

RESPONSE ORDER EFFECTS IN THE MEDICARE POPULATION: THE INTERACTION BETWEEN MODE OF SURVEY ADMINISTRATION AND RESPONDENT AGE

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While it is well documented that aging affects cognition, researchers have only begun studying the complexities of respondent age and its impact on survey responses. Of particular interest to researchers is understanding how the mode of survey administration affects data collected from older respondents. There is growing evidence that older respondents may have more difficulty answering questions over the telephone compared to self-administered questionnaires. Recent experimental findings suggest that questions presented to older respondents auditorily will generate considerably different responses from those of younger respondents or those of older respondents who had questions presented visually. Researchers hypothesize that these differences are the result of declining working memory of older respondents and an absence of visual cues in the auditory delivery of questions (Park, 1999).

Regardless of age and cognitive abilities, answering questions over the telephone can be difficult for all respondents. Not only are telephone respondents expected to hold several response categories in their working memory at a time, they are also expected to answer the presented questions quickly. To cope with the demanding cognitive task of answering a multiple category, closed-ended question, there is evidence that telephone respondents of all ages may "satisfice" by choosing answers that are not necessarily ideal. In other words, a respondent might lessen the cognitive difficulty of a task by using strategies such as choosing the first acceptable response heard, agreeing with an assertion, or selecting a status quo answer, rather than offering their best response (Krosnick, 1991).

With the declining cognitive skills associated with aging, one would expect to see evidence of "satisficing" in data collected from older respondents to telephone surveys. An analysis of previously collected telephone survey data suggests that older respondents may use at least one such "satisficing" strategy more than younger respondents as evidenced by response order effects. Knäuper (1999) found that older respondents more than younger respondents chose either the first category or last category with greater frequency. Such response order effects are defined as primacy effects when the first category is chosen, and recency effects when the last category is chosen primarily because of its position in the

response task. Thus, data collected through telephone survey protocols from older respondents may be considerably different from that of younger respondents due to these response order effects.

Considering the declining cognitive skills of older respondents and the inherent difficulty of responding to telephone surveys, we became interested in further examining how mode and respondent age interact. To date, analyses of population-based data have not extensively compared mode differences with respect to older respondents. Having a data set with parallel mail and telephone samples presented a unique opportunity to explore whether respondent age and mode of administration affected responses. Using national data collected in 1992 among male Medicare beneficiaries, we compared aggregate distributions of responses by mode for respondents under and over the age of 75. We analyzed the data with 3 research inquiries in mind: 1) if there were differences between mail and phone responses consistent with response order effects; 2) if response order effects were greater for respondents over age 75 than younger respondents; and 3) if response order effects were more evident with an increasing number of response categories.

METHODS

The sample was drawn from a file containing claims for a 5% sample of Medicare enrollees for the years 1988-1990. Only male patients whose claims records indicated they had undergone a radical prostatectomy for cancer were eligible for selection. Excluding Massachusetts patients, a random sample of 840 patients was selected from the remainder of this file, with 280 patients selected in each of the years 1988, 1989, and 1990. The 840 sampled cases were randomly split into two groups. The first group was assigned to be interviewed by telephone and the second group received a mail questionnaire. If efforts in the original sampled mode failed to result in a completion, patients were contacted through the other mode. Additional details about the sample and data collection for the original study have been previously published (Fowler, Roman, & Di, 1998).

For comparability of sample for this paper, this analysis includes only those who responded in the original mode for which they were sampled. For these respondents, response rates were 85% (n = 341) by mail

and 75% (n = 304) by telephone. Also, 10 mail respondents were excluded from this data file because their interviews were completed by proxy and 8 were excluded because they did not report their age at the time of survey. Based on these criteria, 627 cases remained in the data file to be analyzed, of which there were 213 respondents under age 75 for both mail and phone. Respondents age 75 and older number 110 and 91 for mail and phone respectively. The mean respondent age was 72.7 years old (standard deviation of 3.6 years) and there were no significant educational differences between the under 75 and 75 and older groups.

Analyses focused on the differences in responses to the same questions between men under 75 and those 75 and older according to mode of administration. Questions analyzed varied not only in response task, but content. Question content covered treatment issues related to prostate cancer and surgery such as treatments, complications, and quality of life (see the appendix for full question and response task wording). For purposes of this analysis, questions were included if they had at least 4 categories in the response task.

RESULTS

One of the initial questions we investigated was whether or not differences existed between mail and phone responses which were consistent with response order effects. To explore this question, we ran cross-tabulations and chi-square tests on responses for each of 26 questions by mode separately for respondents under the age of 75 and those 75 and older. Significant differences between modes were tallied separately for respondents over age 75 and those who were younger.

