MEMORY
2019, VOL. 27, NO. 5, 714–722
https://doi.org/10.1080/09658211.2018.1557209

Routledge
Taylor & Francis Group

Examining self-defining memories and aggression in a sample of criminal offenders

Bayley J. Taple [a], Carmen Zabala-Baños[b], María V. Jimeno[c], James W. Griffith[a] and Jorge J. Ricarte[d]

[a]Department of Medical Social Sciences, Northwestern University Feinberg School of Medicine, Chicago, USA; [b]Department of Nursing, Physiotherapy and Occupational Therapy, University of Castilla – La Mancha, Toledo, Spain; [c]Department of Psychology and Criminology Research Center, University of Castilla – La Mancha, Albacete, Spain; [d]Department of Psychology, University of Castilla – La Mancha, Albacete, Spain

ABSTRACT

Self-defining memories (SDMs) are a type of autobiographical memory that people use as a narrative way to explain their self-identity. We sought to examine the relationships between SDMs, aggression, and criminality in a sample of men, 18–64 years of age, recruited in Spain. The sample included three groups: incarcerated criminal offenders with mental illness, incarcerated criminal offenders without mental illness, and healthy community controls. Analyses of the relationship between SDMs and criminal status demonstrated that incarcerated offenders, regardless of mental health status, endorsed phenomenological characteristics of SDMs of their transgressive self at a higher level than community controls. Aggression differed across all three groups, such that inmates demonstrated higher levels of trait aggression than community controls. The associations between aggression and age at event of SDMs did not differ between groups. Further investigation of the relationship between SDMs, aggression, and criminal status may augment understanding of factors of criminality.

ARTICLE HISTORY
Received 31 July 2018
Accepted 3 December 2018

KEYWORDS
Self-defining memories (SDMs); autobiographical memory; aggression; criminality

Self-defining memories (SDMs), first described by Singer and Salovey (1993), are episodic autobiographical memories that influence one's self concept and life narrative (Conway, 2005). Human beings construct life stories as a way to organise memories of events that are meaningful to the self (Tulving & Craik, 2000). Autobiographical memory can be defined as dynamic activation of knowledge and experience that is personally relevant (Conway & Pleydell-Pearce, 2000). SDMs may be distinct from other autobiographical memories in that they have been rated as more important and emotionally laden (Luchetti, Rossi, & Montebarocci, 2016). A person uses SDMs to explain who they are (Singer, 2005). Previous research has found links between memories with angry or aggressive content and measures of trait aggression (Hung & Bryant, 2016). Thus, exploring differences in phenomenological characteristics of SDMs and aggression between community members and incarcerated criminal offenders may elucidate factors unique to the "criminal self" (i.e., an individual's identity as a criminal). This work extends the study of autobiographical memory to its relationship with criminality.

Memory phenomenological characteristics and identity

Autobiographical memory and self-identity are closely linked. Conway and Pleydell-Pearce (2000) proposed the model of the Self-Memory System (SMS), which had two parts: (1) the working self that stores goals for the present, and (2) an autobiographical knowledge base containing personal goals from the past (Conway & Pleydell-Pearce, 2000). This model has since been modified to include a third component relevant to SDMs – the long-term self, which encompasses adaptive correspondence and self-coherence, further emphasising the link between memories and personal goals (Conway, Singer, & Tagini, 2004). In the original model, SDMs serve to organise themes of one's identity across lifetime periods, built from general events and further comprised of event-specific knowledge (Conway & Pleydell-Pearce, 2000). The elaborated model further classifies the long-term self as the interaction between the autobiographical knowledge base and the "conceptual self," in other words self-identity (Conway et al., 2004). SDMs have been defined as memories that are "vivid, affectively charged, repetitive, linked to other similar memories, and related to an important unresolved theme or enduring concern in an individual's life" (Singer & Salovey, 1993). Blagov and Singer (2004) conceptualised SDMs into four broad domains: specificity, meaning, content, and affect. The phenomenological characteristics of SDMs assessed in the current study fit within this framework. It has been theorised that SDMs are integrated into one's sense of self (Conway & Pleydell-Pearce, 2000; Singer, 2005). In a review of emotion

CONTACT Bayley J. Taple btaple@u.northwestern.edu Department of Medical Social Sciences, Northwestern University Feinberg School of Medicine, 625 N. Michigan Ave., 27th floor, Chicago, IL, USA

and autobiographical memory, Holland and Kensinger (2010), emphasised the functional role of emotional autobiographical memory in maintaining one's sense of self. Moreover, these memories that impact one's identity are affected by the presence of mental disorders (e.g., Williams et al., 2007), and potentially criminal identity, which we aimed to investigate in the present study.

Psychopathology and SDMs

Psychopathology has been shown to impact the generality and specificity of autobiographical memory, as well as the valence of those memories. Several studies have demonstrated that major depressive disorder (MDD) and posttraumatic stress disorder (PTSD) are associated with less specific and more overgeneral autobiographical memories; this phenomenon has been termed overgeneral autobiographical memory (OGM; e.g., Hermans et al., 2008; Kleim & Ehlers, 2008; Sumner, Griffith, & Mineka, 2010; Williams et al., 2007; Williams & Broadbent, 1986; Williams & Scott, 1988). Level of detail is one of the phenomenological characteristics of SDMs, which might vary with psychopathology. With respect to the current study, based on previous findings (Williams et al., 2007), it is possible that individuals with mental illness may rate their SDMs as having lower specificity (i.e., fewer details), and with less positive valence (Williams & Broadbent, 1986). Although level of detail is one of the phenomenological characteristics of SDMs, Griffith et al. (2012) emphasized the need to expand autobiographical memory research beyond just specificity and to examine the relationships between memory and emotion, for example.

