

Amnesia for Violent Offenses: Factors Underlying Memory Loss and Recovery

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Amnesia for violent offenses is common, but little is known about underlying causes or whether memory can recover. In this study, 50 violent offenders were interviewed with neuropsychological and psychometric measures, to determine the factors that underlie amnesia and the recovery of memory in these cases. The results showed that amnesia for a violent offense was associated with crimes of passion and dissociative symptoms at the time, but not with impaired neuropsychological functioning. Long amnesic gaps were associated with a state of dissociation surrounding the offense and with previous blackouts (whether alcoholic or dissociative). Memory often recovered, either partially or completely, especially where there was a history of blackouts or a lengthy amnesic gap. Brief amnesic gaps were likely to persist, perhaps as a consequence of faulty encoding during a period of extreme emotional arousal (or red-out).

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There is considerable controversy concerning amnesia for offenses. Many psychiatric investigators have described amnesia in offenders, particularly in cases of violent crime or where alcohol is involved, and it is a common complaint in court.^{1–8} On the other hand, there are many reports that have questioned the existence of this phenomenon, arguing that amnesia is simulated in many or even most cases.^{9–14}

There is also controversy about the underlying basis of amnesia. Dissociation, repression, or motivated forgetting, have all been postulated as underlying mechanisms, as well as encoding and retrieval impairments of various etiologies (including alcohol, drugs, and emotional arousal).^{15–18} It is possible that different types of mechanisms arise in different types of offenses, but there has been little empirical inves-

tigation of this question. There have been clinical reports¹⁹ and some investigation into the possible contribution that shame regarding an offense has on the offender's likelihood of confession.²⁰ There have been claims that shame affects the general ability to disclose information²¹ and that it may be an important factor in violent offenses.²² The typical length and nature of such amnesic episodes have not been systematically investigated. Notably, there has been little exploration of whether memories return over time in offenders, despite the literature regarding recovery of memory in victims of crime, such as in childhood sexual abuse,²³ and in alcoholic blackout²⁴ and head injury.^{25,26} Furthermore, it is not known whether recovered memories feel real or imagined, despite the potential legal importance of this and related investigations of the quality and reliability of memories in other contexts.^{27–30}

In a previous investigation,⁵ we examined the records of all offenders given a life sentence in England and Wales during 1994. Of the total sample, 85 percent had been convicted of murder, manslaughter, or attempted murder, and 29 percent claimed complete or partial amnesia for the offense. The presence of amnesia was associated with such factors as a history of psychiatric disorder, alcohol abuse, alcoholic

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blackouts, and committing a crime of passion (killing a spouse, lover, or partner). The outcome at three years was examined in the inmate's follow-up reports for the parole board. At this three-year follow-up, memory was reported to have recovered completely in 33 percent of those with amnesia, partially improved in 26 percent, and remained unchanged in 41 percent.

The aims of the present investigation were to identify the characteristics of amnesia, the length of the amnesic gap, and factors associated with amnesia, to help elucidate its underlying cause; to determine what factors are associated with the return of memory following amnesia; and to determine whether recovered memories are qualitatively similar to, or different from, memories in those violent offenders who have never experienced amnesia.

On the basis of the previous literature, we hypothesized that amnesia would be related to such factors as alcohol dependence or blackouts and crimes of passion. Where neurological disease or alcohol and substance misuse were absent, we also hypothesized that amnesia would relate to such factors as dissociative symptoms at the time of the offense, current dissociative symptoms, posttraumatic stress disorder (PTSD) symptoms, a repressive coping style, or high levels of shame. Furthermore, we hypothesized that recovery might relate to the presence of repressive or retrieval mechanisms, rather than dissociative and encoding deficits, and fragmentary rather than *en bloc* mechanisms. Moreover, these recovered memories might differ qualitatively from memories that had never been forgotten, because of postevent contamination and perceptual narrowing due to high arousal during the offense.

Method

Our present sample was selected from our original case notes study,⁵ in which we examined all offenders who received a life sentence in 1994 in England and Wales. That study identified a group of amnesic violent offenders ($n = 59$) and a group of nonamnesic offenders ($n = 148$). None of the inmates sentenced in 1994 had been released when the present data were collected, and their current locations were determined by using the database at Her Majesty's Prison Service Headquarters.

The governor of each identified prison was approached by letter, outlining the purpose of the study in a Patient Information Sheet and asking for per-

mission to approach the inmates concerned. If permission was obtained, the Patient Information Sheet and Consent Form were either sent to the identified persons directly or distributed to them by prison staff. The interviews were conducted in 20 prisons ranging from Category A (high security) to Category D (low-security, or open, conditions) across England by a single researcher (N.P.). These interviews took place over the course of two years, approximately seven years after conviction, because of the considerable difficulties encountered in gaining the support of all 20 prison establishments to approach the participants. Interviews were conducted in private, and a warning on the limits of confidentiality was given regarding any disclosures of intent to harm self or others or of breaches to prison security. The purpose of the research was explained orally and on the Patient Information Sheet, and a consent was signed. It was emphasized that participation in the research or refusal would not have any effect on the inmate's treatment or progress. Exclusion criteria were denial of the offense (i.e., claims of innocence), being unable to speak English fluently, current severe mental disorder, or an ongoing appeal.

All 59 inmates identified as amnesic in the case notes study were approached. Of those, 28 could not be interviewed for various reasons. Eight inmates refused to participate in the research after reading the Patient Information Sheet, and eight were from six prisons whose governors did not reply to repeated letters. One inmate was detained in a maximum-security hospital, and the responsible medical officer did not reply to two letters. Four inmates were in prisons that refused access, and three were in a prison that made access impossible. One inmate was in the process of an appeal and was excluded from the study, one was too behaviorally and mentally disturbed to be interviewed, and a further two now denied that they had ever had amnesia. Hence, 31 amnesic inmates from the case notes study were eventually interviewed.

