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Frequency Reports Across Age Groups

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When a behavior is poorly represented in memory, respondents draw on estimation strategies to arrive at a frequency report. Given that memory declines with age, older respondents should generally be more likely to estimate than younger respondents. Counteracting this general tendency, some behaviors are more relevant for older than younger people and may therefore be better remembered. Experimental results support this reasoning. Compared to younger respondents, older respondents' frequency reports were more influenced by frequency scales when they pertained to mundane behaviors, but less influenced by frequency scales when they pertained to physical symptoms. Such differential effects of frequency scales invite misleading conclusions about age differences.

Key words: Self-reports; behavioral frequencies; age; working memory; cohort comparisons.

1. Introduction

In many studies, respondents are asked to report how often they engage in a given behavior by checking the appropriate response on a frequency scale. An example of such categories would be (a) never, (b) about once a year, (c) about twice a year, (d) about once every other month, (e) about once a month, and (f) about twice a month or more. Respondents typically assume that the researcher constructed a meaningful scale and that values in the middle range of the scale reflect the average or "typical" frequency, whereas the extremes of the scale correspond to the extremes of the distribution (for a review see Schwarz 1996, 1999). On the basis of this assumption, respondents use the range of the response alternatives as a frame of reference in estimating their own behavioral frequency. This results in higher frequency estimates along high rather than low frequency scales. Hence, the obtained reports are, in part, a function of the specific frequency scale used. This effect has been observed for a wide range of behaviors, from media consumption (e.g., Schwarz, Hippler, Deutsch, and Strack 1985), consumer purchases (e.g., Menon, Rhagubir, and Schwarz 1995) and number of life-time sexual partners (e.g., Tourangeau and Smith 1996) to physical symptoms (e.g., Schwarz and Scheuring 1992).

As expected on theoretical grounds, the influence of frequency scales is less pronounced the better the respective behavior is represented in memory, thus attenuating the need to rely on an estimation strategy (e.g., Ji, Schwarz, and Nisbett 2000; Menon et al. 1995).

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This observation suggests that the size of scale effects may vary with respondents' age. On the one hand, age-related declines in memory performance (for a review see Park 2000) make it more difficult for older respondents to arrive at a memory-based answer. Hence, older respondents should be more likely than younger respondents to draw on the response alternatives to compute a plausible estimate. On the other hand, age may influence to which extent individuals pay attention to a given behavior. For example, older people are known to monitor their physical health more closely than younger people (e.g., Borchert, Gilberg, Horgas, and Geiselmann 1999). Thus, physical symptoms are probably better represented in the memory of older than of younger respondents. This, in turn, may attenuate the influence of frequency scales on older respondents' reports of physical symptoms. In combination, these conjectures predict a differential effect of frequency scales on older and younger respondents. Which form this differential effect takes, however, depends on the specific behavior under investigation. Support for these conjectures would raise serious concerns about the comparability of frequency reports across age groups.

The present research extends the exploration of age-related differences in the emergence of context effects (see Schwarz, Park, Knäuper, and Sudman 1999) by addressing these possibilities. Older and younger respondents were asked to report the frequency of two mundane behaviors (eating red meat; buying birthday presents) and two physical symptoms (headaches; heartburn) along either a high or a low frequency scale. We predicted (1) that older adults' reports of mundane behaviors would be more affected by scale range than younger adults' reports, whereas (2) older adults' reports of physical symptoms would be less affected by scale range than younger adults' reports.

2. Method

2.1. Participants

The participants were 233 older adults (aged 60 to 100, mean age 76.21) and 143 younger adults (aged 20 to 49, mean age 35.29) and the questions were administered as part of a larger session of data collection. Older participants were recruited from the human subject core at the Center for Applied Research in Cognitive Aging at the University of Michigan as well as through newspaper advertisements. Younger participants were recruited only through newspaper advertisements. 52.8% of the older and 52.4% of the younger group were women.

The two age groups were comparable in formal education. 39.9% of the older sample were high school graduates, had attended trade, technical, or business school, or had some years of college and 56.0% had a bachelor's degree or higher. Of the younger participants, 39.2% were high school graduates, had attended trade, technical, or business school, or had some years of college and 58.8% had a bachelor's degree or higher. All participants had 20/40 corrected vision, were screened for audition, and were walk-ins in good health.

2.2. Questions and presentation

The experiment was computer administered and participants were run in groups of four, in individual cubicles. The questions and response alternatives were presented on a touch

screen with the text being displayed in 18-point Helvetica bold font. The field to be touched for indicating the answer was sufficiently large to accommodate possible problems with motor coordination in the elderly. Questions were presented visually, one-at-a-time, with all response alternatives displayed with the question. Presentation rate was self-paced, as in a real-world self-administered survey.

Younger and older respondents were asked a series of four questions, two pertaining to mundane behaviors (eating red meat, buying birthday presents) and two pertaining to physical symptoms (headaches, heartburn). The birthday present, headaches and heartburn questions were presented to all participants ($N = 376$); the eating red meat question was only presented to a random half of the participants ($N = 185$). All questions were combined with either high or low frequency response alternatives. The question wordings and response alternatives are presented in the Appendix.

2.3. Testing of hypotheses

Answers along the high or low frequency scales can be compared by determining the percentage of respondents who reported a frequency above a response alternative shared by the two scales, e.g., the percentage of respondents who report having headaches more than "once a month." These cut-off points are marked by italics in the Appendix. To provide focused tests of our predictions, we computed planned contrasts (Rosenthal and Rosnow 1985), using the contrast weights shown in the bottom panel of Table 1.