Several studies have demonstrated that emotional experience can shape autobiographical memory. Sutherland and Bryant (2005) found that individuals with PTSD retrieved more SDMs related to trauma, compared to their counterparts with no history of trauma or who were exposed to trauma and did not develop PTSD. Thus, trauma and other emotionally laden experiences may influence identity such that trauma may be associated with trauma-related SDMs. Emotional state at the time of encoding and retrieval can also shape memory; Hung and Bryant (2016) examined the effect of trait and state anger on the recall of autobiographical memories and found that high trait anger was associated with biased retrieval of memories with angry content. Therefore, aggression may play a role in the sharing and retrieval of SDMs in people who have engaged in criminal behaviour, and indeed may contribute to the development of a "criminal self." Experimental research has demonstrated that emotional intensity influences autobiographical memory (e.g., Talarico, LaBar, & Rubin, 2004). Thus, examining emotional valence and intensity of SDMs will provide richer insight regarding the interplay of psychopathology, aggression, memory, and the development of a criminal self.

Impact of criminality and psychopathology on memory

Aggression may influence the Self-Memory System by forming salient memories (e.g., an intense conflict). Dolan and Anderson (2002) found that in criminal offenders diagnosed with at least one cluster B personality disorder (i.e., antisocial, narcissistic, borderline, or histrionic), trait aggression was not associated with memory function. In other words, these individuals had the capacity to encode and retrieve memories. Thus, aggression may contribute to remembering (i.e., people having salient memories for events during which they behaved aggressively). Moreover, emotional intensity contributes to autobiographical memory retrieval (Holland & Kensinger, 2010). Interestingly, an experimental study of Italian adolescents found that inducing violent false memories was predictive of self-reported delinquent behaviour (Vannucci, Nocentini, Chiorri, & Menesini, 2014), underscoring the relationship between memory and criminality. One study on perpetrators of violent crime found that intrusive memories with negative valence accounted for 16% of the perpetrators' trauma symptomatology (Evans, Ehlers, Mezey, & Clark, 2007); that is, a crime that an individual has committed impacts their own SDMs and psychopathology. Overall, research has found that memory ability for individuals that exhibit aggressive behaviours is intact, specific memories are formed about these events, and these memories are related to transgressive or criminal behaviour. Thus, examining the relationship between memory and criminality may elucidate components of the criminal self, which is the objective of the current study.

The Current Study

This study investigated between-group differences of phenomenological characteristics of SDMs in a sample of community controls and incarcerated individuals with and without mental illness. The present study aimed (1) to determine which phenomenological characteristics of the autobiographical experience support the criminal self, (2) to examine differences between offenders and community controls on characteristics of SDMs and aggression, and (3) to gain insight into the development of a criminal self, which can help to guide later efforts to prevent criminality. We hypothesised that there would be differences across phenomenological characteristics of SDMs between incarcerated offenders with mental illness, incarcerated offenders without mental illness, and community controls. Moreover, we expected that level of trait aggression would be greater in incarcerated offenders compared to community controls. To our knowledge, this is the first study to investigate the relationships among SDMs, aggression, and criminality.

Methods

Participants

The present sample included 775 Spanish-speaking adult males, aged 18–64 years, and consisted of three groups: criminal offenders with mental illness ($N = 54$), criminal offenders without mental illness ($N = 177$), and community controls ($N = 544$). To recruit a sample representative of the region of Spain where the study was conducted, group sizes were disparate. In addition, we over-sampled for incarcerated individuals to have appropriate statistical power to compare groups. Thus, this research provides a unique study sample. Controls were recruited from the community of Castilla – La Mancha, Spain, and incarcerated offenders at Ocaña-I Prison in Toledo, Spain.

Incarcerated individuals were diagnosed by highly qualified psychiatrists in the medical service of the prison (Ocaña-I) and the Mental Health Unit of the National Public Health System. Note that in some cases prisoners are better diagnosed than the general population as they can be mandated to receive a mental health assessment. The incarcerated offenders in the present study were diagnosed using the Diagnostic and Statistical Manual of Mental Disorders (DSM-5); those who met criteria for a mental disorder had either a personality disorder (58%), psychotic disorder (18%), or adjustment disorder (24%).

The full community sample, which included men and women, was drawn from a larger study that examined several facets of memory and behaviour in an incarcerated sample. All 592 women were excluded from the present analyses to match controls on gender with the incarcerated sample, which only included men. Sample characteristics are presented in Table 1. Note that data on race/ethnicity was not collected in this study. This project was approved by the Ethics Committee for Clinical Research of the Toledo (Spain) Health Service Area and the Secretariat-General for Prison Institutions at the Spanish Ministry of the Interior.

