

# The Reliability of the Subjective Reports of Memories

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There is a growing trend within memory research to explore people’s subjective judgements about the qualities of their memories. The reliability of these measures is fundamental for the value of this research. Several possible problems have been highlighted by survey methodologists concerning the reliability of subjective judgements which we explore with respect to memory research. We report a large-scale ( $n = 4289$ ) study that investigated whether the types of questions used in flashbulb memory research, one of the main areas exploring subjective aspects of memory, produce similar response patterns when these questions are asked in different orders. The large sample size allowed us to conclude that while small effects are present, they are not large enough to question the substantive conclusions from flashbulb memory research. However, several other techniques should be used to evaluate reliability and we urge care in interpreting responses to questions of this type.

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This research was conducted as part of the London School of Economics’ Cognitive Survey Laboratory, a project funded by the Economics and Social Research Council (ESRC). More recently, this research has also been supported by a British Academy Fellowship on “Conceptual and Methodological Issues in Naturalistic Cognition” awarded to D.B.W. We thank the British Market Research Bureau International (BMRBI) for administering this study and for helpful suggestions in the design. We also thank the reviewers for many useful comments.

## INTRODUCTION

During the past two decades, there has been a renewed interest in the qualities of memory. Many tasks used in both experimental and naturalistic memory research rely on people's reports of phenomenological aspects of their memories (Brewer, 1992). One of the first papers of this rebirth was by Brown and Kulik (1977), who described people's remarkably vivid recollections of John Kennedy's assassination as well as other news events of that period. Their paper has led to much research into (see Conway, 1995; Winograd & Neisser, 1992), and criticism of (see McCloskey, Wible, & Cohen, 1988; Neisser, 1982), what they called *flashbulb memories*. We treat flashbulb memory research as a particular exemplar within phenomenological memory research because it has generated considerable theoretical controversy, as well as much methodological discussion (see McCloskey, 1992; Wright & Gaskell, 1995).

In flashbulb memory research (broadly defined), people are usually asked about important and surprising events. Examples include earthquakes (Cardena & Spiegel, 1993; Neisser et al., 1996; Pennebaker & Harber, 1993), assassinations (Brown & Hulik, 1977; Christianson, 1989; Curci, Stasolla, Leone, & Bellelli, 1996; Winograd & Killinger, 1983; Yarmey & Bull, 1978; see Pillemer, 1984, for an attempted assassination), political events (Conway et al., 1994; Morse, Woodward, & Zweigenhaft, 1993), tragedies at sport events (Wright, 1993), the Space Shuttle disaster (Bohannon, 1988; Bohannon & Symons, 1992; Neisser & Harsch, 1992; Warren & Smartwood, 1992), the start of "Operation Desert Storm" (Lyman & Hertel, 1992; Weaver, 1993), groups of news events (Brown, 1990; Larsen, 1992) and personal events (see, for example, Burt et al., 1995; Conway, Collins, Gathercole, & Anderson, 1996; Rubin & Kozin, 1984; Thompson, 1982; Wagenaar, 1986). In these studies, people are typically asked to respond on a 5, 7 or 11 point Likert-type scale for various aspects of the target event and of their memories of the event. Three aspects that are measured in most of these studies concern the clarity of the memory, the emotional reaction to the event and the perceived importance of the event. These three, in some form, have been the centre of focus since Brown and Kulik (1977) proposed that surprise and consequentiality were instrumental in producing flashbulb memories.

Determining the reliability of responses to these questions is a precursor to using such data to test hypotheses about flashbulb memories. Too often the reliability of such subjective reports is merely taken for granted. In other areas of psychological research, the criteria of reliability and validity are an essential component in the development of indicators and concepts respectively. A minimum level of reliability must be established before tests of concepts can proceed.

Similar methodological concerns have been faced by survey researchers over the last 40 years: how to operationalise and measure attitudes and opinions. There is now a large body of research (cf. Krosnick & Schuman, 1988; Schuman & Presser, 1981) demonstrating that the way in which questions are asked can affect responses, thereby questioning both their reliability and their validity. In this paper, we explore one particular type of unreliability that occurs in questionnaires and surveys measuring attitudes, and examine if there are similar effects for subjective judgements of events and memories. This is where the order in which the questions are asked influences the responses to the questions, so-called *context effects*. To address this issue, we asked three memory quality questions (concerning memory clarity, event importance and emotional reaction) in each of the six possible orders. Usually these three questions are asked with several other related questions. We asked only these three because we wanted to isolate any effects of question order.

