

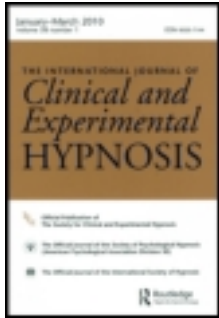
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### Posthypnotic Amnesia For Autobiographical Episodes: Influencing Memory Accessibility and Quality

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## POSTHYPNOTIC AMNESIA FOR AUTOBIOGRAPHICAL EPISODES: *Influencing Memory Accessibility and Quality*

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**Abstract:** The authors examined the impact of posthypnotic amnesia on the accessibility and quality of personal memories. High, medium, and low hypnotizable individuals recalled two autobiographical episodes and rated those memories. During hypnosis, subjects were given a posthypnotic amnesia suggestion that targeted one of the episodes. After hypnosis, they recalled and rated their memories of the episodes. The posthypnotic amnesia suggestion influenced the accessibility and quality of autobiographical memory for high and some medium, but not low, hypnotizable participants. The article discusses these findings in terms of investigating and understanding the impact of posthypnotic amnesia on autobiographical memory.

Posthypnotic amnesia (PHA) involves suggesting to hypnotized persons that they will be unable to recall particular information or events after hypnosis until they receive a reversibility cue that cancels the suggested effect. In response to this, high but not low hypnotizable individuals typically show: (a) profound forgetting as indexed by explicit memory measures; (b) a continuing influence of the forgotten material as indexed by implicit memory measures; and (c) reversibility of the effect (Barnier, Bryant, & Briscoe, 2001; Bryant, Barnier, Mallard, & Tibbits, 1999; Kihlstrom, 1980). PHA has been described variously as a temporary, retrieval-based dissociation between episodic and semantic memory (Kihlstrom, 1985; Kihlstrom & Barnhardt, 1993), as a strategic, socially motivated response withholding (Coe, 1978; Spanos, 1986), and as output inhibition based on the selective tagging

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of targeted information as “forbidden” (Husemann, Gruder, & Dorst, 1987; Smith, Morton, & Oakley, 1998).

Experimental investigation has focused on the impact of a PHA suggestion on simple information and events learned or experienced during hypnosis (e.g., lists of words, events of hypnosis; see Kihlstrom, 1985). In recent research, we examined whether PHA is effective in creating amnesia for information learned before hypnosis and for more personally significant and complex autobiographical memories that participants bring with them to the hypnotic setting. Our approach is motivated in part by the possibility that PHA may provide a laboratory model for understanding disorders of autobiographical memory such as functional amnesia (Barnier, 2002; Barnier & McConkey, 1999; Cox & Barnier, 2003; Kihlstrom & Schacter, 1995).

In terms of information learned before hypnosis, Barnier et al. (2001) gave high and low hypnotizable individuals a PHA suggestion that targeted a word list that participants learned either before or during hypnosis. Barnier et al. (2001) found recall impairments for highs but not lows, equivalent levels of perceptual and semantic priming across highs and lows, and reversibility of the effect. Notably, PHA was effective for material learned before and during hypnosis. In terms of autobiographical memories, Barnier (2002) gave highs and lows a PHA suggestion that targeted one of two autobiographical episodes (viz., first day of high school or first day of university). Barnier (2002) reported recall impairments of personal semantic facts and memorable incidents from the episodes for highs but not lows, equivalent performance on implicit memory tasks (viz., category generation and social judgment) across highs and lows, and reversibility of the effect. This indicates that PHA can influence information learned immediately and long before hypnosis. Moreover, the effect appears to be selective in that forgetting is greatest for (but not necessarily limited to) episodes that are targeted by the suggestion (Allen, Iacono, Laravuso, & Dunn, 1995; Cox & Barnier, 2003).

There remains much to understand, however, about the precise impact of a PHA suggestion on personal memory. Kihlstrom (1985) argued that PHA represents a temporary dissociation between contextual (episodic) and other features of a memory trace, which impairs the individual’s ability to consciously retrieve material available in memory. Although this highlights the ability of suggested amnesia to impair the accessibility of memory, it does not address the issue of whether it also influences the quality of memory. Kihlstrom (1985) noted that whereas most hypnotizable individuals may show a complete, or virtually complete, deficit in recall of the targeted information or events, more moderately hypnotizable individuals may show partial effects characterized by vague and fragmentary recollections; in other words, effects on the quality of memory. This situation is consistent

with case reports of amnesic patients that indicate that whereas some individuals experience an inability to access personal memories at even the most general level (i.e., they fail to recall entire lifetime periods as well as all specific events within these periods), others show reasonably unimpaired retrieval but complain about the “mundane” quality of their memories (Conway, 1996; Conway & Pleydell-Pearce, 2000).

Although some research involving simple stimuli has considered the impact of suggested amnesia on the quality of memory (e.g., temporal and semantic organization; Kihlstrom, 1985; Spanos, Radtke-Bodorik, & Stam, 1980), most has focused solely on accessibility. The nature of personal memory, however, is such that the balance between accessibility and quality needs to be considered empirically and theoretically. To help guide this investigation, it is useful to think of autobiographical memory as being organized hierarchically across at least three levels of autobiographical knowledge: lifetime periods, general events, and event-specific knowledge. Knowledge at the higher levels is general and decontextualized (i.e., representing large periods of time rather than specific events), whereas knowledge at the lowest level is detailed and sensory in nature, including perceptual, spatial, temporal, and affective details (Conway & Pleydell-Pearce, 2000). Moreover, sensory aspects are partially independent and may be influenced (whether altered, forgotten, or retrieved) at different rates (Mitchell & Johnson, 2000). Thus, in some circumstances, suggested amnesia may influence autobiographical knowledge across all levels (leading to total forgetting), but in other circumstances it may influence only event-specific knowledge (leading to qualitatively poor recall).

