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ORIGINAL ARTICLE

Predicting self- and other-directed violence among discharged psychiatric patients: the roles of anger and psychopathic traits

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Background. We examined the extent to which trait anger and psychopathic traits predicted post-discharge self-directed violence (SDV) and other-directed violence (ODV) among psychiatric patients.

Method. Participants were 851 psychiatric patients sampled from in-patient hospitals for the MacArthur Violence Risk Assessment Study (MVRAS). Participants were administered baseline interviews at the hospital and five follow-up interviews in the community at approximately 10-week intervals. Psychopathy and trait anger were assessed with the Psychopathy Checklist: Screening Version (PSC:SV) and the Novaco Anger Scale (NAS) respectively. SDV was assessed during follow-ups with participants and ODV was assessed during interviews with participants and collateral informants. Psychopathy facets and anger were entered in logistic regression models to predict membership in one of four groups indicating violence status during follow-up: (1) SDV, (2) ODV, (3) co-occurring violence (COV), and (4) no violence.

Results. Anger predicted membership in all three violence groups relative to a non-violent reference group. In unadjusted models, all psychopathy facets predicted ODV and COV during follow-up. In adjusted models, interpersonal and antisocial traits of psychopathy predicted membership in the ODV group whereas only antisocial traits predicted membership in the COV group.

Conclusions. Although our results provide evidence for a broad role for trait anger in predicting SDV and ODV among discharged psychiatric patients, they suggest that unique patterns of psychopathic traits differentially predict violence toward self and others. The measurement of anger and facets of psychopathy during discharge planning for psychiatric patients may provide clinicians with information regarding risk for specific types of violence.

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Key words: Aggression, anger, psychopathy, suicide, violence.

Introduction

Violence is a major public health problem and the elucidation of factors that predict violence is essential to inform risk management and the development of interventions for risk reduction. Although violence is most typically conceptualized as being externally directed, compelling arguments have been made for including self-harming behaviors within the rubric of violence (Gray *et al.* 2003). Elevated rates of both self-directed violence (SDV) and other-directed violence (ODV) have been identified among psychiatric patients (Torrey *et al.* 2008), and both forms of violence represent important targets for clinical intervention. However, despite substantial clinical interest in elucidating SDV and ODV among psychiatric patients, relatively few studies have examined the extent to which these distinct forms of violence are associated with common *versus* distinct risk factors. In the present study we address this by examining how individual differences associated with general violence predict inward- or outward-directed violence.

SDV and ODV

Several investigations have reported a link between SDV and ODV. Angst & Clayton (1986) found higher

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aggression scores at last observation among psychiatric patients who eventually died by suicide relative to controls. Conner *et al.* (2001) found that interpersonally violent behavior in the last year of life predicted suicide in a large community sample. In addition to suicide deaths, the association between ODV and SDV extends to suicide attempts (Angst & Clayton, 1986; Conner *et al.* 2009) and non-lethal, self-injurious behavior (Hillbrand, 1995). Common biological underpinnings of SDV and ODV raise the possibility that tendencies toward the two may arise from the same diathesis. Serotonergic function is crucial for the regulation of ODV (Gietl *et al.* 2007), and several studies have demonstrated a correlation between low serotonergic activity and SDV (Mann, 2003; Braquehais *et al.* 2010). Similarly, alterations in cholesterol homeostasis have been implicated in attempted suicide and in suicide among individuals with low serum cholesterol (Gietl *et al.* 2007), and studies of interpersonally violent individuals have shown decreased levels of serum cholesterol relative to non-violent individuals (Troisi & D'Argenio, 2006). It has been suggested that these largely genetically determined biological mechanisms interact to create a diathesis for generally violent behavior (Gietl *et al.* 2007). Whereas this genetic and biological-level model of violence highlights features that underlie both SDV and ODV, it has been posited that the presence or absence of additional variables may determine whether an individual with tendencies toward violence is predominantly violent toward the self or others (Plutchik *et al.* 1995). Therefore, the identification of readily assessed psychological variables that predict inwardly *versus* outwardly directed violence is of considerable utility.

