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Amnesia for violent crime among young offenders

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Amnesia for the perpetration of violent offences is an important issue in medico-legal proceedings. Previous studies of amnesia have mainly relied on selected groups of unconvicted offenders, which raises the question of how reliable the findings are. The purpose of this study was to examine the prevalence and phenomenological qualities of amnesia in violent offenders. In semi-structured interviews with 105 young offenders convicted of serious violence, 20 (19%) reported partial amnesia for their offence and only one (1%) reported complete amnesia. Amnesia was associated with high alcohol intake, emotional ties to the victim, and cognitive processing during the assault. Complete amnesia for violent crime appears to be less frequent than suggested by previous reports using unconvicted samples. The findings have implications for the clinical assessment of claimed amnesia for violent crime and are potentially of medico-legal significance.

Keywords: amnesia; crime; violence; perpetrators; violent crime; dissociation

Introduction

Amnesia in relation to the perpetration of violent offences is an important issue in forensic clinical practice and it also has implications for medico-legal proceedings. Memory gaps or loss potentially undermine the assessment of precipitants, future risk, relevant clinical interventions, or consideration of possible legal defences. However, there are very few systematic descriptive studies of the phenomenology of amnesia for violent offending (Bradford & Smith, 1979; Lynch & Bradford, 1980), and these should be considered preliminary as they have a range of shortcomings. With a few exceptions (Cima, Merckelbach, Hollnack, & Knauer, 2003; Cima, Nijman, Merckelbach, Kremer, & Hollnack, 2004), most studies failed to differentiate between partial and complete amnesia. Others have used imprecise definitions of amnesia, such as 'hazy memory', which implies partial

presence of memory rather than complete amnesia (Bradford & Smith, 1979; Lynch & Bradford, 1980). Other methodological limitations include reliance on unconvicted (recent exceptions being Cima et al., 2004; Pyszora, Barker, & Kopelman, 2003) or highly selected (e.g., high secure hospital) samples, lack of comparison groups, lack of information about amnesia in perpetrators of non-lethal violence, and failure to use transcripts to document systematically what subjects could recall or to include measures of inter-rater reliability. A recent study by Pyszora et al. (2003) is one of the few exceptions to have examined the reliability of accounts of amnesia, using comparisons between probation and psychiatric reports.

Furthermore, there has been virtually no research into the cognitive processes that may lead to amnesia for a violent offence. Previous studies have discussed the potential role of problematic cognitive processing; for example, dissociation may cause amnesia, but none of these studies included direct measures of dissociation (Hopwood & Snell, 1933; Moskowitz, 2004; Taylor & Kopelman, 1984). It has been speculated that the derealisation, depersonalisation, and emotional numbing experienced during dissociation might impede the elaboration of the trauma memory, leading to more disorganised recall (Ehlers & Clark, 2000), or making the memory less amenable to verbal recall (Brewin, Dalgleish, & Joseph, 1996). Similarly, it has been suggested that disorganised memories might arise from an inability to establish a self-referential perspective while experiencing an event, which leads to poor integration into the continuum of other autobiographical memories (Ehlers & Clark, 2000).

Previous evidence has suggested an association between alcohol intoxication and amnesia in violent offenders (Bradford & Smith, 1979; O'Connell, 1960; Parwatikar, Holcomb, & Menninger, 1985; Taylor & Kopelman, 1984), as well as an association between amnesia and chronic alcohol abuse or dependence (Bradford & Smith, 1979; O'Connell, 1960; Taylor & Kopelman, 1984). The association between amnesia and illicit drug dependence or intoxication at the time of the offence is less clear, with some studies supporting an association (Cima et al., 2003, 2004) while others do not (Bradford & Smith, 1979; Lynch & Bradford, 1980; Parwatikar et al., 1985).

The aims of this study were to investigate amnesia's phenomenological characteristics, the prevalence of amnesia for both lethal and non-lethal violent crime in young offenders, and associations with amnesia of clinical, demographic, and specific emotional and cognitive variables.

It was hypothesised that amnesia for violent crime in this group would be associated with alcohol intoxication, alcohol dependence, illicit substance intoxication, illicit substance dependence, high emotional arousal, dissociation and lack of self-referent processing, and perceived lack of control. It was further hypothesised that partial amnesia would be more common that complete amnesia for the violent crime.

Method

Design

This was an interview study of violent young offenders incarcerated within England and Wales' young offenders' institution system, focusing on the presence or absence of amnesia for the violent offence.

Subjects

Participants were 105 male prisoners, all of whom had been convicted of grievous bodily harm (GBH), attempted murder, manslaughter, or murder. All participants were imprisoned at two young offenders' institutions (YOI) within the UK during a 20-month period, with the large majority (95%) contained within the YOI which served as the main placement for young offenders convicted of serious violent offences for a large region of the UK. Every young offender meeting the inclusion criteria identified by the prison database during the study period was approached. The exclusion criteria were being unable to speak English fluently, having a severe learning disability, suffering from active psychosis, being actively suicidal, denying being present at the scene of the offence for which they have been convicted, and posing an unacceptably high security risk (e.g., by having a history of hostage-taking). Of the 149 subjects who met the legally-defined entry criteria of having been convicted of one of the four offences listed above, 113 were suitable for inclusion in the study. Of these, six (5%) declined to take part without stating a reason and two (2%) refused because they experienced distressing flashbacks during the consenting process, giving an overall compliance rate of 105 out of 113 subjects approached (93%). Overall, 78 (74.3%) of the participants were Caucasian. All participants completed an interview and questionnaires. The mean time from the assault to the time of interview was 22.6 months ($SD = 11.18$, range 5–76 months).

Measures

Demographic and assault characteristics

Demographic characteristics were assessed using a semi-structured interview, adapted from Dunmore, Clark, and Ehlers (1999, 2001), which included questions relating to demographic information, medical and psychiatric history, and criminal history.