A focus on memory accessibility and quality raises methodological issues. PHA is traditionally scored dichotomously in terms of whether a targeted item, such as a word, is present/recalled or absent/not recalled on a memory test. Indeed, the major hypnotizability measures score PHA in terms of the number of items or hypnotic events recalled (e.g., Harvard Group Scale of Hypnotic Susceptibility, Form A; HGSHS:A; Shor & Orne, 1962). However, reports by participants in our previous research suggested that it is relatively rare for even the most hypnotically talented person to forget an entire autobiographical episode in a wholesale way (Barnier, 2002; Cox & Barnier, 2003). Thus, it is possible that indexing PHA in terms of accessibility and quality will reveal individual differences within and across hypnotizability levels.

The present experiment draws on concepts and methods from the autobiographical memory literature to investigate the influence of an amnesia suggestion on the accessibility and quality of autobiographical memory. Before hypnosis, we asked high, medium, and low hypnotizable individuals to recall two autobiographical episodes. During hypnosis, we gave participants a PHA suggestion that targeted one of these episodes. After hypnosis, we asked them to recall the episodes again.

We indexed the impact of PHA on memory accessibility in terms of whether participants generated a memory and the number of words they used to describe their memories during free recall and in response to standard probes. We indexed the impact of PHA on memory quality in terms of whether participants generated a specific (as opposed to general) memory, whether the memory contained an identifiable narrative, and participants' qualitative ratings of their memories.

We expected that the suggestion would influence both the accessibility and quality of highs' recall of the targeted episode, because they are most capable of experiencing suggested amnesia. However, given previous findings that wholesale forgetting of autobiographical episodes is relatively rare (and perhaps quite difficult; Barnier, 2002), we expected that highs would show impairments of memory quality more so than accessibility and that partial forgetting would be more likely than wholesale forgetting. We expected that mediums would show impairments of memory quality rather than accessibility, because they often experience partial, rather than complete, amnesia on standard items in hypnotizability scales. Finally, we expected that lows would show impairments of neither memory accessibility nor quality.

## METHOD

### *Participants and Design*

Thirty-eight high (7 male, 31 female; age  $M = 19.16$ ,  $SD = 5.02$ ), 24 medium (10 male, 14 female; age  $M = 19.87$ ,  $SD = 4.48$ ), and 36 low (12 male, 24 female; age  $M = 20.81$ ,  $SD = 5.67$ ) hypnotizable undergraduate psychology students from the University of New South Wales voluntarily participated for research credit. Selection was based on a 10-item modified version of the HGSHS:A and a 10-item tailored version of the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962). Highs scored 7–10 on the HGSHS:A ( $M = 7.84$ ,  $SD = 0.75$ ) and 8–10 on the SHSS:C ( $M = 9.00$ ,  $SD = 0.81$ ); mediums scored 4–7 on both the HGSHS:A ( $M = 5.25$ ,  $SD = 0.94$ ) and the SHSS:C ( $M = 5.92$ ,  $SD = 0.97$ ); and lows scored 0–3 on both the HGSHS:A ( $M = 2.03$ ,  $SD = 1.03$ ) and the SHSS:C ( $M = 1.89$ ,  $SD = 1.04$ ). The experiment used a 3 (hypnotizability)  $\times$  (2) (PHA)  $\times$  (2) (test) mixed-model design. Hypnotizability was a 3-level between-subjects factor (high vs. medium vs. low); PHA was a 2-level within-subjects factor (episode targeted by PHA vs. episode not targeted), and test was a 2-level within-subjects factor (Elicitation vs. Recall 1).

### *Procedure*

Following informed consent, the experimenter asked participants to generate memories (Elicitation). She asked them to recall two episodes:

their last birthday and their last Christmas; order of episode was counterbalanced across individuals. For each episode, she asked participants to close their eyes and imagine themselves experiencing the episode again, and then tell her everything they could remember in as much detail as possible. When participants indicated they could recall nothing further, the experimenter administered three standard probes for additional information, irrespective of their previous recall. These focused on physical surroundings ("Tell me more about where you were, your physical surroundings"), interpersonal aspects ("Tell me more about the people you were with"), and emotional experiences ("Tell me more about how you felt"). After this, the experimenter asked participants to rate their memory on four 7-point Likert scales derived from dimensions of the Memory Characteristics Questionnaire (Johnson, Foley, Suengas, & Raye, 1988): overall memory clarity ("How clear is your memory of this event?"; 1 = *dim*, 7 = *sharp and clear*), sound ("To what degree does your memory involve sound?"; 1 = *little or none*, 7 = *a lot*), spatial information ("In your memory how clear is the location of other people and objects in relation to you?"; 1 = *vague*, 7 = *distinct*), and thoughts and feelings ("To what degree do you remember what you thought and felt at the time of the event?"; 1 = *not at all*, 7 = *very clearly*). Participants' verbal narrative of the two episodes and their ratings were recorded on a Sony audiocassette recorder.

After Elicitation, the experimenter administered the hypnotic induction procedure of the SHSS:C and the standard test items of eye closure, hand lowering, moving hands apart, mosquito hallucination, taste hallucination, arm rigidity, dream, age regression, and arm immobilization. She then administered a hypnotic deepening procedure followed by the PHA suggestion. She told half the participants that they would not be able to remember their last birthday and the other half that they would not be able to remember their last Christmas. She told participants they would be unable to recall these events until they received a reversibility cue ("Now you can remember everything").

After deinduction, the experimenter tested participants' memory of the two autobiographical episodes (Recall 1). As for Elicitation, for each episode, she: (a) asked participants to tell her everything they could remember in as much detail as possible; (b) administered three standard probes for additional information (viz., physical surroundings, interpersonal aspects, emotional experiences), irrespective of participants' previous recall; and (c) asked participants to rate their memory on overall memory clarity, sound, spatial information, and thoughts and feelings. She then gave the reversibility cue that canceled amnesia and tested participants' memory again (Recall 2). For each episode, she asked participants to tell her any additional details they could now remember that they did not report during Recall 1. Also, she asked

them to rate their memory on overall memory clarity, sound, spatial information, and thoughts and feelings. Finally, the experimenter answered any questions and ended the session.