Externalizing psychopathology (Krueger *et al.* 2002; Krueger, 2006), including antisocial behavior disorders, substance use disorders, and related personality traits, is a promising avenue of exploration in the effort to identify features that confer risk for SDV *versus* ODV. Externalizing psychopathology can be reliably assessed and is associated with increased risk for both types of violence (Conner *et al.* 2001; Verona *et al.* 2001; Leistico *et al.* 2008). However, unlike the fine-grained analyses that have linked specific internalizing features such as hopelessness (Beck *et al.* 1985) and depression (Cavanagh *et al.* 2003) to SDV (Brown *et al.* 2005), there are few data on specific aspects of externalization that promote risk for SDV *versus* ODV. Given the prevalence of externalizing psychopathology in community, psychiatric and forensic populations (Verona *et al.* 2004; Walsh *et al.* 2007), more and better data on specific risk-promoting aspects of externalization are needed (Swogger *et al.* 2009).

Psychopathy and anger

Psychopathy and anger are among the most robust individual-level predictors of violent behavior. Psychopathy is a personality syndrome characterized by a diminished capacity for remorse, impulsive behavior and superficial charm (Cleckley, 1976). A wealth of data from both forensic and non-forensic settings has established its relationship to ODV (Skeem & Mulvey, 2001; Hare, 2003; Leistico *et al.* 2008). As assessed by the Hare Psychopathy Checklist – Revised (PCL-R; Hare, 2003) and its derivatives, the psychopathic personality consists of two higher-order factors: Factor One (F1) reflects callous, unemotional personality and manipulative interpersonal style, and Factor Two (F2) reflects impulsive and antisocial lifestyle and behavior. More recently, a four-factor model has been validated in which each of the original two factors is composed of two correlated facets (Hare, 2003). Factor One (F1) comprises distinct interpersonal (i.e. charm, deceit, manipulation) and affective (i.e. emotional shallowness, lack of empathy and remorse) facets, and Factor Two (F2) comprises lifestyle (i.e. impulsivity and irresponsibility) and antisocial (i.e. chronic and varied antisocial behavior) facets. Although the PCL-R facets are highly correlated, there is important heterogeneity among individuals with high psychopathy scores (Swogger & Kosson, 2007) such that specific patterns of elevations may be meaningful because of their differential correlates (Hare & Neumann, 2009). Research has demonstrated that both F1 and F2 are related to ODV (Kosson *et al.* 1997; Skeem & Mulvey, 2001; Woodworth & Porter, 2003), although some studies have found that F1's relationship to ODV is reduced substantially after controlling for shared variance with F2 (e.g. Harris *et al.* 1993; Skeem & Mulvey, 2001). Regarding SDV, studies using the two-factor psychopathy model indicate that F1 is either orthogonal to or inversely related to suicidal behavior (Verona *et al.* 2005), and F2 is positively associated with suicidal behavior (Verona *et al.* 2004; Douglas *et al.* 2006). A more recent analysis using MacArthur Violence Risk Assessment Study (MVRAS) data and incorporating the four-factor model of psychopathy provided evidence that the antisocial facet, in particular, is associated with suicide attempts among psychiatric in-patients (Swogger *et al.* 2009).

The associations between psychopathy dimensions and ODV and SDV raise intriguing possibilities. The interpersonal and affective facets comprising F1 may be distinctly correlated with ODV and may not predict SDV. However, given the robust association between F2 and ODV, and the association between ODV and SDV, the link between F2 and SDV may be an

epiphenomenon of the more general association between psychopathy and violence. If this is true, the examination of psychopathic traits and SDV without taking into account ODV may obscure the true nature of the association between psychopathic traits and SDV. We are aware of no studies that have examined psychopathy and SDV in light of levels of ODV.

Anger is an important correlate of externalizing psychopathology (Wang & Diamond, 1999) and often plays a central role in ODV (Wilkowski & Robinson, 2008; Sadeh *et al.* 2011). Anger is associated with interpersonally violent behavior including intimate partner violence, workplace violence, and child abuse (Nomellini & Katz, 1983). Moreover, data from the MVRAS indicate that self-reported anger predicts ODV among discharged psychiatric patients (Doyle & Dolan, 2006). There is also evidence that anger is associated with SDV. Trait anger has been found to correlate with number of suicide attempts (Esposito *et al.* 2003) and with a previous history of suicide attempts among adolescent patients (Daniel *et al.* 2009). However, findings regarding the relationship between anger and SDV are equivocal, as anger has been found to be unrelated to SDV among adult in-patients (Brezo *et al.* 2006) and criminal offenders (Sadeh *et al.* 2011). In short, relative to the robust relationship between trait anger and ODV, data on the trait anger/SDV relationship are preliminary (Brezo *et al.* 2006).

