Crashing memories and reality monitoring: Distinguishing between perceptions, imaginations and 'false memories.'

James Ost*, Aldert Vrij, Alan Costall & Ray Bull.

Department of Psychology, University of Portsmouth, King Henry Building, King Henry I Street, Portsmouth, Hampshire, PO1 2DY.

* author to whom correspondence should be addressed

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Abstract

Research has shown that the memory characteristics questionnaire (MCQ) can be used to discriminate between 'memories' of perceived events and 'memories' of imagined events. The present study extended this research by examining the utility of the MCQ in distinguishing impossible memories (i.e. reports of an event a person could not have witnessed). Congruent with previous research, a considerable number of participants in both the pilot study (45%) and the main study (44%) were willing to report that they had seen a non-existent film of the car crash in which Diana, Princess of Wales was killed. The MCQ ratings of three groups of participants were therefore compared: (1) those who indicated that they had seen the non-existent film, (2) those who were asked to imagine having seen the film, and (3) a control group who were asked to rate their memory of when they first heard the news of the crash. The MCQ did not serve to distinguish impossible memories, but there were reliable differences on one of the MCQ subscales between those who imagined the film and controls. Furthermore, participants who reported that they had seen the film gave higher scores on the Self Monitoring scale. Implications are discussed.

Introduction

The recent recovered/false memory controversy has focussed attention on the reliability or otherwise of reports of childhood trauma (Brandon et al., 1997; Conway, 1997; Lynn & McConkey, 1998; Pezdek & Banks, 1996; Williams & Banyard, 1999). The consensus in the literature is that reports by adults of childhood trauma can either be 'true', 'false' or a mixture of both. From a legal perspective it is important to know whether there are any reliable indicators of the veracity of such reports. As Gold (1999, p. 8) has recently observed, "memory is the currency of the courts, it is what the courts deal in, but false memory is counterfeit currency … ". The question, at least in this context, is how are the counterfeits to be identified?

Numerous research papers have demonstrated the utility of the reality monitoring model in discriminating between participants' self-reports of the quality of externally- and internally-generated stimuli (Johnson, 1988; Johnson & Raye, 1981; Markham, 1991). Typically, these studies find that participants' reports of externally generated events (e.g. 'real' events) contain more sensory information than, for example, reports of internally-generated events (e.g. 'imagined' events or dreams) (Johnson, Kahan, & Raye, 1984; Johnson & Suengas, 1989). Recent research has adopted this model to examine whether reality monitoring can be used to distinguish a further group of reports: those which participants make about events that, as far as it is possible to ascertain were not witnessed, or did not occur at all (Porter, Yuille, & Lehman, 1999). Porter et al. (1999) devised a procedure (the Memory Assessment Procedure, or MAP), based on the reality monitoring model, that may be an important first step in providing answers to these questions.

The Memory Assessment Procedure (MAP) was developed from elements of the Memory Characteristics Questionnaire (MCQ, Johnson, Foley, Suengas, & Raye 1988), as well as elements from Statement Validity Analysis (Steller & Köhnken, 1990). Using this new procedure, participants' reports were rated using 12 factors (5 were rated by participants themselves and 7 were rated by independent coders) including vividness, confidence,

sensory components, amount of detail, repeated details and coherence. Participants in the Porter et al. (1999) study were asked to provide, over three interviews, details of emotionally-charged childhood events. Participants were informed that their parents had provided the details of *all* of the events. In fact, whilst some of the events were based on parental reports (*'real'*), some of the events (*'created'*) had been crafted by the investigators. In the final interview participants were asked by another investigator to deliberately *fabricate* an investigator-provided childhood event. The investigators then used the Memory Assessment Procedure (MAP) to investigate possible differences between the three 'types' of reported 'memories' (real, created, and fabricated).

Porter et al. (1999) found that participants' reports of *real* events were rated as more vivid and clear, detailed, moderately coherent, with participants willing to admit a lack of memory. Participants' reports of *created* events were rated as having good coherence, but were rated as less vivid, and were held with less confidence. Deliberately *fabricated* reports were found to have an exaggerated 'over-the-top' quality, being reported as highly vivid and clear, with high stress ratings, and containing many repeated details.

Of course, one of the problems with this paradigm is that it relies on parental reports of events that may not be particularly reliable. Critics argue that the alleged false events reported by participants may just be distortions of events that did occur and therefore not objectively false (see Conte, 1999). However, defenders of this paradigm argue that what is significant is that participants come to report the *specific suggested details* about the *created* events (Loftus, 1997).

