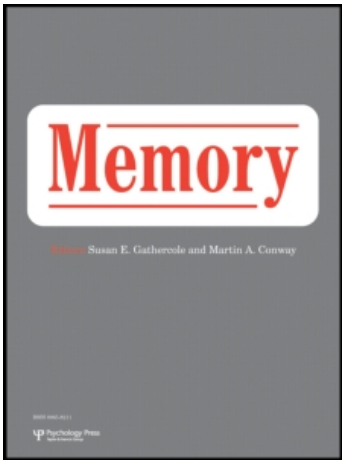

Memory
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713683358

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To cite this Article Thompson, J. , Morton, J. and Fraser, L.(1997) 'Memories for the Marchioness', Memory, 5: 5, 615 — 638
To link to this Article: DOI: 10.1080/741941482
URL: http://dx.doi.org/10.1080/741941482

MEMORY, 1997, 5 (5), 615–638

Memories for the *Marchioness*

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We examined the accounts of 27 survivors of the *Marchioness* ferry sinking, using cross-validation of accounts to search for instances of motivated forgetting. In order to identify objective items that could be validated, we focused the analysis on subjects' statements of whom they were with at various stages of the disaster. We compared these findings with an informal recall of a non-traumatic event after an interval of a few days. The main finding was that recall was reasonably good for both traumatic and non-traumatic events. Specifically, in the *Marchioness* sample, among those 86 statements that could have been confirmed in the accounts of other informants, 74 were in fact confirmed. Of the remaining 12 unconfirmed statements, only one involved a contradiction. We conclude that for a disaster of this kind, and with this particular sample of individuals, motivated forgetting was extremely rare.

INTRODUCTION

Are the memories for traumatic events better or worse than memories for ordinary events? The answer to this question is interesting for both practical and theoretical reasons. From a practical point of view, trauma may distort or diminish recall such that it is very difficult to carry out forensic investigations of highly stressful events. From a theoretical point of view, it is important that the role of mood states and emotional associations in memory storage and recall be clarified.

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We are grateful to the survivors of the *Marchioness* for helping us with our research enquiries, and to the therapists at the Traumatic Stress Clinic, 73 Charlotte Street, London W1P 1LB for allowing us access to their files. Debra Bekerian and Beth Loftus kindly commented on an early draft. We are also grateful to Jonathan Schooler and Dan Tucker for their comments.

There are a range of hypotheses concerning the effects of trauma on memory. At one extreme is the hypothesis that trauma blanks out painful memories in order to protect the individual from the pain. According to some people, this is an unconscious process and is called repression; according to others it is a conscious process called motivated forgetting. With either case, the possibility remains that the memory can be recovered.

Wartime experiences are reported to give rise to amnesic states. Sargant (1967) reported that during the Second World War there were many cases of what he called acute hysterical losses of memory, although the definition and validation of these cases is not clear. After Dunkirk, 150 of the first thousand admissions to his care were diagnosed that way. The treatment was to inject sodium amytal which brought the memory back, often accompanied by overwhelming emotional release and an apparent reliving of the forgotten experiences.

The other extreme position is that trauma increases the memorability of events. The ecological reason for this would be in order to give emphasis to survival learning. Bad events must be remembered vividly in order that they be avoided in future. Indeed, the vividness of these memories can cause distress and lead to post-traumatic stress disorder (Thompson, 1991, 1992). There is a growing consensus that intrusive memories are a key feature of the disorder, that intrusive memories account solely for the etiological link between the traumatic event and subsequent post-traumatic disorders, that the intensity of recurring memories is as indicative of a disturbance of mood as any rating of the severity of the trauma (McFarlane, 1992), that they can be used to measure severity using the emotional Stroop colour-naming paradigm (Kaspi, McNally, & Amir, 1995), that they may be accessed by a variety of techniques, including word-stem completion tasks (Zeitlin & McNally, 1991), and that they are a central feature of cognitive processing models of the disorder (Creamer, Burgess, & Pattison, 1992).

It seems impossible to generalise about the outcome of a particular type of trauma. One event can trigger different responses. Terr (1979, pp.564–565) refers to an example in which the contrast is between a traumatised adult and a child:

> Caroline was eight when she was attacked by a German shepherd dog who slashed open her throat. Mrs C. was in her home during the attack but came outside and rescued her daughter. Caroline nearly died, and required surgery and hospitalization. Four years later the child remembered every detail of the attack and rescue (verified by witnesses because it was a legal case). She recalled that her mother pulled the dog back from further attack. Mrs C. cannot remember how she got the dog off or how she held it off. That part of the episode is completely forgotten by the adult, but remembered by the child.

Terr (1981) reported on children involved in the Chowchilla kidnapping, where a school bus was hijacked and the 26 children aged 4–14 years were

driven around in closed vans for 11 hours, and then transferred to a buried tractor trailer. After 27 hours, part of the roof collapsed, and the children dug their way to freedom. These children had intact and detailed memories of the incident up to 13 months afterwards with a variety of post-traumatic symptoms. Four years after the event the memories remained detailed (Terr, 1983).

The forms of treatment that are currently most successful for treatment of post-traumatic stress disorder in adults all assume that the patient's memories will be vivid, and that emotional processing will occur fastest after direct therapeutic exposure to the stimuli that elicit the painful memories (Hacker-Hughes & Thompson, 1994; Thompson et al., 1995). However, the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R)* definition (American Psychiatric Association, 1987) under which subjects were assessed includes traumatic amnesia as one of the possible diagnostic features of the disorder, and this still applies to DSM-IV (American Psychiatric Association, 1995).