The present study was designed to address gaps in the existing literature by examining whether psychopathic traits and trait anger are broadly related to both SDV and ODV, or whether unique combinations of these traits specifically predict tendencies toward inwardly or outwardly directed violence. To this end, we examined the unique and combined power of psychopathic traits and anger to predict whether patients discharged from in-patient psychiatric treatment would commit ODV, SDV, or both (i.e. co-occurring violence; COV) during a 1-year follow-up period. To provide a fine-grained analysis of psychopathic traits, we used the four-factor model of psychopathy. We predicted that all features of psychopathy would predict ODV and COV. Based upon prior findings, we hypothesized that interpersonal and affective features (F1) of psychopathy would predict ODV but not SDV or COV in adjusted analyses that controlled for all other variables. We expected that trait anger would predict both ODV and COV in these analyses. Consistent with the idea that the relationship between antisocial features of psychopathy and SDV is an epiphenomenon of a relationship between these features and ODV, we hypothesized that antisocial features of psychopathy would be related to ODV and COV but not SDV in adjusted analyses. Informed by the literature on ODV and SDV, we included select covariates. Substance use disorders have been extensively studied in relation to both self-directed and interpersonal violence, and exhibit associations with both SDV and ODV (Verona *et al.* 2004). Likewise, studies of SDV and ODV have yielded gender and ethnic differences (Conner *et al.* 2009; Swogger *et al.* 2009). Thus, we examined substance use disorder diagnosis, gender and ethnicity as covariates.

Method

Participants

Participants were 851 civil psychiatric patients between the ages of 18 and 40 (mean = 30.3, S.D. = 6.1) years who were sampled from one of three acute in-patient hospitals for the MVRAS; see Silver *et al.* (1999) for a detailed description of this study. Additional inclusion criteria were: (*a*) civil admission, (*b*) English speaking, and (*c*) diagnosis, based on medical records, of schizophrenia, schizo-affective disorder, schizophreniform disorder, dysthymia, mania, depression, brief reactive psychosis, alcohol or other drug abuse or dependence, delusional disorder, or personality disorder. Otherwise eligible individuals who were hospitalized for 21 days or more prior to enrollment were excluded to obtain a sample of acute, rather than chronic, psychiatric patients. Participants were administered a baseline interview in the hospital and follow-up interviews in the community, attempted at approximately 10-week intervals. Eighty-six percent of attempted follow-up interviews were successfully completed.

For the present study we have incorporated data from the baseline interview and all five follow-up interviews. After excluding data from 285 participants who were not administered the Psychopathy Checklist: Screening Version (PCL:SV) and a baseline measure of anger, data on 492 males and 359 females ($n = 851$) were analyzed. This sample comprised individuals with independently determined baseline primary diagnoses of depression (41%), schizophrenia or schizo-affective disorder (17%), bipolar disorder (11%), substance use disorder (22%), personality disorder (2%), or other disorder (7%). The ethnic distribution was 602 (71%) European American and 249 (29%) African American.[1]†

Measures

Psychopathy

Psychopathy was assessed by trained raters using the PCL:SV (Hart *et al.* 1995), based on a semi-structured

† The notes appear after the main text.

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interview and supplemented by a review of file information. The PCL:SV was administered to all participants during the first or second follow-up session. Prior research with this sample reported good interrater reliability ($\kappa = 0.66$) (Fleiss, 1981) and internal consistency ($\alpha = 0.87$) (Skeem & Mulvey, 2001). The sample mean total PCL:SV score was 8.5 (S.D. = 5.6). Mean scores on the PCL:SV facets were as follows: interpersonal = 1.4 (S.D. = 1.6), affective = 1.7 (S.D. = 1.7), lifestyle = 2.9 (S.D. = 1.9), and antisocial = 2.5 (S.D. = 1.8).

Anger

Anger was assessed at baseline using the Novaco Anger Scale (NAS; Novaco, 1994), a 60-item self-report measure of inclination toward anger reactions through cognitive (e.g. rumination, hostility), arousal (e.g. somatic tension, anger intensity), and behavioral (e.g. impulsive reaction, verbal aggression) domains. The NAS displays good internal reliability (Novaco, 1994) and good construct validity (Doyle & Dolan, 2006). The sample mean score for the NAS was 94.7 (S.D. = 16.9).

