hour.
 I: How many days a week are you dusting?
 R: Two times a week.
 I: And about how long are you busy with that?
 R: Let’s say, two hours.
 I: Two hours; then you remove everything?
 R: Yes, then I wipe off everything wet.
 I: You mean from the windows?
 R: Yes, and from the door.
 I: I only talk about dusting. How much time do you need for dusting only?
 R: Let’s say two hours a week.
 I: Making the bed you do everyday I suppose?
 R: Yes
 I: Doing the laundry. With that I mean collecting the laundry, selecting it, put it in the washer. How often do you do the laundry in an average week?

 [twelve turns skipped here]
 I: Cooking; how much time do you spend on that? And then I actually mean the time you are really busy with that. Say, peeling potatoes, searing the meat. Not the time it is simmering.
 R: Yes
 I: How much time do you do that each day?
 R: Ah, perhaps, I think that a quarter I am busy with that.
 I: With peeling potatoes, cleaning the vegetables and searing the meat?
 R: Yes, a quarter.

4.2 The Coding of the Strategies

The transcripts of 326 interview fragments were all coded with the help of a coding scheme described elsewhere (Van der Zouwen, Smit and Van der Horst, 2005). For the purpose of the present paper it is sufficient to say that on the coding variable ‘interview strategy’, sequences with the prescribed integral strategy received code 0, the deviating ‘partial’ strategy receives code 2, and the ‘mixed’ strategy, in between these two strategies, receives code 1. The inter coder reliability regarding this variable is sufficient for sequences related to light household tasks (Cohen’s Kappa = .56 and Holsti’s percentage of agreement is 72%) and rather high for sequences

concerning heavy household tasks (Kappa = .84 and 92% of the sequences receiving the same code from two different coders).

4.3 The Use of the Interview Strategies

Table 1 gives information about the frequency of the use made by the interviewers of the three strategies. The most striking result of Table 1 is that the interviewers used the – prescribed - integral questioning strategy in only one third (37%) of the sequences. This means that there is a wide gap between what kind of behavior researchers expect from their interviewers, and what they actually do. For the questions about heavy household tasks, in the majority of the sequences (82%) a questioning strategy that deviates from the prescribed one, is used.

Table 1. Distribution of the sequences over interview strategies for both groups of household tasks

Interview Strategy	Light Household work	Heavy Household work	Total
Integral	51%	19%	37%
Mixed	28%	33%	26%
Partial	21%	49%	37%
Total	100%	100%	100%
N	311*	241**	552

*15 resp. **85 incomplete sequences could not be coded regarding the interview strategy used

5. Interview Strategies and Efficiency

We expect that the behavior of the interviewer has an effect on the efficiency of the data collection process. One indicator of the efficiency is the time it takes to complete a question-answer sequence. A proxy for ‘time’ is the number of words used by interviewer and respondent, or – what is about the same (with a correlation coefficient r of .90) – the number of turns by interviewer and respondent the sequence consists of.

In the partial strategy, the interviewer has to ask for every household task a respondent performs, three questions (the task question, the frequency question, and the duration question), whereas in the integral strategy each of these three questions has to be posed only once. This leads to the following hypothesis:

H1: *The use of the partial strategy will lead to longer sequences than the use of the integral strategy, with the ‘mixed’ strategy somewhere in between.*

In line with this hypothesis, the data presented in Table 2 show that the partial strategy leads to significantly ($p < .001^{***}$) lengthier sequences than the integral strategy. Stated otherwise, for collecting the same data, much more time is used when using the partial strategy, thus leading to a less efficient data collection process.

