APPLIED COGNITIVE PSYCHOLOGY
Appl. Cognit. Psychol. **18**: 505–518 (2004)
Published online in Wiley InterScience
(www.interscience.wiley.com) DOI: 10.1002/acp.999

Feigning Amnesia Undermines Memory for a Mock Crime

KIM VAN OORSOUW* and HARALD MERCKELBACH

Maastricht University, The Netherlands

SUMMARY

Using scripts, previous studies by Christianson and co-workers have suggested that simulating amnesia undermines memory. Relying on a more realistic mock crime paradigm, the current study examined whether feigning amnesia has memory-undermining effects. After committing a mock crime, one group of participants ($n = 21$) was instructed to simulate amnesia for the event. Their performance on immediate free recall tests was compared to that of participants ($n = 20$) who were instructed to respond honestly during free recall. After one week, simulators, honestly responding controls, and a second control group ($n = 20$) that had not undergone immediate memory testing after the pertinent event completed free recall tests. This time, all participants were instructed to perform as well as they could.

At the follow-up free recall test, both ex-simulators and controls who underwent the memory testing for the first time performed significantly worse than the honestly responding controls. Thus, the current study supports the idea that simulating amnesia in order to evade responsibility for a crime has detrimental effects on true memory of the crime. Our results also suggest that this effect can best be understood in terms of lack of rehearsal. Copyright © 2004 John Wiley & Sons, Ltd.

INTRODUCTION

It is not uncommon for perpetrators to claim amnesia for their offences (Cima, Merckelbach, Nijman, Knauer, & Hollnack, 2002; Kopelman, 1987; Taylor & Kopelman, 1984). As a matter of fact, 25–45% of murderers claim amnesia for their crime (Kopelman, 1995) and some authors found these rates to be even higher (Bradford & Smith, 1979; O'Connell, 1960). Although many lay people and triers of fact seem to believe that it is perfectly possible for an offender to have complete amnesia for his crime, especially when he was intoxicated during the time of the crime (Cima et al., 2002), psychological science offers little or no consensus as to the existence of crime-related amnesia (Kopelman, 1995; Schacter, 1986a, 1986b; Taylor & Kopelman, 1984). Many authors emphasize that two distinct types of amnesia should be distinguished, namely organic and dissociative (also

*Correspondence to: Kim van Oorsouw, Department of Experimental Psychology, Maastricht University, PO Box 616, 6200 MD, Maastricht, The Netherlands. E-mail: K.vanoorsouw@psychology.unimaas.nl

Contract/grant sponsor: NWO; contract/grant number: 425.20.803.

referred to as psychogenic or functional) amnesia. Organic amnesia refers to memory loss due to brain damage, head injury, viral infections or intoxication (Bourget & Bradford, 1995; Kopelman, 1987, 1995; Schacter, 1986a, 1986b). Dissociative amnesia refers to a condition in which a person has no recollection of his own identity or behaviour due to disruptions of memory and consciousness (Kanzer, 1939; O'Connell, 1960; Sadoff, 1974). Dissociative memory loss is often thought to be the result of intense stress due to marital or financial problems or traumatic childhood experiences (Arrigo & Pezdek, 1997; Loewenstein, 1991).

According to some authors, crime-related amnesia is a form of dissociative amnesia that can best be interpreted as the result of extreme emotional arousal (Kopelman, 1995; Loewenstein, 1991; Swihart, Yuille, & Porter, 1999). By this view, excessive arousal during a crime would make it difficult to retrieve memories of the event when the person regains a normal state of arousal. This would result in lack of memory for the crime. Not only extreme arousal, but also excessive alcohol intake would contribute to state dependency of crime memories and, along this pathway, contribute to dissociative amnesia for crime (Bourget & Bradford, 1995; Bower, 1981; Goodwin, 1995; Goodwin, Crane, & Guze, 1969; Kalant, 1996; Kopelman, 1995; Swihart et al., 1999).

Apart from organic and dissociative amnesia, there is a third interpretation of cases in which perpetrators claim to have no memories of the crime. Although some authors (e.g. Gerson, 2002) opine that malingering is a rare phenomenon, there are several well-documented cases in which perpetrators feigned amnesia for the crime they committed (e.g. Denney, 1996; see also Cima, Merckelbach, Hollnack, & Knauer, 2003). The most common motive for offenders to simulate amnesia is avoidance or minimization of legal responsibility.

The issue of whether a claim of crime-related amnesia has an organic background, is dissociative in nature or is a form of malingering is not without important legal implications (e.g. Bradford & Smith, 1979; McSherry, 1998; Porter, Birt, Yuille, & Herve, 2001; Schacter, 1986a). For example, when triers of fact have the impression that such a claim is bona fide and take it as a strong indication that the perpetrator was in a dissociative state when he/she committed the crime, this might have consequences for the perpetrator's competency to stand trial (Schacter, 1986a) or it might inspire a not-guilty-by-reason-of-insanity outcome (McSherry, 1998; Porter et al., 2001). Because of these legal ramifications, the psychological literature on crime-related amnesia has been preoccupied with parameters that might discriminate between organic, dissociative, and feigned amnesia. However, as Kopelman (2000) points out, there are no robust demarcations between these forms of amnesia. Instead it is more plausible that they form the endpoints of a continuum. Thus, according to Kopelman (2000), claims of amnesia often represent a mixture of genuine and malingered components. A case in point is the experimental work by Christianson and Bylin (1999) who suggested that feigning amnesia might have a memory-undermining effect. More specifically, Christianson and Bylin (1999, see also Bylin & Christianson, 2002) found that participants instructed to simulate memory impairment for a crime narrative that they had read showed poorer overall memory for the crime story when instructed to perform as well as they could during a 1-week follow-up. This suggests that simulating memory difficulties for a crime has negative effects on genuine memory for that crime.