Substance use diagnosis

Based upon administration of the DSM-III-R checklist (Janca & Helzer, 1990) at baseline, the presence *versus* absence of a current substance use disorder diagnosis was determined. Four-hundred and eighty-six participants (57.1%) met criteria for a substance use disorder.

SDV and ODV

Two questions were asked to assess SDV. During the follow-up interviews, participants were asked whether they had thought of hurting themselves during the approximately 10 weeks since the previous interview. Those who answered affirmatively were asked whether they had attempted to hurt themselves during that time. Two hundred and forty-three participants (29%) reported SDV (i.e. an attempt to hurt themselves) at least once during the follow-up period. ODV was assessed during the same follow-up interviews with participants, and also by interviews with collateral informants. ODV was defined as battery resulting in physical injury (ranging from bruises to death), sexual assault, and threats with weapons in hand. Two hundred and thirty-eight participants (28%) committed ODV at least once during the follow-up period. Based upon presence *versus* absence of SDV and ODV during the follow-up period, four groups were created: (1) no violence ($n = 464$), (2) SDV only ($n = 149$), (3) ODV only ($n = 144$), and (4) COV ($n = 94$).

Data analysis

Analyses were based on multinomial logistic regression models. Odds ratios (ORs) and asymptotic confidence intervals (CIs) were computed using the method of profile likelihood. Statistical significance was based on $\alpha = 0.05$. Predictors were the four psychopathy facets and trait anger, along with covariates that included presence/absence of a current substance use disorder, age, gender, and ethnicity. There was an absence of pronounced multicollinearity among predictors ($r \leqslant 0.65$). For the primary analyses, we first examined each variable in a univariate test, and then entered them simultaneously in a multinomial model predicting membership in the SDV, ODV and COV groups relative to non-violent participants. Finally, we conducted two supplementary analyses. In the first, we used the SDV group as a reference to determine which variables predict ODV and COV relative to SDV only. In the second, we examined group differences on the NAS cognitive, arousal, and behavioral subscales.

Results

More than 80% of follow-up interviews were completed for each group (range 83–88%). Group demographics and means on each variable are shown in Table 1. For descriptive purposes, anger and psychopathy facet *z* scores for each group are depicted in Fig. 1.

Unadjusted analyses

Univariate results showing the predictive value of each variable on group membership are presented in Table 2. Female gender and Caucasian ethnicity were associated with SDV, whereas age was negatively related to COV. Substance use disorder was negatively associated with SDV and positively associated with ODV and COV. Anger was positively associated with membership in each violent group relative to the non-violent reference group, and each psychopathy facet was related to ODV and COV in univariate analyses.

Multivariate analyses

Multivariate results are shown in Table 3. After adjustment for covariates, anger predicted membership in each violent group relative to individuals with no violent acts during follow-up. Psychopathy facets remained unrelated to the SDV group. With regard to psychopathy, whereas ODV was predicted by both

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Table 1. *Intercorrelations among predictors*

Variable	1	2	3	4	5	6	7	8
1. Male gender	–	0.00	0.17**	−0.03	0.15**	0.15**	0.12**	0.16**
2. Age	–	–	0.04	−0.12**	−0.04	−0.05	0.03	−0.03
3. Substance use disorder	–	–	–	0.16**	0.22**	0.23**	0.35**	0.39**
4. Anger	–	–	–	–	0.07	0.17**	0.15**	0.25**
5. PCL:SV Interpersonal	–	–	–	–	–	0.65**	0.42*	0.38**
6. PCL:SV Affective	–	–	–	–	–	–	0.52**	0.49**
7. PCL:SV Lifestyle	–	–	–	–	–	–	–	0.56**
8. PCL:SV Antisocial	–	–	–	–	–	–	–	–

PCL:SV, Psychopathy Checklist: Screening Version.

