

*This paper is the product of students from the Faculty of Psychology and Neuroscience, Maastricht University and is meant for student educational purposes only.*

LIANNE WOLSINK

# The Memory Effects of Simulating Crime-related Amnesia: A Review of Experimental Studies

## Literature Review

Crime-related amnesia refers to the amnesia for an offense that is sometimes reported by offenders of a crime. Although some amnesia claims may be genuine, others are likely to be simulated. Simulating amnesia can have advantages for the offender, but some offenders will discontinue claiming amnesia during the police investigation. The current paper reviews experimental studies on the effects of simulating amnesia on subsequent honest memory recall. In general, simulating amnesia has a memory-undermining effect, but exact effects depend on the simulation strategy used. In line with the Memory and Deception framework, false denial is likely to induce omission errors, whereas fabrication is likely to induce commission errors. These errors are suggested to result from a lack of rehearsal and retrieval-induced forgetting, and source monitoring errors, respectively. In contrast to free recall, cued recall appears to be unaffected. Experimental characteristics, such as mock crime presentation, and legal implications are discussed.

**Keywords:** crime-related amnesia, simulation, memory, deception

---

## INTRODUCTION

Crime-related amnesia refers to the amnesia for an offense that is sometimes reported by offenders of (violent) crimes. Approximately 20 to 30% of offenders of violent crimes report to have crime-related amnesia (Cima et al., 2002; Jelicic & Merckelbach, 2007). Although some amnesia claims may be genuine, others are likely to be simulated. Genuine crime-related amnesia can have organic or psychogenic causes (Cima et al., 2002). Organic amnesia results from a permanent or temporary brain dysfunction, such as traumatic brain injury or drug/alcohol intoxication, that interferes with memory encoding and causes retrograde amnesia (Cima et al., 2002; Merckelbach & Christianson, 2007). The reported amnesia needs to be proportional to the brain damage and should cause a deranged hippocampus, a brain structure crucial for memory encoding (Jelicic, 2018). Psychogenic amnesia results from an extreme level of arousal during memory encoding that is not in line with the arousal level during retrieval, the so-called state-dependent memory theory (Cima et al., 2002; Merckelbach & Christianson, 2007). However, the authenticity of this type of amnesia is often questioned (Merckelbach & Christianson, 2007). Simulation of the amnesia may be a more plausible explanation in such cases.

Simulating (or malingering, feigning) amnesia has several possible advantages for the offender, such as avoiding responsibility, hindering the police investigation, and avoiding the recall of the, often traumatic, crime (van Oorsouw & Cima, 2007). However, not all offenders will continue simulating amnesia during the police investigation. Consider for example

the case of Rudolf Hess, a Nazi politician who claimed to have amnesia for his Nazi period before and during the Second World War. When he realised, however, that he could not defend himself against the accusations, he admitted to have simulated his amnesia (Picknett et al., 2001). This raises the question whether and how simulating crime-related amnesia affects subsequent genuine memory recall of the crime. The current paper will review experimental studies on the memory effects of simulating crime-related amnesia and the suggested underlying mechanisms involved.

Simulating amnesia can be considered a form of deception. According to the Memory and Deception (MAD) framework (Otgaar & Baker, 2018), forms of deception can be placed on a continuum of required cognitive resources. From one side to the other, false denial requires the lowest level of cognitive resources, simulated amnesia somewhat more, and fabrication of an alternative story requires the highest level of cognitive resources. Of course, the latter differs between fabrication of a detail and fabrication of an entire story. The MAD framework proposes that the different forms of deception, and their levels of required cognitive resources, result in distinct memory errors (Otgaar & Baker, 2018). False denial is likely to lead to omission errors (i.e. failure to report information), whereas fabrication is likely to lead to commission errors (i.e. introduction of new information) and distortions of details. The suggested underlying mechanisms of these errors will be discussed in a later section. Simulated amnesia assumably results in a combination of omission and commission errors, depending on the used strategy. When individuals simulate amnesia mainly by denying, omission errors are more probable, whereas

commission errors are expected when individuals use fabrication as strategy.