## RESULTS

Our analysis focused primarily on a comparison of recall across Elicitation and Recall 1. We also considered recall at Recall 2 following cancellation of the suggestion. Data relating to memory accessibility were: (a) the number of participants who generated a relevant memory (*memory generation*), (b) the number of words they used to describe their memories during free recall (*free-recall word count*), and (c) the number of words they used in response to three standard probes (*total-probes word count*). Data relating to memory quality were: (a) the number of participants who generated a specific (vs. general) memory (*memory specificity*), (b) the number who generated a memory with an identifiable narrative (*memory narrative*), and (c) their ratings of *overall memory clarity, sound, spatial information, and thoughts and feelings*. The experimenter and an independent rater (who was blind to hypnotizability and experimental conditions) made categorizations of memory generation, memory specificity, and memory narrative; overall interrater reliability was  $K = .95$  (Kappa statistic; Cohen, 1960), and the reported data is that of the experimenter.

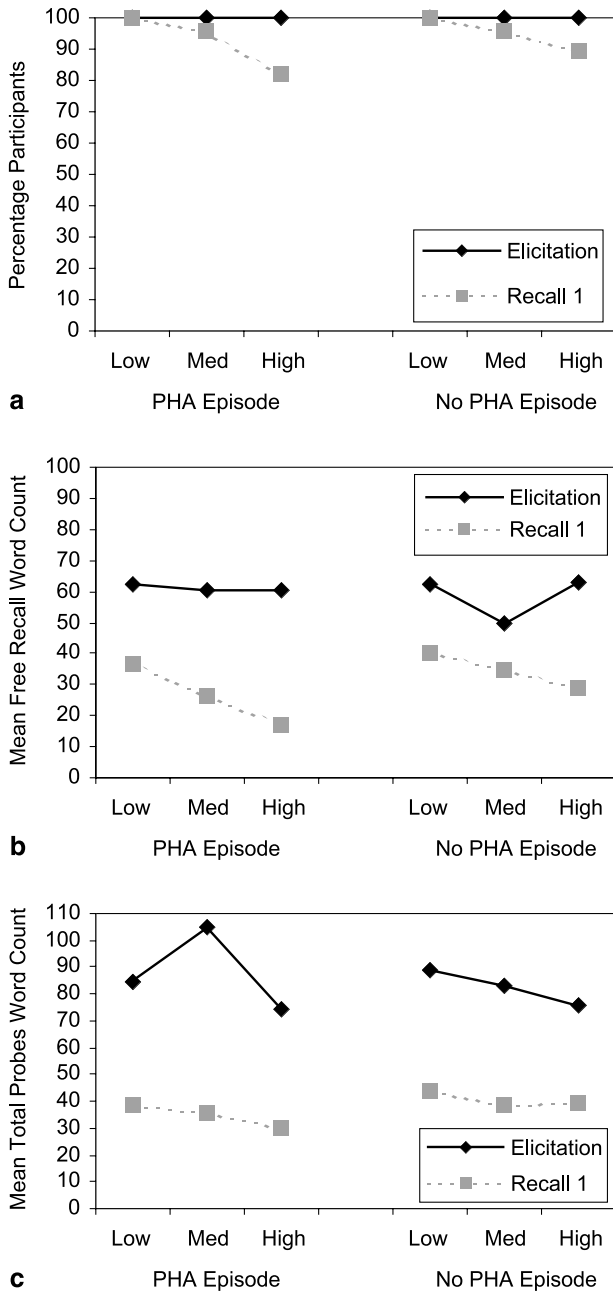
The focus of the suggestion (birthday/Christmas) and the order of episode elicitation were counterbalanced. Chi-square analyses or one-way analyses of variance (ANOVA) of the dependent variables as appropriate indicated that these factors had no influence on the pattern of findings. Accordingly, data for the birthday and Christmas episodes were combined; all subsequent analyses compared participants' recall of the episode targeted (birthday or Christmas; referred to as "PHA") with the episode not targeted (birthday or Christmas; referred to as "No PHA").<sup>3</sup>

### *Memory Accessibility*

Figure 1a presents the percentage of highs, mediums, and lows who generated a relevant memory for the episode targeted and the episode not targeted at Elicitation and Recall 1 (for Recall 1, this refers to

<sup>3</sup>There were also no sex differences in autobiographical recall or amnesia. Although the male/female composition of high, medium, and low hypnotizable groups was unbalanced, chi-square analyses or independent sample *t* tests on each of the accessibility- and quality-dependent variables indicated no general effect of sex; only 3 of 36 variables indicated a significant sex difference at  $p < .05$  (one memory-narrative variable, and two word-count variables).





**Figure 1.** Memory accessibility across Elicitation and Recall 1. (a) Percentage participants who generated the same autobiographical event. (b) Mean free-recall word count. (c) Mean total-probes word count.

the percentage who generated the same memory as at Elicitation). Figures 1b and 1c present participants' mean free-recall word count and mean total-probes word count, respectively, for the episode targeted and the episode not targeted at Elicitation and Recall 1.