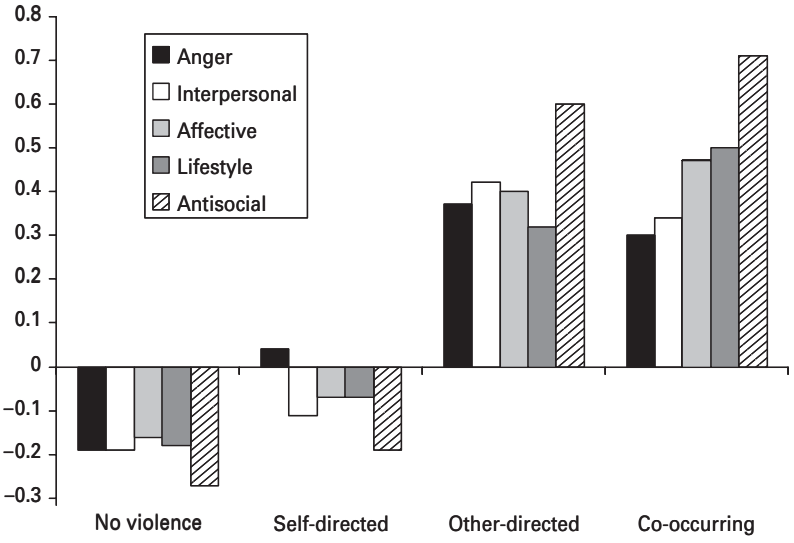

Fig. 1. Anger and psychopathy facet *z* scores for each group.

interpersonal and antisocial facet scores, COV was predicted by antisocial facet scores only.[2]

Supplementary analyses

To determine which variables predicted ODV and COV relative to SDV only, we conducted a multivariate analysis identical to the primary analysis, except that SDV was used as the reference group. After adjusting for covariates, antisocial features of psychopathy predicted ODV (OR 1.47, 95% CI 1.23–1.75, $p<0.01$) and COV (OR 1.56, 95% CI 1.28–1.89, $p<0.01$). Interpersonal features of psychopathy predicted ODV at the trend level (OR 1.19, 95% CI 0.98–1.45, $p=0.09$.) Anger predicted ODV or COV relative to the SDV group.

Finally, to obtain more detailed information regarding facets of anger associated with membership in each group, groups were contrasted on the NAS cognitive, arousal and behavioral subscales using ANOVAs. Tukey HSD *post-hoc* tests revealed the following group differences ($p<0.05$): for the cognitive subscale, mean scores for COV (mean = 32.94, S.D. = 4.93) and ODV (mean = 33.60, S.D. = 5.38) were higher than scores for the non-violent group (mean = 31.09, S.D. = 5.02). For the arousal subscale, scores were higher for COV (mean = 33.48, S.D. = 6.39), ODV (mean = 34.44, S.D. = 6.08), and SDV (mean = 33.83, S.D. = 6.04) than the non-violent group. For the behavioral subscale, scores were higher for COV (mean = 33.24, S.D. = 6.51) and ODV (mean = 32.86, S.D. = 6.61) than SDV (mean = 29.28, S.D. = 6.62) and the non-violent group (mean = 28.76, S.D. = 6.80).

Discussion

In the present study, we aimed to determine whether psychopathic traits and trait anger are broadly related

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Table 2. *Descriptive statistics for the four groups formed based on violent acts committed during follow-up*

	Non-violent ($n=464$)	SDV ($n=149$)	ODV ($n=144$)	COV ($n=94$)
Male, *n* (%)	282 (60.8)	58 (38.9)	99 (68.8)	53 (56.4)
Caucasian, *n* (%)	331 (71.3)	124 (83.2)	84 (58.3)	63 (67.0)
Substance use disorder, *n* (%)	251 (54.1)	64 (43.0)	101 (70.1)	66 (70.2)
Age (years), mean (S.D.)	30.3 (6.3)	29.6 (6.2)	29.7 (6.5)	28.6 (5.2)
Anger, mean (S.D.)	91.5 (16.7)	95.3 (15.8)	100.9 (16.4)	100.0 (16.9)
PCL:SV Interpersonal, mean (S.D.)	1.2 (1.4)	1.2 (1.4)	2.8 (1.9)	2.0 (1.8)
PCL:SV Affective, mean (S.D.)	1.4 (1.5)	1.6 (1.7)	2.4 (1.8)	2.5 (1.9)
PCL:SV Lifestyle, mean (S.D.)	2.6 (1.9)	2.8 (1.9)	3.5 (1.7)	3.9 (1.5)
PCL:SV Antisocial, mean (S.D.)	2.0 (1.7)	2.1 (1.6)	3.6 (1.7)	3.7 (1.8)

SDV, Self-directed violence; ODV, other-directed violence; COV, co-occurring violence; PCL:SV, Psychopathy Checklist: Screening Version; S.D., standard deviation.

to SDV, ODV and COV, or whether unique combinations of these traits predict inwardly or outwardly directed violence. Our results indicate that unique patterns of elevation on psychopathic traits differentially predict violence among discharged psychiatric patients. That is, elevations on interpersonal and antisocial features of psychopathy differentially predicted ODV and COV relative to a non-violent reference group after adjusting for all other predictors. Moreover, trait anger was broadly, though weakly, related to all forms of violence even after adjusting for substance use disorders, psychopathic traits, and relevant demographic covariates. Psychopathic traits did not differentiate members of the SDV group from individuals who displayed no violence during follow-up.