### Experimental studies on crime-related amnesia

The effects of simulating amnesia on actual memory recall have been examined in several experimental studies (Bylin, 2002; Bylin & Christianson, 2002; Christianson & Bylin, 1999; Mangiulli et al., 2018b; Mangiulli et al., 2019a; Sun et al., 2009; van Oorsouw & Merckelbach, 2004; van Oorsouw & Merckelbach, 2006). For that purpose, participants, often college students, are asked to imagine being the offender in a written or filmed mock crime or to perform a mock crime themselves, for example stealing a wallet. Afterwards, participants perform several memory tests about the mock crime on which they have to respond honestly (control condition) or as if they have amnesia (simulation condition). Usually, after about one week, participants return to the lab to perform follow-up memory tests, but now all participants are asked to respond honestly. The memory tests often consist of free recall and cued recall. Outcome measures are correctly recalled information, omission errors, and commission errors. The memory effects of simulating amnesia are the differences in memory performance between the simulation condition and the control condition during the follow-up session, when all participants respond honestly. The results of these experiments will be discussed in the following section.

### The memory-undermining effect of simulating amnesia

In general, experimental studies using the previously discussed design find a memory-undermining effect of simulating amnesia on the follow-up memory tests (Bylin, 2002; Bylin & Christianson, 2002; Christianson & Bylin, 1999; Mangiulli et al., 2018b; Mangiulli et al., 2019a; Sun et al., 2009; van Oorsouw & Merckelbach, 2004; van Oorsouw & Merckelbach, 2006). Simulating amnesia specifically leads to omission errors during follow-up honest memory recall. That is, simulators recall less crime-related details than honest controls (Bylin, 2002; Bylin & Christianson, 2002; Christianson & Bylin, 1999; van Oorsouw & Merckelbach, 2004). However, simulators do not differ in terms of omission errors from participants who were only tested during the follow-up (delayed-testing only condition; Bylin & Christianson, 2002; Sun et al., 2009; van Oorsouw & Merckelbach, 2004). This finding suggests a lack of rehearsal as underlying mechanism for the memory-undermining effect in simulators (Bylin & Christianson, 2002; Sun et al., 2009; van Oorsouw & Merckelbach, 2004).

Lack of rehearsal as explanation has directly been examined in a recent experiment in which participants received reminders of the crime between the first and second memory tests (Mangiulli et al., 2019a). The memory-undermining effect of simulating amnesia diminished in terms of correct responses when simulators had to chronologically order frames of the mock crime video as reminder of the crime, compared to simulators that did not receive this reminder. In contrast to earlier studies, simulators performed better than delayed-testing only participants (Mangiulli et al., 2019a). A potential explanation for this finding is a more profound initial processing of the crime-related information by simulators, as they had to

imagine being the offender (Mangiulli et al., 2019a; Mangiulli et al., 2018b). Overall, lack of rehearsal appears to be involved in the memory-undermining effect of simulating amnesia, and reminders could help to preserve the memory for the crime, but it is probably not the only mechanism involved.

Another possible explanation for the memory-undermining effect of simulated amnesia is retrieval-induced forgetting (RIF). RIF is a process in which retrieval of a memory item leads to forgetting of another closely related memory item (Anderson et al., 1994). For example, when the word combination “fruit-banana” is practiced, the recollection of the closely related word combination “fruit-apple” deteriorates. In an experimental study on the memory effects of simulating amnesia, it was indeed found that RIF plays a role in the memory-undermining effect of simulating amnesia (Mangiulli et al., 2019b). Crime-related details that were not included in a retrieval practice were reported less than details that were included. RIF may be restricted to a simulation strategy in which simulators retrieve certain crime details, while leaving out others. Selective retrieval could thereby lead to the forgetting of other details and, thus, to omission errors during memory recall.

Simulating amnesia also leads to commission errors during the follow-up honest memory recall (Bylin, 2002; van Oorsouw & Merckelbach, 2006), but this depends on the used strategy. In particular when simulators fabricate an alternative scenario, commission errors occur (Bylin, 2002; van Oorsouw & Giesbrecht, 2008; Mangiulli et al., 2020). The longer the fabricated scenario, the more commission errors occur (van Oorsouw & Giesbrecht, 2008). Moreover, when participants are explicitly instructed to

simulate amnesia by withholding information, more omission errors occur, whereas more commission errors occur when they are instructed to simulate amnesia by distorting information (Bylin & Christianson, 2002).