Table 1 shows that of the 22 significant differences between mail and telephone respondents, only 6 of the significant differences occurred in the under 75 group, while the other 16 occurred in the 75 and older group. Additionally, 6 of the significant differences in the 75 and older group were at the <.001 significance level, 7 were at the <.01 level, and 3 were at the .05 level. Differences in the under 75 group were not as strikingly significant with no differences at the <.001 level, 4 differences at the <.01 level and 2 at the 0.05 level. Also, note that the samples were larger for those under 75, providing more statistical power. Overall, differences were not only more frequent among the 75 and older group, but were of greater magnitude as well.

Table 1.

Tally of significant differences* between mail and telephone respondents for questions analyzed, by age**

P	<75	75+
.001	--	6
.01	4	7
.05	2	3
Total	6	16

* by chi-square test

** Twenty-six questions were analyzed, resulting in 52 cross-tabulations.

To understand if the significant differences could be attributed to response order effects, frequencies were compared to understand the direction of the responses. With closer examination, 21 of the 22 significant differences between modes were the result of telephone respondents choosing either the first (primacy effect) or last category (recency effect) with significantly greater frequency than mail respondents (Table 2). On the surface, the telephone mode of administration produces a more significant response order effect compared to mail mode. This is consistent with recent literature which suggests that the visual cues in self-administered questionnaires buffer response order effects for older respondents (Park, 1999).

Table 2.

Tally of significant differences* between mail and telephone respondents, by response order effect and mode where the response order effect was greater

Response order effect	Mode where response order effect was greater			Total
	Telephone	Mail	Neither	
Primacy	14	--	--	14
Recency	7	--	--	7
No evident effect	--	--	1	1
Total	21	--	1	22

* by chi-square test

In order to better understand the primacy and recency effects we found among telephone respondents, we looked at how respondent age and content of questions and responses contributed to these differences. Based on an examination of the social desirability of responses, a more complex story emerges. For all 21 of the significant differences for which a response order effect is pronounced, the direction of the responses is consistent with the response which is most socially desirable (Table 3). This is true for respondents under age 75 and those 75 and older. Thus, it seems likely that social desirability is responsible, at least in part, for the response order effects.

Table 3.

Tally of significant differences* between mail and telephone respondents, by age, response order effect, and social desirability of question

Response order effect	Most socially desirable response first		Most socially desirable response last		Total
	<75	75+	<75	75+	
Primacy	4	10	--	--	14
Recency	--	--	1	6	7
No evident effect	--	--	1	--	1
Total	4	10	2	6	22

* by chi-square test

For example, in one series, respondents were presented with five questions asking about their current mental state. When asked, "During the past month, how much of the time have you been a very nervous person?" 64% of telephone respondents chose the last response category 'None of the time' compared to only 37% of mail respondents. The next question in the series asks, "During the past month, how much of the time have you felt calm and peaceful?" Thirty-four percent of telephone respondents age 75 and older chose the first category 'All of the time' compared to only 8% of mail respondents who chose this category (Table 4). Using this comparison, we see that respondents are not consistently choosing the first or last category by rote, but are listening to the content of the question and response task and are choosing the more socially desirable responses.

Table 4.

Frequencies of mail and telephone respondents age 75 and older

During the past month, how much of the time:

	have you been a very nervous person?		have you felt calm and peaceful?	
	Mail %	Tel %	Mail %	Tel %
All of the time	1	1	8	34
Most of the time	4	2	57	38
A good bit of the time	6	3	9	9
Some of the time	16	18	19	11
A little of the time	36	12	6	6
None of the time	37	64	1	2
Total	100	100	100	100

Finally, we explored whether response order effects were more evident with an increasing number of response categories, presumably because of the greater cognitive burden placed on respondents. However, the findings do not demonstrate this to be the case. Half of the cross-tabulations performed on questions with 4-category and 5-category response tasks were significant, while a little more than a third of the cross-tabulations for questions with 6-category response tasks were significant. While there was only one question with a 7-category response task, neither of the 2 cross-tabulations were significant (Table 5).

Table 5.

Tally of significant differences* between mail and telephone respondents, by number of categories in response task

Response task	Cross-tabulations performed	Significant differences*	Percent significant
4-category	8	4	50%
5-category	22	11	50%
6-category	20	7	35%
7-category	2	--	--
Total	52	22	42%

* by chi-square test

CONCLUSION

Current research has found response order effects to be pronounced among older respondents to telephone interviews (Knäuper, 1999). Our findings substantiate this; telephone respondents both under 75 and age 75 and older were significantly more inclined to choose either the first or last response in a response task compared to mail respondents in the same age groups. There were also more significant differences between mail and telephone responses for respondents age 75 and older compared to those under age 75.