Is it possible for participants to come to report that they have witnessed an *entire event* that they could not objectively have witnessed? One study has examined 'memories' of an emotionally charged, real-life event that definitely could *not* have been perceived by participants. Crombag, Wagenaar, and van Koppen (1996) examined participants' reports of a film of a plane crashing into an apartment block in Amsterdam. They distributed two questionnaires asking participants if they had seen on television a film of the moment when

the plane crashed into the apartment blocks, when in fact, no such film existed, although the crash did take place and was major news. The first questionnaire simply asked whether participants had seen the film and, if so, where they had seen it and roughly how long it had taken for fire to break out once the plane had crashed. They found that 55% of their participants reported having seen the film and most of these participants gave further details, including how long it took for fire to break out. Only 18% of participants stated that they did not remember the film.

Crombag et al. (1996) then distributed a second, modified questionnaire to another sample of participants. This questionnaire asked whether participants had seen the film and, if so, asked for further specific details regarding events surrounding the crash (such as the angle that the plane hit the apartment buildings, how long it took before fire broke out, and the final resting place of the remains of the plane). This time 66% of their participants stated that they had seen the film and gave further information, including the angle that the plane hit the building, at what point fire broke out, and the final resting position of the remains of the plane. These investigators suggested that the highly charged nature of the event and its publicity may have evoked particularly strong and vivid imagery which, in turn may have led the participants to make an erroneous source monitoring judgements and wrongly report that they had actually seen the film. They also stated that female participants were more likely to report having seen the film than male participants were.

The aim of the present study was to examine participants' MCQ ratings of a perceived event, an imagined event, and an event that participants *did not witness*, but nevertheless claimed to have seen, to investigate whether there are any distinguishing characteristics of such reports. The present study also examined whether certain individual difference measures were correlated with false reporting. Specifically, participants were asked to complete the Dissociative Experiences Scale (DES, Bernstein & Putnam, 1986; Wright & Loftus, in press), which has been found to be correlated with memory suggestibility (Hyman & Billings, 1998; Ost, Fellows & Bull, 1997; Porter et al., 1999). Since Crombag et al. (1996) suggested that compliance (or eagerness to please) may have been responsible for their findings, the self

monitoring scale (Snyder, 1974) was also administered. High self-monitoring individuals are more likely to want to please others and therefore may be more likely to report that they have seen the non-existent film in order to please to experimenters and appear to be "good subjects". Unlike previous studies, the present study also included a five-item memory confidence scale, a high score on which indicated that participants believed that they generally had good memorial abilities (adapted from Broadbent, Cooper, Fitzgerald & Parkes, 1982). This was included to examine whether participants' confidence in their own memory was a significant factor in deciding whether or not they had seen the target event. In addition, the present study examined sex differences in MCQ ratings to examine if there was anything that might explain the sex effect found by Crombag et al. (1996). The target event was the car crash in Paris in which Diana, the Princess of Wales, Dodi Fayed and their driver lost their lives.

Hypotheses

Based on the reality monitoring model, the first hypothesis was that ratings given by participants in the control condition about their memory of when they first heard the news of the crash would contain more sensory information and less evidence of cognitive operations than ratings given by participants who were asked to *imagine* seeing the film and those who claimed to actually have *seen* the film. The second hypothesis predicted that participants who had claimed to have *seen* the film would give higher scores on the dissociative experiences scale (DES) and the self monitoring scale than participants in the *imagine* group. Based on Crombag et al.'s (1996) findings, we also explored sex differences in responses to the MCQ.

Method

The target event

The target event in this study was the car crash in Paris in which Princess Diana, Dodi Fayed and their driver were killed[1]. As soon as the news had broken, virtually every television station in Britain broadcast a continual coverage of the events. Therefore, it would be difficult to find a resident of the UK with access to a television that had not witnessed at least some of the coverage. There was considerable controversy after the crash as to whether the paparazzi, who had allegedly been carrying video-cameras and who had been pursuing the car across Paris, had actually caught the moment of impact on film. As far as it is possible to ascertain, no film of the actual crash exists, and if it does exist it has certainly never been shown on television. Therefore, in order to replicate the Crombag et al. study as closely as possible (i.e. to question participants about a non-existent film), participants in the present study were given a questionnaire asking them if they had seen this video-recording of the car crash.