Characteristics of the offence were assessed using the Index Offence Questionnaire, a 32-item, semi-structured interview adapted from Dunmore et al. (1999, 2001), which included questions related to legal aspects (e.g., conviction, plea, initial charge, and sentence), descriptive aspects (e.g., victim/s, co-defendant/s, location, timing, duration, and use of weapons),

medical aspects (e.g., victim and perpetrator injuries), and situational aspects (e.g., drug or alcohol intoxication, background stress, perceived provocation, planning and preparation, and motivation). Of particular interest to the current study were alcohol use and the relationship of the participant to the victim. High alcohol consumption before the assault was defined as more than four units of alcohol in the preceding six hours.[1] Very high consumption was defined as more than 10 units. The perpetrator was considered to have emotional ties with the victim if they were described as a partner, spouse, relative, family member, friend, date, or ex-partner.

Intelligence

Intelligence was measured by the Quick Test (Ammons & Ammons, 1962), a structured assessment that uses non-verbal (picture) cues to estimate an intelligence quotient (IQ). The Quick Test has been shown correlate well with the Wechsler Adult Intelligence Scale (Wechsler, 1981), at $r = .91$ (Frith, Leary, Cahill, & Johnstone, 1991).

Amnesia

The presence or absence of amnesia for the index offence at the time of the study was assessed with Item 7 of the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990); change in amnesia status following conviction was not assessed. The CAPS is a standardised semi-structured interview for the assessment of PTSD symptoms, including amnesia, which has excellent inter-rater reliability (Mechanic, Resick, & Griffin, 1998) and strong psychometric properties (Blake et al., 1995). It assesses amnesia frequency ('Have you been unable to remember important parts of the event [e.g. names, faces, sequences of events]?'; 'How much of the event have you had difficulty remembering in the past month?') and intensity ('How much difficulty do you have recalling important parts of the event?'). The interviewer follows up these questions with additional probes (e.g., 'If I asked you to describe the entire event from A to Z, do you think you would be able to do so or would there be important parts missing?'). The participant is then asked to estimate how much of the event is not recalled, and to describe the parts that they believe to be missing.

In line with the scoring rules for the CAPS, amnesia was operationally defined by dividing the sample into two groups: those participants who scored at least 1 on frequency and 2 on intensity on CAPS Item 7 (amnesia group), and those whose scores fell below this threshold criterion (no amnesia group). Complete amnesia was considered to be present if the participant had no recall of the offence at all, from the commencement to the cessation of their violence; partial amnesia was deemed to be present if they

could not recall important parts of the event but could remember others during the period of the actual assault.

Three other parts of the assessments were used to confirm the CAPS-based assessment of amnesia.

First, participants were asked to give a detailed narrative of the assault, starting with the events leading up to it, and ending with them leaving the scene. They were asked to recall it as vividly, clearly, and in as much detail as possible, while describing events in the order in which they occurred. The experimenter did not interrupt the participant during the recall task. All narratives were tape-recorded and transcribed verbatim. Narratives provided a minimum baseline account of what could be remembered about the assault.

Second, Question 8 of the Peritraumatic Dissociation Experiences Questionnaire-Rater version (PDEQ-R, (Marmar et al., 1997) was asked: 'Were you surprised to find out after the event that a lot of things had happened at the time that you were not aware of, especially things that you felt you ordinarily would have noticed?

Third, Question 8 of the PTSD Symptom Scale Interview (Foa & Tolin, 2000) was asked: 'Are there any important aspects about the assault that you still cannot recall?'

Only those participants who gave a consistent account of their claimed memory gaps across all three checks were included in the amnesia group.

Emotions during the assault

Participants rated a list of emotions on a five-point Likert-type scale (0 = 'not at all', 4 = 'very strongly'), based on a questionnaire used in previous research with victims of violent assault (Dunmore et al., 1999). This was adapted to include some positive emotions in recognition of the 'active' role that a violent offender might (but might not) play in the commission of a violent offence. The additional emotions included 'brave', 'excited', 'furious', 'insulted', 'cool', 'heroic', 'frustrated', and 'hatred'. Factor analyses of the current data indicated six scales: helpless (six items, $\alpha = .82$), anger (five items, $\alpha = .83$), shame (two items, $\alpha = .85$), fear (two items, $\alpha = .90$), brave (three items, $\alpha = .64$), and calm (two items, $\alpha = .73$).

Information processing during the assault

Two aspects of information processing during the assault were of interest.

Dissociation during assault has been hypothesised to lead to amnesia. The PDEQ-R (Marmar et al., 1997) is a 10-item structured interview which assesses the degree of dissociation experienced during and immediately after a traumatic event. Each dissociative experience was rated on a three-point scale (1 = 'absent', 3 = 'threshold'). The PDEQ assesses a variety of dissociative experiences including depersonalisation, derealisation, time

distortion, and out-of-body experiences. A total dissociation score is generated by summing the items. The PDEQ has good internal consistency ($\alpha = .80$) and satisfactory convergent and discriminative validity (Marmar et al., 1997). For the purposes of this study, we excluded the amnesia item from the total score, as we were interested in whether dissociation was associated with amnesia.[2]

Memory research suggests that autobiographical memory requires processing of events in a self-referent way (Wheeler, 1997). A lack of self-referent processing may therefore be related to problems remembering aspects of traumatic events (Ehlers & Clark, 2000; Ehlers, Hackmann, & Michael, 2004). The Lack of Self-Referent Processing Scale is an eight-item scale which assesses the extent to which participants processed the assault as happening to themselves and incorporated the experience with other autobiographical information relating to the self (e.g., 'I felt as if it was happening to someone else'; 'I felt cut off from my past'). It has been shown to have good internal consistency ($\alpha = .88$; Halligan, Michael, Clark, & Ehlers, 2003). The scale has been demonstrated to predict memory disorganisation and the development of PTSD symptoms in survivors of assault and motor accidents (Ehring, Ehlers, & Glucksmanm, 2006, 2008; Halligan et al., 2003).