But, the reason for these response order effects may not be completely apparent at first glance. Certainly, the demand placed on older telephone respondents to remember and process multiple categories in a response task is great, and a means of stream-lining the cognitive task is likely. While the response order effects we identified could simply be the result of older telephone respondents not being able to process all of the responses in each response task, this explanation is incomplete. As demonstrated, the response order effects in this study were not consistently primacy effects or recency effects. This would argue against older telephone respondents choosing either the first or last response in a response task without considering each category first. Thus, older telephone respondents may be listening specifically for the most socially desirable response, regardless of where it exists in the order of responses.

One might argue that our results were due to older telephone respondents being more susceptible to social desirability, irrespective of cognitive skills. However, there is no strong evidence to support this argument in these data. Because 76% of the men in the sample were between the ages of 70 and 79, it is highly unlikely that a difference in age cohort could account for a greater susceptibility to social desirability. Also, there were no significant educational differences between the under 75 and 75 and older groups which might account for a greater likelihood of providing a more socially desirable response. In contrast, there is significant evidence that cognitive capacity declines with age, and with decreased cognitive skills comes the greater likelihood to “satisfice” in some way, like providing the most socially desirable response.

One limitation of this analysis is the specific content of the questions asked, many of which could be perceived as sensitive topics. It is possible that the personal nature of these questions magnified the social desirability of particular responses. As a result, the significant differences detected between modes in this study may not be generalizable to studies with less sensitive content. Regardless, the differences between modes were particularly striking in this study, and they raise questions

about the use of traditional telephone data collection methods for the oldest of respondents. These findings underscore the need for further research to investigate how age-related changes in cognitive skills relate to the way respondents deal with questions.

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APPENDIX: QUESTION AND RESPONSE TASK TEXT

4-category response task:

How much physical discomfort would you say you have because of anything related to your prostate cancer or the effects of its treatment? (A lot/Some/A little/None at all)

How much do you worry about your health because of anything related to your prostate cancer or the effects of its treatment? (A lot/Some/A little/None at all)

How much would you say your day-to-day activities are limited by anything related to your prostate cancer or the effects of its treatment? (A lot/Some/A little/None at all)

Overall, how much would you say you are bothered by anything related to your prostate cancer or the effects of its treatment? (A lot/Some/A little/None at all)

5-category response task:

Over the past month or so, how often have you had sexual erections when you were sexually stimulated in any way? (Not at all/A few times/Fairly often/Usually/Always)

Over the last month or so, when you had erections, how often were they firm enough to have intercourse? (Not at all/A few times/Fairly often/ Usually/Always)

Over the past month, how much has the following been a problem for you: Dripping or leaking urine? (No problem/Very small problem/Small problem/ Medium problem/Big problem)

Over the past month, how much has the following been a problem for you: Frequent urination? (No problem/Very small problem/Small problem/ Medium problem/Big problem)

Over the past month, how much has the following been a problem for you: Having to urinate without much warning? (No problem/Very small problem/Small problem/Medium problem/Big problem)

Over the past month, how much has the following been a problem for you: Concern about your sexual functioning? (No problem/Very small problem/Small problem/Medium problem/Big problem)

Over the past month, how much has the following been a problem for you: Having pain or discomfort with bowel movements? (No problem/Very small problem/Small problem/ Medium problem/Big problem)

Over the past month, how much has the following been a problem for you: Having diarrhea? (No problem/Very small problem/Small problem/ Medium problem/Big problem)

Over the past month, how much has the following been a problem for you: Worry about prostate cancer? (No problem/Very small problem/ Small problem/ Medium problem/Big problem)

Over the past month, how much has the following been a problem for you: Worry about any other kind of cancer? (No problem/ Very small problem/Small problem/Medium problem/Big problem)

Overall, how would you rate your health now? (Excellent/Very good/ Good/Fair/Poor)

6-category response task:

During the past month, how much of the time were you a happy person? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time have you felt downhearted and blue? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time have you been a very nervous person? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time have you felt calm and peaceful? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time have you felt so down in the dumps that nothing could cheer you up? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time did you have a lot of energy? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time did you feel tired? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time were you bothered by any illness, bodily disorder, aches or pains? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time did you feel healthy enough to carry out the things you like to do or had to do? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

During the past month, how much of the time were you worried or did you have any fears about your health? (All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time)

7-category response task:

If you were to spend the rest of your life feeling the way you feel now, how would you feel about that? (Delighted/Pleased/Mostly satisfied/ Mixed/Mostly dissatisfied/Unhappy/Terrible)