We have considered the extreme positions with respect to the effect of trauma on memory: enhancement, and amnesia. There are other positions that give rise to intermediate predictions. For example, work on state-dependent learning indicates that events occurring under one emotional state are less well recalled when in another emotional state (Bower, 1981; Teasdale, 1983). For this reason one would expect recall of a traumatic event to be worse the longer the interval from the event, given that the original, extreme, affect remains attached to the memory and the current affect is normal. Recurrence of the original affect for some reason should then make recall more likely. On some theories there would be further complications. In the Headed Records model (Morton, Hammersley, & Bekerian, 1985) the traumatic event itself would be laid down in a primary record. Any account of this event by the sufferer would give rise to a secondary record. This would be based on the narrative but could include a variety of material from the original record. Future access to memories of the trauma could be through the secondary record rather than through the primary one (Morton, 1994). As affect could well be reduced on each telling, there need be no reduction in the retrievability of such memories over time—although each successive telling in relative tranquillity might create a record with reduced affective content.

One further obstacle to generalisations about the effects of trauma on memory is that traumatic events are highly heterogeneous in terms of complexity. A hijack or kidnapping could involve long periods of inactivity; a hold-up is fast and short; major accidents, such as the King's Cross fire, the *Herald of Free Enterprise* or the *Marchioness* sinkings may involve an hour or more of continuous, acute life threat. When these variables are added to others such as the occurrence of direct threats against the person versus threats against others, active versus passive participants, involvement with an aggressor or not, it becomes clear that generalisations are likely to be very difficult.

A further problem in assessing the effects of trauma on memory is that the protocols that are available have been obtained under a variety of specific circumstances. In some cases, immediately after the event, the questioning has focused on identifying the location or fate of other individuals. A further confounding factor here is that the victim's emotional state, physical injury, pain, fatigue, or loss of sleep may lead to confusion. The protocol could be extremely impoverished as a result, and this could be interpreted as revealing forgetting, repression, or lack of registration. In other cases the focus of the interview might be on the current emotional state of the individual, with questions concerning the past events only followed in as much as they bore on the current state in the interests of therapy.

In the case of a major disaster, there are other factors that obstruct our understanding of how much is registered in an individual's memory at the time of the event, and how much of the original memory can be retrieved. To start with, the disaster itself may make it difficult for people to gather accurate perceptions. Second, the material recalled at any time is a mixture of the original event and any previous recall. Given that any recall is partially reconstructed, there is the danger that the reconstructions from the earlier recall will obstruct recall of some original material. A further problem has to do with the importation of material from other sources. Apart from the issue of the effect of leading questions, there is the effect of victims talking to each other about their experiences, as well as the effects or reading about the event in the papers or watching it on television. Frequent retelling may lead to the rehearsal of certain key events to the detriment of others. These sources of corruption make it difficult to be too precise about memory performance of the victims and require a certain amount of flexibility in evaluation. However, suppose we do find large gaps in the memories of survivors of a traumatic event, to what would these be attributed?

Finally, it is difficult to know what to compare memory against. The traumatic event of immediate study is the *Marchioness* disaster. We decided to take recall data from a non-traumatic event which shared the characteristics of being an evening party with roughly the same duration in which most of the participants knew each other. Recall in this case was about a week after the event, which could bias any comparison in favour of the non-traumatic event. As we will see, this did not turn out to be a problem.

MEMORY FOR A NORMAL EVENT—AN EXAMPLE

The situation was unremarkable in that it was one of a series of weekly events—the evening following a seminar given by a visiting speaker at the Applied Psychology Unit in Cambridge. This event occurred 20–30 times a year and had a well-established basic shape of talk, drinks, eat. This is an example of a normal party event about which one of the authors (JM) interviewed the seven

participants within a week of the event. The usefulness of this event is that, as with the target event, the participants knew each other, and none of them could have suspected that they would be questioned.

Immediately after the event, JM wrote up his own version of the events, not as a veridical record, but as a bench-mark script, in order to locate the other accounts. Seven people were questioned about the evening, which had taken place on a Thursday. The questioning was either on the Monday, the Tuesday or, in one case, the Friday of the following week. Initially the informants were simply asked ''I would like you to tell me the story of what happened last Thursday evening''. Minimum further instruction was given. When the first narrative finished the informants were asked ''whether there were any other incidents that occurred during the evening that you missed out for any reason''.

The General Facts

The evening had three locations. After the talk, which had been given by the speaker, a number of people went to the post-seminar pub. At 7.30 p.m. a subgroup drove to a nearby village to eat at a restaurant. On the way, one of the cars was stopped by a policeman. A second car was just behind and stopped to observe the incident. The dinner was notable for the company being treated to a flamboyant 15-minute discourse by the landlord, whose arm was in a brightly striped sling, about a skiing accident. The restaurant was also a pub. Meals are ordered at a counter, each person gets a number and when the number is called one gets one's own food. There are no waiters except to clear the tables. After dinner, at about 9.15 p.m., most of the company went on to the house of one of the company, where they had coffee and drinks and talked until about 11.45 p.m.

The main interest in the evening was the extent to which the two deviant incidents, the policeman and the landlord's story, would be included in the narrative. One account went:

> Well the story of Thursday evening for me begins with being overhauled by a policeman on a bicycle and after that we all got into the [restaurant], had a beer, ordered our food, went round the corner, found a table, were regaled by the landlord's story of how he ... of why he got his arm in a sling ...

This person contrasts with the speaker, who was questioned a week after his talk and initially recalled neither of the unusual events. He first went into some detail about events between his talk and the pub. He went on:

> I talked to [some research students], there were other people around, and then off we went to dinner, what happened there, it was, it was a pub with classical music, and, well, extremely enjoyable, everything was very nice except the Gents ... I can't remember very much actually about the dinner but I enjoyed it very much ...

Of the seven people questioned, only two recalled the landlord's story first time through, although all of them recalled it following general prompting for more detail. Of the five who witnessed the policeman, only two recalled him without any prompting. If we had not specifically asked for further details, we could have assumed that they had forgotten and landlord and the policeman. We would further suspect that repeated questioning without probing would leave these subjects with good recall of the evening without either of the two special incidents.

There are indications that detail can be stored separately and retrieved if the task demands require it. Thus, there was good consensus on such matters as what individual people ate and the order in which people were served. This detail is, however, not always veridical. Thus, the speaker said ''we had dinner, coffee, no sweet'' whereas, in fact, no one had coffee in the restaurant; another person claimed the company sat down and talked before the meal, whereas, in fact, everyone ordered before sitting down. A third person, who described in detail what other people ate, made errors while doing so.