Two types of response shift are usually investigated when exploring question order effects: shifts in means and shifts in correlations (cf. Gaskell, Wright, & O'Muircheartaigh, 1995). One often cited example (Schuman & Presser, 1981) in the survey methodology literature of a shift in means is that people are more likely to support freedom of the press for communist reporters in the USA (where Schuman and Presser's research was conducted) if they were previously asked whether American reporters should be granted freedom of the press in communist countries. If asked the question about the American reporters first, the interviewees presumably felt they should not show double standards.

A second way in which question order can affect response patterns is through differences among the correlations. Much of the flashbulb memory theorising hinges on inter-item correlations (and covariances). Conway et al. (1994), for example, built up an intricate latent path model in which affect and importance are both contributing factors in producing flashbulb memories. If these correlations are sensitive to the order of the questions, then much flashbulb memory research would need to be re-examined.

Survey research has shown that correlations can be systematically affected by question order. Schwarz, Strack and Mai (1991) argue that people either assimilate information in earlier questions to help answer the question at hand (an assimilation effect), or deliberately exclude the information (a contrast effect). The former increases the correlations, while the latter decreases them. Strack, Martin and Schwarz (1988) demonstrated this by asking university subjects how happy they were with their dating and how happy they were with their life as a whole. When asked in this order, specific to general, the correlation was high ( $r$

= 0.55). When asked in the other order, general to specific, the measures were essentially uncorrelated ( $r = 0.16$ ).

Schwarz (1995) explains these effects by arguing that people follow Grice's (1975) maxims of communication even within highly structured survey interviews. Grice described how conversations usually follow the *cooperative principle*, which includes various "maxims". Here, the effect is because people use Grice's maxim of quantity. They assume that the information they give should be as informative as necessary but not more informative than is required. When asked about dating and then about life in general, people assume that life in general does not include dating life because they have already given information about that aspect of their lives (a contrast effect). The respondents assume that the interviewer would not ask for information that they had just been told. This means that the correlation is lower than when asked in the reverse order. For the three flashbulb memory questions, we had no *a priori* predictions for how correlations among flashbulb memory questions might be affected. Arguably, any of these three characteristics could be subsumed by the others. Examining the reliability of correlations was necessary because of their use in most flashbulb memory research.

The questions used by survey methodologists are often purposefully designed to illustrate directional predictions. Strack et al. (1988), for example, chose their items specifically to demonstrate assimilation and contrast effects. When investigating context effects for questions designed for substantive issues, rather than to illustrate methodological biases, the effect sizes are usually much smaller. Therefore, both to detect if any effects are present and to determine if the sizes of any shifts are of concern to researchers, a large sample is needed. While thousands of students could be asked these questions, market research companies are in place to administer such tasks. Loftus, Fienberg and Tanur (1985) have pointed out that the survey is an excellent vehicle for investigating many cognitive phenomena (see also Jobe, Tourangeau, & Smith, 1993).

We decided to ask subjects about their recollections of Margaret Thatcher's resignation as Prime Minister of Britain on 22 November 1990. This was an important event in British politics as well as having a considerable impact on European and global politics. Eleven months after the event, Conway et al. (1994) found that 86% of their sample of British university students had memories that could be classified as flashbulb memories. Therefore, the event appears a good candidate for examining methodological biases in flashbulb memory research.

## METHOD

The experiment was embedded in the British Market Research Bureau International's (BMRBI) July and August 1992 face-to-face omnibus

surveys (approximately 20 months after the event). The interviews took place in the respondents' homes. BMRBI used a high-quality quota sampling technique known as GRID random sampling to ensure the sample had similar characteristics to the general UK population. This quota system is based on "likelihood of being at home", which has advantages over traditional quota selection methods.