Procedure

Participants were interviewed over the course of one day, by a trained interviewer, and each interview took approximately 30–45 min. Participants completed questionnaires about impulsivity, aggression, and demographics. Note that measures of impulsivity were included as part of a larger study, but were not included in the analyses presented here, as impulsivity was beyond the scope of this investigation. SDMs were evoked using the Self-Defining Memory Task (Blagov & Singer, 2004); the task was consistent across groups. Participants were given a definition of SDMs, the interviewer ensured participant comprehension of SDMs, then participants were asked to write down a memory related to their most aggressive, transgressive, or criminal self. The instructions were given in Spanish and are translated below.

> This part of the survey refers to a special type of personal memory called a Self-Defining Memory (memories that define us). A Self-Defining Memory has the following characteristics:
>
> 1. It occurred at least one year ago.
> 2. It is a memory from your life that you remember clearly and when you think about it still feels important to you.
> 3. It is a memory about an important theme, issue, or conflict in your lifetime. This memory helps to explain who you are and would help someone to understand you more profoundly.
> 4. It is a memory connected to other memories that share a common theme or interest.
> 5. The memory can be positive, negative, or both, depending on how it makes you feel. The only aspect that is important is that it produces strong feelings.
> 6. It is a memory that you have thought about many times. It should be familiar to you like a painting you have studied or a song (happy or sad) that you [know by heart].
>
> To better understand what a Self-Defining Memory is, imagine that you just met someone that you really like and you are spending time together. Each one of you is very dedicated to helping the other to understand the "real you." Do not try to [be someone you are not] or to put on an act. [It is human nature that] we say things that [may not reflect who we truly are, but try] to put forth great effort to be honest. During the conversation, describe a memory that you feel strongly communicates how you came to be the person that you are today. [As you tell this memory to the other person] it forms a Self-Defining Memory. On the next page, you will be asked to remember and write down a Self-Defining Memory.
>
> Please look back and remember a Self-Defining Memory that defines your most aggressive, transgressive self, including your most criminal self.

The Self-Defining Memory Task experimentally manipulated the content of participants' memories, such that they were instructed to share memories related to their aggressive/criminal identity. If participants asked for clarification about the instructions, they were prompted to focus on the term "aggressive" and to try to retrieve a memory of a situation where they had behaved in an aggressive manner. Based on an adaptation of Singer and Moffitt's (1992) methodology for evaluating SDMs, as described by Wood and Conway (2006), participants then rated the phenomenological characteristics of their SDMs, as well as reported their age at the time of the SDM event. The adapted evaluation also drew from the Centrality of Events Scale (Berntsen & Rubin, 2006).

Measures

Self-defining memories

As discussed above, participants rated different phenomenological characteristics of SDMs (adapted from Singer & Moffitt, 1992; e.g., Martinez-Hernandez & Ricarte, 2018). In the current study, ten phenomenological characteristics of SDMs as well as age at SDMs were assessed. Each characteristic was rated on a seven-point scale. Characteristics included: (1) age when the event occurred; (2) clarity of the memory, rated from diffuse to clear; (3) level of detail remembered, rated from few details to many details; (4)

Table 1. Sample characteristics.

	Overall sample			Incarcerated with mental illness			Incarcerated without mental illness			Community controls		
Variable	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*
Age (years)	30.8	12.7	775	41.3	8.9	54	39.7	9.8	177	26.9	11.7	544
Years of education	11.9	3.9	683	8.6	3.0	48	10.0	4.1	172	13.0	3.4	463
Years in the workforce	13.4	12.2	489	13.8	9.8	52	14.3	10.3	169	12.9	13.6	268

valence of the memory, rated from negative to positive; (5) emotional intensity when recalling the memory, rated from little intensity to much intensity; (6) importance of the implications of the event for oneself, rated from not at all to very important; (7) how one felt in the moment of the event, rated from not at all to a lot; (8) level of self-definition of the event, rated from not at all to very defining; (9) level of repetition of the SDM, rated from never to many times; (10) attribution of hostility in others, rated from none to a lot; and (11) threat to one's physical integrity, rated from not at all to very threatening.

Buss-Perry aggression questionnaire (Buss & Perry, 1992)

Trait aggression was measured using a Spanish translation of the AQ. The AQ consists of 29 items, and comprises four subscales: physical aggression, verbal aggression, anger, and hostility. Items are rated on a seven-point scale ranging from 1 = *extremely uncharacteristic of me* to 7 = *extremely characteristic of me*. Example items include: "Given enough provocation, I may hit another person;" "I can't help getting into arguments when people disagree with me;" "I have trouble controlling my temper." With regard to internal consistency, Cronbach's alpha was reported as .89. Test-retest reliability of the AQ is high at $r = .80$ (Buss & Perry, 1992). Aggressive traits as measured by the AQ have good discriminant validity from other personality traits (Buss & Perry, 1992).

Analytical strategy

Descriptive statistical analyses were performed using R (R Core Team, 2013) and the *pastecs* package (Grosjean & Ibanez, 2014). Please note that the dataset and R analysis code are publicly available on Open Science Framework (OSF; DOI: 10.17605/OSF.IO/GUJTA). We performed one-way ANOVAs to analyze group differences on demographic variables. Bivariate correlations between the study variables were calculated for each group separately using the *Hmisc* package in R (Harrell & Dupont, 2006). We performed non-parametric Kruskal–Wallis rank sum tests to examine between group differences for each phenomenological characteristic of SDMs and aggression, given that assumptions of normality and homogeneity of variance were not met (e.g., Dmitrienko & D'Agostino, 2018). To minimize the familywise error rate, we used a significance criterion of $\alpha = .005$.