The conclusions that can be drawn from this analysis are that people taking part in a non-traumatic event can appear to forget material of various kinds even including unusual and extraordinary events, and that their level of apparent recall depends very much on how they are questioned and prompted. One cannot explain these lapses by reference to traumatic effects. Had these unusual events been unpleasant, one can see how it might have been argued that they were cases of motivated forgetting. We might further want to say that motivated forgetting cannot be accepted as a cause of non-reporting under any circumstances unless there has been extensive probing of the target event. However, in many disaster settings, the questioner will not know what the key events have been, and isolated unpredictable episodes could well be missed as a natural consequence of the interrogatory trajectory.

THE *MARCHIONESS* DISASTER

The post-seminar dinner was taken as a contrast with the *Marchioness* riverboat disaster (Thompson, Chung & Rosser, 1994). This single event was experienced by a large group of people, most of whom knew each other, and had followed a common approach of making statements to solicitors, followed later by individual intensive debriefings by staff of the Traumatic Stress Clinic, University College Hospitals, London. The records of these interviews enabled us to build up a picture of what happened to individual people, and to do some cross-checking on their accounts. Other survivors were treated at other centres simply as a result of chance referral patterns.

The *Marchioness* disaster happened in the river Thames on 20 August, 1989 (MAIB, 1991). Guests arrived at Charing Cross Pier at around midnight to wait for the *Marchioness*, a 90-ton pleasure cruiser, on which they were planning to

celebrate the 26th birthday of a financier. Close friends and business associates had been invited, and some of these had in turn invited additional guests. Most people knew many of the guests well. The boat left at about 1.20 a.m., about 20 minutes later than planned.

The *Marchioness* sailed down the Thames towards Tower Bridge. After about half an hour, as the *Marchioness* had passed Southwark bridge and was trying to go through the central span of Cannon Street rail bridge, the back of the boat was suddenly hit by the *Bowbelle*, a 1500-ton dredger, which was sailing downriver in the same direction. The *Marchioness* was consequently turned sideways and was then hit again by the *Bowbelle*, which went straight into the lower deck where the dining room was situated. The boat immediately capsized and the top part, which contained the bar, was sheered off. The *Marchioness* sank within two minutes. The *Hurlingham*, the sister ship that had been sailing alongside the *Marchioness*, immediately started to rescue the people in the Thames. Some time later, police launches, helicopters, and fireboats arrived to join the rescue.

A total of 51 people died and 80 survived, a death rate of 39%; 27 dead bodies were recovered from the river and 24 bodies were recovered from the boat. Most bodies were recovered within a three-to four-day period. Newspaper accounts stated that 51 people were rescued by the police and 29 people swam to the shore or were rescued by the *Hurlingham*.

The nature of the party was that people were moving from one group to another as the evening developed. Before boarding the *Marchioness*, a large group was waiting at Charing Cross pier, and many had come there from dinner parties together. Once on board they often picked out friends in order to greet them, but also noticed known and unknown people who passed by them or who joined other groups. The layout of the boat meant that groups formed in different rooms and thus had different perspectives of the moment of impact. Once the survivors were in the river, it was almost random whom they would find themselves next to as they struggled to survive. Many did not know those in the river. Most were calling out for those they loved. The time until they were rescued might involve seeing various groups of people and bodies on the river. Some people were floating in a group together, and knew each other at least by name. Others were separated from the group, and managed to reach safety on their own. After rescue, people might be in a boat with others they knew well or hardly at all.

Method

The files of 27 subjects were studied. This is the total set of those who survived the *Marchioness* sinking and were referred to the Traumatic Stress Clinic at the Middlesex Hospital. Other survivors went through different processes for circumstantial reasons and we do not have direct access to their statements. Two key sources of information from each file were studied in detail. The first was

the statement made to solicitors some months after the event. They were given on average 4.28 months after the sinking (*s.d.* 4.90, range 10 days to 1 year 3.5 months). The second was the written notes of the psychological debriefing they received at the clinic, which was usually of three hours' duration, and served as a first step in a treatment process. These interviews were carried out on average 7.13 months (*s.d.* 6.47, range 1 month to 2 years 2.5 months) after the sinking.

As the 27 subjects in our sample constitute only 34% of the full 80 survivors it is immediately evident that the possibility of confirming a survivor's story from the account of another survivor is considerably reduced. This was particularly true of the period in the river in which people were seen or floated together or were rescued by each other, but because these subjects were not referred to the clinic we have no access to their accounts. Our method was to search for validation from within our subjects' accounts, and to pay particular attention to any anomalies that could be detected in these accounts.

Our initial procedure was to study the written accounts in detail and to note the names of the people each subject mentioned in their account, and their locations, either absolutely or relative to the informants. A search was then made through the account of the mentioned person to see if the subject had themselves been mentioned in return. If this was the case, the mention was classified as confirmed. Table 1 shows the distinctions between confirmation categories.

Results

The statements made to solicitors were on average 1809 words long (*s.d.* 749). Each statement was a formal document, part of a court process. There were no leading questions or prompting relevant to the subject matter we looked at. The focus of the questioner was to get a factual account of what happened, but with a special interest in the question of responsibility for the disaster. For example, questions were asked about safety aspects, whether there were any warning

TABLE 1
Categories of Confirmation

Not confirmable	A target person mentions being with another who either died or whose records were not available to us.
Confirmable	A target person mentions being with another who survived and whose records were available to us.
Confirmed	A target person mentions being with another who survived, and that other person spontaneously mentions being with the target person.
Not confirmed	A target person mentions being with another who survived, but that other person did not spontaneously mention being with the target person.
Anomalies	A target person does not report an important event involving another person, although that other person reports it.
Lapses	A target person reports a memory lapse for some period of their account.

messages, whether life jackets were available, and whether a count was made or names were taken as passengers entered the boat. People were also asked about financial losses resulting from damage to clothes and possessions. Subjects often gave the names of other people they had seen during the disaster. They were also asked about the general impact on them of the event. Within the statements, the section from boarding the *Marchioness* up to rescue or escape from the river came to 643 words (*s.d.* 185).