According to the MAD framework, commission errors occur as a result of source monitoring errors (Otgaar & Baker, 2018). Source monitoring is the process of deciding whether a memory has an internal (e.g. thoughts, imaginations, including lies) or external (information from others, including misinformation) source. The Source Monitoring Framework (SMF; Johnson et al., 1993) states that memories of actual experiences are more rich in perceptual, contextual, and affective information than memories of imagined experiences. Individuals use this information to distinguish between memories of actual experiences and memories of imagined experiences. When, however, memories of imagined experiences are rich in information, source monitoring errors could occur, that contribute to the formation of a false memory (Otgaar & Baker, 2018). Fabrication as strategy during simulating amnesia probably leads to confusion about the source of the memory: whether it was part of the crime, or part of the fabricated story. Thereby, this strategy could lead to commission errors. In addition, external misinformation may also contribute to source monitoring errors and commission errors (both for honest controls and simulators; Mangiulli et al., 2020).

Source monitoring errors may, however, play a weaker role in commission errors after simulating amnesia than previously assumed. When fabricating an alternative story, both the actual crime and the fabricated crime should be kept in mind to ensure a consistent story over repeated interrogations. These elaborate processes may prevent confusion



over the source of memories (Mangiulli et al., 2018a). Indeed, simulators appear to be able to correctly distinguish between the actual crime and their fabricated story (Mangiulli et al., 2018a).

In contrast to earlier findings, Mangiulli and colleagues (2018b) found no memory-undermining effect on cued recall. Simulators showed an equal number of commission errors and correctly recalled information during cued recall than honest controls. Although this result is in contrast with the earlier found impairing effects on cued recall (e.g. Bylin & Christianson, 2002; van Oorsouw & Merckelbach, 2004), it is in line with retroactive interference (Bylin, 2002) that could occur when no cues are present during free recall. During the first memory tests, when participants simulate amnesia, the incomplete retrieval may interfere with the actual memory of the crime. During the follow-up memory tests, when participants have to respond honestly, they may incorrectly perceive their former memory recall as indicative of all information they can remember (Bylin, 2002). Therefore, they probably recall less information on free recall. Cues during memory recall could help to activate crime-related memories and counteract the effects of retroactive interference. To conclude, the memory-undermining effect seems to be weaker than previously shown and restricted to free recall (Mangiulli et al., 2018b).

## DISCUSSION

The aim of the current paper was to examine the memory effects of simulating amnesia on the basis of experimental studies. In general, simulation of crime-related amnesia has a memory-undermining effect

(Bylin, 2002; Bylin & Christianson, 2002; Christianson & Bylin, 1999; Mangiulli et al., 2018b; Mangiulli et al., 2019a; Sun et al., 2009; van Oorsouw & Merckelbach, 2004; van Oorsouw & Merckelbach, 2006). Both omission and commission errors are reported after simulating amnesia, but this depends on the used strategy. In line with the MAD framework, false denial is more likely to induce omission errors, whereas fabrication is likely to induce commission errors (Otgaar & Baker, 2018). Suggested explanations for these errors are a lack of rehearsal and retrieval-induced forgetting for omission errors, and source monitoring errors for commission errors. However, these explanations are far from conclusive.

One-third of the participants instructed to simulate amnesia fabricate an alternative scenario (van Oorsouw & Merckelbach, 2006). Therefore, it is crucial to know whether and to what extent participants are fabricating an alternative story as strategy for simulating amnesia, because that may explain the occurrence of commission errors reported in some studies (Bylin, 2002; van Oorsouw & Merckelbach, 2006). It would be even better to instruct participants to use one specific strategy. Besides the strategies discussed, Mangiulli and colleagues (2018b) suggest to change the simulation instruction to a retrieval suppression instruction. Participants are then asked to consciously suppress memory retrieval because it causes high levels of distress. This strategy would better resemble the used strategy of actual offenders (Mangiulli et al., 2018b). Memory suppression can induce forgetting of the encoded material (e.g. Anderson et al., 2001; Stramaccia et al., 2020). This so-called suppression-induced forgetting has, however, not yet been examined in a mock crime

scenario in which participants use suppression as strategy for simulating amnesia.

The memory effects of simulating amnesia appear to be restricted to free recall, and do not occur during cued recall (Mangiulli et al., 2018b). An important difference with previous studies is the use of a mock crime video instead of a written story. Earlier studies often used written stories (e.g. Bylin, 2002; Christianson & Bylin, 1999), whereas more recent studies use mock crime videos (e.g. Mangiulli et al., 2018b). Although a mock crime video is likely to have facilitated memory encoding (Mangiulli et al., 2018b), these passive forms of mock crime presentation could limit the generalisability to real life simulated amnesia. Actually acting out (enactment) enhances memory for the act (e.g. Engelkamp, 1995), and fits better with a real life experience. Therefore, in some studies, participants performed a mock crime themselves (e.g. van Oorsouw & Merckelbach, 2004). Then, however, the mock crime paradigm may be experienced as artificial due to ethical constraints in experimental research. An interesting development in this regard is the use of virtual reality (VR) in experimental research. VR is for example used in an experimental study concerning eyewitness memory (Romeo et al., 2019). By using VR, the mock crime can be made more immersive and realistic, possibly resembling real life memory processes to a larger extent.