Design

The study investigated the MCQ ratings given by three groups of participants: firstly, participants who *claimed to have seen* the film and secondly, participants who indicated that they had not seen the film but were asked to *imagine* having seen the film. In order to provide a control group, a third subgroup of participants, who had not been asked about the film, were simply asked to remember when they first heard the news of the crash. All participants completed the dissociative experiences scale (DES, Bernstein & Putnam, 1986; Wright &

[1] In order to select a suitable target event, two pilot questionnaires were distributed, concerning events that had not been televised and which participants could not have seen. The first questionnaire asked participants whether they had seen the film of the Diana car crash and the second questionnaire asked participants whether they had seen the film of the Spencer family's funeral for Diana (which in fact they could not possibly have seen). A total of forty participants piloted these questionnaires (twenty different participants completed each pilot questionnaire). Participants were first asked to indicate whether they had seen the film and, if so, where they had seen it and also a few further details (e.g. those asked about the crash film were also asked roughly how many motorbikes were involved in the chase, and those asked about the funeral film were asked roughly how many people were present). Analysis of the pilot questionnaires indicated that 45% of the first pilot group of participants claimed to have seen the film of the car crash, whilst only 10% of the second pilot group claimed to have seen the film of the funeral. The percentage of individuals who claimed to have seen the film of the car crash is similar to the initial percentage of

Loftus, in press), the self monitoring scale (Snyder, 1974), the five-item memory confidence scale (adapted from Broadbent et al., 1982), and the memory characteristics questionnaire (MCQ; Johnson et al., 1988).

Participants

A total of 67 participants took part in the study. Of those, 20 claimed to have seen the film, 25 reported that they had not seen the film and were asked to imagine seeing it. A further 22 participants were not asked about the film but simply about when they first heard the news of the car crash. Thus, of the 45 participants who were directly asked whether they had seen the non-existent film, 20 (44%) indicated that they had. The mean age of participants was 30.6 years (SD = 11.9 yrs) and the range was from 17 years to 72 years. Twenty three (34%) of the participants were male and 44 (66%) were female. The means and standard deviations of the background characteristics are given in Table 1.

---insert table 1 about here---

Procedure

The study was conducted in the local shopping centre, near to the University, and the sample consisted of members of the public. The experimenters (one male and two female) excluded potential participants if they indicated that they were students at the University of Portsmouth. Shoppers were approached and asked whether they would participate in a University of Portsmouth study examining how well individuals could remember tragic events. Potential participants were informed of the ethical guidelines constraining the research, were informed of their right to withdraw from the study at any time, and were debriefed when they had completed all the questionnaires.

participants who claimed to have seen the film of the plane crash in Crombag et al.'s study (55%). Based on these results, the film of the car crash was therefore chosen to serve as the target event for the main study.

The first 45 participants were initially asked to respond to the question “Have you seen the papparrazi’s video-recording of the car crash in which Diana, princess of Wales and Dodi Fayed lost their lives?” Participants who claimed to have seen the film were asked to complete the MCQ in reference to their ‘memory’ for having seen the film of the car crash. Participants who reported that they had not seen the film were asked to ‘imagine’ what the film would have looked like and then complete the MCQ accordingly. The experimenters continued approaching potential participants until a total of 20 participants had indicated that they had seen the film of the crash. As a result, there are slightly more participants (i.e. 25) who were asked to imagine having seen the film.

A further 22 participants were not asked about the film of the car crash but instead were asked “Do you remember where you were when you heard the news about the death of Diana, Princess of Wales?”. These participants were then asked to complete the MCQ in reference to their memory of when they first heard or saw the news of the car crash. The aim here was to provide a baseline measure on the MCQ for an event that participants would have experienced. After completing the MCQ all participants were asked to complete the individual differences measures, the order of presentation of which was counterbalanced for all three groups.

Results

Correlations between background variables

---insert table 2 about here---

The correlations between the background variables were calculated using Kendall’s tau, for two reasons: to test for monotonic, rather than specifically linear relationships between the variables, and to provide a coefficient for those associations involving gender (a dichotomous variable) comparable to the others (Meddis, 1984). As shown in Table 2, there were several noteworthy correlations between variables across the whole sample. Responses to the

dissociative experiences scale were positively correlated with responses to the self monitoring scale, and negatively correlated with age and the memory confidence score. Thus, participants who scored higher on the dissociative experiences scale, also scored higher on self monitoring, were younger, and rated their memory as poorer. Higher scores on the self monitoring scale were associated with younger, male participants.

Comparisons across sample - groups and sex

Due to the relatively small sample size in the present study it was not possible to perform an analysis that included all 38 items of the MCQ individually. Furthermore, the small sample size precluded the use of a technique such as Principal Components Analysis with which a new set of subscales could have been constructed. Instead the statistical analysis was performed using the subscales identified by McGinnis and Roberts (1996) and these are detailed below.