Subjects ( $n = 4289$ ) were asked about their memories for "the occasion when you first heard about Margaret Thatcher's announcement that she would resign as Prime Minister". The wording of the three questions is listed below. The response alternatives were presented on separate showcards and coded from 1 (low) to 5 (high) for the analyses. These questions were asked in all six possible orders with the number of subjects in each condition shown in Table 1 (the imbalance of subjects per condition is due to characteristics of the survey and was unavoidable). So that interviewer effects did not confound the experimental effect, the conditions were spread within each interviewer's workload as far as possible.

*Clarity Question (C)*

Some events can be recalled with almost complete clarity. People remember them as if they are actually seeing what was happening. Other events are much less clearly remembered. From this list, how clear is your recollection of the event?

Cannot remember it  
Vague  
Fairly clear  
Clear  
Completely clear

*Importance Question (I)*

Taking your answer from this list, how important do you think this event was?

Extremely important  
Very important  
Quite important  
Not very important  
Of no importance

*Emotional Reaction Question (E)*

Taking your answer from this list, how strong was your emotional reaction to this event? We're not interested in whether you think the event was good or bad, just if you had an emotional reaction, how strong it was.

No emotional reaction  
Hardly any emotional reaction  
Some emotional reaction  
Strong emotional reaction  
Very strong emotional reaction

## RESULTS

Before examining whether the question order made a difference to subjects' estimates, it was necessary to make sure that the people allocated to the different conditions were similar on various socio-demographic variables. Previous research (Wright, Gaskell, & O'Muircheartaigh, in press) has shown large differences by social grade on memory quality for Thatcher's resignation. We found no difference among the conditions for the four-category variable social grade ( $\chi^2(15) = 21.45, P = 0.12$ ), nor did we observe differences for gender ( $\chi^2(5) = 1.00, P = 0.96$ ), for the six age categories used ( $\chi^2(25) = 29.79, P = 0.23$ ) or for the nine geographic region samples ( $\chi^2(40) = 5.20, P = 1.00$ ). Because social grade and age are ordinal, we tried several other techniques which also failed to reach statistical significance. Thus, we can assume that the allocation to experimental conditions was unbiased.

Table 1 shows the means for the three questions across the different question orders. There were statistically significant differences among the orders for each question [ $F(5,4265) = 6.50$  for clarity;  $F(5,4231) = 4.82$  for importance;  $F(5,4257) = 5.02$  for emotion; all  $P < 0.001$ ].<sup>1</sup> However, none of these represent large shifts. The effect sizes ( $\eta^2$ ) were each less than 0.01, suggesting less than 1% of the variation in these responses was accounted for by the order.

Scheffé tests with familywise  $\alpha = 0.05$  were conducted to identify any pairs that differed significantly. Although the Scheffé test is conservative, given the sample size used in this experiment, it was felt appropriate. For clarity, condition 2 produced *higher* ratings than conditions 5 and 6. In condition 2, the clarity question was asked last. The clarity questions were asked first and second in conditions 5 and 6, respectively. This suggests that asking the emotion and importance questions before the clarity question may make the memory seem clearer. However, the effect for this comparison is not large, and if the emotion and importance questions did reliably produce this effect, we would have expected many other differences (for example, condition 3 should have had a higher mean than condition 1, but each had a mean clarity score of 2.10).

The statistical significance for importance arose because the subjects in condition 3 gave higher responses than in condition 1. In condition 3, subjects were asked the importance question first, while they were asked it last in condition 1. The conditions that deviated the most from the others for the emotional reaction question were those in which the emotional reaction question was asked last (conditions 5 and 6). Their

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<sup>1</sup>Given the sample size, the central limit theorem ensures that the distributional assumptions of these tests are met.

TABLE 1  
Mean Scores for the Memory Qualities Across the Experimental Conditions (Number of Don't Know Responses in Parentheses)

<i>Condition</i>	<i>n</i>	<i>Clarity</i> (0–4)	<i>Importance</i> (0–4)	<i>Emotion</i> (0–4)
1. clarity→emotion→importance	500	2.10 (2)	2.43 (4)	1.71 (1)
2. emotion→importance→clarity	1082	2.21 (4)	2.53 (17)	1.70 (7)
3. importance→emotion→clarity	545	2.10 (2)	2.68 (6)	1.70 (2)
4. emotion→clarity→importance	546	2.07 (3)	2.47 (6)	1.71 (6)
5. clarity→importance→emotion	514	1.99 (2)	2.65 (4)	1.58 (5)
6. importance→clarity→emotion	1102	1.94 (5)	2.52 (15)	1.90 (5)
Total	4289	2.07 (18)	2.57 (52)	1.74 (26)

*Note:* The standard errors of these estimates are between 0.03 and 0.06, depending on the sample size.

means, however, were on each side of the others, so the differences do not appear systematic or afford any simple explanation.