Several inmates identified as nonamnesic in the case notes study were also approached to provide a comparison group, matched as closely as possible to the amnesic group in terms of their offense and the prisons they were held in. The interviewer was not blind to the presence or absence of amnesia according to the case notes. However, a standard interview was used for all participants, whether or not they had been classified as amnesic in the case notes study.

Following the interview, the participants were divided into three groups for the purposes of the study. Group 1 had never experienced amnesia ($n = 19$); Group 2 reported amnesia with complete or partial recovery of memory ($n = 16$); and Group 3 reported amnesia that had not changed through time ($n = 15$).

The project was approved by the Prison Health Research Ethics Committee.

Measures

Semistructured Interview

A semistructured *pro forma* format was used. The participants were asked about their current memory of the index offense, including the estimated duration of any amnesic gap. They were also asked to provide an account of what they remembered about the offense immediately after it occurred. Therefore, they were asked to recall both their current memory of the offense and what their memories had been seven years earlier, estimating the length of any amnesic gap at both times. Amnesia was defined as the inability to recall part or all of the offense and excluded those who simply denied committing the offense. Participants were asked about alcohol and illicit drug use in the 12 hours preceding the index offense. The offense was coded as to whether it was a crime of passion, defined as killing by the defendant, while in a state of heightened arousal, of someone emotionally important to him.

The semistructured *pro forma* included items about any medical and psychiatric history, previous blackouts (whether related to alcohol or dissociative experiences), and childhood physical or sexual abuse. We also screened for a history of alcohol dependence, using the four-item CAGE questionnaire.³¹ For those who scored two or above on the CAGE, we examined whether the participant fulfilled ICD-10 criteria for a diagnosis of alcohol dependence. The participant was also asked about any history of drug misuse (Ref. 32, p 75) and again ICD-10 criteria for drug dependence (Ref. 32, p 75) were applied.

Neuropsychological Measures

National Adult Reading Test–Revised (NART-R)³³: gives an estimate of premorbid IQ.

Wechsler Memory Scale–Revised³⁴: a measure of immediate and delayed verbal recall tested by Logical Memory prose passages.

Camden Memory Tests³⁵: includes measures of verbal paired-associate learning recall, verbal recognition memory, and visual recognition memory (for pictures, faces, and topography). The Pictorial Recognition Memory Test also serves as a measure of deliberate underperformance.

Psychometric Measures

Dissociative Experiences Scale (DES)³⁶: a 28-item self-report questionnaire. Participants were asked to rate themselves on a 10-point visual analog scale in response to questions about the frequency of any dissociative experiences in their daily lives. Items include experiences of disturbance in memory, identity, awareness, and cognition.

Peritraumatic Dissociation Questionnaire: based on the Peritraumatic Dissociative Experiences Questionnaire,³⁷ adapted by Mechanic *et al.*³⁸ and Hunter.³⁹ Eight items ask about dissociative reactions occurring at the time of the offense (trauma), including depersonalization, derealization, out-of-body experiences, and alterations to the perception of time. One measure, relating to blanking out had the potentially confounding effect of not being independent of amnesia at the time of the offense. Results were therefore recorded both including (labeled PTD 1) and excluding (labeled PTD 2) this item.

Repressive Coping Style Questionnaire⁴⁰: derives from the Bendig short form of the Manifest Anxiety Scale (MAS)⁴¹ and the Marlowe-Crowne Social Desirability Scale (MC),⁴² and requires participants to rate 58 statements as true or false, according to whether each statement generally applies to them or not. In accordance with Weinberger *et al.*,⁴⁰ repressors were identified as those participants with low self-report scores on anxiety (8 or under on the MAS) and high scores on defensiveness (17 or higher on the MC).

Experience of Shame Scale⁴³: a self-reported evaluation of shame felt during the past year, based on the Characterological, Behavioral, and Bodily Shame Interview.⁴⁴ Characterological shame concerns personal habits, manner with others, and self-perception. Behavioral shame includes items about doing something wrong, saying something that makes the self-rater appear

unintelligent, and feelings of failure in competitive situations. Bodily shame incorporates shameful feelings about one's body or any part of it. The scale therefore measures dispositional shame as a personality trait, rather than shame about a specific event, such as a violent offense.

Memory Characteristics Questionnaire²⁹: a 38-item self-report questionnaire that assesses the quality of current memory for an event to determine whether this event memory is likely to be real or imagined. According to Johnson *et al.*,²⁹ memories arising from perceptual experience (real memories) are characterized by the presence of more perceptual information (e.g., color and sound), contextual information (time and place), and meaningful detail. By contrast, memories originating from thought (imagined memories) are characterized by more reports about the cognitive operations that generated them. There are also neutral items on the questionnaire, unaffected by whether an event was real or imagined. In the current study, the events asked about were those occurring just before, during, or after the index offense.

Impact of Event Scale (IES)⁴⁵: a self-report questionnaire asking about the degree of subjective distress experienced as a result of a specific event, including intrusive memories and avoidance reactions, but not the hyperarousal symptoms of PTSD. Participants were asked to evaluate these symptoms with respect to the events surrounding the index offense.

Statistical Analysis

Data were entered on a spreadsheet and analyzed with SPSS 11.5. Where data were categorical, analyses of differences between groups were conducted with Pearson's chi-square test (with Yates's correction where the expected frequency was less than five). Where data were continuous, the normality of distribution was checked. Comparisons between two groups were made by using the independent-samples *t* test. Comparisons between three groups were performed by one-way analysis of variance (ANOVA), with the *post hoc* Tukey test. The Mann-Whitney U test was used for nonparametric data. The significance level was set at $p < .05$ for all analyses.