*Memory generation.* As expected, all participants generated relevant memories for the episode targeted and not targeted at Elicitation. At Recall 1, participants either generated the same memory as at Elicitation, no memory, or a new, different memory. For the episode targeted, fewer highs (81.58%), most mediums (95.83%), and all lows (100.00%) generated the same memory; chi-square analysis indicated that this pattern differed significantly,  $\chi^2(4, N=98)=9.88, p < .05$ . For the episode not targeted, most highs (89.47%), most mediums (95.83%), and all lows (100.00%) generated the same memory as at Elicitation; this pattern did not differ appreciably. Separate McNemar tests for the significance of changes, which compared "same memory" and "no/different memory" across Elicitation and Recall 1, yielded a significant change in highs' recall of the episode targeted (from 100.00% to 81.58%,  $p < .05$ ). There was no change across Elicitation and Recall 1 in highs' recall of the episode not targeted or in mediums' or lows' memories of either episode.<sup>4</sup>

*Word counts.* Separate 3 (hypnotizability)  $\times$  (2) (PHA)  $\times$  (2) (test) mixed model ANOVAs of free-recall word count and total-probes word count were conducted. For free recall, analysis yielded a significant main effect of test,  $F(1,87)=102.38, p < .001$ , and two-way interaction between PHA and test,  $F(1,87)=6.36, p < .015$ . For total probes, analysis yielded a significant main effect of test,  $F(1,86)=220.20, p < .01$ , and two-way interaction between PHA and test,  $F(1,86)=8.66, p < .005$ .<sup>5</sup> Post hoc comparisons ( $p < .05$ ) indicated that participants used fewer words to describe their autobiographical episodes at Recall 1 (free recall:  $M=29.86, SD=14.06$ ; total probes:  $M=35.24, SD=17.47$ ) than at Elicitation (free recall:  $M=58.99, SD=29.41$ ; total probes:  $M=79.92, SD=38.24$ ). At Elicitation, participants gave approximately the same amount of information for the

<sup>4</sup>At Recall 2, participants were asked to report any details they did not report during Recall 1. For the episode targeted, 71.05% of highs, 41.67% of mediums, and 27.78% of lows recalled previously unreported details; this pattern differed significantly,  $\chi^2(4, N=98)=20.25, p < .01$ . For the episode not targeted, 42.11% of highs, 25.00% of mediums, and 25.00% of lows recalled new details; this pattern did not differ appreciably. This indicates that highs' accessibility impairment for the episode targeted by PHA was reversed following the cancellation cue.

<sup>5</sup>For word counts, analyses were conducted after the removal of outliers. Consistent with Upton and Cook's (2002) recommended criterion for outliers, data points with standardized residuals  $\geq 2.5$  were removed from the analyses. A total of 24 (3.06%) data points from 13 participants were removed.

episodes (subsequently) targeted or not targeted. However, at Recall 1, they said less about the episode targeted by the suggestion both during free recall (PHA:  $M = 26.71$ ,  $SD = 15.93$ ; No PHA:  $M = 34.34$ ,  $SD = 19.21$ ) and in response to the standard probes (PHA:  $M = 33.02$ ,  $SD = 19.10$ ; No PHA:  $M = 40.63$ ,  $SD = 24.16$ ).

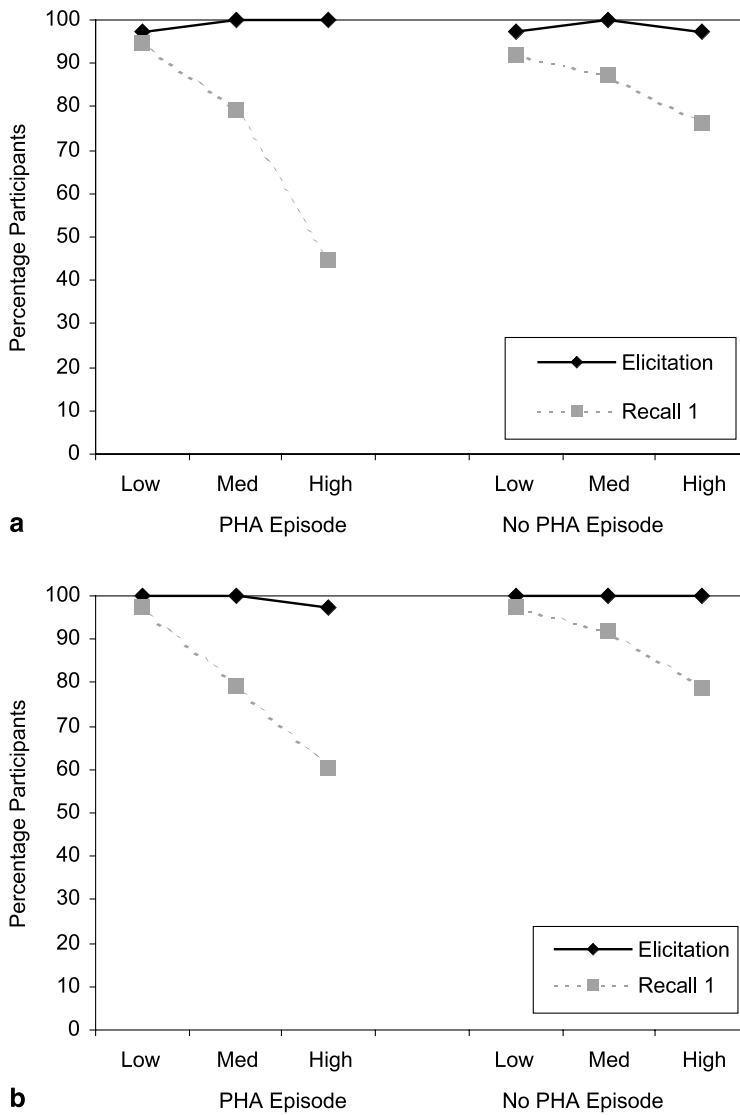
*Summary.* The suggestion influenced highs', but not mediums' or lows', recall of the episode specifically targeted (as indexed by memory generation). The amnesia suggestion did not influence any participants' memories of the episode not targeted by the suggestion. Although the suggestion led to an overall decrease in all participants' recall productivity for the episode targeted (as indexed by word counts), its impact on memory accessibility was relatively modest even for highs; at Recall 1, approximately 80% of highs recalled their Elicitation memory of the targeted episode.

### *Memory Quality*

Figures 2a and 2b present the percentage of highs, mediums, and lows who generated a specific (vs. general) memory and a memory with an identifiable narrative, respectively, for the episode targeted and the episode not targeted at Elicitation and Recall 1.