Results

Descriptive statistics

The overall sample had a mean age of 30.8 ± 12.7 years (range = 18–64 years). Age was statistically higher for incarcerated individuals, with and without psychiatric diagnoses, than community controls, $F(2, 772) = 113.7$, $p = .000$, $\eta^2 = .23$. The overall sample attained a mean level of 11.9 ± 3.9 years of education. Community controls completed more years of education than incarcerated individuals, regardless of mental health status of offenders, $F(2, 680) = 66.46$, $p = .000$, $\eta^2 = .16$. There were no differences between groups for years in the workforce, $F(2, 486) = 0.73$, $p = .485$, $\eta^2 = .00$ ($M = 13.4 \pm 12.2$ years). Descriptive statistics of sample characteristics are presented in Table 1. Means and standard deviations for phenomenological experiences of SDMs are displayed in Table 2.

SDMs and criminal status

Assumptions of normality and homogeneity of variance for ANOVA were not met; thus, we calculated non-parametric Kruskal–Wallis rank sum chi-squared tests for each facet of SDMs to examine between group differences. Supporting our hypothesis that characteristics of SDMs would demonstrate group differences, each phenomenological characteristic of SDMs, with the exception of self-definition and perceived hostile attribution in others, displayed significant differences between groups at $p < .005$. Kruskall-Wallis test values were as follows: age at SDM, $\chi^2 = 129.89$; clarity, $\chi^2 = 20.87$; detail, $\chi^2 = 12.79$; valence, $\chi^2 = 43.11$; current emotional intensity, $\chi^2 = 111.59$; importance of implications, $\chi^2 = 111.09$; memory of emotion at SDM, $\chi^2 = 23.43$; self-description, $\chi^2 = 7.89$; repetition, $\chi^2 = 93.68$; hostile attribution, $\chi^2 = 9.05$; physical threat, $\chi^2 = 29.19$. See Table 2 for detail of analyses for all characteristics of SDMs. Pairwise Nemenyi post-hoc tests performed on ranked means, with Tukey correction, revealed that overall differences in the significant aspects of SDMs were driven by differences between community controls and criminal offenders, regardless of mental health status.

Age at time of event, current emotional intensity, and importance of implications demonstrated differences of large effect size (as determined by η^2). Compared to community members, incarcerated offenders were older at the event of SDMs, experienced greater emotional intensity recalling SDMs, and rated SDMs as more important. Valence and repetition of SDMs showed intermediate

Table 2. Descriptive statistics and Kruskal-Wallis rank sum tests for characteristics of SDMs.

	Incarcerated without mental illness		Incarcerated with mental illness		Community controls		χ^2	*p-value*	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*			
Age at SDM *N* = 663	30.16	11.34	28.41	11.98	19.63	9.35	129.89	.000	.194
Clarity *N* = 677	5.98	1.97	6.06	2.02	5.78	1.58	20.87	.000	.028
Detail *N* = 677	5.53	2.13	5.55	2.22	5.33	1.71	12.79	.002	.016
Valence *N* = 676	1.95	1.83	2.15	2.13	2.79	2.04	43.11	.000	.061
Current emotional intensity *N* = 673	5.58	1.99	5.80	1.89	3.82	1.94	111.59	.000	.164
Importance of implications *N* = 674	6.02	2.00	6.06	2.06	4.32	2.20	111.09	.000	.163
Memory of emotion at SDM *N* = 676	5.79	2.07	5.96	2.24	5.55	1.73	23.43	.000	.032
Self-description *N* = 674	3.78	2.66	4.65	2.68	3.58	2.09	7.89	.019	.009
Repetition *N* = 676	5.54	2.04	5.76	2.12	3.94	1.96	93.68	.000	.136
Hostile attribution *N* = 676	4.06	2.77	3.86	2.70	3.29	2.13	9.05	.011	.010
Physical threat *N* = 675	4.19	2.80	4.53	2.87	3.00	2.15	29.19	.000	.040

Note. η^2 indicates effect size for Kruskal-Wallis tests (Lenhard & Lenhard, 2016). Bolded variables indicate effects significant at $p < .005$.

effect sizes of group differences. Incarcerated individuals rated SDMs as more negative than community controls, and remembered SDMs with greater levels of repetition. Clarity of SDMs, feelings during the event, and perceived threat to physical integrity displayed small effects. Criminal offenders endorsed their SDMs as having more clarity, with more feelings, and with greater threat to their physical integrity.

Aggression and criminal status

As with the phenomenological characteristics of SDMs, assumptions of normality and homogeneity of variance for ANOVA were not met for aggression. Given these violations of parametric assumptions, we opted for non-parametric Kruskal–Wallis rank sum chi-squared tests to analyze between group differences. Aggression was different across groups ($M_{Community} = 61.42$; $M_{Offender} = 69.28$; $M_{OffenderMI} = 81.71$), $\chi^2 = 55.93$, $p = .000$. Pairwise Nemenyi post-hoc tests performed on ranked means revealed that trait aggression did not statistically differ between incarcerated individuals diagnosed with a psychiatric disorder, compared to incarcerated individuals without mental illness. In addition, as hypothesised, offenders both with and without mental illness had higher levels of aggression than community controls.