Christianson and Bylin argue that several mechanisms might be responsible for the memory-undermining effect of feigning amnesia. One candidate is retrieval-induced forgetting (Anderson, Bjork, & Bjork, 1994; Ciranni & Shimamura, 1999; Macrae &

MacLeod, 1999; Shaw, Bjork, & Handal, 1995). Retrieval of fabricated memories requires inhibition of correct information. This may lead to retrieval difficulties when one later tries to recall the correct information (Anderson et al., 1994; Christianson & Bylin, 1999; Wright, Loftus, & Hall, 2001). Another potential mechanism has to do with source monitoring. Thus, fabrication of a new version of the story may lead to confusion of this new version with the original story when asked to report honestly on the second test occasion. Perhaps, then, ex-simulators misattribute fabricated information to the original story and, in this way, make source-monitoring errors (Johnson, Hashtroudi, & Lindsay, 1993; Roediger, Jacoby, & McDermott, 1996). Finally, Christianson and Bylin (1999; Bylin & Christianson, 2002) point out that the memory-undermining effect of simulated amnesia might simply reflect lack of rehearsal. Research by Turtle and Yuille (1994) has shown that initial recall is important for later recall. This implies that performance on a follow-up memory test may benefit from previous rehearsal of information. Perhaps, then, it is not simulation per se, but lack of rehearsal that is responsible for the poor performance of ex-simulators on the second test occasion.

The present study made an attempt to replicate and extend the results found by Christianson and Bylin (1999). Thus, we wanted to test whether simulating amnesia during a first test occasion would have a negative effect on subsequent memory performance (e.g. during a second test) as claimed by Christianson and Bylin (1999). In particular, we wanted to know whether such an amnestic effect of simulation occurs when a setting is created that more closely resembles a real-life crime situation. In the Christianson and Bylin studies, participants read a story about a crime and they were instructed to imagine that they were the perpetrator. However, work by Engelkamp (1995, 1998) shows that memory for an imaginative event is different from memory for events in which one has actually participated (i.e. 'enactment'). That is, enactment leads to better free recall than does standard learning (Engelkamp, 1995). With this in mind, we had participants perform a mock crime. Furthermore, by including a delayed testing-only control group, we were able to estimate the effects of being tested only at the second test occasion. This allowed us to examine to what extent the amnestic effect of simulation is a product of lack of rehearsal of critical material during the first phase of the study. A subsidiary aim of our study was to explore whether the amnestic effect of simulation is modulated by certain individual difference measures. One could argue that people high on fantasy proneness and dissociation are superior role players (Merckelbach & Rasquin, 2001). If true, one would expect a significant correlation between these traits and the memory-undermining effect of feigning amnesia. Another relevant trait in this context is social desirability. If the memory-undermining effect of feigned amnesia is strongly related to social desirability, the question arises whether this effect is genuine or reflects some people's tendency to stick to their role of simulator despite the instructions to perform as well as they can (Horselenberg et al., 2000).

METHOD

Participants

The sample consisted of 61 psychology undergraduates (54 women) at Maastricht University. Their mean age was 21.7 years ($SD = 0.55$). Participants received either €10 or €20 for participation in the study, depending on the duration of the sessions.

Materials

Participants were instructed to enter a fully equipped bar. They were instructed to take a pool cue that was placed against the bar and to use it for knocking down a dummy, which was sitting on a chair.[1] Next, they had to search the dummy's pockets for his wallet and take out whatever was in it, put the wallet back, leave the bar, and return to the experimenter's room. There, participants read a narrative describing a course of events in which the perpetrator (referred to as 'you') killed the victim (i.e. bar dummy) by hitting him with a pool cue after the victim had acted provocatively towards the perpetrator. The victim was portrayed as a defendant in a crime in which a little girl (closely related to 'you') was strangled, raped, and mutilated with a knife. Below is a shortened version of the narrative.[2] It begins by describing the intense relationship the participant (perpetrator/you) had with a six-year-old neighbour girl named 'Emma' 'who you watched growing up and spent time with almost every day'. And then the narrative goes on like this:

> 'One day, when you are studying, Emma's mother asks you whether you have seen her daughter who appears to be missing. The two of you start a search and after a few hours you call the police. The next morning, you hear that Emma has been found dead. She has been raped, strangled, and mutilated. You help make arrangements for her funeral. After a couple of days, the police arrest two suspects who are identified by a witness who saw them with Emma in a park on the day of the crime. One of the suspects confesses to the murder, but the other one denies involvement. You have every reason to believe that he is guilty too, but, because of a lack of evidence, the police have to release him.
>
> Some days later, your friend picks you up in his blue Opel around nine o'clock that night and you and another friend visit a bar. After some talking, drinking, and playing darts, your friends want to play pool. Because there are three of you, you decide to wait at the bar, while your friends go into the back room where the pool table is. After a while you notice another person sitting at a table in the corner and you recognize him as the suspect at the police station. He looks at you, shows a dirty smile and says: 'She was good', and laughs. You lose control, grab the pool cue that is leaning against the bar and hit him as hard as you can. He falls on the floor and doesn't move. You look around; there is no one there. Your friends are playing pool in the back and the bar tender is not there either. You panic when you realize the guy still doesn't move. You search his pockets for his wallet, take out the contents and put it back. You jump up and go outside. You calmly walk home. That same night the police visit you and ask you to come along to the police station. You are accused of manslaughter.'