Table 1. Behavioral reports (in percent) as a function of frequency scale, age and type of behavior

	Frequency Scale		
	Low	High	Difference
Eating red meat (10 times a month or more)			
Young	24.3% (9/37)	42.9% (15/35)	18.6%
Old	22.4% (13/58)	52.7% (29/58)	30.3%
Buying birthday presents (6 times a year or more)			
Young	41.7% (30/72)	49.3% (35/71)	7.6%
Old	46.0% (52/113)	59.2% (71/120)	13.2%
Headaches (twice a month or more)			
Young	36.6% (26/71)	55.6% (40/72)	19.0%
Old	8.3% (10/120)	11.5% (13/113)	3.2%
Heartburn (twice a month or more)			
Young	14.1% (10/71)	33.3% (24/72)	19.2%
Old	20.8% (25/110)	28.3% (32/113)	7.5%
Contrasts			
Contrast 1			
Young	−1	+1	
Old	−2	+2	
Contrast 2			
Young	−2	+2	
Old	−1	+1	

3. Results

As predicted, older respondents were more influenced by the response alternatives than younger respondents when the questions pertained to mundane behaviors (eating red meat; buying birthday presents). For example, 52.7% of the older respondents reported eating red meat 10 times a month or more when given the high frequency scale, whereas only 22.4% reported doing so when given the low frequency scale, resulting in a scale effect of 30.3 percentage points. In comparison, the scale effect is only 18.6 percentage points for younger respondents. Contrast 1 confirms the reliability of the predicted pattern, $t(181) = 3.83, p < .001$. Respondents' reports of buying birthday presents replicate these findings, as shown in Table 1, $t(372) = 2.19, p < .03$, for Contrast 1.

In contrast, older respondents were less influenced by the response alternatives than younger respondents when the questions pertained to physical symptoms. For example, 55.6% of the younger respondents reported having headaches twice a month or more when given the high frequency scale, whereas only 36.6% provided comparable reports when given the low frequency scale, resulting in a scale effect of 19 percentage points. On the other hand, older respondents' reports were not significantly influenced by scale range, with a difference of 3.2-percentage points. Contrast 2 confirms the reliability of this predicted pattern, $t(372) = 2.97, p < .003$. The heartburn question replicates these findings, as shown in Table 1, $t(372) = 3.01, p < .003$, for Contrast 2.

4. Discussion

In sum, we observed increased as well as decreased scale effects for older as compared to younger respondents. These differential patterns presumably reflect that respondents' need to rely on estimation strategies is a function of two variables: their general memory performance and the extent to which they paid attention to the respective behavior in the first place. From this perspective, older respondents' reports of physical symptoms are less affected by frequency scales because older adults are generally more concerned about their health and pay more attention to relevant symptoms, which renders them more salient and more likely to be encoded than is the case for younger adults (Borchelt, Gilberg, Horgas, and Geiselmann 1999; Linden, Horgas, Gilberg, and Steinhagen-Thiessen 1999). Hence, information bearing on these symptoms is better represented, and more accessible, in memory, attenuating their need to rely on an estimation strategy that draws on the scale as a frame of reference. When the behavior is of less central interest, on the other hand, older adults' generally poorer memory results in increased scale effects. These findings are compatible with previous results, which demonstrated that the relative size of scale effects is a function of how well the respective behavior is represented in memory (Ji et al. 2000; Menon et al. 1995). Nevertheless, more direct evidence bearing on the underlying processes would be welcome and may be provided by future research.

From a methodological point of view, the present findings highlight the perils of comparing behavioral frequency reports across age groups. As Table 1 illustrates, we would conclude, for example, that cohort differences in eating red meat are relatively small (2 percentage points) when a low frequency scale is used, but would conclude that

these differences are large (10 percentage points) when a high frequency scale is used. Such differential scale effects undermine meaningful comparisons across age groups and may attenuate or exaggerate actual differences in behavior. Moreover, the problem is not limited to comparisons across age groups. Ji and colleagues (2000), for example, observed that cultural differences in the attention paid to a given behavior give rise to the same phenomenon. Whenever groups differ in either general memory performance or the attention paid to a given behavior, frequency scales are likely to exert a differential influence that undermines group comparisons. It is therefore advisable to assess frequency reports in an open response format (see Schwarz and Oyserman 2001; Sudman, Bradburn, and Schwarz 1996, for a discussion). While the answers are still error prone, they are at least not systematically biased.

Appendix

Mundane Behaviors

How often do you eat red meat in a typical month?

Low Frequency	**High Frequency**
a. once a month or less	*a. 8 times a month or less*
b. twice a month	b. 10 times a month
c. 4 times a month	c. 15 times a month
d. 6 times a month	d. 20 times a month
e. 8 times a month	e. 25 times a month
f. 10 times a month or more	f. 30 times a month or more

How often do you buy birthday presents for someone?

a. once a year	*a. 5 times a year or less*
b. twice a year	b. 6 times a year
c. 3 times a year	c. 7 times a year
d. 4 times a year	d. 8 times a year
e. 5 times a year	e. 9 times a year
f. 6 times a year or more	f. 10 times a year or more

Physical Symptoms

How often do you have heartburn?

a. never	*a. once a month or less*
b. about once a year	b. about twice a month
c. about twice a year	c. once a week
d. about once every other month	d. twice a week
e. about once a month	e. about 3 times a week
f. about twice a month or more	f. daily

How often do you have headaches?

a. never	*a. once a month or less*
b. about once a year	b. about twice a month
c. about twice a year	c. once a week
d. about once every other month	d. twice a week
e. about once a month	e. about 3 times a week
f. about twice a month or more	f. daily

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