Aggression and SDMs

Of the phenomenological characteristics of SDMs that demonstrated group differences, age at time of event demonstrated the strongest associations with aggression when examined by group for incarcerated individuals with mental illness and for community controls. Age at SDMs had the third strongest correlation with aggression for incarcerated individuals without mental illness, of the facets of SDMs that differed across groups (after detail, $r = -.24$; and clarity, $r = -.20$). Age at the occurrence of event was negatively correlated with aggression, such that trait aggression was related to younger age. This association is presented visually, by group, in Figure 1. Correlations did not statistically differ between groups: community controls, $r = -.21$; incarcerated offenders without mental illness, $r = -.17$; incarcerated offenders with mental illness, $r = -.27$ (reference row 12 of Tables A1, A2, and A3 in the appendix).

A posteriori power analysis

In addition to the analyses above, we conducted a post-hoc power analysis for the between-group analyses on phenomenological characteristics of SDMs. We used G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) to calculate the a posteriori power of a generic F test, as an estimate of power for the non-parametric tests conducted. The parameters of the power analysis were as follows: noncentrality parameter = 30 (software default), $\alpha = .005$, numerator $df = 2$, denominator $df = 772$. Given these parameters, we had 99% power to detect a difference between groups on each characteristic of SDMs.

Discussion

Overall, the relationship between several components of SDMs and criminality differed between community members and criminal offenders, regardless of mental

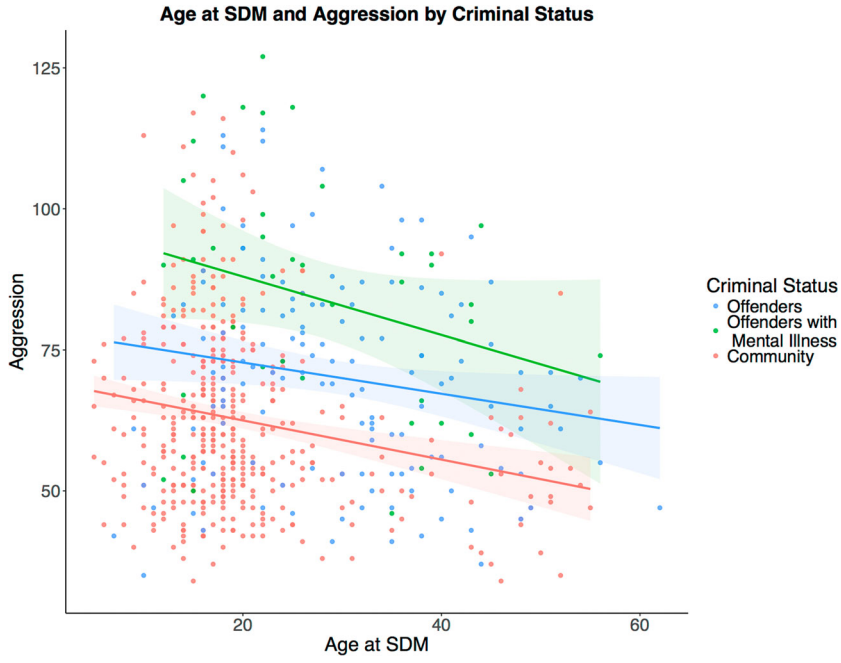

Figure 1. Age at time of event for self-defining memories (SDMs; x-axis) and trait aggression as measured by the Buss-Perry Aggression Questionnaire (y-axis). Shaded areas display 95% confidence intervals for each group.

health status. Thus, our hypothesis was supported in part, such that memories of one's criminal self were distinguished between offenders broadly and community members. Moreover, as expected, aggression differed between groups and was higher in incarcerated individuals. In the present sample, aggression was negatively correlated with age at SDMs, and this association did not differ across groups. Examining factors of SDMs related to the criminal self may provide richer information about criminality than aggression alone. One of the two phenomenological characteristics of SDMs that did not differ between groups, with α =.005, was the level of self-definition. This is not surprising because, by definition, SDMs should have a high level of self-description. Our observations are consistent with other studies in the literature. Berna et al. (2011) found SDMs in patients with schizophrenia compared to community controls did not statistically differ in terms of personal significance.

These results support the notion that having mental illness alone does not make one more likely to endorse characteristics of criminal memories. People with mental illness are sometimes stigmatised as prone to criminality or violence, but our findings demonstrate that psychiatric diagnosis was not associated with differences in SDMs around the criminal self. The largest effects (see Table 2) were observed for age at time of SDMs, emotional intensity during recall of SDMs, and the importance of the implications from the SDM events, which highlight the role of emotion and self-relevance for the development of SDMs.

The negative association between age at SDMs and trait aggression follows the expected pattern of lifespan development. Conway and Holmes (2004) found that autobiographical memories from events in early adulthood related to themes of identity and societal context, in a study examining the relationship between autobiographical memory and Erikson's psychosocial life stages. Our results showed (see Figure 1) that the majority of SDMs occurred in late adolescence to early adulthood for individuals with higher levels of trait aggression, highlighting an interesting developmental facet of the relationship between memory and criminal identity.