Participants' perception of the assault

A 13-item questionnaire assessed participant's perceptions of the assault. Each item was rated on a seven-point Likert scale relating to the extent to which the participant currently endorsed the item. The questionnaire consisted of three subscales: perceived control (Dunmore et al., 2001), victim status, and perceived physical threat to self (Dunmore, Clark, & Ehlers, 1997). Perceived control assessed the extent to which the participant felt in control during the course of events, including when being violent (seven items such as 'The situation never got out of hand'; $\alpha = .78$). Victim status assessed the extent to which the participant felt that they were the true victim in the course of events (four items such as 'I was the victim in all of this'; $\alpha = .84$). Perceived physical threat to the self asked about the extent to which the participant believed that they were going to be seriously injured at the time of the assault (two items such as 'During the assault I believed that I would be seriously injured'; $\alpha = .77$).

Memory disorganisation

To check whether amnesia was related to wider deficits in autobiographical memory for the assault in general, narratives were transcribed verbatim and scored for memory disorganisation following rules developed by Foa, Molnar, and Cashman (1995), and adapted by Halligan and colleagues

(2003). Narratives were divided into 'chunks' or clauses containing only one thought, action, or speech utterance. Three indices of memory disorganisation were assessed: repetitions (clauses consisting of repetitions), disorganised thoughts (clear expressions of uncertainty with regard to memory, confusion, or non-consecutive chunks; e.g., 'I know something didn't … at least … they were broken'), and organised thoughts (clauses indicating understanding of what was happening, as a reverse indicator of disorganisation).

Each score was z-transformed in order to control for the variable narrative length. A composite memory disorganisation score was calculated as $z(1) + z(2) - z(3)$, in relation to the three indices of disorganisation described. In addition, the rater gave a global rating of coherence, ranging from 1 ('not at all disorganised', i.e., temporally sequential with high amounts of detail relevant to the assault) to 10 ('extremely disorganised'), after reading each narrative and using the Global Memory Disorganisation Rating Scale for guidance (Halligan et al., 2003). Inter-rater reliability (two raters, 20 narratives) showed high agreement for the composite memory disorganisation score ($r = .92$, $p < .0005$) and for the global memory disorganisation rating ($r = .96$, $p < .0005$). The raters agreed exactly on the global rating score in 70% of the cases.

Symptoms of PTSD

The PTSD Symptom Scale (PSS-I) is a semi-structured interview which assesses current symptoms of PTSD as defined by DSM-IV criteria (American Psychiatric Association, 1994). The PSS-I consists of 17 items corresponding to the 17 symptoms of PTSD, rated by the interviewer from 0 ('not at all') to 3 ('five or more times per week/very much'). The total PSS-I score is the sum of the ratings for the 17 items. The scale has high internal consistency ($\alpha = .85$), moderate to high correlations with other measures of psychopathology, high test–retest reliability ($r = .80$), high inter-rater reliability ($\kappa = .91$), and good diagnostic agreement with the CAPS (Foa & Tolin, 2000). In order to qualify for a diagnosis of PTSD, a participant had to report the minimum number of symptoms specified in DSM-IV at a level of at least 1 (once per week or less/a little).

Procedure

After the participant had given consent, the semi-structured interviews assessing demographic and offence characteristics were administered. Participants then gave a narrative account of the event and completed the above measures and answered interview questions, the results of which will be presented elsewhere. The amnesia interview followed. Finally, the PSS-I and the Quick Test were administered. The interviews and questionnaires

were administered in a fixed order and took between 1.5 and 2 hours. All interviews were conducted individually by the first author. Where relevant, participants were provided with enlarged rating scales to consider while the researcher read questions or statements out loud, to minimise any potential confounding effect of reading ability.

Data analysis

Interviews were transcribed verbatim. Two raters independently rated transcripts of the amnesia interviews to determine whether memory gaps reported by the participant met the criteria for partial or complete amnesia. There was 100% agreement on the classification of participants into the amnesia and no amnesia groups ($\kappa = 1.0$, $p < .0005$). Agreement on the CAPS intensity ($\kappa = .83$, $p < .0005$) and frequency ($\kappa = .83$, $p < .0005$) scores was also high.

All quantitative data were analysed with SPSS (Statistical Package for the Social Sciences) for Windows (version 11.5). Chi-square tests (for categorical data; or Fisher's exact test if invalid) or t tests (for continuous data; or, when indicated by Levene's equality of variance test, t tests based on unequal variances) were used to examine the background and assault characteristics of participants with and without amnesia. Potential cognitive and emotional correlates of amnesia were analysed using a hierarchical approach. First, multivariate analyses of variance for related groups of variables were conducted. If the multivariate test was significant, univariate comparisons followed. Logistic regression analysis tested how well amnesia could be predicted by the variables investigated in this study.

Ethical approval

Ethical approval was obtained from the Prison Health Research Ethics Committee prior to the commencement of the study. Written approval was also obtained from the governors and the lead clinician of the relevant young offenders' institutions in which the study took place. Approval of the Head of Security and Operations at the YOIs was received for the use of recording equipment within the YO institutions. Written consent was obtained from each participant prior to commencement of the study. Given the sensitive nature of the data collected in this study, details of assaults and participant characteristics reported in the descriptive aspects of this paper have been modified to protect anonymity.

Results

In all, 21 (20%) participants reported either partial ($n = 20$, 19%) or complete ($n = 1$, 1%) amnesia for their violent offence. Six participants

(5% of the participants with amnesia, 6% of the participants without amnesia) met the criteria for PTSD.

Demographic, clinical, legal, and assault variables

Table 1 shows that participants with and without amnesia were comparable on most demographic characteristics measured. The amnesia group was significantly more likely than the no amnesia group to be Caucasian. Post-hoc analysis showed that Caucasian participants were more likely ($n = 22$, 51.2%) than non-Caucasians ($n = 56$, 90.3%) to

Table 1.   Demographic and assault characteristics.