The written accounts of the psychological debriefing were on average 2242 words long (*s.d.* 875). The debriefing session was a private confidential clinical interview, and the written records gave only a partial account of the statements made. The focus of the debriefer was to find out what had happened and, what was most important to the patient, to understand the meaning of the event for the patient, with a view to helping them cope with the impact of the disaster. Questions were asked about close friends, about feelings of responsibility and guilt, about occasions when others who were drowning had asked for help but had not received any, about contemplating imminent death, and about their attempts to cope with the impact of the disaster on them. Stress was placed on the freedom to discuss thoughts and emotions, but little time was spent pressing for details about the reconstruction of the sequence of events. Names of other people were sometimes asked for, but often the names came out in a rush, with great emotion, and a complete record was not obtained. Within the debriefings the section from boarding the *Marchioness* up to the rescue or escape from the river came to an average of 658 words (*s.d.* 305).

In 12 cases the debriefing had not been written out separately, but the account of the disaster was part of a psychological report for a solicitor. These reports were not verbatim and had often been summarised. They were 914 words long on average (*s.d.* 488). Within the reports, the section from boarding the *Marchioness* up to rescue or escape from the river came to 641 words (*s.d.* 242).

In each of the three accounts, the mean word count for the central events of the disaster was very similar at about 645 words, although the variability of the debriefings was greater than that of the statements to the solicitors.

The study of concordances in multiple written accounts is complex. There are two main tasks: confirming that statements made are accurate recollections, and determining where forgetting has taken place. The main problem for both of these tasks is that each written account will only collect a small sample of the possible recollections of which the subject is capable. Using the written account as the measure of memory will inflate the apparent traumatic amnesia, although the fault may lie with insufficient enquiry rather than poor memory. A narrowly focused interview may illuminate only scattered patches of memory, making it statistically unlikely that other subjects' accounts will confirm what was said. The second problem is that a network of accounts has to be built up before a decision can be reached about what happened to a group of people, and whether and to what extent their accounts confirm each other. We should not, then, be

surprised, if apparent performance were poor. In addition, as we have indicated, the survivors were not questioned in detail for the kind of information that we have focused on, and at no time that we know of was any memory-enhancing technique used, such as the Cognitive Interview (Fisher & Geiseslman, 1992).

One other source of material was available to us. A researcher had access to statements made to the Westminster Coroner's Court, and took notes of any mention of other individuals. This added another 11 fragments that could be used for validation.

The total set of information on which we are working is given in the Appendix. As many of the statements are distressing we have assigned false initials to all people mentioned on the following convention: the 27 people for whom we have statements are labelled AA to AZ and ZA. The people for whom we have notes of statements made at the hearing are labelled BA to BK. The survivors for whom we have no statements have a first initial N, and those who died are prefixed with an X.

Cross Validation Networks. The first attempt at cross validation was to take all examples of a survivor mentioning someone by name and checking to see if the mention was reciprocated. There are three problems here. The first is that the relationships among the individuals were hierarchical, and people tend to focus on either close friends or more important or dominant people for spontaneous mention. As the questioning did not focus on the importance of mentioning everyone who was seen at every stage, there would be no chance of correcting for the first mention bias. Second, someone might be mentioned who was not currently in a reciprocal interaction (''I saw X in the bow and was going to talk to him''). Third, we might not have the statements of the person mentioned, who could have been debriefed at some other centre. Fourth, many of the people who were mentioned actually died in the accident. The result of these factors is that about half the statements could not be verified. Accordingly we adopted a less restrictive method, without losing accuracy.

The first example of indirect validation is given in Fig. 1. In his statements, AR mentioned only his wife, XP, who died. However, his statement could be verified by AF, who mentioned AR & XP as being together in the location mentioned by AR. The correspondence between the two statements means that they can both be counted as correct recall. AF also mentions XG, XH, and XI. These statements were counted as unconfirmed. A similar situation occurred with AL, whose mentions of XK, XL, NG, & XM were unconfirmed by AN or BG (see Appendix, Fig. a1).

A more complicated example is given in Fig. 2 which concerns those people who were in the bow of the ship. AI's mention of AK and ZA were reciprocated. AO said he was talking to XJ (who died) but AI mentions them both and this counts as confirming AO. There are problems with BI and BC who said they were ''with'' AB and ZA respectively but there was no reciprocal mention.

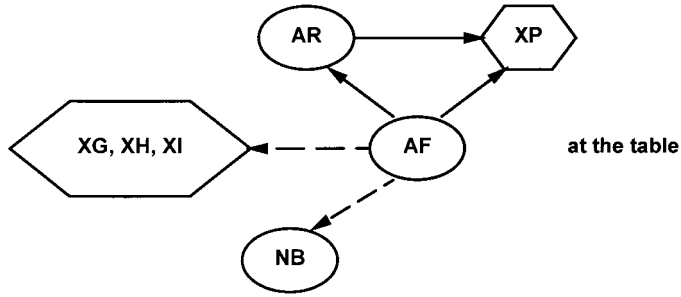

FIG. 1. A graph diagram indicating the validation of a deceased person's (XP) position on the *Marchioness*. The arrows indicate the direction of a mention in the transcripts. AF's mentions of XP, XH, XI (all of whom died), and NB (whose statements were not available to us) were counted as non-confirmed, as AR did not mention them.

However, as both BI and BC also said they were in the bow, as well as saying that they were with people who we know, because of other testimony, were in the bow, we felt that there was a good case for counting these as confirmed statements. The same is true for AP's mention of AI. AP's mention of XO and XW, on the other hand, was not confirmed. As both XO and XW died we called this a case of non-confirmability.