When rehabilitating individuals who have been incarcerated, it may be beneficial to emphasise how SDMs play a role in their identity. This is especially important because identifying as a criminal may render a person more likely to reoffend. Assessing SDMs of offenders may elucidate identity related to the development of their criminal career. Literature from the field of criminology highlights the impact of self-identity as an offender, and reshaping that identity, on desistance (i.e., stopping re-offenses and antisocial behaviour), as well as intervening early to curtail the development of a criminal career (Bottoms, Shapland, Costello, Holmes, & Muir, 2004; Farrington, Ttofi, Crago, & Coid, 2014). Prevention of criminal recidivism might focus on reframing past criminal behaviour as events in the past rather than a necessary and stable characteristic of one's identity. For example, "I committed a crime, and I can change my behaviour," rather than "I am a criminal and always will be." Therapeutic interventions tailored for this purpose and population remain to be explored. Further research on targeted interventions, perhaps similar to MEmory Specificity Training (MEST; Raes, Williams, & Hermans, 2009) for individuals with depression, may be beneficial.

Limitations

We acknowledge limitations of the current study. First, most of the sample was comprised of community controls, and controls were not matched to the sample of incarcerated individuals (i.e., those with and without mental illness). Although community controls were asked to self-report any psychiatric disorders, they were healthy overall; only four community individuals reported mental illness. Future studies should more formally assess and control this variability to the extent possible. Second, the current study only included men; women may show different effects.

Finally, although the methodology of eliciting SDMs was consistent among all participants, asking about one's most criminal or transgressive self may have been more readily accessible for incarcerated individuals. Nonetheless, all participants recalled and reported SDMs about their most transgressive self. Community controls were also able to demonstrate their most aggressive self. Specifically, most of the memories that controls reported were from periods of childhood or adolescence, where they engaged in or reacted with aggressive behaviours in social interactions (e.g., responding to peer provocation with aggression). For example, one community member reported,

> One time in high school when I was 13 or 14 years old, a peer (I did not especially like him) made fun of me by dragging the chair I was kneeling on and I almost hit my mouth on the window frame [nearby] … I turned to him while he was laughing and I punched him in the face, his glasses flew off, and then we started to argue.

Another stated,

> Once at a summer camp, while we were playing a [game], a friend of mine threw an egg at my head and I'm allergic to eggs. At that moment, I didn't hit him because I [was able to] control myself and because he was my friend…

Although the SDM content for controls was not as serious as a crime, their SDMs did include elements of aggression. Despite these limitations, this research demonstrates connections between SDMs, criminality, and aggression that can be a foundation for future research and guide the cognitive assessment of criminal offenders.

Conclusion

In summary, SDMs of one's most transgressive, aggressive, or criminal self differ by several characteristics between incarcerated individuals and community controls. SDMs did not statistically differ in terms of degree of self-definition across groups. Irrespective of group, our assessment of SDMs confirmed that these memories were indeed self-defining and thus relevant to their sense of identity. Factors such as emotional intensity were different and endorsed at a higher level in criminal offenders compared to community members, suggesting that memories contributing to the criminal identity are more salient for incarcerated offenders. This is an important insight for the development of a criminal identity, and may be a target for rehabilitation and mitigating recidivism.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Bayley J. Taple http://orcid.org/0000-0002-5812-5848

References

Berna, F., Bennouna-Greene, M., Potheegadoo, J., Verry, P., Conway, M. A., & Danion, J.-M. (2011). Self-defining memories related to illness and their integration into the self in patients with schizophrenia. *Psychiatry Research*, *189*(1), 49–54. doi:10.1016/j.psychres.2011.03.006

Berntsen, D., & Rubin, D. C. (2006). The centrality of event scale: A measure of integrating a trauma into one's identity and its relation to post-traumatic stress disorder symptoms. *Behaviour Research and Therapy*, *44*(2), 219–231. doi:10.1016/j.brat.2005.01.009

Blagov, P. S., & Singer, J. A. (2004). Four dimensions of self-defining memories (specificity, meaning, content, and affect) and their relationships to self-restraint, distress, and repressive defensiveness. *Journal of Personality*, *72*(3), 481–511. doi:10.1111/j.0022-3506.2004.00270.x

Bottoms, A., Shapland, J., Costello, A., Holmes, D., & Muir, G. (2004). Towards desistance: Theoretical underpinnings for an empirical study. *The Howard Journal of Criminal Justice*, *43*(4), 368–389. doi:10.1111/j.1468-2311.2004.00336.x

Buss, A. H., & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology*, *63*(3), 452–459. doi:10.1037/0022-3514.63.3.452

Conway, M. A. (2005). Memory and the self. *Journal of Memory and Language*, *53*(4), 594–628. doi:10.1016/j.jml.2005.08.005

Conway, M. A., & Holmes, A. (2004). Psychosocial stages and the accessibility of autobiographical memories across the life cycle. *Journal of Personality*, *72*(3), 461–480. doi:10.1111/j.0022-3506.2004.00269.x

Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review*, *107*(2), 261–288. doi:10.1037/0033-295x.107.2.261