Characteristics of the experimental samples could also limit the generalisability of the findings. Experimental samples often consist of college students, mostly female. These participants arguably differ from actual offenders, for example in educational level and gender (e.g. Schacter, 1986). Therefore, further research should use more variable or realistic

sample, such as participants from the general population or a forensic sample. A related point is the potential mismatch between the participant's gender and the offender's gender in the mock crime story or video. This mismatch may limit the emotional involvement of the participant and affect the effectiveness of the manipulation. For example, a female participant could have more difficulty to imagine being a male offender than being a female offender in a mock crime scenario. Further research could be improved by adjusting the offender in mock crime story or video to fit the participant's gender, and perhaps also other characteristics.

Claiming amnesia is more common for violent than nonviolent crimes (Jelicic & Merckelbach, 2007). Examining the memory effects of simulating amnesia for a violent mock crime would, therefore, be more useful for forensic practice than examining these effects for a nonviolent mock crime. Still, some studies examined a nonviolent mock crime, such as stealing exam answers (Romeo et al., 2018) or drinking-related death (Sun et al., 2009), because these scenarios may be more realistic for college students. Sun and colleagues (2009) argued, for example, that a mock crime paradigm in which participants had to act as if they robbed a bar and killed someone (van Oorsouw & Merckelbach, 2004), is not realistic for college students. Yet, the participant's self-ratings of emotional impact and subjective guilt did not indicate an impaired emotional involvement (van Oorsouw & Merckelbach, 2004). Moreover, asking participants to simulate amnesia after a nonviolent mock crime, such as stealing exam answers, is not realistic either. Deciding upon an appropriate mock crime scenario is thus an ongoing point of debate.

The discussed research findings have implications for the legal field. After the first studies on the memory-undermining effect of simulating amnesia, it was argued that preventing offenders from simulating amnesia is of foremost importance because of the memory-undermining effects (e.g. van Oorsouw & Merckelbach, 2006). However, the recent study by Mangiulli and colleagues (2018b) showed a weaker memory-undermining effect, and restricted to free recall. This suggests that cues during police interrogations could be helpful to facilitate memory retrieval and to increase information gathering. Offenders appear to be able to remember many crime-related details despite having simulated amnesia. Legal practitioners could therefore consider their reports as more complete and accurate than previously assumed.

### Acknowledgements

I would like to thank Prof. Dr. Marko Jelicic for his useful contribution to this paper.

## REFERENCES

- Anderson, M.C., Bjork, R. A., & Bjork, E. L. (1994). Remembering can cause forgetting: retrieval dynamics in long-term memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20, 1063-1087. doi: 10.1037/0278-7393.20.5.1063
- Anderson, M. C., & Green, C. (2001). Suppressing unwanted memories by executive control. *Nature*, 410, 366-369. doi: 10.1038/35066572
- Bylin, S. (2002). How does repeated simulation of memory impairment affect genuine memory performance?. *Psychology, Crime and Law*, 8, 265-288. doi: 10.1080/10683160208401819
- Bylin, S., & Christianson, S. Å. (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. doi: 10.1348/135532502168379
- Christianson, S. Å., & Bylin, S. (1999). Does simulating amnesia mediate genuine forgetting for a crime event? *Applied Cognitive Psychology*, 13, 495-511. doi: 10.1002/(sici)1099-0720(199912)13:63.o.co;2-o
- Cima, M., Merckelbach, H. L. G. J., Nijman, H., Knauer, E., & Hollnack, S. (2002). I can't remember your honor: Offenders who claim amnesia. *German Journal of Psychiatry*, 5, 24-34.
- Engelkamp, J. (1995). Visual imagery and enactment of actions in memory. *British Journal of Psychology*, 86, 227-240. doi: 10.1111/j.2044-8295.1995.tb02558.x
- Jelicic, M. (2018). Testing claims of crime-related amnesia. *Frontiers in Psychiatry*, 9, 617. doi: 10.3389/fpsy.2018.00617
- Jelicic, M., & Merckelbach, H. (2007). Evaluating the authenticity of crime-related amnesia. In S. Å. Christianson (Ed.), *Offenders' memories of violent crimes* (pp. 215-233). Chichester, England: Wiley. doi: 10.1002/9780470713082.ch9
- Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological Bulletin*, 114, 3-28. doi:10.1037/0033-2909.114.1.3
- Mangiulli, I., Lanciano, T., Jelicic, M., Van Oorsouw, K., Battista, F., & Curci, A. (2018a). Can implicit measures detect source information in crime-related amnesia? *Memory*, 26, 1019-1029. doi: 10.1080/09658211.2018.1441421