Design and procedure

Participants were randomly assigned to one of three groups: the simulation group ($n = 21$), the honestly responding control group ($n = 20$), and the delayed-testing only control group ($n = 20$). Upon arrival, participants were provided with a general description of the experiment and received instructions as to what they were expected to do in the bar. No mentioning was made of any upcoming recall task. After they returned from the bar, they were given the narrative. They were instructed to read the material carefully and to try to link the bar incident to the narrative.

[1]See for an illustration of the scenery: www.psychology.unimaas.nl/Base/research/Psychology&law.htm
[2]The original protocol was about two pages and is available from the first author upon request.

Next, participants rated their emotional involvement and their ability to identify with the main character of the narrative on 11-point scales (anchors: 1 = *not emotionally involved/it's extremely difficult for me to identify with the main character*; 11 = *very much involved/it's very easy for me to identify with the main character*). Participants in the delayed-testing only control group were sent home with the instruction not to talk about the experiment and were scheduled for an appointment 1 week later. For participants in the simulation group and honestly responding control group, a 30 min filler interval followed during which they completed several personality questionnaires. These were the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986), the Creative Experience Questionnaire (CEQ; Merckelbach, Horselenberg, & Muris, 2001), and the Social Desirability Scale (SDS; Crowne & Marlow, 1960).

DES. The DES (Cronbach's *alpha* = 0.94) is the standard measure of dissociative experiences. It contains 28 items that address typical dissociative phenomena like feelings of derealization, depersonalization, amnesia, and identity confusion. Respondents indicate on 100 mm Visual Analogue Scales (anchored 0 = *never*; 100 = *always*) how often they experience these phenomena. Sores are averaged across items to obtain a total DES score with higher scores indicating higher levels of dissociation.

CEQ. The CEQ (Cronbach's *alpha* = 0.78) is a brief self-report measure of fantasy proneness. It contains 25 true-false items that address various features of fantasy proneness as described by Wilson and Barber (1982). Merckelbach et al. (2001) provide evidence for the reliability and concurrent validity of the CEQ.

SDS. The SDS (Cronbach's *alpha* = 0.80) consists of 33 true/false items that measure the tendency to provide socially desirable answers. After recoding mirror items, a total SDS score can be calculated such that higher scores reflect a stronger tendency to exhibit socially desirable responses.

After participants had completed the questionnaires, they were taken to a different room. They received the following instructions: 'Imagine that you are arrested because you are the prime suspect of the murder of a man who was found dead in a bar. A witness has seen you there and all the evidence points against you. The police ask you to give a statement about your involvement in the crime and what might have motivated you. You are asked to report every detail you can remember'. We asked participants, about their motives so as to encourage them to identify with the main character of the story. Further instructions differed for the two groups: Simulators were told that 'things do not look good for you. However, you are determined to minimize your responsibility by simulating a memory disorder. Thus, you try to describe events in such way that it looks like you have great difficulties remembering what happened. Note, however, that a witness saw you in the bar and you cannot simply deny everything.' Participants in the genuine group were told that 'you decide to cooperate and report in as much detail as possible everything you remember.' All participants were asked whether they understood what was expected of them and whether they had any questions. Also, they were given written instructions so that they could read them in case they forgot the instructions. We did not give simulators examples about how to simulate memory difficulties since we did not want to guide them in a particular direction on how to evade responsibility.

Having received these instructions, participants were given 20 min to write down an account of what happened. Following this 'free recall', participants were given a sheet with 25 open-ended questions about the narrative and bar incident (i.e. cued free recall).

Following these memory tests, participants were asked to fill out a questionnaire that served as a manipulation check and that intended to measure the extent to which they felt responsible for the crime. Answers were rated on 11-point scales. Thus, they were asked whether they were responsible for what had happened (anchors: 1 = *not at all responsible*, 11 = *very responsible*), or whether they thought the victim was responsible for what happened (1 = *not at all responsible*, 11 = *very responsible*). Total duration of the first test session was about 100 min for participants in the simulation and honestly responding control group and 30 min for delayed-testing only control participants.

After 1 week, all participants returned for a second test session. First, they were asked if and how much they had talked about the experiment with family or fellow students. Next, they were brought back to the test room. Simulators were told that 'this time, you do not have to simulate a memory deficit. So write down every detail of the incident that you can remember.' Participants in the honestly responding control group were told that 'unfortunately, we lost your account and therefore we ask you once more to write down everything you remember about the incident in detail.' Delayed-testing only control participants were instructed to write down the event in as much detail as possible. Next, all participants completed the cued recall task and the responsibility items described earlier. In the cued recall task, participants now also gave confidence ratings for each answer, using three-point scales (anchors: 1 = *I am sure*, 2 = *I am fairly sure*, 3 = *I am not sure*). Finally, participants were fully debriefed and paid. Total duration of the second session was about 40 min.