Next, we take a section of the rescue, shown in Fig. 3. This involves two beer barrels (probably thrown overboard by people in the *Hurlingham*, the sister ship

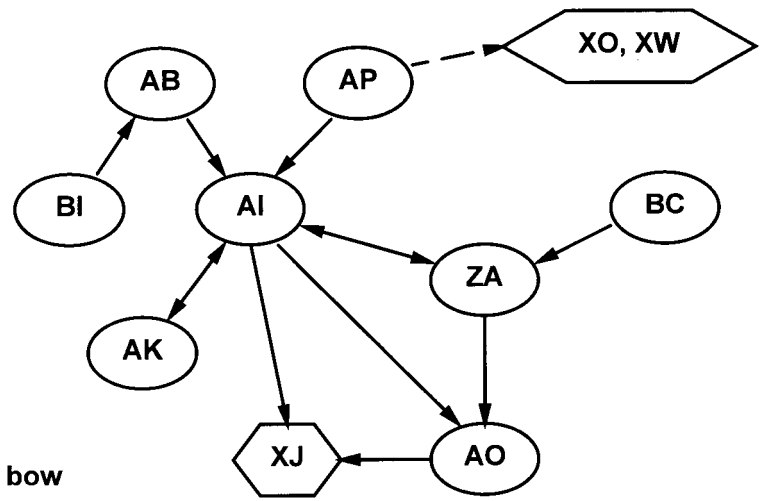

FIG. 2. A more complex example of cross validation of statements made in the transcripts concerning the location of people on the bow of the *Marchioness* at the time of impact. AB's claim to have been with AI was not confirmed.

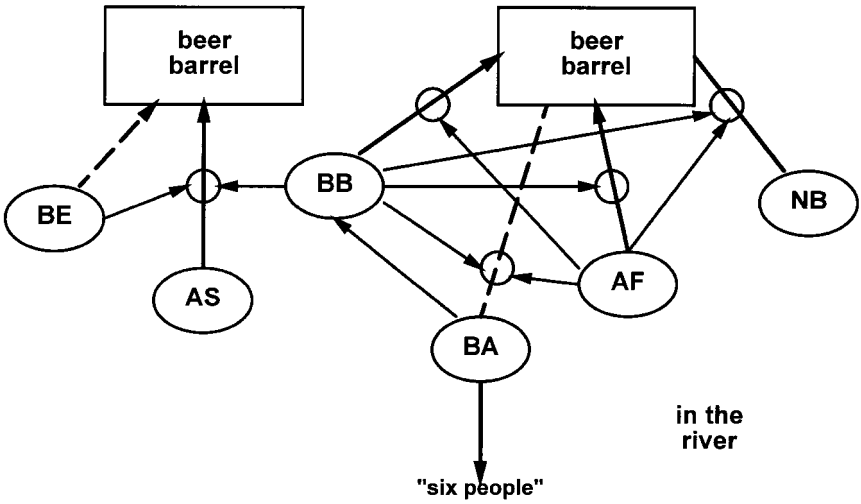

FIG. 3. An example of cross validations and a memory lapse (AS not mentioning BE). Arrows point to objects or persons mentioned. The dashed line means that no mention was made of the barrel by BA. Arrows pointing to the line connecting individuals with the barrels indicates an explicit mention of the person being on the barrel. (NB survived but her transcript was not available.)

nearby, to assist those in the river). AS reported clinging to a barrel at one stage of his rescue. BE said he shared a barrel with AS—that is, he validates the AS–barrel connection. The rest of the diagram indicates that AS was seen on the barrel by BB, who ended up holding on to a second barrel on which there were a number of people, some of whom mentioned each other. We believe that AS not mentioned BE counts as a memory failure, on the grounds that one other person sharing a barrel under these circumstances would be salient in the context of the interviews. Accordingly, the BE–barrel connection is classified as not confirmed. These are difficult factors to judge, however.[1] Note that BA only mentions being with BB, his girlfriend, and does not mention the barrel or name the other people on it, apart from saying he swam towards six people in the water. This may be a memory failure but we have conservatively taken it as reflecting prioritisation in the reporting. As both BB and AF mentioned BA and NB, these four statements are counted as cross validating.

[1] Jonathan Schooler (personal communication) posed the question of whether the issue of traumatic forgetting ultimately boils down to whether or not people forget experiences that our folk theories of memory suggest they should not. The converse to that, of course, is that there is a danger of automatically giving the label of false memory to something we claim was forgotten for a period and which our folk theories of memory believe that we should always have remembered. We do not, at the moment, see a satisfactory way out of either dilemma.

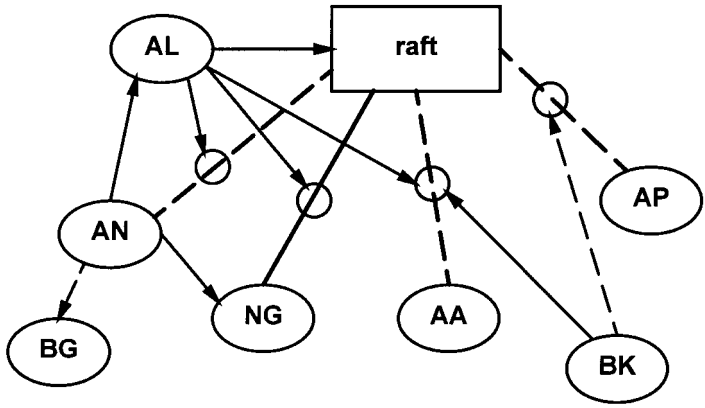

FIG. 4. Further complex cross validations in the water. BK's claim of having seen AP on the same raft as AA was not validated.

As a final example, shown in Fig. 4, we have the most confusing set of statements from in the river. AL says that NG jumped off a raft and pulled him towards it. There were also AN and AA. AN said he hung onto some debris, and saw BG, NG, and AL in the water. BK said that he had seen AP clinging to a raft on which he saw AA. Neither AP nor AA mention the raft or each other, and AP, in fact, is mentioned by no-one else. (Note that BG said that he had been with AL and AN prior to impact, but we have no extended statement by him or any comment on later events.) We have scored as confirmable but unconfirmed AN's mention of BG, and BK's mention of AP. Of course we can make no judgement as to whether the statements are in error, whether other people have forgotten BG and AP who ought to have mentioned them, or whether other people would confirm the statements if asked. The unconfirmed category, that is, is the highest estimate.