Table 2. Average sequence length (expressed in number of turns) for each of the three interview strategies

Interview strategy	Light household work		
	Number of sequences	Average sequence length	Standard deviation
Integral	160	12.3	5.1
Mixed	65	22.4	11.6
Partial	86	30.7	11.6
Total	311	19.5	11.9

Interview Strategy	Heavy household work		
	Number of sequences	Average sequence length	Standard deviation
Integral	45	12.0	5.6
Mixed	79	20.6	9.9
Partial	117	20.4	9.3
Total	241	19.4	9.4

For light household work: $F=123.8$; $df=2$; $p < .001^{***}$

For heavy household work: $F=98.6$; $df=2$; $p < .001^{***}$

The partial strategy requires that for every task performed, the interviewer poses a frequency and a duration question. In view of the age of the respondents (65+) one might expect that they perform more light household tasks themselves, than heavy household tasks. This leads us to the second hypothesis:

H2: *The differences in question length between the integral and the partial strategy will be larger for the light household tasks than for the heavy household tasks.*

The data in Table 2 give support to this hypothesis: the differences between the average sequence lengths are larger, and the relationship between sequence length and interview strategy is stronger for the light household tasks than for the heavy household tasks.

6. Interview Strategy and Outcome of the Data Collection

One may expect that the way in which questions are asked by the interviewers has an impact on the answers given. The questioning process within the partial strategy is so different from that in the integral strategy that we expect that the outcome of this process will also be different. This led us to hypothesis

H3: *The use of a particular interview strategy is related to the response to (a) the frequency question and (b) the duration question.*

6.1 Frequency Questions

The responses to the frequency questions (Q25) and (Q28) are expressed in the FIS-score, the number of days during the past two weeks that the respondent said he or she performed light, respectively heavy household tasks. This score can be any integer from 0 till 14.

Table 3. Average FIS scores for each of the three interview strategies

Interview strategy	Light household work		
	Number of sequences	Average FIS-score	Standard deviation
Integral	156	13.4	2.3
Mixed	64	13.3	2.3
Partial	84	13.8	1.0
Total	304	13.5	1.2

Interview Strategy	Heavy household work		
	Number of sequences	Average FIS-score	Standard deviation
Integral	42	3.7	3.0
Mixed	76	4.8	3.8
Partial	107	4.7	3.8
Total	225	4.5	3.7

For light household work: $F=1.66$; $df=2$; $p=.19$ (n.s)
 For heavy household work: $F=1.29$; $df=2$; $p=.28$ (n.s)

Interestingly, the effect of the interview strategy on the answers to the frequency questions (Q25 and Q28) is about absent; see Table 3. This leads to a falsification of the first part of hypothesis H3. This negative result can, for the question about light household tasks (Q25), partly be explained by a ‘ceiling effect’: those respondents who perform light household tasks usually

do this at a daily basis, leading to the maximum FIS-score of 14 (14 days in the last two weeks) for about all respondents. For the heavy household tasks, the large standard deviation, as compared with the low average FIS score, could partly explain that the relatively large difference between the questioning strategies $((4.7 - 3.7) / 3.7 = 27\%)$ is yet not significant.

6.2 The Duration Questions

The second part of hypothesis H3 states that there is an effect of the interview strategy on the response to the duration questions (Q26 and Q29). This response is expressed in the DIS-score, the average number of minutes respondents per day spend with doing light, respectively heavy, household tasks.

The data in Table 4 give full support to hypothesis H3b. The DIS-score is about twice as high for respondents asked with the ‘prescribed’ integral strategy than for respondents asked with the partial strategy, with the mixed strategy in between. These results hold for both light and heavy household tasks.

Table 4. Average DIS-scores and interview strategies

Interview strategy	Light household work		
	Number of sequences.	Average DIS-score	Standard deviation
Integral	156	94.8	67.1
Mixed	64	66.5	50.9
Partial	84	55.2	46.1
Total	304	78.0	61.2

Interview Strategy	Heavy household work		
	Number of sequences	Average DIS-score	Standard deviation
Integral	41	28.9	39.1
Mixed	76	27.3	33.8
Partial	107	13.1	16.0
Total	224	20.8	28.9

For light household work: $F=13.9$; $df=2$; $p<.001$ ***
 For heavy household work: $F=7.8$; $df=2$; $p=.001$ ***

Which of these different DIS-scores seems to be the most accurate, will be discussed in the next section.

7. Interview Strategy and Accuracy

7.1 Agreement as Proxy for Accuracy

In the literature a discussion is going on about the issue whether, to increase accuracy of the answers, retrospective questions about large categories of behaviors could better be decomposed into series of sub-questions, or not (Menon, 1997; Belli et al., 2000). In our opinion this discussion is not yet finished, and we therefore worded our hypothesis regarding the effect on response accuracy quite cautiously.