RESULTS

Statistical analysis

Both free and cued recall data were subjected to 2 (groups: simulation versus honestly responding control group) $\times$ 2 (first versus second test occasion) analyses of variance (ANOVAs) with the last factor being a repeated measure. Separate one-way ANOVAs (with the three groups: ex-simulators, honestly responding, and delayed-testing only control groups, as independent factor) were conducted for the data obtained during the second test session. To identify specific differences between groups, follow-up pair-wise comparisons (LSD) were carried out. Ratings of emotional involvement, responsibility, and confidence were also evaluated with either 2×2 ANOVAs or one-way ANOVAs. Finally, with correlation analysis, we explored the links between individual difference measures and memory effects of simulation.

Emotional impact and subjective guiltiness ratings

The three groups did not differ with regard to their mean emotionality ratings of the narrative [$F(2, 58) < 1$], means being 7.2 ($SD = 1.4$), 7.7 ($SD = 1.4$), and 7.7 ($SD = 0.8$) for simulating, honestly responding, and delayed-testing only control participants, respectively. Neither did the groups differ with regard to their ability to identify with the main character of the story [$F(2, 58) < 1.0$], means being 8.0 ($SD = 1.5$), 8.1 ($SD = 1.5$), and 8.1 ($SD = 1.6$) for simulating, honestly responding, and delayed-testing only control participants, respectively.

At the first session, simulators and honestly responding participants differed with regard to responsibility ratings. Simulators rated both themselves and the victim as being less responsible for what happened relative to honestly responding participants, with $t(39) = 5.89$, $p < 0.005$ for own responsibility and $t(39) = 3.94$, $p < 0.005$ for victim's responsibility. Means were 3.5 ($SD = 2.9$) and 6.0 ($SD = 3.6$) for simulators and 8.3 ($SD = 2.0$) and 9.3 ($SD = 1.2$) for honestly responding participants, respectively. This indicates that the manipulation was successful. At the second test session, the groups did not differ with regard to own responsibility [$F(2, 58) = 1.88$; $p = 0.16$] and victim's responsibility [$F(2, 58) < 1.0$]. All participants now rated both themselves and the victim as being highly responsible for what had happened. Overall means were 8.1 ($SD = 1.9$) and 8.7 ($SD = 1.5$), respectively.

Free recall

A scoring device was developed to evaluate participants' free recall. The experimenter and two independent raters identified 137 critical information units in the narrative. A critical unit was defined as a piece of information that would be useful for police investigation (e.g. 'I went to the bar with friends'). For every reported unit, participants received 1 point. To obtain a total free recall score, the number of correctly reported information units was summed (maximum = 137).[3] To allow for comparison with the Christianson and Bylin (1999) study, free recall scores were transformed into proportions.[4] We also calculated the number of commission errors. A commission error was defined as the introduction of new information, e.g. information that was not part of the bar incident or the narrative (e.g. 'The defendant was smoking a cigarette') or distorted information.

Free recall accounts were scored by the first author. A second rater, who was blind as to the group status, scored 20 free recall stories from both test occasions. Pearson correlations between both raters were 0.97 for number of correctly recalled items and 0.66 for number of commission errors (both $ps < 0.001$).

Proportions of correctly recalled information, omissions, and number of commission errors are shown in Table 1. For proportion correctly recalled information, a 2 (groups) × 2 (test occasion) ANOVA yielded a significant main effect of groups: $F(1, 39) = 35.84$, $p < 0.001$. Thus, overall, simulating participants recalled less correct information than honestly responding controls. Also, a significant main effect of test occasion emerged: $F(1, 39) = 37.59$, $p < 0.001$, indicating that both groups recalled more correct information after the 1-week time interval. Most importantly, a significant interaction of group by test occasion was found: $F(1, 39) = 17.23$, $p < 0.001$. That is, across test sessions, simulators exhibited a steeper increase in memory performance than did honestly responding participants. However a one-way ANOVA for the 1-week follow-up data revealed significant overall between group differences $F(2, 58) = 5.70$, $p < 0.005$. Post-hoc analysis showed that honestly responding controls recalled more correct information than either ex-simulators [$t(39) = 2.52$, $p < 0.05$] or delayed-testing only controls [$t(38) = 3.71$, $p < 0.05$], with the latter two groups not differing from each other [$t(39) < 1.0$].

[3]One could counter that not every information unit reported would be equally relevant to a police investigation. Thus, participants recalling less important information might have a similar recall score as participants recalling more important information. To control for this, possibility, we re-scored the free recall protocols using a weighted procedure such that information units that were considered more crucial ('black hat') received more points than units that were considered less crucial ('played pool'). However, this method yielded essentially similar results as the unweighted procedure.

[4]In, addition, we calculated a free recall ratio score by subtracting the number of commission errors from the number of correctly reported informational units divided by the maximum obtainable score [e.g. (30 correct elements − 5 commissions)/137 = 0.18]. This was done so as to obtain a measure of free recall hits corrected for commissions. An ANOVA performed on these ratios yielded main effects of group [$F(1, 39) = 54.73$, $p < 0.001$] and test occasion [$F(1, 39) = 53.21$, $p < 0.001$], and the critical interaction effect [$F(1, 39) = 40.90$, $p < 0.001$]. This pattern is basically the same as that found for simple proportions.