*Memory specificity.* At Elicitation, most highs (98.68%), mediums (100.00%), and lows (97.22%) generated memories that were classified by raters as "specific" for the episode targeted and the episode not targeted. At Recall 1, about half the highs (44.74%), most mediums (79.17%), and virtually all the lows (94.44%) generated a specific memory for the episode targeted; this pattern differed significantly,  $\chi^2(2, N = 98) = 23.31, p < .001$ . Most highs (76.32%), mediums (87.50%), and lows (91.67%) generated a specific memory for the episode not targeted; this pattern did not differ appreciably. Separate McNemar tests, which compared "specific memory" and "general/no memory" across Elicitation and Recall 1, indicated that the number of highs generating a specific memory decreased for both the episode targeted (100.00% to 44.74%,  $p < .001$ ) and not targeted (97.34% to 76.32%,  $p < .01$ ). The number of mediums generating a specific memory tended to decrease across the tests for the episode targeted (100.00% to 79.17%,  $p < .065$ ). There was no change in the number of lows generating a specific memory for either episode. At Recall 1, highs' memories of both episodes were less specific than those of mediums or lows; this effect on highs' recall was greatest for the episode targeted (44.74%) than not targeted (76.32%;  $p < .002$ ).

*Memory narrative.* At Elicitation, virtually all highs (98.68%), mediums (100.00%), and lows (100.00%) generated memories that contained an identifiable narrative. At Recall 1, fewer highs (60.50%), most mediums (79.17%), and virtually all lows (97.22%) generated a memory



**Figure 2.** Memory quality across Elicitation and Recall 1. (a) Percentage participants who generated a specific (vs. general) memory. (b) Percentage participants who generated a memory with identifiable narrative.

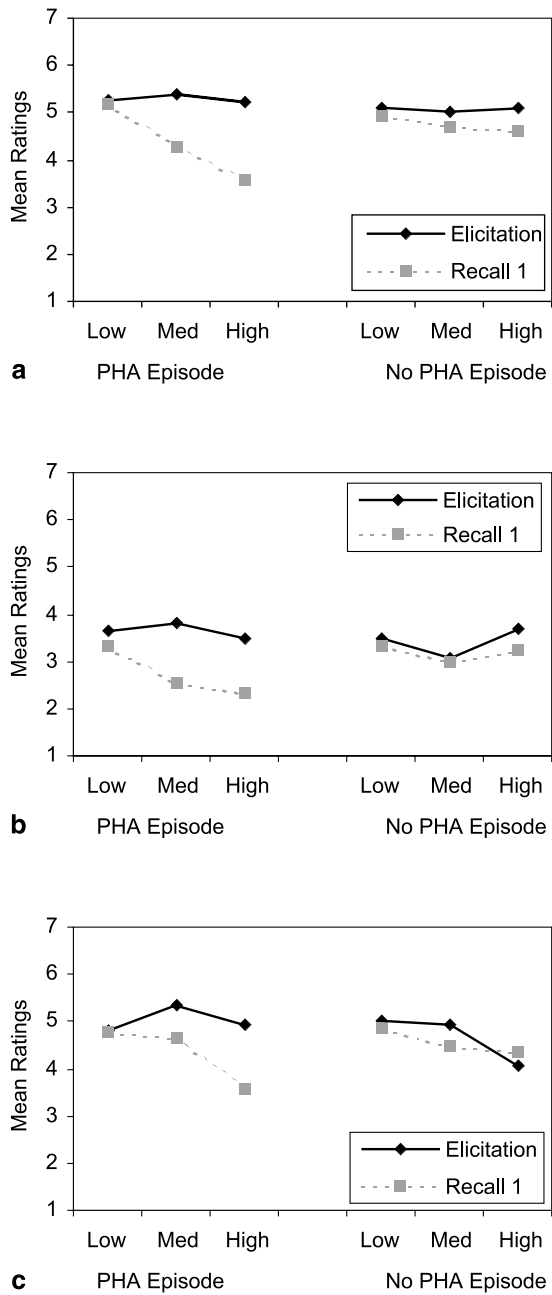
with an identifiable narrative for the episode targeted by PHA; this pattern differed significantly,  $\chi^2(2, N = 98) = 14.79, p < .001$ . Also, fewer highs (78.95%), virtually all mediums (91.67%), and all lows (97.22%)

generated a memory with an identifiable narrative for the event not targeted by PHA; this pattern also differed significantly,  $\chi^2(2, N = 98) = 6.46, p < .05$ . Separate McNemar tests, which compared “identifiable narrative” and “no identifiable narrative” across Elicitation and Recall 1, indicated that the number of highs generating a memory with an identifiable narrative decreased across the tests for both the episode targeted (100.00% to 60.50%,  $p < .001$ ) and not targeted (97.37% to 78.95%,  $p < .01$ ). The number of mediums generating a memory with an identifiable narrative tended to decrease across the tests for the episode targeted (100.00% to 79.17%,  $p < .065$ ). There was no change in lows’ memory narrative for either episode. At Recall 1, highs’ memories of both episodes had a weaker narrative than those of mediums or lows; this effect on highs’ recall was somewhat greater for the episode targeted (44.74%) than not targeted (76.32%;  $p < .065$ ).

*Memory-characteristic ratings.* Figures 3a, 3b, 3c, and 3d present participants’ memory-characteristic ratings for the episode targeted and not targeted at Elicitation and Recall 1; specifically, they present participants’ mean ratings of *overall memory clarity*, *sound*, *spatial information*, and *thoughts and feelings*, respectively. Participants’ memory-characteristic ratings at Elicitation and Recall 1 were analyzed using separate 3 (hypnotizability)  $\times$  (2) (PHA)  $\times$  (2) (test) mixed-model ANOVAs.