We list all the statements in the appendix, together with diagrams of confirmed statements. The summary of the findings is given in Table 2. Our 27 informants made 86 statements which identified specific individuals whose accounts were also available to us, either as other statements or as notes taken during the hearing. These 86 statements, then, could in principle be confirmed. In fact, as shown in Table 2, 70 were confirmed and 16 were not confirmed. Of the 16, only 1 involved a contradiction. It should be remembered that the other 13 unconfirmed points were not actually directly questioned. These memory achievements overcome not only the trauma but the context-dependent factor of recalling on land what happened in the water (cf. Goddon & Baddeley, 1975).

If some active forgetting process was involved in reducing access to traumatic experiences, then one might expect greater forgetting (higher

TABLE 2
Classes of Statements Made

	Location	*Pre-impact*	*Post-impact*	*Total*
Total	27	53	39	119
Not confirmable	9	12	12	33
Confirmable	18	41	27	86
Confirmable-Confirmed	18	29	23	70
Confirmable-Not Confirmed	0	12	4	16

The table gives a list of the statements made, divided into three classes: claims about the subject's own location at the time of the impact, and events involving other people, either before or after the impact. Most of the latter category involved what happened in the river.

frequency of confirmable but not confirmed memories) for the post-impact as compared to the pre-impact memories. In fact there were 12 out of 41 unconfirmed memories pre-impact, and 4 out of 27 post-impact.

We only found one outright discrepancy. AZ said that he saw AJ in the water ''who appeared to be drowning'' and that he and ''another person'' supported AJ until they got aground. AJ, however, gave a long account where he got ashore alone, not mentioning AZ, but saying that he had been worried about BF ''whom he knew could not swim''. AJ went home after getting ashore and waited for his friends. BF arrived there with AZ. In another, later account, AZ says that he was holding on to a ring with BF. BF validates this. We assume that AZ's first statement was a memory error which was corrected by later conversations with BF and AJ.

As part of their assessment, subjects were interviewed about their emotional reactions. Post-traumatic stress disorder, as defined in the Statistical and Diagnostic Manual (American Psychiatric Association, 1987) includes traumatic amnesia as one of the possible symptoms of the disorder. Only 3 subjects out of 27 claimed that they had forgotten aspects of the disaster. These did not include the subjects in whom we have identified discrepancy of omission. For one of these subjects, AI, it was the period immediately prior to the impact which was remarked on: ''The recollection of people is hazy because I think I have deliberately pushed it to the back of my mind to try and deal with the situation.'' AL could not recall how he got himself free from the *Marchioness*, and AE was blank from entering the water to arriving on the shore. The accounts of these subjects do not appear to differ significantly from those of others in terms of word length (615 versus 643 words to solicitors, 677 versus 650 words at debriefing) and the amount and type of event-relevant detail included. Although all report memory lapses for some part of the disaster sequence, none appears to have significantly poorer recall. In this case, self-reported memory lapses have little relationship with recall as we assessed it, although we suppose that these,

like all other subjects, forgot some features of the event. Other subjects, AT, AQ, & AV, reported segments of time loss, mostly while they were escaping from the boat (sometimes not having the slightest idea how they got out) or while they were in the water. Other subjects, however, went into a lot of detail about the events during the escape or in the water.

DISCUSSION

Despite restrictions in both the sample and the date which might have served to inflate the apparent frequency of traumatic amnesia, motivated forgetting appears to be extremely rare in a natural disaster. Access to the full population of survivors would increase enormously the probability of achieving confirmation of subjects' accounts. Fuller interviews, particularly those designed to seek validation of experiences, would also have increased the probability of confirmation. Nonetheless, even with these restrictions the rate of confirmation was over 80%.

What chance did we give our informants for motivated forgetting? Although it is the case that the items for which corroboration was sought were relatively neutral, many accounts included harrowing details of attempts to save others which had to be abandoned in the interests of self-preservation. Although it cannot be said how frequent these recollections were, when compared with some objective account of the event, it can certainly be asserted that these highly emotional personal recollections were frequently reported many months after the event. Could we expect more forgetting with longer delays? Possibly, but the average of seven months should have been sufficient to have brought about forgetting, particularly as this was a time of great emotional distress in which forgetting would have been desired. The apparent absence of motivated forgetting might be because of its relative infrequency. A larger sample would increase the probability of finding such rare people.

Our non-traumatic post-seminar dinner party comparison revealed that striking and unusual events were not reported spontaneously by five of the seven subjects, and that errors occurred in other details. Compared with this, the memories of these highly distressed individuals appear to be all too good. They recall too well, and too frequently, suffering from PTSD as a consequence (Thompson et al., 1994). Although a few have forgotten some aspects of the disaster, and a few openly say that they have deliberately tried to forget it, the overwhelming majority give detailed accounts with few lapses or inconsistencies, and with many instances of confirmation from other survivors.

There is always the possibility that some stories have converged in terms of content because they have been retold among groups of friends. This could possibly have affected the stories given to the solicitors, but it is less likely to have affected the psychological debriefings which focused sharply on how the individuals felt. In these interviews, factual matters such as the presence of

others emerged in support of the affective narrative. There may be residual doubts as to the purity of the accounts of the *Marchioness* survivors, and it is clear that caution is needed in attempting to generalise these data to other kinds of traumatic events, but it is clear that, for whatever reason, the *Marchioness* accounts cannot be looked at for evidence of extensive traumatic amnesia.

Manuscript received 1 February 1996
Manuscript accepted 10 September 1996

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APPENDIX

Possible Validations

This is the complete listing of the statements of the 27 subjects that we considered, together with statements made at the hearing by other survivors whose statements are not available to us. We have added diagrams of the major sets of interactions which have not already been covered in the main body of the paper. These are Figs. a1, a2, a3 and a4.