Consistent with prior literature (e.g. Kosson *et al.* 1997; Leistico *et al.* 2008), psychopathy, including all four psychopathy dimensions, predicted ODV. Moreover, all four dimensions of psychopathy were predictive of co-occurring violence against the self and others during follow-up. Consistent with our hypothesis, in adjusted analyses controlling for variance associated with all other variables, the unique contribution of antisocial features of psychopathy predicted ODV and COV relative to non-violent individuals. Also consistent with our expectations, interpersonal features predicted ODV, but not SDV and COV. Contrary to our hypothesis, the unique contribution of affective features of psychopathy was not significant in the prediction of ODV, SDV or COV. No psychopathy facets predicted SDV in the absence of violence toward others. These results help to clarify the literature on psychopathy and SDV. Prior studies had found that the relationship between psychopathy and SDV was primarily due to the antisocial, and possibly impulsive-antisocial, features of psychopathy (Douglas *et al.* 2006; Swogger *et al.* 2009). However, in the present study antisocial features of psychopathy predicted SDV only among individuals who also committed ODV, suggesting that the relationship between these traits and SDV may be an artifact of the relationship between antisocial features of psychopathy and *general* violence. Indeed, this overlap between personality variables and violence may also apply to other personality disorders. For example, Mann *et al.* (1999) noted that borderline personality disorder and interpersonal violence are both robust predictors of suicide attempts; however, the two are strongly interdependent and difficult to separate. In the present study, no features of psychopathy were related to SDV among individuals who committed no ODV during follow-up. This finding raises the possibility that, in assessing individuals' risk for self-harm, antisocial features of psychopathy only confer risk among individuals who exhibit violence toward others.

In general, the interpersonal facet of psychopathy has been associated with instrumental violence, that is violence used as a means to attain a subsidiary goal, often in the absence of intense emotion (Walsh *et al.* 2009). Although findings are mixed (see Walsh *et al.* 2009), impulsive and antisocial features of psychopathy are more highly associated with reactive violence, that is violence that occurs in response to a perceived threat or provocation and is associated with emotional arousal including anger and anxiety, poor modulation of physiological arousal, and loss of behavioral control (Swogger *et al.* 2010). Notably, reactive violence is thought to confer risk for suicidal behavior (Conner *et al.* 2009). Our results are consistent with a model in which violence against others stems from both a manipulative and a calculating interpersonal style consistent with instrumental violence, whereas prodigious antisociality and poor behavioral controls are consistent with reactive violence. The fact that only the antisocial facet is related to COV is consistent

Table 3. *Multinomial models predicting SDV, ODV and COV group membership*

	SDV		ODV		COV	
Independent variable	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Female	2.43** (1.67–3.55)	2.37** (1.59–3.51)	0.71 (0.47–1.05)	0.96 (0.62–1.48)	1.20 (0.77–1.88)	1.73* (1.05–2.83)
Male	1.00	1.00	1.00	1.00	1.00	1.00
Age	0.98 (0.95–1.01)	0.99 (0.96–1.02)	0.98 (0.95–1.01)	0.99 (0.96–1.02)	0.96* (0.92–0.99)	0.96 (0.92–1.00)
Caucasian	1.99** (1.24–3.20)	2.05** (1.25–3.36)	0.56 (0.38–0.83)	0.74 (0.48–1.15)	0.82 (0.51–1.31)	1.07 (0.63–1.81)
African American	1.00	1.00	1.00	1.00	1.00	1.00
Substance use disorder	0.64* (0.44–0.93)	0.58* (0.38–0.89)	1.99** (1.34–2.98)	0.89 (0.55–1.42)	2.00** (1.24–3.23)	0.88 (0.51–1.54)
Anger	1.01* (1.00–1.03)	1.02* (1.00–1.03)	1.04** (1.02–1.05)	1.03** (1.01–1.04)	1.03** (1.02–1.04)	1.02* (1.00–1.03)
PCL:SV Interpersonal	1.04 (0.91–1.18)	1.01 (0.85–1.19)	1.41** (1.26–1.58)	1.20* (1.03–1.41)	1.36** (1.19–1.54)	1.06 (0.88–1.27)
PCL:SV Affective	1.09 (0.97–1.22)	1.09 (0.92–1.29)	1.41** (1.26–1.57)	1.00 (0.85–1.18)	1.46** (1.29–1.65)	1.09 (0.90–1.32)
PCL:SV Lifestyle	1.06 (0.95–1.17)	1.10 (0.96–1.26)	1.32** (1.19–1.47)	0.98 (0.85–1.13)	1.46** (1.29–1.66)	1.11 (0.94–1.32)
PCL:SV Antisocial	1.05 (0.94–1.17)	1.05 (0.91–1.21)	1.69** (1.50–1.89)	1.54** (1.34–1.78)	1.80** (1.56–2.06)	1.63** (1.38–1.93)