Binary logistic regression analysis was performed to establish the factors most closely associated with

Table 1 Offense Characteristics

Variable	Nonamnesic (<i>n</i> = 19)	Amnesic (<i>n</i> = 31)	$\chi^{2/t}$	<i>p</i>
Index offense, <i>n</i> (%)				
Homicide	15 (79%)	28 (90%)	0.50*	0.48
Crime of passion, <i>n</i> (%)	3 (16%)	15 (48%)	5.43	0.025
Intoxication, <i>n</i> (%)				
Alcohol	11 (58%)	18 (58%)	0.00	0.99
Drugs	4 (21%)	6 (19%)	0.00*	1.00

The *p* value in bold represents a significant difference.

* Yates's correction.

the presence of amnesia (as the dependent variable) and then with recovery of memory (as the dependent variable). Having performed this binary logistic regression, we then entered the independent variables with a significance level of $p < .10$ into a logistic regression model, using the forward likelihood ratio method.

Results

Demographics

The majority of the sample were male (98%) and white (92%), with four percent African Caribbean and four percent Asian. Mean age was 38.04 years (SD 9.23), with a range from 24 to 63. Over half (54%) of the sample had a previous psychiatric history, and 46 percent had a history of deliberate self-harm. There were high rates of self-reported childhood adversity in the form of both physical (42%) and sexual (26%) abuse. One-third (32%) had a history of alcohol dependence and 14 percent a history of drug dependence. Previous amnesic blackouts, whether alcohol related or dissociative, had been experienced by 42 percent. The sample was heterogeneous in previous offending, with the number of previous convictions ranging from 0 to 58 (mean 9.41; SD 12.69) and 52 percent having a previous conviction for a violent offense. The 50 participants selected for interview were compared with the original cohort of 207 across the demographic data and did not differ significantly on any of the measures.

Amnesia and Associated Factors

Offense Characteristics

Table 1 shows the characteristics of the offense in the amnesic ($n = 31$) and nonamnesic participants ($n = 19$). The amnesic subjects were significantly more likely to have committed a crime of passion

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Table 2 Neuropsychological Tests

Variable	Nonamnesic (n = 19)	Amnesic (n = 31)	$\chi^{2/t}$	p
NART IQ, mean (SD)	106.21(9.20)	108.23(10.12)	-0.71	0.48
Weschler Logical Memory, mean (SD)*				
Immediate	27.95(5.89)	24.55(6.99)	1.77	0.08
Delayed	22.95(7.55)	19.77(7.26)	1.48	0.15
Camden Memory Tests, mean (SD)*				
Paired-Associate Learning (1)/24†	19.00(3.43)	18.42(3.69)	0.56	0.58
Paired-Associate Learning (2)/24	22.74(1.76)	22.10(2.34)	1.03	0.31
Pictorial Recognition Memory /30	29.05(1.31)	29.29(1.37)	-0.61	0.55
Topographical Recognition Memory/30	25.42(4.21)	24.61(3.54)	0.73	0.47
Recognition of Words/25	24.68(0.48)	24.55(0.93)	0.59	0.56
Recognition of Faces/25	24.42(0.69)	24.58(0.67)	-0.81	0.42

* Raw scores.

† The maximum possible score is shown after each test title.

than were the nonamnesic participants ($\chi^2(1) = 5.43, p < .025$). There was no significant difference between the two groups in intoxication with either drugs or alcohol at the time of the offense. The amnesic and nonamnesic groups did not differ significantly in any of the demographic variables listed.

Neuropsychological Tests

Table 2 shows results of estimated IQ (NART-R) and the memory test scores. The two groups did not differ significantly on any of these measures. In particular, scores on the Pictorial Recognition Memory Test were well above chance, indicating that the amnesic subjects were not faking their performance.

Psychometric Measures

Table 3 shows that the amnesic group had significantly higher rates of peritraumatic dissociation immediately before or after the time of the offense ($t(45) = -4.38; p < .0001$), even after the amnesia item had been excluded ($t(45) = -3.64, p < .001$). Data were unobtainable from three amnesic participants, as their amnesic gap was too extensive to allow them to recall any dissociative symptoms. Table 3 shows that there were some important negative findings. In particular, there were no significant differences between amnesic and nonamnesic participants in IES, shame, or repressive coping style scores.

Table 3 Psychometric Measures

Variable	Nonamnesic (n = 19)	Amnesic (n = 31)	$\chi^{2/t}$	p
Peritraumatic Dissociation, mean (SD)				
Including amnesia measure (PTD 1)	13.68 (5.53)	21.00 (5.68)	-4.38	<0.0001
Excluding amnesia measure (PTD 2)	12.11 (4.59)	17.54 (5.29)	-3.64	<0.001
Dissociative Experiences , mean (SD)	10.64 (9.91)	17.33 (14.56)	-1.76	0.08
Impact of Event Scale, mean (SD)				
Total	33.22 (12.65)	32.61 (11.40)	0.17	0.86
Avoidance	15.61 (6.82)	15.29 (6.03)	0.17	0.87
Intrusion	17.61 (6.83)	17.32 (6.68)	0.15	0.89
Shame, mean (SD)				
Total	39.11 (11.07)	44.23 (13.08)	-1.42	0.16
Characterological	17.63 (5.95)	20.81 (7.52)	-1.56	0.13
Behavioral	15.68 (5.21)	16.48 (5.27)	-0.52	0.60
Bodily	5.95 (2.78)	6.94 (2.99)	-1.17	0.25
Repressive coping, n (%)	11.0 (58%)	15.0 (48%)	0.43	0.51
MAS, mean (SD)	6.11 (4.14)	7.87 (5.05)	-1.28	0.21
MC, mean (SD)	19.26 (5.13)	18.19 (6.17)	0.63	0.53
Memory characteristics mean (SD)				
Perceived	96.28 (9.42)	83.07 (17.13)	3.32	<0.0025
Imagined	21.22 (4.40)	19.67 (3.98)	1.23	0.23
Neutral	96.33 (9.59)	84.96 (18.31)	2.72	<0.01

P values in bold represent significant differences. PTD, peritraumatic dissociation. MAS, Manifest Anxiety Scale; MC, Marlowe-Crowne Social Desirability Scale.