SUBJECT	*STATEMENTS TO BE VALIDATED*		*VALIDATED?*[a]
AA	Location? Dance deck		NC:1
	With? Pre-impact:	*XA XB XC*	NC:3
	Impact:	*XB*	NC:1
AB	Location? Bow		C-C:*BI*
	With?	*AI*	*C-NC:AI*
AC	Location? Bow		NC:1
	With?	*NF, XD, NA*	NC:3
	In river:		
	– with	*AK*	C-C:*AK [INF]*
		NF	C-C:*AK*
		NA	NC:1
	AK saved by *NF*		C-C:*AK*
AD	Location? Bow		C-C:*AM*
	With?	*AM*	C-C:*AM*
		XE	C-C:*AM*
	In river:		
	– fails to save *XE*		NC:1
	– saves *AM*		C-C:*AM*
	– ''chef'' under bridge		C-C:*AM*

[a] ''Validated?'' NC = Not Confirmable
C-C = Confirmable-Confirmed
C-NC = Confirmable-Not Confirmed

SUBJECT	*STATEMENTS TO BE VALIDATED*		*VALIDATED?*[a]
AE	Location? Bow		C-C:*AY, AT*
	With?	*AY*	C-C:*AY, AT*
		AT	C-C:*AY, AT*
	in river alone		NC:1
AF	Location? Dining Deck		C-C:*AR*
	With?	*AR*	C-C:*AR [XW]*
		XW	C-C:*AR*
		XG XH XI NB	C-NC:4 *[AR]*
	In the river		
	– on barrel with *BB*		C-C:*BB*
		NB	C-C:*BB*
		BA	C-C:*BB*
AG	Location? Bar		C-C:*AS, AH*
	With?	*XQ*	C-C:*AS, AH*
		AS	C-C:*[XQ]*
	Escape from river:	*BJ*	NC:1
AH	Location? Bow		C-C:*NE*
	With?	*XQ*	C-C:*NE*
AI	Location? Bow		C-C:*ZA, AK*
	With?	*XJ*	C-C:*AO*
		ZA	C-C:*ZA*
		AK	C-C:*AK*
		AO	C-C:*ZA*
	In river:		
	– saves *BC*		C-C:*BC*
AJ	Location? Gents loo		NC:1
	With? On own		NC:1
AK	Location? Bow		C-C:*AI*
	With?	*AI*	C-C:*AI*
	In river:		
	– swims towards man	*(AT)*	C-C:*AT*
	– saved by	*NF*	C-C:*AG*

SUBJECT	*STATEMENTS TO BE VALIDATED*		*VALIDATED?*[a]
AL	Location? Dance deck		C-C:*AN, BG*
	With?	*AN*	C-C:*AN, BG*
		XK XL NG XM	C-NC:4
	Escape from boat:	*AN*	C-C:*AN*
	Escape from river:		
	– pulled onto raft by	*NG*	NC:1
		AA	C-NC:*AA*
	AA on raft		C-C:*BK*
	AN on raft		C-C:*AN*
AM	Location? Bow		C-C:*AD*
	With?	*AD*	C-C:*AD*
		XE	C-C:*AD*
	In river:		
	– saved by *AD*		C-C:*AD*
	– ''chef'' under bridge		C-C:*AD*
AN	Location? Dance deck		C-C:*AL*
	With?	*AL*	C-C:*AL*
	Escaping from boat:	*AL*	C-C:*AL*
	in the river	*BG*	C-NC:1
		NG	C-C:*AL*
		AL	C-C:*AL*
	Escape from river:		
	– pulled onto police launch by *NG*		NC:1
AO	Location? Bow		C-C:*AI, ZA*
	With?	*XJ*	C-C:*AI*
AP	Location? Bow		C-C:*[AI]*
	With?	*XO, XW*	C-NC:2 *[AB, AI AO etc]*
		AI	C-C:*[AI]*
AQ	Location? Bow		NC:1
	With?	*XV*	NC:1
	in water with *XV*		NC:1
AR	Location? Bottom level (dining deck)		C-C:*AF*
	With?	*XP* and 2 others (die)	C-C:*AF*

SUBJECT	*STATEMENTS TO BE VALIDATED*		*VALIDATED?*[a]
AS	Location? Bar		C-C:*AG*
	With?	*XQ*	C-C:*AG*
	In river:		
	– speaks to *BB*		C-C:*BB*
	– holding on piece wood with *NH* & *NI*		NC:2
	– transfer to beer barrel		C-C:*BB*, *BE*
	– on life raft with *AI*		C-NC:*AI*
AT	Location? Bow		C-C:*AE*, *AY*
	With?	*AE*	C-C:*AE*, *AY*
		AY	C-C:*AE*, *AY*
	In river:		
	– swims away from approaching man *(AK)*		C-C:*AK*
AU	With?	*XR*	NC:1
	On shore: *NJ* screaming for *XR*		NC:1
AV	Location? Bar		NC:1
	With?	*XS*	NC:1
	In river:		NC:1
AW	Location? Bar		NC:1
	With?	*XT*	C-NC:*[BD, BE]*
		NL	C-C:*BD*, *BE*
	In river:	with *XT*	NC:1
AX	Location? Outside gents loo/dining deck		NC
	With? On own		NC
AY	Location? Bow		C-C:*AE*, *AT*
	With?	*AE*	C-C:*AE*, *AT*
		AT	C-C:*AE*, *AT*
AZ	Location? Dining deck		NC:1
	With?	*XU*	NC:1
	In river:		
	(a) – saves *AJ*		C-NC:*AJ*
	(b) – holds onto ring	with *BF*	C-C:*BF*
ZA	Location? Bow		C-C:*AI*, *BC*
	With?	*AI*	C-C:*AI*
		AO	C-C:*AI*

The following items were drawn from notes taken during the hearing. They were used for validation of the previous items but, because of their non-systematic acquisition, they were not counted in Table 2.