Variable	No amnesia group	Amnesia group	Statistic	p
Age in years: mean (*SD*)	19.7 (0.92)	19.6 (.89)	$t(102) = .05$	.89
Ethnicity: n (%)			$\chi^2_1 = 6.03$	.01
Caucasian	58 (69)	20 (95.2)		
Non-Caucasian	26 (31)	1 (4.8)		
Education: n (%)			$\chi^2_1 = 1.01$	.32
No qualifications	54 (64.3)	11 (52.4)		
GCSE/equivalent or above	30 (35.7)	10 (47.6)		
Age finished in years: mean (SD)	15.0 (1.7)	14.8 (1.1)	$t(103) = .61$	.54
Employment status: n (%)			$\chi^2_1 = .47$	.63
Employed/student	41 (48.8)	12 (57.1)		
Unemployed/ not at school	43 (51.2)	9 (42.9)		
Relationship status: n (%)			$\chi^2_1 = .04$	.84
Current partner	50 (59.5)	12 (57.1)		
No current partner	33 (40.5)	9 (42.9)		
Religious affiliation: n (%)			FE test	.07
No affiliation	65 (77.4)	20 (95.2)		
Affiliation	19 (22.6)	1 (4.8)		
Criminal record: n (%)			$\chi^2_1 = .01$	.92
No convictions	25 (29.8)	6 (28.6)		
Previous convictions	59 (70.2)	15 (71.4)		
Prior imprisonment: n (%)			$\chi^2_1 = .17$	.68
No	56 (66.7)	13 (61.9)		
Yes	28 (33.3)	8 (38.1)		

Table 1.   (*Continued*).

Variable	No amnesia group	Amnesia group	Statistic	p
Prior violent offence: n (%)			$\chi^2_1 = .09$	.77
No	47 (56)	11 (52.4)		
Yes	37 (44)	10 (47.6)		
Intelligence (Quick Test)			$t(103) = .86$	.39
Mean (SD)	84.1 (8.7)	85.8 (6.6)		
PTSD symptoms (PSS-I): mean (SD)				
without amnesia item	5.4 (6.4)	6.0 (6.0)	$t(103) = -38$	.70
Victim			FE test	.04
No emotional ties	78 (92.9)	16 (76.2)		
Emotional ties	6 (7.1)	5 (23.8)		
Duration of assault			$\chi^2_1 = .09$	.76
Five minutes or less	55 (65.5)	13 (61.9)		
More than five minutes	29 (34.5)	8 (38.1)		
Use of weapon			$\chi^2_1 = .012$	.91
No	23 (28.4)	6 (28.6)		
Yes	58 (71.6)	8 (38.1)		
Location of the assault			$\chi^2_1 = .33$	.57
Public place	65 (77.4)	15 (71.4)		
Victim's or offender's place	19 (22.6)	6 (28.6)		
Provocation				
No	14 (16.7)	1 (4.8)	FE	.29
Yes	70 (83.3)	20 (95.2)		
Alcohol intake			$\chi^2_1 = 7.7$	.005
<Four units in previous six hours	40 (47.6)	3 (14.3)		
Four + units in previous six hours	44 (52.4)	18 (85.7)		
Illegal drug use			$\chi^2_1 = 1.16$	.28
None in previous six hours	47 (56.0)	9 (42.9)		
Drug use in previous six hours	37 (44.0)	12 (57.1)		
Planning: mean (SD)[1]	11.94 (22.32)	6.76 (15.88)	$t(103) = 1.00$	.32
Intent to seriously injure[2]	3.76 (2.27)	3.62 (2.38)	$t(103) = .26$	.80
Intent to kill[2]	2.02 (1.89)	1.90 (1.73)	$t(103) = .26$	.80

[1]Rated on a 100-point percentage scale ranging from no forethought, planning, or preparation to detailed forethought, planning, and preparation; [2]Measured on a seven-point Likert scale (ranging from 'totally disagree', through neutral, to 'totally agree').

have consumed more than four units of alcohol in the six hours prior to the offence (Fisher's exact probability $< .0005$, $df = 1,105$, two-tailed).

The amnesia and no amnesia groups also differed in alcohol intake before the assault, but not in the consumption of other drugs. A significantly greater proportion ($n = 19$, 91%) of the amnesia group consumed at least some alcohol prior to the offence than the no amnesia group ($n = 47$, 56%; $\chi^2 = 8.58$, $df = 1$, $p = .002$, two-tailed). The amnesia group ($n = 18$, 86%) was also significantly more likely ($\chi^2_1 = 8.23$, $p = .004$) than the no amnesia group ($n = 43$, 51%) to report high levels of alcohol consumption prior to committing the offence (more than four units in the preceding six hours). For very high levels of alcohol (more than 10 units), the percentages were 71% versus 38% ($\chi^2_1 = 7.55$, $p = .006$). The amnesia group also habitually tended to consume somewhat more alcohol (median = 80 units/week) than the no amnesia group (43 units/week; U = 668.5, $p = .086$).

In terms of clinical variables, there were no significant differences between the amnesia and no amnesia groups in terms of previous history of trauma, total number of traumas experienced, being the victim of a violent assault, previous head injury, history of memory problems, intelligence, or alcohol or illegal drug use or dependence. [3] The amnesia group ($n = 6$, 29%) was significantly more likely than the no amnesia group ($n = 6$, 7%) to have been referred for psychiatric assessment and/or treatment since imprisonment (Fisher's exact test, $p = .01$). In line with this finding, the amnesia group ($n = 4$, 19%) was also more likely than the no amnesia group ($n = 3$, 3.6%) to be currently prescribed psychiatric medication (Fisher's exact test, $p = .03$).

There were few differences between the amnesia and no amnesia groups on any of the offence characteristics. In particular, there was no difference between the amnesia and no amnesia groups in terms of whether the assault was fatal or not. However, the amnesia group ($n = 5$, 24%) was significantly more likely (Fisher's exact test, $p = .04$) than the no amnesia group ($n = 6$, 7%) to have emotional ties with the assault victim.