Conway, M. A., Singer, J. A., & Tagini, A. (2004). The self and autobiographical memory: Correspondence and coherence. *Social Cognition*, *22*(5), 491–529. doi:10.1521/soco.22.5.491.50768

Dmitrienko, A., & D'Agostino, R. B. Sr. (2018). Multiplicity considerations in clinical trials. *New England Journal of Medicine*, *378*(22), 2115–2122. doi:10.1056/NEJMra1709701

Dolan, M., & Anderson, I. M. (2002). Executive and memory function and its relationship to trait impulsivity and aggression in personality disordered offenders. *The Journal of Forensic Psychiatry*, *13*(3), 503–526. doi:10.1080/0958518021000019452

Evans, C., Ehlers, A., Mezey, G., & Clark, D. M. (2007). Intrusive memories in perpetrators of violent crime: Emotions and cognitions. *Journal of Consulting and Clinical Psychology*, *75*(1), 134–144. doi:10.1037/0022-006x.75.1.134

Farrington, D. P., Ttofi, M. M., Crago, R. V., & Coid, J. W. (2014). Prevalence, frequency, onset, desistance and criminal career duration in self-reports compared with official records. *Criminal Behaviour and Mental Health*, *24*(4), 241–253. doi:10.1002/cbm.1930

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149–1160. doi:10.3758/BRM.41.4.1149

Griffith, J. W., Sumner, J. A., Raes, F., Barnhofer, T., Debeer, E., & Hermans, D. (2012). Current psychometric and methodological issues in the measurement of overgeneral autobiographical memory. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*(Suppl 1), S21–S31. doi:10.1016/j.jbtep.2011.05.008

Grosjean, P., & Ibanez, F. (2014). Pastecs: Package for analysis of space-time ecological series (Version R package version, 1.3-18). Retrieved from https://cran.r-project.org/

Harrell, F. E., & Dupont, M. C. (2006). The Hmisc package (Version R package version, 3-0). Retrieved from https://cran.r-project.org

Hermans, D., Vandromme, H., Debeer, E., Raes, F., Demyttenaere, K., Brunfaut, E., & Williams, J. M. G. (2008). Overgeneral autobiographical memory predicts diagnostic status in depression. *Behaviour Research and Therapy*, *46*(5), 668–677. doi:10.1016/j.brat.2008.01.018

Holland, A. C., & Kensinger, E. A. (2010). Emotion and autobiographical memory. *Physics of Life Reviews*, *7*(1), 88–131. doi:10.1016/j.plrev.2010.01.006

Hung, L., & Bryant, R. A. (2016). Autobiographical memory in the angry self. *PLoS ONE*, *11*(3), e0151349. doi:10.1371/journal.pone.0151349

Kleim, B., & Ehlers, A. (2008). Reduced autobiographical memory specificity predicts depression and posttraumatic stress disorder after recent trauma. *Journal of Consulting and Clinical Psychology*, *76*(2), 231–242. doi:10.1037/0022-006x.76.2.231

Lenhard, W., & Lenhard, A. (2016). *Calculation of effect sizes [Software]*. Dettelbach, Germany: Psychometrica. Retrieved from https://www.psychometrica.de/effect_size.html. doi:10.13140/RG.2.1.3478.4245

Luchetti, M., Rossi, N., & Montebarocci, O. (2016). Brief report: Collecting self-defining memories outside therapy. *Clinical Psychologist*, *20*(2), 80–85. doi:10.1111/cp.12032

Martinez-Hernandez, N., & Ricarte, J. (2018). Self-defining memories related to alcohol dependence and their integration in the construction of the self in a sample of abstinent alcoholics. *Memory (Hove, England)*, 1–10. doi:10.1080/09658211.2018.1493128

Raes, F., Williams, J. M. G., & Hermans, D. (2009). Reducing cognitive vulnerability to depression: A preliminary investigation of MEmory specificity training (MEST) in inpatients with depressive symptomatology. *Journal of Behavior Therapy and Experimental Psychiatry*, *40*(1), 24–38. doi:10.1016/j.jbtep.2008.03.001

R Core Team. (2013). *R: A language and environment for statistical computing (Version Version 3.3.1)*. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from http://www.r-project.org/

Singer, J. A. (2005). *Memories that matter: How to use self-defining memories to understand & change your life*. Oakland, CA: New Harbinger Publications.

Singer, J. A., & Moffitt, K. H. (1992). An experimental investigation of specificity and generality in memory narratives. *Imagination, Cognition and Personality*, *11*(3), 233–257. doi:10.2190/72a3-8upy-gdb9-gx9k

Singer, J. A., & Salovey, P. (1993). *The remembered self: Emotion and memory in personality*. New York, NY: Free Press.

Sumner, J. A., Griffith, J. W., & Mineka, S. (2010). Overgeneral autobiographical memory as a predictor of the course of depression: A meta-analysis. *Behaviour Research and Therapy*, *48*(7), 614–625. doi:10.1016/j.brat.2010.03.013

Sutherland, K., & Bryant, R. A. (2005). Self-defining memories in posttraumatic stress disorder. *British Journal of Clinical Psychology*, *44*(4), 591–598. doi:10.1348/014466505x64081

Talarico, J. M., LaBar, K. S., & Rubin, D. C. (2004). Emotional intensity predicts autobiographical memory experience. *Memory & Cognition*, *32*(7), 1118–1132. Retrieved from https://link.springer.com/content/pdf/10.3758/BF03196886.pdf

Tulving, E., & Craik, F. I. M. (2000). *The Oxford handbook of memory*. New York, NY: Oxford University Press.