Hypothesis H4 reads: *The interview strategy used by the interviewer has an effect on the accuracy of the estimate of the average time daily spend with light and heavy household activities (the DIS score).*

Because there exists no external and valid estimate of this outcome variable, we can test hypothesis H4 only indirectly. We apply the assumption that the degree of agreement between the DIS-scores and the independently obtained estimates of the duration of household activities based on the 7-day diary (EDA for short) is a useable proxy indicator of accuracy: the stronger the agreement between the scores on DIS and EDA, the more confidence one may have in the accuracy of the data collected with the LAPAQ questionnaire.

7.2 Transforming the Diary Responses into a Score on EDA

The part of the diary that is relevant for our study, has the following format:

Q1. How long have you been doing light household work (dusting, cooking, washing the dishes, etcetera)?

	M	T	W	T	F	S	S
0 min.							
1-15 min.	X			X			X
16-30 min.		X			X	X	
31-60 min.							
61-120 min.							
More than 2 hours			X				

Q2. How long have you been doing heavy household work (mopping, vacuuming, window cleaning, etcetera)? (followed by the same scheme as with question Q1)

Respondents were asked to answer these questions every evening of the week by putting a cross in the appropriate cell of the scheme. The pattern of marks that showed up by the end of the week can be used as a

basis for estimating how much time the respondent has spent with doing light and heavy household work. In order to make an estimate, it is necessary to translate the six categories of the scheme into the corresponding number of minutes. We have chosen for the following 'translation rule': The category '0 minutes' of course gets score 0, the category '1-15 minutes' receives score 8, and the following categories received respectively 23, 45, 90 and 120 minutes.

The fictitious responses in the scheme above lead to a weekly score of $8+23+120+8+23+23+8=213$ minutes. The average daily (EDA) score for light household activities is $213/7 = 30.4$ minutes.

7.3 Comparing the Questionnaire and Diary Data: Correlations and Differences

Next, the EDA score, based on diary data, can be compared with the DIS score, based on answers to the LAPAQ questionnaire. In the ideal situation, thus with maximal agreement, for each respondent his or her EDA score would be equal to the DIS score. If these scores would be depicted in a scatter plot in which the X-axis represents the EDA score and the Y-axis the DIS score, then all data points would lie on a straight line, $EDA = b \cdot DIS + a$, with $b = 1.00$ and $a = 0.00$.

Due to the occurrence of measurement errors, this ideal situation is not reached in the real world, and data points will lie on a lesser or greater distance from the line $EDA = DIS$. The resulting scatter plot is the basis for our analysis of the degree of agreement that is still left. In Figure 1 this scatter plot is presented for sequences concerning light household tasks. The average time daily spend on light household activities as measured by EDA is indicated by the X-axis and as measured by the DIS-score on the Y-axis. Respondents interviewed with the partial strategy are represented by small squares and respondents interviewed with the integral interview strategy, are represented by asterisks.

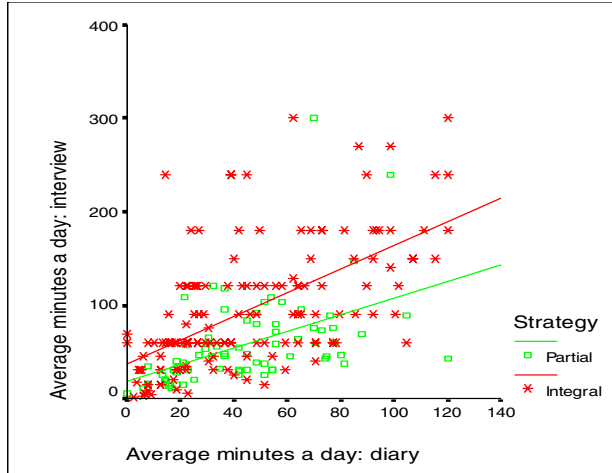


Figure 1. The relation between EDA and DIS-scores.