SDV, Self-directed violence; ODV, other-directed violence; COV, co-occurring violence; OR, odds ratio; CI, confidence interval; PCL:SV, Psychopathy Checklist: Screening Version.
* $p < 0.05$, ** $p < 0.01$. Individuals in each of these three groups are compared to a non-violent reference group.

with the reactive violence–suicidal behavior hypotheses, in which poor behavioral controls lead to both SDV and ODV.

Anger is a construct that overlaps with psychopathy and, in particular, the antisocial facet (Jackson *et al.* 2007). Nonetheless, anger can be psychometrically distinguished from psychopathy and there is evidence that minimal negative affect distinguishes a psychopathy subtype (Selborne *et al.* 2005; Swogger & Kosson, 2007). Our results provide evidence for the role of trait anger in predicting SDV, ODV and COV, suggesting a broad relationship between anger and violence. Whereas Doyle & Dolan (2006) have already demonstrated the importance of anger for predicting ODV in the MVRAS dataset, current findings broaden the previous analysis to show that anger also predicts general violence, including SDV and COV, even after adjusting for substance use disorders and demographic variables. Our study is the first prospective investigation of the relationship between anger and self-harm in psychiatric patients. The results replicate some prior findings on this understudied relationship (Esposito *et al.* 2003; Brezo *et al.* 2006). In contrast to features of psychopathy that only predicted self-harm among interpersonally violent individuals, anger predicted SDV both with and without ODV. Notably, however, our supplementary analyses suggest that, of the components of anger, it is anger arousal that may be most highly related to SDV in the absence of violence toward others.

Given that both anger and psychopathy can be reliably measured, the current findings indicate the utility of assessing these constructs as part of risk assessments for SDV and ODV. Trait anger may indicate elevated risk for either SDV or ODV. Individuals with a history of prodigious criminal behavior and poor behavioral controls (antisocial traits) are also at risk for SDV and ODV. Among these individuals, those who do not display superficial charm, pathological lying and grandiosity (interpersonal traits) may be more likely to engage in self-harm.

Several limitations of this study are worth noting. First, data on SDV were based upon self-report using a small number of items. Future studies might address this limitation by obtaining collateral information or hospital records to enhance assessment. Future studies might also distinguish between non-suicidal self-injury and self-harm with intent to die. In addition, this study is of Caucasian and African American psychiatric patients, so caution is warranted in generalizing to other populations. Finally, it should be noted that individuals included in our analysis were less likely than those lost to follow-up to have a history of violence (Steadman *et al.* 1998), further indicating the necessity of caution in generalizing our findings.

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These limitations were balanced by several strengths. The prospective design enabled us to examine prediction of ODV and SDV across a large sample of data that included a substantial representation of African Americans. Moreover, this study is novel in that we analyzed anger in addition to psychopathy to examine predictors of SDV.

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Declaration of Interest

None.

Notes

[1] Because of the small sample of Hispanic patients ($n = 18$), these individuals were excluded from analysis.

[2] Because of the high rate of severe mental illness in our sample, we conducted an additional analysis in which we re-ran the primary analysis adding overall symptom levels as a covariate using the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962). The pattern of significant results was identical to those reported, except that the relationship between anger and membership in the SDV group became marginally significant ($p = 0.08$).

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