Table 1. Mean proportion of correctly reported free recall information, proportion of omissions, and number of commissions of participants in the simulating ($n = 21$), honestly responding ($n = 20$) and delayed-testing only ($n = 20$) condition during the first (T1) and second (T2) test occasion. Standard deviations appear between parentheses

	Simulating Ss†		Honestly responding Ss		Delayed-testing only Ss
Proportion	T1	T2	T1	T2	T2
Correct	0.09 (0.07)[a]	0.25 (0.10)[d]	0.29 (0.10)	0.32 (0.08)[b,d]	0.23 (0.06)[c]
Omissions	0.91 (0.05)[a]	0.75 (0.11)[d]	0.71 (0.14)	0.68 (0.08)[b,d]	0.76 (0.06)[c]
Commissions*	11.5 (5.2)[a]	4.7 (3.9)[d]	1.1 (1.5)	3.5 (2.3)[d]	3.4 (1.9)

†Ss, subjects.
*Commission errors are displayed in absolute numbers.
[a]$p < 0.05$ between groups at T1.
[b]$p < 0.05$ between simulating and honestly responding groups at T2.
[c]$p < 0.05$ between honestly responding and delayed-testing only group at T2.
[d]$p < 0.05$ within groups between T1 and T2.

A 2 (groups) × 2 (test occasion) ANOVA performed on commission errors only revealed that during both sessions, simulators made significantly more commission errors than honestly responding controls: $F(1, 39) = 41.20$, $p < 0.005$. In keeping with their instructions, simulators made more commission errors during the first test occasion than honestly responding controls, [$t(39) = 8.51$, $p < 0.005$]. Yet, at the 1-week follow-up, the number of commission errors of the simulators no longer differed from those of the other two groups $F(2, 58) = 1.38$, $p = 0.26$.

We also calculated proportion of same commission errors (PSE).[5] Mean proportions of same commission errors were 10% and 13% for the simulating and honestly responding participants, respectively, a difference that fell short of significance: $t(39) = \ < 1.0$.

Cued recall

Answers to cued recall questions might include several correct details. For each correctly reported detail 1 point was assigned. For example, if a participant would respond to the item 'Describe what Emma looked like' with 'dark curls and blue eyes', he or she would receive 2 points for that answer. When only 'blue eyes' was reported, the participant would receive 1 point. In this way, a maximum score of 65 points could be obtained for cued free recall. Cued free recall scores were expressed as proportions. Table 2 summarizes cued recall data. As expected, during session 1 simulators had significantly lower correct cued recall scores than honestly responding participants [$t(36) = 5.84$, $p < 0.01$]. Interestingly, at the second session, this difference was maintained [$t(39) = 2.17$, $p < 0.05$]. Likewise, simulators omitted more information than the honestly responding participants [$t(39) = 2.17$, $p < 0.05$].

A one-way ANOVA for session 2 showed that groups differed with regard to their cued recall performance [$F(2, 58) = 4.98$, $p < 0.05$]. Post-hoc tests made it clear that delayed-testing only controls had similar correct cued recall proportions as ex-simulators [$t(39) = 1.13$, $p = 0.27$, but performed significantly worse than honestly responding participants [$t(38) = 3.23$, $p < 0.005$]. No group differences were found for the number of commission errors during cued recall at the second test occasion: $F(2, 58) < 1.0$.

[5]PSE was computed by summing for each person the number of commission errors from the first test occasion that were repeated at the second test occasion devided by total number of commissions during the second test occasion.

Table 2. Mean proportion of correctly reported cued free recall information, proportion of omissions, and number of commissions on the first (T1) and second (T2) test occasion of participants in the simulating ($n = 21$), honestly responding ($n = 20$) and delayed-testing only ($n = 20$) condition. For T2 confidence ratings (1 = very, sure, 3 = not sure) are displayed. Standard deviations appear between parentheses

	Simulating Ss†		Honestly responding Ss		Delayed-testing only Ss
Proportion	T1	T2	T1	T2	T2
Correct	0.32 (0.11)[a]	0.48 (0.10)[d]	0.50 (0.07)	0.54 (0.08)[b,d]	0.44 (0.11)[c]
Omissions	0.68 (0.10)[a]	0.52 (0.10)[d]	0.50 (0.08)	0.46 (0.08)[b,d]	0.56 (0.11)[c]
Commissions*	5.6 (3.4)[a]	2.4 (1.6)[d]	2.0 (1.8)	2.3 (2.9)	2.5 (1.6)
Confidence		1.49 (0.22)		1.49 (0.29)	1.70 (0.22)[c,e]

†Ss, subjects.
*Commission errors are displayed in absolute numbers.
[a] $p < 0.005$ between groups at T1.
[b] $p < 0.05$ between simulating and honestly responding group at T2.
[c] $p < 0.05$ between honestly responding and delayed-testing only group at T2.
[d] $p < 0.05$ within group between T1 and T2.
[e] $p < 0.05$ between simulating and delayed-testing only group at T2.

A one-way ANOVA performed on confidence ratings obtained at the second test occasion (see Table 2) revealed that delayed-testing only controls had confidence ratings that were significantly below those of the other two groups [$F(2, 58) = 4.79$, $p < 0.05$]. Simulators and honestly responding participants did not differ with regard to their confidence ratings [$t(39) < 1.0$], see Table 2.