Vannucci, M., Nocentini, A., Chiorri, C., & Menesini, E. (2014). Brief report: Violent false memories and engagement in aggressive and delinquent behavior: An investigation in adolescents. *Journal of Adolescence*, *37*(8), 1329–1333. doi:10.1016/j.adolescence.2014.09.007

Williams, J. M., Barnhofer, T., Crane, C., Herman, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*, *133*(1), 122–148. doi:10.1037/0033-2909.133.1.122

Williams, J. M., & Broadbent, K. (1986). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology*, *95*(2), 144–149. doi:10.1037/0021-843x.95.2.144

Williams, J. M., & Scott, J. (1988). Autobiographical memory in depression. *Psychological Medicine*, *18*(3), 689–695. doi:10.1017/S0033291700008370

Wood, W.-J., & Conway, M. (2006). Subjective impact, meaning making, and current and recalled emotions for self-defining memories. *Journal of Personality*, *74*(3), 811–846. doi:10.1111/j.1467-6494.2006.00393.x

Appendix

Table A1. Bivariate correlations among the study variables: Inmates with mental illness.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age at SDM												
2. Clarity	.07											
3. Detail	.07	.62										
4. Valence	−.09	−.06	.04									
5. Current emotional intensity	.00	.04	.06	.11								
6. Importance of implications	−.02	−.22	−.11	.10	.47							
7. Memory of emotion at SDM	.17	.30	.47	.05	.16	−.05						
8. Self-description	.14	.18	.34	−.05	.25	.10	.10					
9. Repetition	.21	−.22	−.03	−.02	.35	.44	.04	.19				
10. Hostile attribution	.04	.09	−.14	.16	.14	.18	.03	.00	.07			
11. Physical threat	.02	−.08	−.17	−.03	.14	.20	−.03	−.04	.06	.42		
12. AQ Total	−.27	.05	.11	−.04	.17	.07	−.15	.16	−.20	.19	−.05	

Note. AQ Total is aggression as measured by the Buss-Perry Aggression Questionnaire.

Table A2. Bivariate correlations among the study variables: Inmates without mental illness.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age at SDM												
2. Clarity	.14											
3. Detail	.15	.71										
4. Valence	−.28	.14	.15									
5. Current emotional intensity	.16	.11	.14	−.09								
6. Importance of implications	.30	.07	.11	−.34	.23							
7. Memory of emotion at SDM	.00	.34	.29	−.01	.06	.19						
8. Self-description	.01	.12	.10	.08	.08	.01	.07					
9. Repetition	.19	.02	.12	−.24	.38	.35	.14	.25				
10. Hostile attribution	.17	−.08	.04	−.15	−.04	.03	.08	−.02	.03			
11. Physical threat	.04	−.05	.02	−.09	−.04	−.03	.05	−.06	−.04	.56		
12. AQ Total	−.17	−.20	−.24	.02	.13	−.07	.03	.18	.05	.11	.14	

Note. AQ Total is aggression as measured by the Buss-Perry Aggression Questionnaire.

Table A3. Bivariate correlations among the study variables: Community controls.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age at SDM												
2. Clarity	.19											
3. Detail	.16	.77										
4. Valence	.06	.14	.07									
5. Current emotional intensity	.06	.31	.33	.16								
6. Importance of implications	.04	.26	.28	.09	.50							
7. Memory of emotion at SDM	.14	.48	.41	.01	.33	.43						
8. Self-description	.11	.26	.25	.29	.44	.49	.32					
9. Repetition	.08	.27	.32	.06	.56	.59	.44	.48				
10. Hostile attribution	.04	.01	.10	−.03	.09	.13	.13	.11	.16			
11. Physical threat	−.04	−.01	.03	−.04	.04	.02	.04	−.02	.07	.47		
12. AQ Total	−.21	.02	.08	.00	.10	.12	.10	.10	.16	.22	.14	

Note. AQ Total is aggression as measured by the Buss-Perry Aggression Questionnaire.

Table A4. Bivariate correlations among the study variables across groups.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age at SDM												
2. Clarity	.17											
3. Detail	.15	.74										
4. Valence	−.11	.11	.08									
5. Current emotional intensity	.23	.23	.26	.02								
6. Importance of implications	.24	.18	.21	−.06	.51							
7. Memory of emotion at SDM	.12	.42	.38	.00	.25	.33						
8. Self-description	.11	.21	.21	.19	.33	.34	.23					
9. Repetition	.25	.16	.24	−.07	.57	.58	.33	.39				
10. Hostile attribution	.13	.00	.07	−.07	.10	.15	.11	.06	.15			
11. Physical threat	.09	−.02	.02	−.09	.12	.10	.05	−.01	.12	.51		
12. AQ Total	−.08	−.02	.01	−.05	.22	.16	.08	.16	.20	.21	.18	

Note. AQ Total is aggression as measured by the Buss-Perry Aggression Questionnaire.