A visual inspection of this scatter plot leads to the following observations:

Firstly, the data points representing sequences in which the integral strategy was used, mostly lie above those in which the partial strategy was used. Stated otherwise: the integral strategy seems to lead to higher estimates of time spend on light household tasks than the partial strategy.

Secondly, many data points representing the integral strategy, lie on lines to be described as EDA=60, EDA=120, EDA=180, EDA=240. That is, they represent strongly rounded off estimates of time spent, given in response to the duration question Q26. For the partial strategy this rounding off is far less visible.

The scatter plot concerning heavy household tasks looks similar to Figure 1, except that the scores on both axes (DIS and EDA) are considerably lower.

To make the analysis more precise, we computed within each category of sequences the correlation between EDA and DIS, and the average difference between the EDA and DIS scores. The assumption used here is that the stronger the correlation and the smaller the difference, the stronger is the agreement between EDA and DIS, and thus the accuracy of DIS.

Table 5 gives information about the correlation between both scores. When evaluating these results, one has to bear in mind that these correlation coefficients are not corrected for measurement errors. If both DIS and EDA scores have a measurement error of .20, then the maximum value of the correlation between these two estimates can only be $(1.00 - .20) * (1.00 - .20) = .64$. So the average correlation of .57

between questionnaire estimate and diary estimate, in the case of light household work, is reasonably high.

Table 5. Correlation between DIS scores and EDA scores, by interview strategy

Strategy	Light		Heavy	
	Corr.	N	Corr.	N
Integral	.60**	146	.46*	40
Mixed	.55**	60	.32	72
Partial	.50**	76	.44**	100
All	.57**	287(a)	.39**	216(a)

(a) Total number of sequences is different due to missing data

From Table 5 it appears that the correlation between both estimates, DIS and EDA, is stronger for the light household activities than for the heavy household activities.

What is most relevant here is that the correlation between the estimates within each type of household activities is stronger for the integral questioning strategy than for the other two strategies. And this difference with respect to correlation is larger for the heavy household activities than for the lighter ones. Table 6 gives information about the mean differences between EDA and DIS scores.

Table 6. Mean differences between EDA score and DIS score, by interview strategy

Interview strategy	Light household work		
	N	Mean	Standard deviation
Integral	146	-49.4	54.9
Mixed	60	-26.7	42.8
Partial	76	-13.5	41.0
All	282	-34.9	51.4

Interview Strategy	Heavy household work		
	N	Mean	Standard deviation
Integral	40	-6.9	35.1
Mixed	72	-16.5	32.0
Partial	100	-1.4	15.8
All	212	-7.5	27.4

The minus signs in the table indicate that the DIS scores are systematically higher than the EDA scores. The discrepancy is largest for light household activities, and then especially with the integral strategy. However, this discrepancy is quite small for the estimates of heavy household activities, especially when questioned with the partial strategy.

Hypothesis H4 is thus supported by our data: the correlation between DIS and EDA scores, as well as the average difference between these scores, is different for each of the questioning strategies.

8. Summary and Discussion

In the survey reported here, the interviewers did their very best to encourage and help the elderly respondents to come up with adequate answers to rather hard to answer questions about average time, daily spend on light and heavy household tasks.

For that purpose they often, that is, in 63 per cent of the sequences, used an interview strategy, that substantially deviates from the wording of the questionnaire. In the partial strategy the interviewer actually decomposes the broad questions of the questionnaire into smaller, and hopefully easier to answer, sub-questions.

Whether this decomposition leads to better data quality still remains an issue. On the one hand, it leads to less rounding off and less overestimation of the average time spend on household tasks, and thus to more precise and accurate data. On the other hand, the correlation between the estimation based on the questionnaire, and that based on the diary, is lower than with the prescribed integral strategy. So the integral strategy gives a better prediction of the differences among respondents regarding the time they spend on the performance of household tasks.

Irrespective of how one actually combines these two contrary outcomes into an overall assessment of the data quality obtained with the different interview strategies, it is clear that the prescribed, integral, strategy, leads to the most efficient process of data collection, requiring less than half of the time needed for the use of the partial strategy.

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