Amnesia: phenomenological characteristics

Table 2 summarises the nature of the memory gaps in participants judged to have partial or complete amnesia for their violent offence. There was a mixed picture in terms of what aspects of the assault could not be recalled. Of the 16 participants (76%) in the amnesia group who used weapons in their assault, eight claimed to have no recall at all of using the weapon (bladed weapons or broken bottles in all but one instance), although they were able to describe other parts of the assault. A further eight participants could remember part, but not all, of their weapon use.

Table 2.   Reported memory gaps for the amnesia group.

Case	Complete or partial[1]	% missing[2]	Amnesic gap
2	Complete	100	Cannot recall kicking victim in head several times (out of character). Recalls co-defendant throwing victim, then no memory.
4	Partial	35	Cannot recall jumping on victim's chest or other people fighting. Hit on head with plastic piping, knocked out briefly. Patchy memory loss.
9	Partial	10	Can recall all of assault except for the second of two punches he landed, confirmed on CCTV. One small, clear gap.
13	Partial	75	Can only recall one of several stab wounds inflicted on victim. Cannot recall family of victim being present. Only has 'two pictures' of assault.
15	Partial	20	Cannot recall slashing victim with knife dropped by victim but can remember chasing him. Remembers jogging away afterwards.
25	Partial	80–90	Cannot recall most of assault (punched and kicked victim). Recalls walking towards victim; next recall is putting rope around neck at end.
27	Partial	20–30	Cannot recall stabbing victim. Can remember confronting him and then recalls victim holding neck on ground. Cannot recall next one to two hours.
35	Partial	40	Cannot remember threatening victim, getting knife from home, climbing into house, or stabbing the victim several times.
41	Partial	50	Can recall punching victim, then clear gap until stamping on his head. Estimated several minutes missing of assaultative behaviour
45	Partial	50	Cannot recall knife being put in his hand, stabbing victim several times, or any noises from the assault ('felt like I went deaf').
46	Partial	50	Cannot recall kicking victim, chasing him, rolling around on ground, giving him 'verbals', or spitting on him. Patchy recall of being violent.
47	Partial	50	Remembers being hit by victim, then gap until seeing victim on ground. Cannot remember stabbing him with bottle in head, or later behaviour.
48	Partial	30	Remembers confronting victim. Cannot recall jumping around or stabbing him in face. 'Seeing red … blanked out for about one minute.'

Table 2.   (*Continued*).

Case	Complete or partial[1]	% missing[2]	Amnesic gap
54	Partial	20	Has patchy recall of assaulting victim in a pub. Cannot recall how many times he was taken out of pub and went back in.
59	Partial	90	Recalls argument with victim and punching him, but cannot recall then attacking him with a knife. Clear gap until he saw victim lying on floor.
68	Partial	50	Patchy recall of extended fight between victim and respondent and his co-defendant. Can only recall a only few of multiple stab wounds caused.
76	Partial	50	Can recall striking victim on head with bar, but not then punching and kicking him in the head and threats to kill. Recalls arrest.
89	Partial	40–50	Recalls punching victim in the face, then dense memory gap until he came around with victim lying unconscious in his lap, stabbed twice.
96	Partial	70	No recall of first stabbing; then can recall first stabs but not the next several. Cannot recall where he threw the knife or getting home.
98	Partial	Unsure	Recalls holding victim with rope and stabbing first few times, but not the next several times. 'Blackout' until he saw victim dead on floor.
101	Partial	Unsure	Can recall hitting victim with bottle on head but cannot recall stabbing him in face several times. Can remember being arrested.

[1]As judged by the interviewer: any recall of assaultative behaviour indicated that the amnesia was partial; [2]Percentage missing of the actual assault, as estimated by the participant on the basis of their knowledge of their own assaultative behaviour from third-party information, including witnesses and medico-legal information.

Several phenomenological features emerge from the descriptions in Table 2 in relation to the form of amnesia.

Partial versus complete amnesia

The overwhelming majority of participants reported partial amnesia in relation to their offence. Only one participant (i.e., fewer than 1%) reported complete amnesia. Two further cases approached complete amnesia for the offence, but both recalled one element of assaultative behaviour (an initial punch, and using a noose to strangle the victim, respectively). Over three-quarters of the amnesia group claimed they could still remember more than half of the important features of the series of events comprising the index

offence, compared to their knowledge of their own assaultative behaviour from third-party information (witnesses or medico-legal evidence).

Memories for events preceding the violence

Every individual with amnesia was able to recall the events leading up to, or involving the commencement of, violence.

Memories for events following the violence

In the amnesia group, 18 (86%) participants were able to describe in detail the immediate consequences of their violence, most notably in terms of the injuries caused to the victim. Only three participants reported amnesia that persisted beyond the assault, amounting to periods of 30 minutes to two hours. One individual recalled punching his victim and then nothing until he recalled sitting with his back against a wall with the victim unconscious in his lap. He estimated that the amnesic gap was in the order of two hours. The other two cases had amnesia for some of their violent actions, then a brief but clear return of memory for the consequences of their actions followed by a second, extended period of amnesia. The overwhelming majority of the amnesic group reported memory gaps lasting from a few seconds to a few minutes.

The boundaries of memory gaps

The majority of the amnesia group ($n = 16$, 76%) reported a precise cut-off between what they could remember and the gaps in their memory. Less precise boundaries to the amnesic gap were found in five (24%) of the amnesia group.

Number of memory gaps

While 12 (57%) participants described only one period of amnesia, nine (43%) described at least two periods of amnesia.

Emotional and cognitive correlates of amnesia

Table 3 summarises the cognitive and emotional correlates of amnesia. For information processing during the assault, MANOVA showed a significant overall effect of group; the subsequent univariate analyses showed significantly greater dissociation and lack of self-referent processing in the amnesia group than in the no amnesia group. For emotions during the assault, no significant overall group effect could be established; univariate tests were not performed.