Individual difference measures and memory effects for simulators

Mean DES, CEQ, and SDS scores in the subsample of simulators were 18.60 ($SD = 14.1$), 6.43 ($SD = 3.8$) and 15.05 ($SD = 7.1$), respectively. It is noteworthy that these scores come close to the scores that have previously been reported for undergraduate samples (e.g. Horselenberg et al., 2000).

To explore whether memory undermining effects of simulation are modulated by individual differences, we calculated for each simulator's free recall and cued free recall performance a difference score (Δ free recall = free recall test 2 − free recall test 1; Δ cued free recall = cued free recall test 2 − cued free recall test 1). If dissociation, fantasy proneness, and/or social desirability are related to the memory-undermining effect, one would anticipate that they would correlate negatively with these difference indices. Table 3 shows the relevant correlations. As can be seen, no significant correlations were found between individual difference measures and memory indices.

Table 3. Correlations between Δ free recall and Δ cued free recall and dissociation (DES), fantasy proneness (CEQ), and social desirability (SDS) for the simulating participants ($n = 21$)

	Δ Free recall	Δ Cued free recall
DES	−0.09	−0.22
CEQ	0.07	0.39
SDS	−0.20	0.04

*$p < 0.05$.

DISCUSSION

The main findings of the current study can be summarized as follows. To begin with, we replicated Christianson and Bylin's (1999) finding that simulating amnesia has memory-undermining effects. Secondly, these effects were evident for both free recall and cued free recall. Thirdly, in many respects memory performance of delayed-testing only participants resembled that of ex-simulators. Finally, the memory-undermining effect of simulation was not related to individual differences in dissociation, fantasy proneness or social desirability.

It is important to emphasize that we went to great lengths in trying to create a setting that would more closely approach a real-life crime situation than the procedure employed by Christianson and Bylin (1999). Thus, we expected that participants would be better able to enter the role of the main character when they had actually participated in the story and not only read about it. That our manipulation was successful is supported by participants' emotionality ratings, which were quite high. Our manipulation check ratings further suggest that they were very well able to identify with the perpetrator in the narrative. As well, participants instructed to simulate memory difficulties in order to minimize responsibility for the crime reported less information during the first session relative to honestly responding participants. This indicates that simulators adhered to their instructions. Only for the first test occasion, simulators had lower responsibility ratings than honestly responding participants. Again, this indicates that simulators behaved in line with their instructions. The fact that ex-simulators and honestly responding controls did not differ with regard to their confidence ratings on the cued recall task during the second session, also suggests that ex-simulators had given up their role and followed instructions. Interestingly, even though confidence ratings were highly similar for ex-simulators and honestly responding controls, the former group performed worse on cued recall, which is in line with the memory-undermining effect of feigning amnesia. This overconfidence of ex-simulators is reminiscent of the literature on imperfect accuracy-confidence relations (Sporer, Penrod, Read, & Cutler, 1995; Lindsay, Read, & Sharma, 1998). Delayed-testing only participants had the lowest confidence ratings, which were more in line with their cued recall performance than those of ex-simulators. We have no ready explanation as to why confidence ratings of ex-simulators were higher than those of delayed-testing only participants, except that ex-simulators were familiar with the task, which might have promoted their subjective confidence.

Even though they had been engaged in a mock crime, participants instructed to simulate memory difficulties on the first session reported less correct information about the crime and surrounding circumstances 1 week later relative to honestly responding participants. This memory-undermining effect was evident for both free recall and cued free recall, suggesting that the effect is quite robust. Christianson and Bylin (1999) suggested that this memory-undermining effect of feigning amnesia might be a rehearsal phenomenon. That is so to say, feigning amnesia might interfere with the beneficial memory effects of rehearsing information. A second explanation offered by Christianson and Bylin (1999) for the memory-undermining effects of simulation is retrieval-induced forgetting (Anderson et al., 1994; Ciranni & Shimamura, 1999; Shaw et al., 1995). By this view, reconstruction of false information in the first test results in recall difficulties of correct information during the second test (Anderson et al., 1994; Macrae & MacLeod, 1999). A third explanation for the memory-undermining effect of feigned amnesia assumes that feigning produces source-monitoring errors. Simulators who made up a new version of the story in the first session in order to minimize responsibility might later confuse their new version with the true story when they are instructed to report honestly.

To test the empirical credibility of the rehearsal-effect explanation, we included a delayed-testing only control group. Results showed that during the second test occasion, objective memory performance of this control group was very similar to that of ex-simulators. Apparently, then, lack of rehearsal is one mechanism behind the memory-undermining effects of feigning amnesia.

Our findings are inconsistent with a retrieval-induced forgetting interpretation of the memory-undermining effect. It is true that there are some fine examples in the literature of retrieval-induced forgetting in eyewitness accounts. For example, Wright et al. (2001) showed that when participants are instructed to omit certain details, they fail to retrieve these details on a later test occasion. However, in the current experiment, performance of ex-simulators closely resembled that of delayed-testing only participants. The latter group had not been instructed to withhold information and so lack of rehearsal rather than retrieval-induced forgetting provides the more parsimonious explanation for the pattern of findings in our study.