Table 4 Length of the Amnesic Gap

Variable	Group 1 Never Amnesic (<i>n</i> = 19)	Group 2 Recovered Amnesic (<i>n</i> = 16)	Group 3 Still Amnesic (<i>n</i> = 15)
Time of offense (minutes)			
Mean (SD)	0	668.1 (1439.8)	58.3 (117.8)
Median	0	120.0	1.0
Seven year follow-up (minutes)			
Mean (SD)	0	363.2 (1114.4)	58.3 (117.8)
Median	0	0.1	1.0
Degree of memory return, %			
Complete, mean (SD)		6 (37.5)	0
Partial, mean (SD)		10 (62.5)	0

Memory Characteristics for the Offense

Table 3 also shows that, regarding the current memory characteristics surrounding the offense, the amnesic sample could recall significantly fewer perceptual details ($t(43) = 3.32; p < .003$) and neutral details ($t(43) = 2.72; p < .01$) than the nonamnesic group could, although there was no difference in imagined details between the two groups ($t(43) = 1.23; p = .23$). In other words, memories surrounding the amnesic gap and the offense were less vivid in the amnesic group, but the participants did not have more imagined memories.

Logistic regression analysis was performed to identify the factors most strongly associated with amnesia. Binary likelihood ratio regression revealed several significant associates of amnesia. These were then entered into a forward likelihood ratio regression analysis. The final model contained peritraumatic dissociation (odds ratio (OR) = 1.25; $p = .009$; 95% confidence interval (CI) = 1.06–1.47) and mcq.p (Memory Characteristics Questionnaire: perceived detail of current memory for the offense) (OR = 0.92, $p = .03$, 95% CI = 0.86–0.99). For every unit by which peritraumatic dissociation was increased, the odds of amnesia occurring was increased by 0.25; whereas for every unit that the mcq.p score was increased, the probability of amnesia decreased by 0.08. In other words, the presence of peritraumatic dissociation meant it was more likely that the inmate would report amnesia, whereas vivid perceived memories for surrounding events meant that it was less likely that the inmate would report it.

Length of the Amnesic Gap

Table 4 shows the length of the amnesic gaps (in minutes) that the interviewee reported as having been present at the time of the offense and at the

follow-up. Both gaps were estimated by the participant at the time of interview, approximately seven years after conviction for the offense.

There was a large mean (668 minutes) and standard deviation (1439 minutes) for length of gap in the inmates in the amnesic group who eventually recovered memories (Group 2). This result was accounted for by the large number of alcoholics in this group who had a blackout of many hours' duration that incorporated the offense. By contrast, those who remained amnesic (Group 3) generally had a short gap, ranging from a few seconds to 15 minutes, except for three inmates who had longer amnesic periods that did not change over time. These three participants accounted for the larger mean than median (and the large standard deviation) in this subgroup. Of these three cases, one participant had an amnesic gap of four hours which included killing his neighbor; he was intoxicated with alcohol and cannabis at the time. Another person had an amnesic gap of four hours that incorporated the killing of his wife; he was also intoxicated at the time. The third person had an amnesic gap of six hours during which he killed a policeman, when intoxicated with alcohol and temazepam. In none of these three cases did the participant show any subsequent change in memory. When these three cases were excluded, the mean amnesic gap for this group was only 2.9 minutes with a median of 0.5 minutes, indicating that 50 percent in this group had amnesia of 30 seconds or less.

Table 4 highlights that, at the time of the offense, those participants who subsequently recovered their memories (Group 2) had a significantly longer amnesic gap (mean, 668 minutes) than those who showed no change in their amnesia (Group 3; mean, 58 minutes) ($U = 53; z = -2.67; p < .01$). The reason that the median duration of amnesia differs so

Table 5 Comparison of Long vs. Short Amnesic Gaps and Recovered vs. Nonrecovered Amnesic Participants

Variable	Long vs. Short Amnesic Gap $\chi^{2/t}$ (<i>p</i>)	Recovered vs. Nonrecovered $\chi^{2/t}$ (<i>p</i>)
Blackouts	3.77 (0.05)*	7.43 (< 0.01)
Alcohol dependence	3.65 (0.06)*	3.04 (0.08)
Alcohol intoxication	0.009 (0.93)	0.88 (0.35)
Shame		
Characterological	-1.14 (0.26)	1.90 (0.07)
Behavioral	-2.48 (< 0.025)	0.76 (0.45)
MAS	-0.27 (0.79)	1.94 (0.06)
PTD excluding amnesia	-3.24 (< 0.005)	1.08 (0.29)
Tariff	-2.46 (< 0.025)	0.60 (0.56)

PTD, peritraumatic dissociation.

* Yates's correction. *P* values in bold represent significant differences.

markedly from the mean, both initially and at follow-up, is because of a few individuals in Group 2 and three in Group 3 (as indicated above) in whom the amnesic gaps extended for many hours. When the amnesia was brief in Group 3, it entailed the most violent part of the assault, and it appeared to remain consistent over the subsequent seven years.

Short Versus Long Amnesic Gaps

To analyze the factors accounting for the differences in the duration of amnesia, we compared findings in participants with either a relatively short amnesic gap or a longer one. The median value for duration of amnesic gap following the offense was 15 minutes in Groups 2 and 3 combined. Consequently, this value was taken as the cutoff.

Table 5 shows that participants with a long amnesic period (>15 minutes) had significantly higher scores for peritraumatic dissociation than did those with a short amnesic gap (<15 minutes) ($t(26) = -3.24$; $p < .005$). In other words, they evaluated themselves as having had more dissociative symptoms around the time of the offense. Those with a long amnesic period also had significantly higher scores for behavioral shame in the past year ($t(29) = -2.48$; $p < .025$), meaning that they had higher scores for shame about doing something wrong, saying something that made them appear unintelligent, or failure in competitive situations, but not for shame about the offense itself.