Table 3.   Amnesia group differences in cognitive processing and emotions at time of offence.

Variable	No amnesia group M (SD) n = 84	Amnesia group M (SD) n = 21	Statistic	p value
Cognitive processing			$F(2,102) = 3.58$	.031
Dissociation PDEQ (without amnesia item 8)	1.57 (0.46)	1.85 (0.42)	$F(1,103) = 6.31$	.014
Lack of self-referent processing	1.33 (1.05)	1.90 (1.06)	$F(1,103) = 4.90$	.029
Memory disorganisation			$F(2,100) = 10.19$	<.0005
Global rating	3.90 (1.22)	5.62 (2.48)	$F(1,101) = 20.38$	<.0005
Composite fragmentation score	0.13 (1.47)	0.49 (1.94)	$F(1,101) = 2.60$	.110
Emotional factors			$F(6,98) = 1.92$	.085[1]
Helpless	1.18 (1.02)	1.41 (1.14)		
Fear	1.04 (1.25)	1.19 (1.40)		
Anger	2.20 (1.16)	2.42 (1.03)		
Shame	0.84 (1.13)	1.38 (1.49)		
Brave	1.05 (1.03)	0.83 (0.71)		
Calm	0.76 (0.88)	1.24 (1.38)		
Cognitions during assault			$F(3,101) = 3.01$	.034
Perceived control	2.85 (1.35)	1.91 (0.88)	$F(1.103) = 9.20$	.003
Victim status	2.94 (1.60)	2.92 (1.76)	$F(1,103) = .004$	.952
Perceived threat	2.49 (1.64)	2.69 (1.94)	$F(1,103) = .22$	.660

[1]Related univariate analyses were not conducted because multivariate analysis was not significant.

The participant's cognitions during the assault differed significantly between participants with and without amnesia. Univariate analyses indicated that those in the amnesia group were significantly more likely than those in the no amnesia group to perceive themselves as lacking control during the offence.

For general assault memory disorganisation, as indicated by the assault narrative, there was also a significant group difference in global disorganisation rating.

Logistic regression analysis

Binary logistic regression analysis, with the presence of amnesia for the offence as the dependent variable, was used to examine the ability of clinical

and cognitive variables to predict amnesia for the offence. Variables were entered in hierarchical fashion, starting with clinical and demographic variables, high alcohol intake, emotional ties to the victim, cognitive processing, and cognitive appraisals of the offence. As dissociation and self-referent processing were correlated ($r = .56$), a composite (sum of the z-transformed scores) was used as a measure of problematic information processing. Measures of memory disorganisation were not included in the analysis because gaps in memory were one of the criteria for the global rating, thus confounding predictor and outcome. The results are presented in Table 4.

Table 4. Logistic regression analysis: predicting amnesia.

Variables entered	NR^{2a}	$-2LL^b$	Block df	Block χ^2	p value	% correctly Classified
Block 1: clinical factors	.205	90.49	3	14.60	.002	82
Current psychiatric medication						
Previous psychiatric history						
Ethnic origin						
Block 2: alcohol	.268	85.56	1	4.93	.026	82
Alcohol intake prior to offence, four units or more						
Block 3: victim relationship	.323	81.11	1	4.45	.035	85
Emotional ties to victim						
Block 4: cognitive processing	.377	76.45	1	4.66	.031	86
Composite of peritraumatic dissociation without amnesia item and lack of self-referent processing						
Block 5: cognitive appraisals	.425	72.20	1	4.25	.039	87
Perceived loss of control						

[a]Nagelkerke R^2; [b]-2 log likelihood.

Clinical measures (previous psychiatric history, current psychiatric medication, and ethnic origin) accounted for 21% of the variance in amnesia for the offence. The variables entered in each further step significantly improved the prediction. The final model explained 43% of the variance. Of the participants with amnesia, 82% were identified correctly, as were 87% of the participants without amnesia.

Discussion

This is the first systematic, descriptive study to investigate amnesia for both lethal and non-lethal violent offending using convicted offenders' first-hand accounts. An important finding was that amnesia tended to be partial, rather than complete, in nature. Although memory impairment for offending behaviour has been noted in previous, mainly uncontrolled case series (Bradford & Smith, 1979; Lynch & Bradford, 1980), the conclusions of these studies have tended to be undermined by selection bias and lack of clear definitional criteria. This study involved verbatim transcripts of interviews with an unselected prison population of convicted young violent offenders, applied operational criteria for the dependent variable, and inter-rater reliability measures. We were also careful to record as amnesia only those cases where individuals would have had the opportunity to attend to and encode the material for which they claimed amnesia. This addresses an important distinction made by McNally (2003), who differentiated between information that was not encoded in the first place, possibly because of a narrowing of attention in conditions of extreme arousal (Easterbrook, 1959), and material that was encoded but could not be recalled. Further, to minimise forgetfulness and enhance the retrieval of additional details, the questions about amnesia were asked only after the individual had given their narrative account and answered a number of detailed questions about the offence (McNally, 2003).

Nevertheless, our study cannot determine whether the gaps in memory reported by participants reflect irreversible memory loss, a problem in accessing information by intentional recall, avoidance of thinking or talking about the worst moments of the assault, or a failure of encoding. It is possible that some of the material may have been accessible using other modes of retrieval, such as picture cues or a visit to the scene of the assault.

Overall, this study suggests that a lower rate of amnesia is found in violent offenders than has been previously reported (Kopelman, 1987). In particular, this study found that while some memory gaps are common, complete amnesia for violent offending is very rare. Possible explanations for this include the facts that stringent threshold criteria for amnesia were applied, and that a range of methods were used to measure and quantify amnesia. In addition, many studies to date have included unconvicted and remand as well as convicted prisoners, whereas only convicted prisoners

were recruited for this study. It has been suggested that convicted prisoners have less legal incentive to claim amnesia falsely than prisoners who have not yet had their case heard (Pope, Hudson, Bodkin, & Oliva, 1998). However, we were unable to determine whether the participants would have reported more pronounced amnesia before conviction.