The source-monitoring error interpretation also fails as an adequate interpretation of our data. A detailed comparison of commission errors during the first test and those on the second test revealed that ex-simulators did not persist more in their commissions than honestly responding participants. In fact, for both groups, proportions of persistent (i.e. repeated) commission errors were well below 30% for free and cued-free recall. Thus, even though simulating participants were encouraged to make up different stories during the first session, this did not lead to a heightened frequency of persistent commission errors that would reflect source-monitoring problems. One limitation of our commission data, however, is that rater agreement about what counted as commission errors was fairly low. This indicates that raters found it extremely difficult to define this type of error. Clearly, more strict definitions would enhance higher interrater agreement. Thus, it might be worthwhile for future studies to address this issue in more detail.

Our individual difference data suggest that the memory-undermining effect of feigning amnesia is not modulated by dissociativity or fantasy proneness. Even more important was the finding that this effect does not depend on social desirability (e.g. sensitivity to demand characteristics). Thus, there is little ground for suspecting that memory-undermining effects occur because simulators stick to their role during the second session.

Our study was subject to several limitations. First, our sample consisted mainly of female undergraduates. This might reduce the generalizability of the results, since women may be less able to identify with the role of a murderer. It is worthy to note, though, that our results replicate those of Christianson and Bylin (1999), whose study relied on male undergraduates. Also, female undergraduates were able to identify with the murderer in our study, as shown by our manipulation check data. Nevertheless, undergraduate students are not representative of the typical person being charged with a serious crime. A second limitation of our study has to do with the fact that it relied on one specific order of events: participants first committed the mock crime and then read about the rationale behind the mock crime. We used this order because it corresponds with the finding that crimes for which amnesia is claimed are often not premeditated (Taylor & Kopelman, 1984; Swihart et al., 1999). Nevertheless, this order might have affected the memorability of the events and this point needs to be addressed by future studies on the effects of feigning amnesia. A third limitation concerns the strategy that simulators used to feign amnesia. Our manipulation check data show that simulators followed their instructions, but we do not know which strategies they adopted. Future studies should look at this issue more carefully, for example by conducting exit interviews in which ex-simulators are explicitly asked about how they played their role. Kopelman (1995) suggested that people who are familiar with amnestic periods (e.g. due to head injury) might be good in feigning amnesia and this would be interesting to explore in such exit interviews.

In sum, then, we may conclude that ex-simulators' memory performance during the second test occasion can best be explained in terms of lack of rehearsal. In more general terms, our data add to the studies showing that there is a continuum between feigning amnesia and real forgetting (Christianson & Bylin, 1999; Kopelman, 2000). Note that this position contradicts the tendency in the literature to treat simulated amnesia and real psychogenic amnesia as completely different categories. Simulating amnesia for a crime apparently has detrimental effects on genuine memory. This stresses the importance of creating during the first interrogation a climate in which the perpetrator is willing to talk about the crime he has committed (Holmberg & Christianson, 2002).

ACKNOWLEDGEMENTS

This study was supported by a grant from the Dutch granting organization N.W.O., grant number 425.20.803.

REFERENCES

Anderson, M. C., Bjork, R. A., & Bjork, E. L. (1994). Remembering can cause forgetting: retrieval dynamics in long-term memory. *Psychonomic Bulletin and Review, 20*, 1063–1087.

Arrigo, J. M., & Pezdek, K. (1997). Lessons from the study of psychogenic anmesia. *Current Directions in Psychological Science, 6*, 148–152.

Bernstein, E. M., & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation scale. *Jounal of Nervous and Mental Disease, 174*, 727–735.

Bourget, D., & Bradford, J. M. W. (1995). Sex offenders who claim amnesia for their alleged offense. *Bulletin of the American Academy of Psychiatry and the Law, 23*, 299–307.

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36*, 129–148.

Bradford, J. M., & Smith, S. M. (1979). Amnesia and homicide: the padola case and a study of thirty cases. *Bulletin of the American Academy of Psychiatry and the Law, 7*, 219–231.

Bylin, S., Christianson, S. A. (2002). Characteristics of malingered amnesia: consequences of withholding vs. distorting information on later memory of a crime event. *Legal and Criminological Psychology, 7*, 45–61.

Christianson, S. A., & Bylin, S. (1999). Does simulating amnesia mediate genuine forgetting for a crime event? *Applied Cognitive Psychology, 13*, 495–511.

Cima, M., Merckelbach, H., Nijman, H., Knauer, E., & Hollnack, S. (2002). I can't remember your honor: offenders who claim amnesia. *German Journal of Psychiatry, 5*, 24–34.

Cima, M., Merckelbach, H., Hollnack, S., & Knauer, E. (2003). Characteristics of psychiatric inmates who claim amnesia. *Personality and Individual Differences, 35*, 373–380.

Ciranni, M. A., & Shimamura, A. P. (1999). Retrieval-induced forgetting in episodic memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 25*, 1403–1414.

Crowne, D. P., & Marlow, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Cunsulting Psychology, 24*, 349–354.

Denney, R. L. (1996). Symptom validity testing of remote memory in a criminal forensic setting. *Archives of Clinical Neuropsychology, 7*, 589–603.

Engelkamp, J. (1995). Visual imagery and enactment of actions in memory. *British Journal of Psychology, 86*, 227–240.