Those with a long amnesic gap also had a history of significantly more blackouts ($\chi^2(1) = 3.77$; $p = .05$) than did those with a short amnesic gap. No other clinical or demographic variables differed between the two groups. It is also of interest that those

with a long amnesic period received a significantly longer sentence by approximately three years ($t(29) = -2.46$; $p < .025$), despite the fact that the two groups did not differ in the nature of the index offense.

There were no differences on neuropsychological testing between the groups with long and short amnesic gaps, indicating that this difference did not have a neurological basis. In particular, current anterograde memory test performance did not account for differences in memory of the offense.

Memory Recovery and Associated Factors

Table 4 shows that those who had a long amnesic gap (median, two hours) immediately after the offense generally seemed to have at least some recovery of memory subsequently. More than one-third of this group experienced complete return of memory over the course of seven years. In the two-thirds of this subsample who experienced only partial return of memory, most had substantial shrinkage in their amnesic gap to less than a minute. By the time of the seven-year follow-up, the duration of the amnesic gap did not differ significantly across Groups 2 and 3 ($U = 80$; $z = -1.62$).

However, as illustrated by the three cases mentioned earlier, a long amnesic gap did not always predict recovery of memory. In view of this finding, the data were reanalyzed, comparing the participants who recovered their memories with those who did not. Table 5 shows that the recovered and nonrecovered amnesic groups differed significantly only in having a history of previous blackouts ($\chi^2(1) = 7.43$; $p < .01$) (i.e., recovered amnesics were more likely to have a history of past blackouts, whether alcohol related or dissociative.) The two groups did not differ significantly in neuropsychological functioning or the characteristics of the offense.

In a further analysis, logistical regression was used to identify variables significantly associated with the recovery of memory. Binary logistic regression on individual independent variables revealed two significant associates (long amnesic gap and blackouts) and several near-significant associates (including Manifest Anxiety Scale (MAS) score and characterological shame). The three most important associates (blackouts, long amnesic gap, and MAS score) were entered into a forward likelihood ratio regression analysis. The final model contained blackouts (OR = 0.15; $p = .04$; 95% CI = 0.03–0.92) and a long amnesic

Table 6 Quality of Current Memory in the Three Groups

Variable	Group 1 Never Amnesic (<i>n</i> = 19)	Group 2 Recovered Amnesic (<i>n</i> = 16)	Group 3 Still Amnesic (<i>n</i> = 15)	χ^2/F	<i>p</i>
Memory characteristics, mean (SD)					
Perceived	96.28 (9.42)	87.07 (14.54)	78.08 (19.38)	5.91	<0.005
Imagined	21.22 (4.40)	19.07 (3.26)	20.42 (4.78)	1.10	0.34
Neutral	96.33 (9.59)	89.33 (20.46)	79.50 (14.19)	4.45	<0.025

P values in bold represent significant differences.

gap (more than 15 minutes) (OR = 0.15; $p = .04$; 95% CI = 0.03–0.92). The model correctly classified 83.87 percent of those who recovered their memories (at least partially) with 73.33 percent sensitivity and 93.75 percent specificity. In other words, of those with blackouts and a long amnesic gap, nearly three-quarters showed improvement in memory, whereas when these two factors were absent, it was highly unlikely that any memory would return.

Quality of Recovered Memory

Table 6 shows the quality of current memory in all three groups. There were significant differences between the groups in the perceived ($F = 5.91$; $p < .005$) and neutral ($F = 4.45$; $p < .025$) items, with the nonamnesic offenders reporting more information than the amnesic groups. There were no significant differences for the imagined items. *Post hoc* analyses revealed that Group 3 (amnesia without any recovery) reported significantly less memory for both perceptual ($F = 5.91$; $p < .001$) and neutral ($F = 4.45$; $p < .01$) items than did Group 1 (no amnesia). The raw scores in Table 6 indicate that the recovered group fell midway between the never-amnesic and the still-amnesic groups.

Discussion

In this study, we interviewed 50 inmates with life sentences from an original cohort on whom case notes had been examined.⁵ It seems reasonable to assume that all the participants gave a genuine account of their histories, including any memory difficulties surrounding their offenses, because the interviewees willingly participated in a research interview, knowing that they would be asked to provide an account of their offense; they were interviewed after conviction, when they had no legal advantage to gain by failing to remember their offenses, although psychological or unconscious benefits might still be possible; and they had near-perfect scores on tests of

recognition memory, where below-chance scores would have been indicative of simulation.

Amnesia and Associated Factors

The most important factor associated with amnesia was peritraumatic dissociation (PTD), preceding and following the time of the offense. This result was indicated by dissociative symptoms such as depersonalization, derealization, and identity disturbance around the time of the violent act. Dissociative symptoms have commonly been reported in perpetrators of violent crime, especially homicide.^{46–49} One previous study of young offenders who had committed violent crimes also found an association between peritraumatic dissociation and amnesia.^{18,50}

A second important factor associated with amnesia was its occurrence in the context of a crime of passion. This finding is consistent with observations in previous (less systematic) studies.^{1,16,51} By definition, such crimes are generally associated with intense emotional arousal. It is likely that this degree of emotion makes the offender vulnerable to amnesia because either the intense emotional arousal results in a complete or partial failure in encoding, or the traumatic memories are stored as isolated fragments of sensory perceptions and affective states, rather than as a clear and distinct declarative memory.⁵² Encoding may still occur at an affective and sensory level, perhaps implicitly,⁵³ but the offender does not have explicit memory for events that occurred in the highly aroused state. In addition, there may be a subsequent retrieval deficit.

This has been the first study of amnesic offenders to examine systematically neuropsychological test performance, finding that IQ and memory test scores were generally very well preserved. Neurological memory impairment did not appear to contribute to the occurrence of amnesia in this group of violent offenders.

There were several other important negative findings in the study. There was no specific association between amnesia and alcoholic intoxication, despite evidence from the previous literature on amnesia in offenders^{2,15,54} and common clinical assumptions. Our findings did not corroborate this association, suggesting that alcoholic intoxication may be a relatively infrequent direct contributor to amnesia in offenders, except where there is a history of previous amnesic blackouts.