- Mangiulli, I., Lanciano, T., Van Oorsouw, K., Jelicic, M., & Curci, A. (2019a). Do reminders of the crime reverse the memory-undermining effect of simulating amnesia? *Memory & Cognition*, *47*, 1375–1385. doi: 10.3758/s13421-019-00939-z
- Mangiulli, I., Otgaar, H., Curci, A., & Jelicic, M. (2020). An experimental investigation of the misinformation effect in crime-related amnesia claims. *Applied Cognitive Psychology*, *34*, 1092–1100. doi: 10.1002/acp.3697
- Mangiulli, I., Van Oorsouw, K., Curci, A., & Jelicic, M. (2019b). Retrieval induced forgetting in the feigning amnesia for a crime paradigm. *Frontiers in Psychology*, *10*, 928. doi: 10.3389/fpsyg.2019.00928
- Mangiulli, I., Van Oorsouw, K., Curci, A., Merckelbach, H., & Jelicic, M. (2018b). Feigning amnesia moderately impairs memory for a mock crime video. *Frontiers in Psychology*, *6*, 625. doi: 10.3389/fpsyg.2018.00625
- Merckelbach, H., & Christianson, S. Å. (2007). Amnesia for homicide as a form of malingering. In S. Å. Christianson (Ed.), *Offenders' memories of violent crimes* (pp. 165–190). Chichester, England: Wiley. doi: 10.1002/9780470713082.ch9
- Otgaar, H., & Baker, A. (2018). When lying changes memory for the truth. *Memory*, *26*, 2–14. doi: 10.1080/09658211.2017.1340286
- Picknett, L., Prince, C. & Prieor, S. (2001). *Double standards: The Rudolf Hess Cover-Up*. London: Little, Brown & Company.
- Romeo, T., Otgaar, H., Smeets, T., Landstrom, S., & Boerboom, D. (2019). The impact of lying about a traumatic virtual reality experience on memory. *Memory & Cognition*, *47*, 485–495. doi: 10.3758/s13421-018-0885-6
- Schacter, D. L. (1986). Amnesia and crime: How much do we really know? *American Psychologist*, *41*, 286–295. <https://doi.org/10.1037/0003-066X.41.3.286>
- Stramaccia, D. F., Meyer, A. K., Rischer, K. M., Fawcett, J. M., & Benoit, R. G. (2020). Memory suppression and its deficiency in psychological disorders: A focused meta-analysis. *Journal of Experimental Psychology: General*. Advance online publication. doi: 10.1037/xge0000971
- Sun, X., Punjabi, P. V., Greenberg, L. T., & Seamon, J. G. (2009). Does feigning amnesia impair subsequent recall? *Memory & Cognition*, *37*, 81–89. doi: 10.3758/MC.37.1.81

- 
- Van Oorsouw, K., & Cima, M. (2007). The role of malingering and expectations in claims of crime-related amnesia. In S. Å. Christianson (Ed.), *Offenders' memories of violent crimes* (pp. 191-213). Chichester, England: Wiley. doi: 10.1002/9780470713082.ch9
- Van Oorsouw, K., & Giesbrecht, T. (2008). Minimizing culpability increases commission errors in a mock crime paradigm. *Legal and Criminological Psychology, 13*, 335-344. doi: 10.1348/135532507x228539
- Van Oorsouw, K., & Merckelbach, H. (2004). Feigning amnesia undermines memory for a mock crime. *Applied Cognitive Psychology, 18*, 505-518. doi: 10.1002/acp.999
- Van Oorsouw, K., & Merckelbach, H. (2006). Simulating amnesia and memories of a mock crime. *Psychology, Crime & Law, 12*, 261-271. doi: 10.1080/10683160500224477