Engelkamp, J. (1998). *Memory for actions*. Hove: Psychology Press.

Gerson, A. R. (2002). Beyond DSM-IV: a meta-review of the literature on malingering. *American Journal of Forensic Pathology, 20*, 57–69.

Goodwin, D. W. (1995). Alcohol amnesia. *Addiction, 90*, 315–317.

Goodwin, D. W., Crane, J. B., & Guze, S. B. (1969). Phenomenological aspects of the alcoholic 'blackout.'. *British Journal of Psychiatry, 115*, 1033–1038.

Holmberg, U., & Christianson, S. A. (2002). Murderers' and sexual offenders' experiences of police interviews and their inclination to admit or deny crimes. *Behavioral Sciences and the Law, 20*, 31–45.

Horselenberg, R., Merckelbach, H., Muris, P., Rassin, E., Sijsenaar, M., & Spaan, V. (2000). Imagining fictitious childhood events: the role of individual differences in imagination inflation. *Clinical Psychology and Psychotherapy, 7*, 128–137.

Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological Bulletin, 114*, 3–28.

Kalant, H. (1996). Intoxicated automatism: legal concept vs. scientific evidence. *Contemporary Drug Problems, 23*, 631–648.

Kanzer, M. (1939). Amnesia: a statistical study. *American Journal of Psychiatry, 96*, 711–716.

Kopelman, M. D. (1987). Amnesia: organic and psychogenic. *British Journal of Psychiatry, 150*, 428–442.

Kopelman, M. D. (1995). The assessment of psychogenic amnesia. In A. D. Baddeley, B. A. Wilson, & F. N. Watts (Eds.), *Handbook of memory disorders* (pp. 427–448). New York: John Wiley.

Kopelman, M. D. (2000). Focal retrograde amnesia and the attribution of causality: an exceptionally critical review. *Cognitive Neuropsychology, 17*, 585–621.

Lindsay, S. D., Read, D. J., & Sharma, K. (1998). Accuracy and confidence in person identification: the relationship is strong when witnessing conditions vary widely. *Psychological Science, 9*, 215–218.

Loewenstein, R. J. (1991). Psychogenic amnesia and psychogenic fugue: a comprehensive review. *American Journal of Psychiatry, 10*, 198–222.

Macrae, C. N., & MacLeod, M. D. (1999). On recollections lost: when practice makes imperfect. *Journal of Personality and Social Psychology, 77*, 463–473.

McSherry, B. (1998). Getting away with murder? Dissociative states and criminal responsibility. *International Journal of Law and Psychiatry, 21*, 163–176.

Merckelbach, H., & Rasquin, S. (2001). Psychobiological research on Dissociative Identity Disorder (DID): a methodological note. *Acta Neuropsychiatrica, 13*, 68–72.

Merckelbach, H., Horselenberg, R., & Muris, P. (2001). The Creative Experiences Questionnaire (CEQ): a brief self-report measure of fantasy proneness. *Personality and Individual Differences, 31*, 987–995.

O'Connell, B. A. (1960). Amnesia and homicide. *British Journal of Delinquency, 10*, 262–276.

Porter, S., Birt, A. R., Yuille, J. C., & Herve, H. F. (2001). Memory for murder: a psychological perspective on dissociative amnesia in legal contexts. *International Journal of Law and Psychiatry, 24*, 23–42.

Roediger, H. L., Jacoby, J. D., & McDermott, K. B. (1996). Misinformation effects in recall: creating false memories through repeated retrieval. *Memory and Cognition, 35*, 300–318.

Sadoff, R. L. (1974). Evaluation of amnesia in criminal-legal situations. *Journal of Forensic Sciences, 19*, 98–101.

Schacter, D. L. (1986a). Amnesia and crime: how much do we really know? *American Psychologist, 41*, 286–295.

Schacter, D. L. (1986b). On the relation between genuine and simulated amnesia. *Behavioral Sciences and the Law, 4*, 47–64.

Shaw, J. S., Bjork, R. A., & Handal, A. (1995). Retrieval-induced forgetting in an eyewitness-memory paradigm. *Psychonomic Bulletin and Review, 2*, 249–253.

Sporer, S. L., Penrod, S., Read, D. J., & Cutler, B. (1995). Choosing, confidence, and accuracy: a meta-analysis of the confidence accuracy relation in eyewitness identification studies. *Psychological Bulletin, 118*, 315–327.

Swihart, G., Yuille, J., & Porter, S. (1999). The role of state-dependent memory in 'red-outs.'. *International Journal of Law and Psychiatry, 22*, 199–212.

Taylor, P. J., & Kopelman, M. D. (1984). Amnesia for criminal offences. *Psychological Medicine, 14*, 581–588.
Turtle, J. W., & Yuille, J. C. (1994). Lost but not forgotten details: repeated eyewitness recall leads to reminiscence but not hypermnesia. *Journal of Applied Psychology, 79*, 260–271.
Wilson, S. W., & Barber, T. X. (1982). The fantasy prone personality: implications for understanding imagery, hypnosis, and parapsychological phenomena. *PSI Research, 1*, 94–116.
Wright, D. B., Loftus, E. F., & Hall, M. (2001). Now you see it; now you don't: inhibiting recall and recognition of scenes. *Applied Cognitive Psychology, 15*, 471–482.