If cases of complete and partial amnesia are considered together, the rate of amnesia (20%) is slightly lower than that reported in studies of predominantly homicide samples. It is unlikely that the lower rate of amnesia found in this study can be explained by the inclusion of individuals who had perpetrated non-fatal assaults, as the lethality of the violence was not related to reported amnesia.

Amnesia for the violent offending was characterised by brief memory gaps, generally corresponding to the most violent part of the assault. All the participants had clear recall up to the assault and, in all but three cases, they regained continuous memory immediately following the assault. Every individual, except one, could recall some important aspect of the assault. Some individuals reported brief periods of memory during the assault prior to the return of continuous memory, which have been termed 'islands (or islets) of memory' (Kopelman, 1987, p. 325). Although about three-quarters of participants reported a sudden onset of memory loss, even to the point of losing count of the number of strikes delivered with a weapon, there was no clear phenomenological pattern as regards the boundaries of the reported memory deficit – a finding in line with previous reviews (Porter, Birt, Yuille, & Herve, 2001).

Previous studies have suggested an association between alcohol intoxication and amnesia for offending behaviour (Bradford & Smith, 1979; O'Connell, 1960; Parwatikar et al., 1985; Taylor & Kopelman, 1984), particularly in violent offenders (Kopelman, 1987). This study found a significant association between high alcohol intake and amnesia, using a cut-off of more than four units of alcohol in the six hours prior to the assault. However, this study did not replicate the association between amnesia and chronic alcohol abuse or dependence reported in earlier studies (Bradford & Smith, 1979; O'Connell, 1960; Taylor & Kopelman, 1984). This may be due to the younger age of the sample, as alcoholic blackouts are considered to be a relatively late manifestation of alcoholism (Goodwin, Crane, & Guze, 1969). Also in line with some previous research, no association was found between amnesia and drug dependence or intoxication at the time of the offence (Bradford & Smith, 1979; Lynch & Bradford, 1980; Parwatikar et al., 1985).

Although high alcohol intake was associated with amnesia in this study, acute alcohol intoxication did not necessarily prevent the formation of central memories for the offence, although in some cases recall was partial rather than complete. The results suggest that alcohol intake can be associated with patchy memory loss that is not recoverable, but is partial.

The amnesia associated with alcohol intoxication had features of *en bloc* blackouts and fragmentary memory loss, with participants tending to experience islands of dense and unchanging memory loss, co-existing with partial recall of some elements of the index offence more consistent with fragmentary memory loss (Goodwin et al., 1969). It is likely that *en bloc* alcoholic blackouts may require very high levels of alcohol intoxication, or long durations of excessive alcohol consumption, or both.

There were mixed results with regard to the role of emotional arousal in the development of amnesia for the offence. High emotional arousal has been previously assumed to be present when the victim is someone with whom the perpetrator of violence has a relationship (Taylor & Kopelman, 1984). The results from this study support this general notion, in that emotional ties with the victim were significantly more common in the amnesia group than the no amnesia group. However, a more direct exploration of the type and intensity of emotions experienced at the time of the assault failed to produce any significant associations with amnesia. It is possible that the retrospective nature of the measurement of emotional intensity at the time of assault may have contributed to this negative finding.

This is the first study to provide empirical evidence that cognitive processing at the time of the assault is associated with amnesia for violent offending. As predicted, peritraumatic dissociation (consistent with previous research in victims of sexual trauma; Mechanic et al., 1998) and lack of self-referent processing were significantly associated with amnesia. Further, in combination these factors improved the prediction of amnesia in a binary logistic regression analysis over and above clinical factors, alcohol intake, and emotional ties to the victim.

In the past it has been assumed that dissociative processes at the time of encoding can lead to gaps in memory, which this study supports, but the specific mechanisms involved remain unclear. The finding that peritraumatic dissociation was correlated with amnesia was based on the overall PDEQ-R score, excluding the amnesia item. However, dissociation is a complex phenomenon, comprising several different components, including depersonalisation, derealisation, and numbing (Ehlers & Clark, 2000; McNally, 2003).

Amnesia may represent an extreme form of memory disorganisation. Global ratings of assault memory disorganisation were significantly associated with measures of both cognitive processing and amnesia. These findings support the hypothesis that the disorganised nature of the resultant memory is associated with disrupted processing at the time of encoding.

Perceived lack of control during the offence was associated with amnesia, contributing additional variance in the logistic regression model, which has not been previously been investigated or reported in the literature. One possible interpretation is that when an individual perceives that the course of events is dramatically out of their control, their cognitive processing, or control of attention, is disrupted. Rather than their attention being

narrowed because of extreme emotional arousal, another possibility is that their attention is poorly focused, and they fail to register, and therefore encode, relevant information. However, several of the current participants had partial amnesia for their use of weapons, and while the use of a weapon is not necessarily irreconcilable with perceived loss of control, it is somewhat problematic.

A limitation of the current study is that although the population studied was representative of all convicted young violent offenders in the institutions in which the study was based, as nearly all such offenders incarcerated at the time of the study were interviewed, these results may not apply to older or to unconvicted violent offenders. Replication in such groups is necessary. However, concerns about the generalisability of data from this young offender sample are offset by the use of stronger scientific methods than in previous approaches.

One implication of the current results is that, in the absence of specific organic factors such as epilepsy, somnambulism, heavy alcohol intoxication, or florid psychotic illness, claims of complete amnesia, or amnesia that includes events leading up to the offence, should be treated with caution in convicted offenders. The findings from this study also support the importance in forensic practice of conducting careful and systematic assessments of reported amnesia, as well as establishing precisely what memories are present, particularly when conducting medico-legal assessments.