SUBJECT	*STATEMENTS TO BE VALIDATED*		*VALIDATED?*[a]
BA	in river – saw six people		C-C:*BB & others*
		including *BB*	C-C:*BB*
BB	In river – on barrel		*BA*
	with	*AF*	
		NF	
		BA	
	saw *AS* holding barrel		
BC	Location bow		C-C:*ZA*
	with *ZA*		C-C:*ZA*
	in river – *AI* tried to save		C-C:*AI*
BD	Location? bar		C-C:*BE*
	with tarot reader	*(NL)*	C-C:*BE*
		BE	C-C:*BE*
BE	Location? bar		C-C:*BB*
	with tarot reader	*(NL)*	C-C:*BD*
	in river – held barrel		C-NC:*AS*
	on barrel	*AS*	C-C:*BB*
BF	in river:	holds onto ring with *AZ*	C-C:*AZ*
BG	Location? dance deck		C-C:*AN, AL*
	with	*AN*	C-C:*AN, AL*
		AL	C-C:*AN, AL*
BH	in water	saw *AQ*	C-NC:*AQ*
BI	Location? bow		C-C:*AB*
	with	*AB*	C-NC:*AB*
BJ	Location? bar		C-C:*AH*
	with	*AH*	C-C:*AH*
		XQ	C-C:*AH*
BK	in river – sees on raft	*AA*	C-C:*AL*
		AP	C-NC:

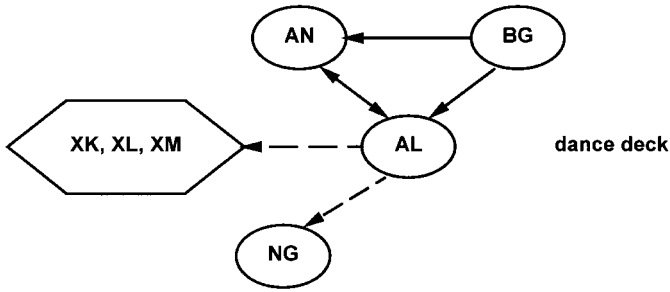
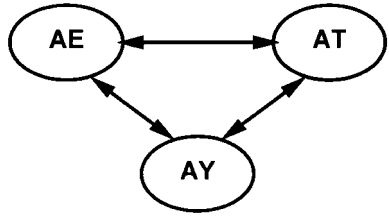


FIG. a1.



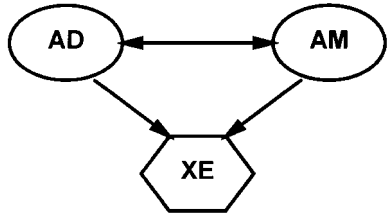


FIG. a2.

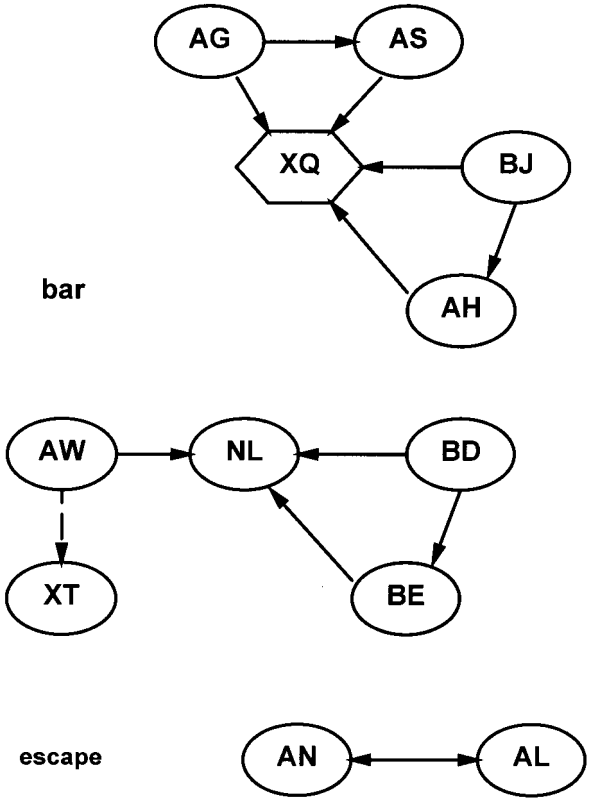


FIG. a3.

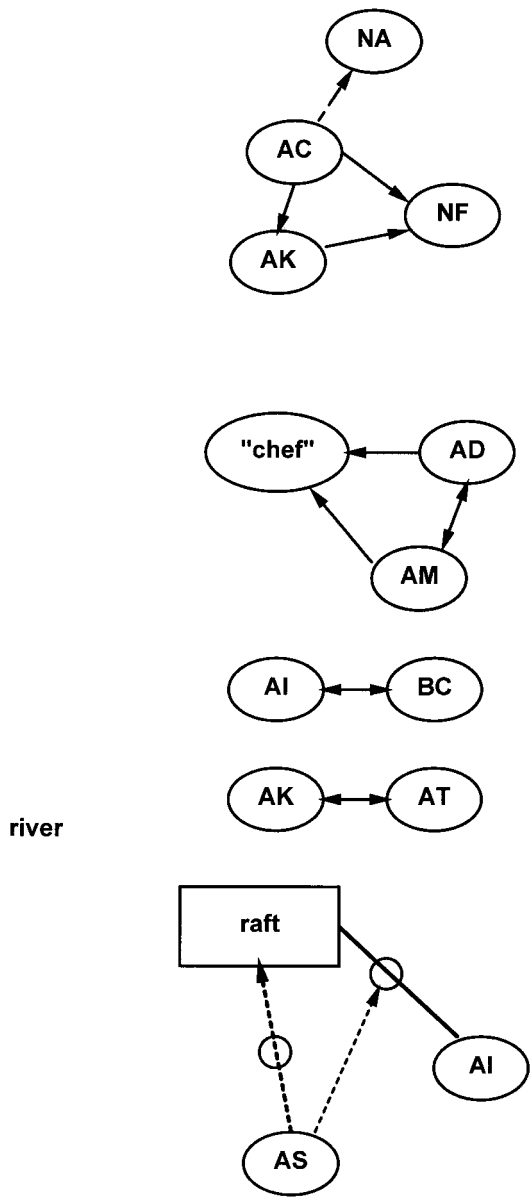


FIG. a4.