Table 2 shows the correlations among the three variables across the conditions. To test for differences, Fisher's  $z$  transformation was used (see Howell, 1992, pp. 251–252). In total, 45 different pairs were compared. We used an  $\alpha = 0.01$  criterion, which still leaves a minimum  $\beta = 0.98$  for observing what Cohen (1977, ch. 4) calls a *medium* size effect. The only two pairwise differences detected at this level were for the clarity–importance correlation comparing condition 1 with 3, and condition 2 with 3. Examining these three conditions, there appears to be no simple explanation for this pattern. In condition 1, the clarity question was asked before the importance question; in conditions 2 and 3, the reverse was true. Given that a pairwise  $\alpha = 0.01$  equates with a large

TABLE 2  
Correlations between the Memory Qualities Across the Experimental Conditions

<i>Condition</i>	<i>Clarity/Importance</i>	<i>Clarity/Emotion</i>	<i>Importance/Emotion</i>
1. clarity→emotion→importance	0.243	0.321	0.432
2. emotion→importance→clarity	0.272	0.338	0.416
3. importance→emotion→clarity	0.454	0.378	0.454
4. emotion→clarity→importance	0.350	0.409	0.433
5. clarity→importance→emotion	0.352	0.358	0.352
6. importance→clarity→emotion	0.346	0.309	0.362
Total	0.315	0.337	0.401

familywise  $\alpha$  of about 0.44 for 45 comparisons (assuming independence), we will not dwell on the significance of these two comparisons. Furthermore, if we combine all the conditions where the clarity question was asked before the importance question (conditions 1, 4 and 5), then  $r = 0.324$  ( $n = 1541$ ), which is not significantly different ( $z = 0.473$ ,  $P = 0.636$ ) from the remaining conditions ( $r = 0.310$ ,  $n = 2685$ ).

## SUMMARY

Much research has been conducted on the accuracy, or validity, of recollections (cf. Loftus, 1991). Brown and Kulik (1977) were criticised in their flashbulb memory study for assuming that their subjects' vivid reports were accurate (see McCloskey et al., 1988; Neisser, 1982). Even when reports are vivid, "if we had the capability of verifying every aspect, we would undoubtedly find they [the reports] were fraught with error" (Loftus & Kaufman, 1992, p. 213). We encourage people not to assume that just because a report is vivid or detailed, that it is valid.

Our concerns here were with reliability, and in particular the reliability of ratings about a memory/event. This concern has not been adequately addressed in cognitive psychology and therefore we rely for much of our methods and theory on survey methodology research. If large shifts had been found, the empirical data from flashbulb memory research, and other types of phenomenological memory research, would need to be viewed with caution. However, in this study, the different question orders produced similar response patterns. Consistent with much survey methodology work, we found that the order in which questions were asked did make a difference. Having used an adequate sample size to examine the size of the differences, we can confidently report that while shifts occurred, they were not large.

That the correlations remained relatively consistent is reassuring for flashbulb memory studies, because this type of measurement unreliability would seriously question the results of any covariance-based analyses. While this stability is reassuring, we examined only one type of reliability and did not examine validity in any way. Further research is necessary to assess other forms of reliability and validity of responses in research exploring all types of memory. We recommend (a) continuing developing new methods of checking memory accuracy, (b) examining the effects of having many prior and related questions, (c) examining the effects of increasing people's expectations that they have a vivid memory (as is done in many of the flashbulb questionnaire preambles), and (d) testing whether subjects give similar responses over short durations (i.e. test-retest reliability). By focusing on methodological concerns, not only can

researchers construct better instruments, but by understanding why these effects occur, the phenomenon can be better understood.

Manuscript received May 1996

Revised manuscript received December 1996

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