We also examined systematically for associations between amnesia for crime and factors such as repression, shame, and PTSD. Despite theories in the literature that repression leads to amnesia for criminal offenses^{15,55} the present investigation did not find any direct association between a repressive coping style and amnesia. It is possible that repressors are only successful in reducing the negative affect⁵⁶ associated with the memory of an offense, rather than repressing or actually forgetting the offense itself. In the present sample, the repressors had experienced significantly less shame (a negative affect) in the past year than had the nonrepressors ($t = -2.51$; $p < .025$). It is also possible that, rather than repressing the memory, the offender may inhibit the initial encoding into memory of the offense by restrictions of attention and memory processing.⁵⁷ Alternatively, he may avoid subsequent rehearsal of the memory, resulting in forgetting and impaired retrieval,⁵⁸ although this might be expected to result in poorer overall memory for the offense (rather than a discrete amnesic gap). Recent research has demonstrated that executive control processes appear important in the suppression of unwanted memories⁵⁹ and that this psychological inhibition involves bilateral dorsolateral frontal brain activation and medial temporal deactivation.⁶⁰ It has been suggested⁵³ that such a process is particularly relevant in cases where there is a dense impairment in the recollection of all details of a discrete traumatic event.

The present investigation also found that the experience of shame did not occur more commonly in amnesic than nonamnesic offenders, despite suggestions that amnesic offenders may experience higher levels of shame related to an inability to disclose or consciously confront their actions.⁵⁸ It is possible that a measure of event-specific shame, rather than dispositional shame, would have shown an association with amnesia, although there is a complex relationship between internal and external pressures to

admit to a crime, and inhibitory factors that make disclosure less likely.²⁰

Offense-related posttraumatic symptoms, measured on the Impact of Events Scale, did not differ between the amnesic and nonamnesic groups. Although the literature supports the view that an offense can be traumatic for the perpetrator of violence,⁶¹ (previous studies having shown high rates of PTSD in violent offenders⁶²), the evidence from this study and one in juvenile offenders⁵⁰ indicates that the disorganized memory experienced in PTSD is unrelated to amnesia for the actual offense.

We also examined the qualitative aspects of an offender's memory for the events surrounding the offense. The amnesic group reported significantly poorer qualitative memories than did nonamnesic offenders for perceived and neutral details (reflecting real perceptions or experience), which may reflect either forgetting or giving limited attention to peripheral details,⁶³ whereas memories originating from thought or imagination did not differ.

Length of the Amnesic Gap

The length of the memory gap in the amnesic offenders, according to their self-reports, varied from only a few seconds in many of them to 10 hours or more; the median was 15 minutes. Offenders with longer amnesic gaps had significantly higher peritraumatic dissociation scores for the period of the offense. The literature suggests that a dissociative state may occur simultaneously with a trauma and also that the dissociative symptoms may persist long after the cessation of the traumatic event.⁶⁴ Moreover, Tanay¹⁶ reported that an altered state of consciousness may occur before an act of homicide. In our study, offenders with a long amnesic gap were more likely to report a history of previous blackouts ($p < .05$) and alcohol dependence ($p = .06$), a finding perhaps not surprising, in that an alcoholic blackout often constitutes a large proportion of the drinking episode.⁶⁵

Although shame was not more common in the amnesic than in the nonamnesic groups, longer amnesic gaps were also associated with higher levels of behavioral shame during the past year, including shame about having done something wrong. This finding may simply indicate that those with higher degrees of shame develop longer amnesic periods for their actions than those with lower levels of shame. However, those with a long amnesia generally

showed subsequent return of some memory, and the experience of shame may thus be a consequence of having (at least partially) recovered memory of past actions. Previous reports indicate that committing an act of violence may result in significant shame in the perpetrator.⁶⁶ It may be that a measure of event-specific shame (related to the offense directly) would clarify the direction of the link among shame, amnesia, and the return of memory, a topic worthy of further exploration.

Memory Recovery and Associated Factors

Apart from a 1933 study at Broadmoor Hospital,⁵¹ a high-security psychiatric hospital in England, this has been the first study that we know of that has involved the systematic follow-up of a sample of violent offenders claiming amnesia for part or all of their offenses. In our previous investigation,⁵ we found that amnesia was reported by 29 percent of life-sentence inmates. In reports prepared for the Parole Board at three years after conviction, 33 percent of the sample were described as having experienced complete return of memory, 26 percent a partial return, and 41 percent no change. In the present study, we interviewed a subsample of 31 amnesic offenders, finding that 16 (52%) had some recovery of memory. Of these, 6 (37.5%) experienced complete return of memory, and 10 (62.5%) a partial return.

The central portion of the amnesic gap with a median duration of one minute appeared to show permanent loss in all the amnesic offenders. Even in those with long initial memory gaps, a brief residual amnesic gap often remained after substantial memory improvement had occurred. It seems plausible that this brief amnesic gap results from a common underlying mechanism, reflecting the extreme emotional arousal during the offense and possibly a brief period of impaired or absent encoding, as in crimes of passion. Swihart *et al.*¹⁷ called such memory gaps red-outs.¹⁷

Those amnesic offenders who experienced a return of memory possessed a quality of memory for perceptual or neutral content between that of the nonamnesic group and the nonrecovered amnesic participants. The groups did not differ in imagined content, suggesting that the recovered memories were indeed real rather than imagined.

It would be clinically useful to be able to predict those amnesic offenders who will recover memory and those who will not. In the present study, a logis-

tic regression analysis revealed that those with a long initial amnesic gap (>15 minutes) and a history of previous blackouts (usually alcoholic) were most likely to recover some memory, and that this model had a 73 percent sensitivity and 94 percent specificity. If this finding were to be generalized, it would mean that three-quarters of offenders with a history of blackouts and an amnesic gap >15 minutes would be expected to regain memory. By contrast, where an offender does not have blackouts or a long amnesic gap, it would be unlikely that any memory would return. Such findings are potentially useful in pretrial assessments, for postconviction risk assessments, and for planning treatment regimens, where an account of the offense is generally considered vital.