Acknowledgements

Notes

1. Taylor and Kopelman (1984) used a cut-off between high and low levels of alcohol consumption of one to two pints of beer or their equivalent within the 12 hours prior to the offence.
2. The reliability and validity data refer to the complete PDEQ-R, including the amnesia item.
3. The combined rates of alcohol and drug dependence were 21.9% and 19% respectively.

References

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Ammons, R.B., & Ammons, C.H. (1962). *Quick Test*. Missoula, MT: Psychological Test Specialists.

Blake, D.D., Weathers, F.W., Nagy, L.M., Kaloupek, D.G., Gusman, F.D., & Charney, D.S. (1995). The development of a clinician-administered PTSD scale. *Journal of Traumatic Stress, 8*, 75–90.

Blake, D.D., Weathers, F.W., Nagy, L.M., Kaloupek, D.G., Klauminzer, G., Charney, D.S., et al. (1990). A clinician rating scale for assessing current and lifetime PTSD: The CAPS-1. *Behaviour Therapist*, *13*, 187–188.

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

Brewin, C., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review*, *103*, 670–686.

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

Cima, C., Nijman, H., Merckelbach, H., Kremer, K., & Hollnack, S. (2004). Claims of crime-related amnesia in forensic patients. *International Journal of Law and Psychiatry*, *27*, 215–221.

Dunmore, E., Clark, D.M., & Ehlers, A. (1997). Cognitive factors in persistent versus recovered post traumatic stress disorder: A pilot study. *Behavioural Cognitive Psychotherapy*, *25*, 147–159.

Dunmore, E., Clark, D.M., & Ehlers, A. (1999). Cognitive factors involved in the onset and maintenance of posttraumatic stress disorder (PTSD) after physical and sexual assault. *Behaviour Research and Therapy*, *37*, 809–829.

Dunmore, E., Clark, D.M., & Ehlers, A. (2001). A prospective investigation of the role of cognitive factors in persistent posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy*, *39*, 1063–1084.

Easterbrook, J.A. (1959). The effect of emotion on cue utilisation and the organisation of behaviour. *Psychological Review*, *66*, 183–201.

Ehlers, A., & Clark, D.M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, *38*, 319–345.

Ehlers, A., Hackmann, A., & Michael, T. (2004). Intrusive reexperiencing in posttraumatic stress disorder: phenomenology theory and therapy. *Memory*, *12*, 403–415.

Ehring, T., Ehlers, A., & Glucksmanm, E. (2006). Contribution of cognitive factors to the prediction of posttraumatic stress disorder, phobia and depression after road traffic accidents. *Behavior Research and Therapy*, *44*, 1699–1716.

Ehring, T., Ehlers, A., & Glucksmanm, E. (2008). Do cognitive models help in predicting the severity of posttraumatic stress disorder, phobia and depression after motor vehicle accidents? A prospective longitudinal study. *Journal of Consulting and Clinical Psychology*, *76*(2), 219–230.

Foa, E.B., Molnar, C., & Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress*, *8*, 675–690.

Foa, E.B., & Tolin, D.F. (2000). Comparison of the PTSD Symptom Scale-Interview version and the Clinician-Administered PTSD Scale. *Journal of Traumatic Stress*, *13*, 181–191.

Frith, C.D., Leary, J., Cahill, C., & Johnstone, E.C. (1991). Performance on psychological tests: Demographic and clinical correlates of the results of these tests. *British Journal of Psychiatry*, *159*(suppl. 13), 26–29.

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

Halligan, S.L., Michael, T., Clark, D.M., & Ehlers, A. (2003). Posttraumatic stress disorder following assault: The role of cognitive processing, trauma memory and appraisals. *Journal of Consulting and Clinical Psychology*, *71*, 419–431.

Hopwood, J.S., & Snell, H.K. (1933). Amnesia in relation to crime. *Journal of Mental Science*, *79*, 27–41.

Kopelman, M. (1987). Crime and amnesia: A review. *Behavioural Sciences and the Law*, *5*, 323–342.

Lynch, B.E., & Bradford, J.M.W. (1980). Amnesia: Its detection by psychophysiological measures. *Bulletin of the American Academy of Psychiatry and the Law*, *8*, 288–297.

Marmar, C.R., Weiss, D.S., & Meltzer, T.J. (1997). The Peritraumatic Dissociative Experiences Questionnaire. In J.P. Wilson & T.M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 412–428). New York: Guilford Press.

McNally, R.J. (2003). *Remembering trauma*. Cambridge, MA: Belknap Press of Harvard University Press.

Mechanic, M., Resick, P.A., & Griffin, M.G. (1998). A comparison of normal forgetting, psychopathology, and information-processing models of reported amnesia of recent sexual trauma. *Journal of Consulting and Clinical Psychology*, *66*, 948–957.

Moskowitz, A. (2004). Dissociation and violence: A review of the literature. *Trauma, Violence and Abuse*, *5*, 21–46.

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

Parwatikar, S., Holcomb, W.R., & Menninger, K.A. (1985). The detection of malingered amnesia in accused murderers. *Bulletin of the American Academy of Psychiatry and the Law*, *13*, 97–103.

Pope, H.G., Hudson, J.I., Bodkin, J.A., & Oliva, P. (1998). Questionable validity of 'dissociative amnesia' in trauma victims: Evidence from prospective studies. *British Journal of Psychiatry*, *172*, 210–215.

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

Pyszora, N., Barker, A., & Kopelman, M. (2003). Amnesia for criminal offences: A study of life sentence prisoners. *Journal of Forensic Psychiatry and Psychology*, *14*, 475–490.

Taylor, P.J., & Kopelman, M.D. (1984). Amnesia for criminal offences. *Psychological Medicine*, *14*, 581–588.

Wechsler, D. (1981). *The Wechsler Adult Intelligence Scale* (rev. ed.). San Antonio, TX: Psychological Corporation.

Wheeler, M. (1997). Toward a theory of episodic memory: The frontal lobes and autonoetic consciousness. *Psychological Bulletin*, *121*, 331–354.