Subscales of the MCQ employed by McGinnis and Roberts (1996)

1. **Clarity**. MCQ items related to memory clarity and vividness (Questions 1, 3, 8, 9, 33)
2. **Sensory components**. MCQ items related to memory for touch, sound, taste, and smell (Questions 4-7)
3. **Contextual attributes**. MCQ items related to memory for setting and spatial arrangement (Questions 13-16)
4. **Time**. MCQ items related to memory for time, date, year, and season (Questions 17-21)
5. **Valence**. MCQ items related to the magnitude of positive or negative tone or feelings (Questions 23 & 28)
6. **Thoughts and feelings**. MCQ items related to the emotional components of memories and the implications of the remembered experience (Questions 25-27, 29, 31, 32)
7. **Events before and after**. MCQ items related to memory for events that preceded and followed that specific memory (Questions 34 & 35)
8. **Frequency of consideration**. MCQ items related to how frequently a participant had thought about or talked about that specific memory (Questions 37 & 38)

A MANOVA was conducted on the mean scores of the eight subscales, with the subgroup and sex as the independent variables. Box's M test was not found to be significant therefore homogeneity of covariance was assumed (Box's M = 225.70, F (108,3306) = .702, p=.991). At the multivariate level, significant main effects of subgroup (Roy' Largest Root = .377, F

(8,55) = 2.59, p = .018) and sex (Roy's Largest Root = .424, F (8,54) = 2.86, p = .010) were found[2]. There were no interaction effects (Roy's Largest Root = .116, F (8,55) = .80, p = .60). At the univariate level the *sensory* subscale differed as a function of the groups of participants (F (2,61) = 3.51, p = .036). Scheffé post hoc contrasts indicated that participants who were asked to rate their memory of when they first heard the news of the crash gave significantly higher scores (p = .025) on the *sensory* subscale (M = 9.20, SD = 0.74) when compared to participants who were asked to imagine having seen the film (M = 6.41, SD = 0.80). The *clarity* subscale achieved marginal significance (F (2,64) = 2.82, p = .067) and a comparison of the mean scores indicated that the same trend existed. Participants who were asked to rate their memory of when they first heard the news of the crash gave higher scores on the *clarity* subscale (M = 26.72, SD = 1.58) than participants who were asked to imagine having seen the film (M = 21.36, SD = 1.70). Thus the first hypothesis, that the participants in the control subgroup would give higher ratings for sensory information than participants in the imagine subgroup or the claim-to-have-seen subgroup, received only limited support as only one of the eight subscales differed significantly between two of the three groups. Furthermore, the MCQ scores of participants in the *claim to have seen* group did not differ significantly from MCQ scores of participants in the control group.

At the univariate level there was a main effect of sex on two of the MCQ subscales, *sensory* (F (1,61) = 7.157, p = .010) and *thought and feelings* (F (1,61) = 7.035, p = .010). Inspection of the mean scores indicated that female participants gave higher scores on the *sensory* subscale (M = 8.8, SD = 0.53) than male participants (M = 6.39, SD = 0.73). Female participants also gave higher scores on the *thoughts and feelings* subscale (M = 31.3, SD = 1.08) than male participants (M = 26.39. SD = 1.49).

Comparisons among groups - background characteristics

In order to investigate whether there were differences in background characteristics between the groups, independent t-tests were conducted on the individual differences measures

[2] Differences between the three groups reached the .05 level using Roy's Largest Root (p=.018) but not using Wilk's Lambda (p=.193). However, since the purpose of this study was exploratory, the less stringent analysis (i.e. Roy's

(excluding sex) with the groups (excluding the control group[3]) as the independent variable. Analysis of these data revealed that, as predicted, Self Monitoring scores were significantly higher in the *claimed to have seen* subgroup than in the *imagine* subgroup, partially supporting the second hypothesis (see Table 3). However, there were no systematic differences between the two groups on any of the other measures (including the DES). In order to investigate sex differences between the groups, a Chi^2 analysis was conducted, which did not reveal a significant effect.

---insert table 3 about here---

Discussion

The most striking finding of the present study was that a substantial number of participants were willing to report that they had seen a non-existent film of the car crash. This is an important replication of Crombag et al.'s findings. With regards to the experimental hypotheses, however, the results are less clear.

Analysis of the MCQ ratings given by participants who were asked to imagine the film and participants asked to rate their memory of when they first heard the news of the crash (control subgroup) supported the reality monitoring model. Participants who rated their memory of when they first heard the news of the crash gave consistently higher mean scores on the *sensory* subscale than participants who were asked to imagine seeing the film. However, this study provides limited support for the first hypothesis that the MCQ may be a useful tool in distinguishing 'true' and 'false' memories as the MCQ ratings of the *claim to have seen* subgroup were not significantly different from the MCQ ratings of the *imagine*, or the control subgroup.