Limitations

The main limitations to this study were the small sample size (raising the possibility of Type 2 errors) and the retrospective nature of the data (participants were asked to recall events and dissociative symptoms and to estimate the amnesic gap from several years earlier). The number of analyses conducted raised the possibility of Type 1 errors. The attrition rate was relatively high from the original sample as a result of the administrative problems involved in following a prison cohort over several years.

Conclusions

In relation to our original hypotheses, we found that crimes of passion and a history of blackouts, alcoholic or otherwise, were associated with amnesia, but not specifically alcoholic intoxication. Dissociative symptoms at the time of the offense were related to the occurrence and duration of amnesia, but not PTSD symptoms, a repressive coping style, or high levels of shame. We suggest that the finding of a brief, persistent amnesic gap reflected an initial encoding deficit, perhaps associated with extreme emotional arousal or red-out. In the many cases of improved or recovered memory, it was lengthy initial amnesia and a history of previous blackouts that predicted improvement through time. These retrieved memories were described as less vivid than the memories of those who had never reported amnesia.

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References

1. Taylor PJ, Kopelman MD: Amnesia for criminal offences. *Psychol Med* 14:581–8, 1984
2. Parwatiker SD, Holcomb WR, Menninger KA: The detection of malingered amnesia in accused murderers. *Bull Am Acad Psychiatry Law* 13:97–103, 1985
3. Kopelman MD: Crime and amnesia: a review. *Behav Sci Law* 5: 323–42, 1987
4. Gudjonsson GH, Hannesdottir K, Petursson H: The relationship between amnesia and crime: the role of personality. *Pers Individ Differ* 26:505–10, 1999
5. Pyszora NM, Barker AF, Kopelman MD: Amnesia for criminal offences: a study of life sentence prisoners. *J Forensic Psychiatry Psychol* 14(suppl 3):475–90, 2003
6. Bourget D, Whitehurst L: Amnesia and crime. *J Am Acad Psychiatry Law* 35:469–80, 2007
7. Bourget D, Bradford JMW: Sex offenders who claim amnesia for their alleged offence. *Bull Am Acad Psychiatry Law* 23: 299–307, 1995
8. Scott CL: Evaluating Amnesia: Guidelines to Remember. A Forensic Focus on “Forgetting”. Presented at the Annual Meeting of the Faculty of Forensic Psychiatry, The Royal Australian and New Zealand College of Psychiatrists, Hong Kong, September 2012
9. Schacter DL: On the relation between genuine and simulated amnesia. *Behav Sci Law* 4:47–64, 1986
10. Wiggins EC, Brandt J: The detection of simulated amnesia. *Law Hum Behav* 12:57–78, 1988
11. Cery SP, Schretlen DJ, Brandt J: Simulated amnesia and the pseudo-memory phenomena, in *Clinical Assessment of Malingering and Deception* (ed 2). Edited by Rogers R. New York: Guilford Press, 1997, pp 85–107
12. Cima M, Merckelbach H, Nijman H, *et al*: I can’t remember your honor: offenders who claim amnesia. *Ger J Psychiatry* 5:24–34, 2002
13. Christianson S, Freij I, Von Vogelsang E: Searching for offenders’ memories of violent crimes, in *Offenders’ Memories of Violent Crimes*. Edited by Christianson S. Chichester, UK: Wiley, 2007, 3–35
14. Sartori G, Agosta S, Zogmaister C, *et al*: How to accurately detect autobiographical events. *Psychol Sci* 19:772–80, 2008
15. O’Connell BA: Amnesia and homicide: a study of 50 murderers. *Br J Delinq* 10:262–76, 1960
16. Tanay E: Psychiatric study of homicide. *Am J Psychiatry* 125: 1252–8, 1969
17. Swihart G, Yuille J, Porter S: The role of state-dependent memory in ‘red-outs’. *Int J Law Psychiatry* 22:199–212, 1999
18. Evans C, Mezey G, Ehlers A: Amnesia for violent crime among young offenders. *J Forensic Psychiatry Psychol* 20:85–106, 2009
19. Gudjonsson GH: *The Psychology of Interrogations and Confessions: A Handbook*. Chichester: John Wiley, Sons, 2003
20. Gudjonsson GH, Sigurdsson JF: The Gudjonsson Confession Questionnaire-Revised (GCQ-R): factor structure and its relationship with personality. *Pers Individ Diff* 27:953–68, 1999
21. Swan S, Andrews B: The relationship between shame, eating disorders and disclosure in treatment. *Br J Clin Psychol* 42:367–78, 2003
22. Gilligan J. *Violence: Reflections on our Deadliest Epidemic*. London: Jessica Kingsley Publishers, 2000
23. Andrews B, Morton J, Bekerian DA, *et al*: The recovery of memories in clinical practice. *Psychologist* 8:209–14, 1995
24. Goodwin DW, Crane JB, Guze B: Phenomenological aspects of the alcoholic blackout. *Br J Psychiatry* 115:1033–8, 1969
25. Russell WR, Nathan PW: Traumatic amnesia. *Brain* 69:280–300, 1946
26. Schacter DL, Crovitz HF: Memory functioning after closed head injury: a review of quantitative research. *Cortex* 13:150–76, 1977
27. Loftus EF, Palmer JC: Reconstruction of automobile destruction: an example of the interaction between language and memory. *J Verb Learn Verb Behav* 13:585–9, 1974
28. Loftus EF, Miller DG, Burns HJ: Semantic integration of verbal information into a visual memory. *J Exp Psychol Hum Learn* 4:19–31, 1978
29. Johnson MK, Foley MA, Suengas AG, *et al*: Phenomenal characteristics of memories for perceived and imagined autobiographical events. *J Exp Psychol Gen* 117:371–6, 1988
30. Henkel LA, Franklin N, Johnson MK: Cross-modal source monitoring confusions between perceived and imagined events. *J Exp Psychol Learn Mem Cogn* 26:321–35, 2000
31. Mayfield D, McLeod G, Hall P: The CAGE questionnaire: validation of a new alcoholism screening instrument. *Am J Psychiatry* 131:1121–3, 1974
32. World Health Organization: *ICD-10 Classifications of Mental and Behavioral Disorder: Clinical Descriptions and Diagnostic Guidelines*. Geneva: World Health Organization, 1992
33. Nelson H, Willison JR: *National Adult Reading Test (NART): Test Manual* (ed 2). Windsor, UK: NFER-Nelson, 1991
34. Wechsler D: *Wechsler Memory Scale III*. San Antonio, TX: The Psychological Corporation, 1997
35. Warrington EK: *The Camden Memory Tests*. Hove, UK: Psychology Press, Taylor, Francis Ltd., 1996
36. Bernstein EM, Putnam FW: Development, reliability and validity of a dissociation scale. *J Nerv Ment Dis* 174:727–35, 1986
37. Marmar CR, Weiss DS, Meltzer TJ: *The Peritraumatic Dissociative Experiences Questionnaire in Assessing Psychological Trauma and PTSD*. Edited by Wilson JP, Keane TM. New York: Guilford Press, 1997
38. Mechanic MD, Resick PA, Griffin MG: A comparison of normal forgetting, psychopathology, and information-processing models of reported amnesia for recent sexual trauma. *J Consult Clin Psychol* 66:948–57, 1998
39. Hunter E: *The nature, antecedents and consequences of forgetting in adult survivors of childhood sexual abuse*. Unpublished doctoral dissertation. London: University of London, 1999
40. Weinberger DA, Schwartz GE, Davidson RJ: Low-anxious, high-anxious, and repressive coping styles: psychometric patterns and behavioural and physiological responses to stress. *J Abnorm Psychol* 88:369–81, 1979
41. Bendig AW: The development of a short form of the Manifest Anxiety Scale. *J Consult Psychol* 20:384, 1956
42. Crowne DP, Marlowe DA: *The Approval Motive: Studies in Evaluative Dependence*. New York: Wiley, 1964
43. Andrews B, Qian M, Valentine J: Predicting depressive symptoms with a new measure of shame: The Experience of Shame Scale. *Br J Clin Psychol* 41:29–42, 2002
44. Andrews B, Hunter E: Shame, early abuse, and the course of depression in a clinical sample: a preliminary study. *Cogn Emotion* 11:373–81, 1997
45. Horowitz M, Wilner N, Alvarez W: Impact of Event Scale: a measure of subjective stress. *Psychosomat Med* 41:209–18, 1979
46. Smith S: The adolescent murderer: a psychodynamic interpretation. *Arch Gen Psychiatry* 13:310–9, 1965
47. Meyerson AT: Amnesia for homicide (‘pedicide’): its treatment with hypnosis. *Arch Gen Psychiatry*, 14:509–15, 1966
48. Carlisle AL: Dissociation and violent criminal behaviour. *J Contemp Crim Just* 7:273–85 1991
49. Spinelli GA: Systematic investigation of 16 cases of neonaticide. *Am J Psychiatry* 158:811–3, 2001