For *clarity* ratings, analysis yielded a significant main effect of test,  $F(1, 94) = 39.76, p < .001$ , two-way interactions between hypnotizability and test,  $F(2, 94) = 8.86, p < .001$ , and PHA and test,  $F(1, 94) = 11.19, p < .01$ , and a three-way interaction among hypnotizability, PHA, and test,  $F(2, 94) = 4.79, p < .01$ . Post hoc comparisons ( $p < .05/3$ ) indicated that for the episode targeted, highs, mediums, and lows rated their memories similarly at Elicitation (overall  $M = 5.27, SD = 1.19$ ), but on Recall 1 highs ( $M = 3.58, SD = 1.46$ ) and mediums ( $M = 4.25, SD = 1.26$ ) rated their memories as significantly less clear than did lows ( $M = 5.19, SD = 1.28$ ). There was no appreciable difference in clarity ratings for the episode not targeted across Elicitation (overall  $M = 5.08, SD = 1.42$ ) and Recall 1 (overall  $M = 4.74, SD = 1.51$ ).

For *sound* ratings, analysis yielded a significant main effect of test,  $F(1, 94) = 47.46, p < .001$ , and two-way interactions between hypnotizability and test,  $F(2, 94) = 5.39, p < .01$ , and PHA and test,  $F(1, 94) = 11.49, p < .001$ . Post hoc comparisons ( $p < .05$ ) indicated that whereas at Elicitation participants rated the two episodes as involving a similar degree of sound (PHA:  $M = 3.62, SD = 1.51$ ; No PHA:  $M = 3.47, SD = 1.62$ ), at Recall 1 they rated their memories of the episode targeted ( $M = 2.76, SD = 1.52$ ) as involving less sound than the episode not targeted ( $M = 3.21, SD = 1.73$ ). Also, whereas at Elicitation highs, mediums, and lows gave similar sound ratings (overall  $M = 3.55, SD = 1.30$ ),



**Figure 3.** Memory characteristics ratings across Elicitation and Recall 1. (a) Mean overall memory clarity ratings (1–7). (b) Mean sound ratings (1–7). (c) Mean spatial ratings (1–7). (d) Mean thoughts and feelings ratings (1–7).

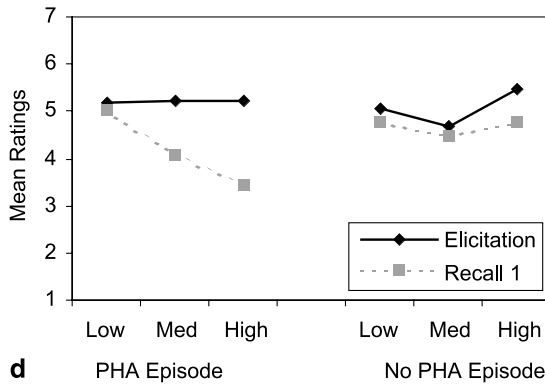


Figure 3. (continued).

at Recall 1 highs ( $M = 2.80$ ,  $SD = 1.29$ ) and mediums ( $M = 2.77$ ,  $SD = 1.89$ ) rated their memories as involving less sound than did lows ( $M = 3.55$ ,  $SD = 1.55$ ).

For *spatial information* ratings, analysis yielded a significant main effect of test,  $F(1, 94) = 39.04$ ,  $p < .001$ , and a two-way interaction between hypnotizability and test,  $F(2, 94) = 10.32$ ,  $p < .001$ . Post hoc comparisons ( $p < .05/3$ ) indicated that whereas at Elicitation highs, mediums, and lows gave similar spatial ratings (overall  $M = 5.00$ ,  $SD = 1.02$ ), at Recall 1 highs ( $M = 3.97$ ,  $SD = 1.33$ ) rated their memories as involving less clear spatial information than did lows ( $M = 4.82$ ,  $SD = 1.18$ ); mediums ( $M = 4.54$ ,  $SD = 1.04$ ) did not differ significantly from either highs or lows.

For *thoughts and feelings* ratings, analysis yielded a significant main effect of test,  $F(1, 94) = 32.61$ ,  $p < .001$ , two-way interactions between hypnotizability and PHA,  $F(2, 94) = 5.00$ ,  $p < .01$ , hypnotizability and test,  $F(2, 94) = 5.98$ ,  $p < .005$ , and PHA and test,  $F(1, 94) = 16.27$ ,  $p < .001$ , and a three-way interaction among hypnotizability, PHA, and test,  $F(2, 94) = 6.95$ ,  $p < .002$ . Post hoc comparisons ( $p < .05/3$ ) indicated that for the episode targeted, at Elicitation highs, mediums, and lows rated their ability to remember thoughts and feelings about the episodes similarly (overall  $M = 5.19$ ,  $SD = 1.22$ ), but at Recall 1 highs ( $M = 3.45$ ,  $SD = 1.54$ ) rated their ability to recall this information as significantly poorer than did lows ( $M = 5.00$ ,  $SD = 1.45$ ); mediums ( $M = 4.08$ ,  $SD = 1.47$ ) did not differ significantly from either highs or lows. There was no difference in participants' ratings of thoughts and feelings for the episode not targeted across Elicitation (overall  $M = 5.11$ ,  $SD = 1.38$ ) and Recall 1 (overall  $M = 4.68$ ,  $SD = 1.50$ ).

*Summary.* PHA influenced the quality of highs' recall of both the episodes targeted and not targeted by the suggestion (as indexed by memory specificity, memory narrative, and subjective ratings); these effects were strongest for the targeted episode. In contrast to the findings for memory accessibility, PHA influenced the quality of mediums' memories of the episode targeted by the suggestion (as indexed by memory specificity, memory narrative, and subjective ratings). For both highs and mediums, PHA influenced their ratings of overall memory clarity and thoughts and feelings more than their ratings of sound and spatial information. Consistent with memory accessibility, the suggestion had no impact on memory quality for lows.<sup>6</sup>

## DISCUSSION

This experiment investigated the impact of a suggestion for PHA on the accessibility and quality of autobiographical memory. For highs, the suggestion temporarily influenced both the accessibility and quality of their memory of the targeted episode, as well as the quality of their memory of the nontargeted episode. Highs were less likely to recall previously elicited memories of the targeted episode, their recall of both episodes was more general and lacked an identifiable narrative, and they rated memories of both episodes as less clear overall and less detailed in terms of sound, spatial information, and thoughts and feelings. These effects were reversed following cancellation of the suggestion. For mediums, the suggestion did not influence the accessibility but did influence the quality of their memory of the targeted episode (viz., specificity, narrative, and subjective characteristics). For lows, the suggestion influenced neither the accessibility nor quality of their memory of either episode. Overall, these findings demonstrate that suggested amnesia can have a dramatic impact on memory quality, at least among high and some medium hypnotizable individuals, as well as on memory accessibility, at least for high hypnotizable individuals.