Largest Root) was followed.

[3] The control subgroup was excluded from this analysis because it was not possible to know whether, if asked, these participants would have claimed to have seen the film or not. The only psychologically meaningful comparison was therefore between those individuals who had, and had not, claimed to have seen the film.

This may be due partly to the nature of the target event that was used. The target event used in the present study was something that participants claimed (or did not claim) to have seen on television. As a result perhaps the only differences that might be expected would be in terms of visual and auditory components of the experience. Furthermore, the small sample size precluded the use of a principal components analysis (or similar technique) that might have yielded groupings of MCQ items that were more appropriate to base the MANOVA on. The subscales constructed by McGinnis and Roberts (1996) were derived from participants' MCQ ratings of autobiographical events and therefore may not have been as valid when applied to ratings of televised events. Further research is needed to examine MCQ ratings of 'true', 'false', and 'imagined' autobiographical target events (see Porter et al., 1999).

The analysis revealed that female participants gave consistently higher ratings on certain subscales of the MCQ than did male participants. This suggests that further research is needed to establish whether such sex differences in responses to the MCQ are stable. Indeed there is a body of literature that suggests that female participants experience richer imagery than male participants (e.g. Paivio & Clark, 1991). If so, then these would need to be taken into account in future application of the MCQ profiles.

Interestingly, however, participants in the *claim to have seen* subgroup did provide significantly higher scores on the Self Monitoring scale than participants in the *imagine* subgroup. This finding supports the suggestion made by Crombag et al. (1996) that compliance may be a key factor in explaining why so many people claimed to have seen the film of the plane crash in Amsterdam. Further research is needed to examine the role of compliance in other studies of 'false' memory. Perhaps surprisingly, there were no systematic differences on the DES between participants who did, or did not, claim to have seen the film. These findings are inconsistent with the recent literature that reports significant associations between 'suggestibility' and dissociative experiences (Porter et al., 1999; Hyman & Billings, 1998; Ost et al., 1997). However, the present study may have more ecological validity in that the ‘event’ was probably highly emotive for all participants.

Conclusion and future studies

The results of the present study gave only limited support the hypothesis that the MCQ may be a useful tool in distinguishing between 'true' and 'false' memories. Although there were no interaction effects in the data, there was an effect of sex on the MCQ scores that warrants further investigation. The present study did not confirm recent research that reports significant associations between scores on the DES and the tendency to report events that did not occur. In fact, in the present study, an eagerness to please the experimenter (expressed as higher scores on the Self Monitoring scale) appeared to be related to claiming to have seen the non-existent film of the car crash.

Despite the findings of the present study, these results indicate that further research into the utility of the MCQ in distinguishing different types of memory is necessary. Specifically, is the pattern of results similar when personally relevant events are used as target events? If the MCQ is to be applied to the issue of contested claims of childhood trauma, more research will be needed regarding the MCQ profiles of memories of sexual abuse (e.g. Ward & Carroll, 1997). Perhaps most interestingly of all, the findings of the present study suggest that more research is needed to clarify the possible effects of compliance, or eagerness to appear to be "good subjects", on false memory reports that are produced in the laboratory.

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Tables

Table 1. Means, standard deviations and ranges for background characteristics.

N=67	Mean	St. dev.	Min.	Max.
Self monitoring	9.4	3.5	2	17
Memory confidence score	22.5	5.5	10	34
Age	30.6	11.9	17	72
Dissociative experiences scale	38.5	14.4	13.9	72.5

Table 2. Correlations between DES, memory confidence, self monitoring and age.

	Dissociative experiences scale	Memory confidence	Self monitoring	Age	Gender
Dissociative experiences scale		-.20 *	.26 **	-.26 **	-.08
Memory confidence			-.05	.00	.00
Self monitoring				-.18 *	-.45 ***
Age					.18

Key: * denotes significance at p<.05 level, ** denotes significance at p<.01 level, *** denotes significance at p<.001 level.

Table 3. Mean background characteristics scores by subgroup (excluding control).

	"Seen" film n=20	"Imagine" film n=25	Significance
Age (years)	28.7	32.8	t(43) = -1. 35 **n.s.**
DES	39.9	35.5	t(43) = 0. 98 **n.s.**
Self-monitoring	10.4	8.3	t(42) = 1. 89 *
Memory confidence	23.7	21.6	t(43) = 1. 21 **n.s.**
% of females in group	27.3	43.2	Chi^2 = 1. 89 **n.s.**

Note: **n.s.** denotes no significant effect, * denotes p<.05 (1-tailed).