50. Evans C, Mezey G: The nature of memories of violent crime among young offenders, in *Offenders' Memories of Violent Crimes*. Edited by Christianson S. Chichester: Wiley, 2007, pp 3–35
51. Hopwood JS, Snell HK: Amnesia in relation to crime. *J Ment Sci* 79:27–41, 1933
52. Van der Kolk BA, Fisler R: Dissociation and the fragmentary nature of traumatic memories: overview and exploratory study. *J Trauma Stress* 8:505–25, 1995
53. Wortzel HS, Arciniegas DB: Amnesia and crime: a neuropsychiatric response. *J Am Acad Psychiatry Law* 36:218–23, 2008
54. Bradford J, Smith SM: Amnesia and homicide: the Padola case and a study of thirty cases. *Bull Am Acad Psychiatry Law* 7:219–31, 1979
55. Leitch A: Notes on amnesia in crime for the general practitioner. *Med Press* 219:459–63, 1948
56. Weinberger DA: The construct validity of the repressive coping style, in *Repression and Dissociation*. Edited by Singer JL. Chicago: University of Chicago Press, 1990, pp 337–86
57. Bower KS: Unconscious influences and hypnosis, in *Repression and Dissociation*. Edited by Singer JL. Chicago: University of Chicago Press, 1990, pp 143–80
58. Christianson S, Bylin S: Does simulating amnesia mediate genuine forgetting for a crime event? *Appl Cogn Psychol* 13:495–511, 1999
59. Anderson MC, Green C: Suppressing unwanted memories by executive control. *Nature* 410:366–9, 2001
60. Anderson MC, Ochsner KN, Kuhl B, *et al*: Neural systems underlying the suppression of unwanted memories. *Science* 303:232–5, 2004
61. Pollock PH: When the killer suffers: post-traumatic stress reactions following homicide. *Leg Criminol Psychol* 4:185–202, 1999
62. Steiner H, Garcia IG, Matthews Z: Posttraumatic stress disorder in incarcerated juvenile delinquents. *J Am Acad Child Adolesc Psychiatry* 36:357–65, 1997
63. Christianson S, Loftus EF: Memory for traumatic events. *Appl Cogn Psychol* 1:225–39, 1987
64. Spiegel D, Cardena E: Disintegrated experience: the dissociative disorders revisited. *J Abnorm Psychol* 100:366–78, 1991
65. Goodwin DW: Two species of alcoholic 'blackout'. *Am J Psychiatry* 127:1665–70, 1971
66. Yeomans R: Guilt, shame, shock and suicide. *Prison Serv J* 106:28–9, 1996