<sup>6</sup>At Recall 2, participants were asked to rate their memories in terms of overall memory clarity, sound, spatial information, and thoughts and feelings. Separate 3 (hypnotizability)  $\times$  (2) (PHA) mixed-model ANOVAs of change scores (i.e., changes in ratings from Recall 1 to Recall 2) and post-hoc tests indicated that highs' clarity, sound, spatial, and thoughts and feelings ratings increased after cancellation more than lows' ratings; mediums ratings did not differ from the other groups. The increase in highs' ratings of clarity and thoughts and feelings was greatest for the episode targeted by the suggestion. This indicates that the deficit in highs' (and to a lesser extent mediums') memory quality was reversed following cancellation of PHA.



The impact of a hypnotic suggestion for PHA on the accessibility and quality of memories is consistent with other research on experimentally induced and clinically associated forgetting. For instance, Wegner, Quillian, and Houston (1996; see also Rassin, Merckelbach, & Muris, 1997) reported that instructions to suppress thoughts (within a thought suppression paradigm) of a film fragment led to poorer recall of the sequence, but not the content, of the film as well as a more fragmented meta-memory representation of the film. Similarly, Koss, Figueredo, Bell, Tharan, and Tromp (1996) reported that rape victims' memories of a traumatic incident were less clear and vivid, less detailed, and less sequentially ordered than pleasant events. Rassin, Merckelbach, and Muris (2000) argued that strategic or automatic attempts to forget particular events may be more likely to influence the quality of memories associated with those events rather than lead to complete memory loss.

This view is consistent with our finding that although approximately 80% of highs recalled their Elicitation memory of the targeted episode at Recall 1, this recall was less detailed and lacked narrative and sensory information. For instance, at Elicitation, one high described his last birthday in the following way:

My birthday was 2 or 3 months ago on February 18<sup>th</sup>, and it was a Saturday. It was Friday actually and my parents threw me a party on Saturday. On that Friday night, I went out clubbing, and I didn't come home until 4 o'clock in the morning, and so I slept all the way through Saturday. I woke up at 11 or 12 and my mother had been really busy, like food, BBQ, and she was cleaning up the house and getting ready. And my mother got really angry at me saying I didn't help her at all. So I helped downstairs and then when the guests came over and then my friends came over. My friends were hosting the party and there were some other family friends and I was there with my friends, and we had a BBQ and it went on till nighttime, and at nighttime everyone left and I went to my friend's house and stayed over there.

The suggestion targeted his memory of this episode. On Recall 1, all he reported about the event was: "It was the 18th of February and it was my birthday. It was a nice day. My parents were there; my family was there."

This change in quality, more so than in accessibility, across high and some medium hypnotizable individuals suggests that forgetting an episode in its factual and sensory entirety may be less likely than forgetting only selected details or features of that episode. This is consistent with Conway and Pleydell-Pearce's (2000) model of autobiographical memory. Their model considers that autobiographical knowledge is hierarchically organized (across lifetime periods, general events, and event-specific knowledge) and strongly linked in an associative network. Activation across the levels is diffuse such that

knowledge held in lifetime periods can access many associated general events, and knowledge held in general events can access many associated general events, a lifetime period, and many records of event-specific knowledge. Conway and Pleydell-Pearce argue that autobiographical memory is connected to the self via a "self-memory system." Through this connection, the current goals of the self function as executive-control processes that modulate the construction (i.e., retrieval) of memories; autobiographical knowledge that is inconsistent with current goals of the self may be prevented from entering consciousness. Based on this model, Cox and Barnier (2003) conceptualized the effects of a suggestion for PHA as related to the hypnotized individual's current goal of experiencing as genuine the suggested amnesia effect, and involving the use of executive control processes that inhibit or tag as "to-be-forgotten" particular autobiographical knowledge (see Husemann et al., 1987; Smith et al., 1998).

This perspective helps us to understand the present findings. Specifically, if autobiographical remembering involves a staged search through the levels of the autobiographical knowledge base (i.e., "generative retrieval"; Conway & Pleydell-Pearce, 2000), then hypnotized individuals may instigate control processes that prematurely terminate the retrieval cycle (for instance, at general events) to meet the goal of not remembering the targeted episode (and even the nontargeted episode if it is thematically or temporally related; Allen et al., 1995; Cox & Barnier, 2003). The apparent inability of highs and some mediums to recall detailed autobiographical knowledge at Recall 1 is consistent with such an interruption. Put simply, this is why their memories lacked the detailed, sensory aspects provided by event-specific knowledge. This interpretation is consistent with the findings of Cox and Barnier, who used a suggestion for PHA that targeted an entire lifetime period (first romantic relationship). They reported conceptually similar findings, which may also be interpreted in terms of foreshortened retrieval. Rather than forgetting the entire period, highs' memory of selected events within that period was impaired in terms of accessibility (probability of recall and response latency) and quality (ratings of overall clarity and clarity of thoughts and feelings). Moreover, the premature termination of retrieval has been implicated in findings of overgeneral memory in clinical depression (Williams, 1996) and experimentally induced mood (Maccallum, McConkey, Bryant, & Barnier, 2000). In these cases, inhibitory-control processes interrupt memory search so as to meet the current goal of the working self, which is the avoidance of negative, self-referential information.

In addition to these matters of interpretation, the present findings have important methodological implications and raise methodological issues. For instance, the traditional dichotomous scoring of PHA (as absent/present) clearly does not capture the range of influence that an

amnesia suggestion may have on complex autobiographical memories. Measuring this influence on dimensions of memory quality, as well as memory accessibility, not only allows novel theoretical predictions to be tested but also reveals unexpected complexities in the interaction between PHA and hypnotizability. For instance, whereas medium hypnotizable individuals do not normally pass the accessibility based criterion of a standard amnesia item, in this experiment the amnesia suggestion influenced the quality of their memories of the targeted episode. This indicates that mediums are capable of experiencing the effects of a PHA suggestion but that those effects are less profound and complete than those experienced by highs. These findings underscore also the value of a multidimensional approach to indexing individuals' responses to hypnotic suggestions (see also McConkey, Gladstone, & Barnier, 1999; McConkey, Szeps, & Barnier, 2001; McConkey, Wende, & Barnier, 1999).

There are methodological challenges involved in indexing the influence of a suggestion for PHA on personal memory. One is how to adequately capture the recovery of memory following cancellation of the suggestion ("reversibility"). At Elicitation and Recall 1, we asked participants to describe their two episodes and to make ratings about their memories. At Recall 2, we asked participants to report any additional details they recalled rather than to describe the entire episode again. We were concerned that a third recall test might reflect more response fatigue rather than genuine changes in accessibility or quality. Notably, although at Recall 1 only highs showed accessibility effects in terms of memory generation, all participants used fewer words to describe their memories the second time (i.e., word counts). This overall decrease in the level of detail may be due to the problems inherent in repeated testing in the laboratory. Relatedly, future research could usefully examine the demand cues associated with testing both memory accessibility and memory quality. An application of the real-simulating paradigm (Orne, 1959), for instance, could index the extent to which the overall context conveys a relationship between accessibility and quality of memory. Finally, although we demonstrated an impairment in highs' explicit memory of the episodes, we did not index implicit memory in this experiment. Previous experiments have found clear evidence of a dissociation between explicit and implicit personal memory following an amnesia suggestion (Barnier, 2002; Cox & Barnier, 2003).

These issues notwithstanding, the essential finding of our experiment is that a suggestion for amnesia influences both the accessibility and quality of autobiographical memory for high and some medium hypnotizable individuals. Our finding that the suggestion had a greater impact on the quality than the accessibility, of memory is consistent with research involving nonhypnotic experimental paradigms of forgetting. Further research that compares autobiographical memory

performance within paradigms such as thought suppression, directed forgetting, retrieval-induced forgetting, and hypnotic amnesia would help understand the mechanism/s involved in laboratory-based and real-world forgetting.

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**Posthypnotische Amnesie für autobiographische Ereignisse:  
Beeinflussung der Zugänglichkeit des Gedächtnisses und  
der Gedächtnisqualität**

Amanda J. Barnier, Kevin M. McConkey und Jonathan Wright

**Zusammenfassung:** Die Autoren untersuchten den Einfluss der posthypnotischen Amnesie auf die Zugänglichkeit und die Qualität von Gedächtnisinhalten in Bezug auf persönliche Erinnerungen. Hoch, mittel und schwach hypnotisierbare Versuchspersonen erinnerten zwei autobiographische Episoden und beurteilten ihre Erinnerungen. Unter Hypnose wurde eine Suggestion zur posthypnotischen Amnesie gegeben, welche sich auf eine der beiden Erinnerungen bezog. Nach der Hypnose erinnerten die Versuchspersonen die Episoden und beurteilten ihre Erinnerungen. Die Suggestion zur

posthypnotischen Amnesie beeinflusste die Zugänglichkeit und Qualität des autobiographischen Gedächtnisses bei hoch und einigen der mittel, jedoch nicht bei den schwach hypnotisierbaren Teilnehmer. Diese Befunde werden in Bezug auf die Untersuchung und das Verständnis des Einflusses von posthypnotischer Amnesie auf das autobiographische Gedächtnis diskutiert.

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**L' Amnésie post-hypnotique d'épisodes autobiographiques:  
influencer la qualité et l'accessibilité au souvenir**

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Résumé: Les auteurs examinent l'impact de l'amnésie post-hypnotique sur la qualité et l'accessibilité aux souvenirs personnels. Des individus hautement, moyennement et faiblement hypnotisables doivent se rappeler deux événements autobiographiques et donner une note à ces souvenirs. Sous hypnose, les sujets reçoivent une suggestion d'amnésie post-hypnotique qui vise l'un de ces événements. Après une séance d'hypnose, ils devaient à nouveau se souvenir de ces événements et les noter. La suggestion d'amnésie post-hypnotique influence la qualité et l'accessibilité au souvenir autobiographique pour les participants hautement et quelques participants moyennement hypnotisables mais pas pour les sujets faiblement hypnotisables. L'article parle de ces résultats en terme d'investigation et de compréhension de l'impact de l'amnésie hypnotique sur le souvenir autobiographique.

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**La amnesia posthipnótica de episodios autobiográficos: Su influencia  
en la accesibilidad y calidad de la memoria**

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Resumen: Los autores examinaron el impacto de la amnesia posthipnótica en la accesibilidad y calidad de las memorias personales. Individuos con hipnotizabilidad alta, mediana, y baja recordaron dos episodios autobiográficos y evaluaron esas memorias. Durante la hipnosis se dio a los sujetos una sugestión de amnesia posthipnótica para uno de los episodios. Después de la hipnosis, recordaron y evaluaron sus memorias de los episodios. La sugestión de amnesia posthipnótica influyó la accesibilidad y calidad de la memoria autobiográfica en sujetos con alta hipnotizabilidad, y algunos con mediana, pero no en aquellos con baja hipnotizabilidad. Este artículo discute estos resultados desde la perspectiva de investigar y entender el impacto de la amnesia posthipnótica en la memoria autobiográfica.

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