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Psychological factors predicting violent prison inmates' anger and aggression

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ABSTRACT

Based on a functional analysis of aggressive behavior, the present study investigates the psychological determinants of state anger and aggression in violent prison inmates. Comparing psychiatric forensic inpatients with violent prison inmates revealed considerable overlap in these determinants between both samples. Next, the personality traits of neuroticism, agreeableness, conscientiousness, hostility, and anger were studied in explaining the violent prison inmates' state anger and aggression. Data were obtained from 102 male inmates imprisoned for four years or more because of a serious violent crime. Linear regression models were used to assess the relationship between the patients' characteristics of anger and aggression. It was found that neuroticism, trait anger, and hostility contributed to state anger. Furthermore, the main factor contributing to aggression was state anger. Implications of the results for reducing anger and aggression in violent prison inmates are discussed.

KEYWORDS

Aggression; anger; personality traits; dutch violent prison inmates

Introduction

Since violence within prisons severely impacts both inmates and staff, it is crucial to identify the psychological determinants of anger and aggression in prison inmates. During the past decades, extensive research has been done on the individual, clinical, and situational factors of aggressive behavior among prison inmates (e.g., Gendreau et al., 1997) and forensic psychiatric inpatients (Steinert, 2002). Following their literature review on the relationship between personality disorders and violence in both populations, Gilbert and Daffern (2011) considered the General Aggression Model (GAM; Anderson & Bushman, 2002) the appropriate theory to frame important determinants of aggression. Daffern et al. (2007) incorporated these factors into functional analysis, a method that correlates antecedents, individual characteristics, emotional responses, and consequences (Haynes & O'Brien, 2000). Hornsveld, Kraaimaat, Nunes et al. (2019) used this method, complete with their clinical experience, own research, and relevant literature, to explain reactive and

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proactive aggressive behavior in non-sexually violent and sexually violent offenders with only individual factors such as personality traits and problem behavior. Additional literature on these subjects is described below.

For instance, relations between personality traits, the NEO Five-Factor Model (Costa & McCrae, 1985), and aggressive behavior have been studied frequently in several populations. Jones et al. (2011) found in a meta-analysis of 53 studies in offender and nonoffender populations that aggression seems to be positively related to the Big Five domain of Neuroticism and negatively to the domains of Agreeableness and Conscientiousness. Also, several other studies have demonstrated an inverse relationship between agreeableness and trait anger (e.g., Graziano & Tobin, 2002; Meier & Robinson, 2004; Miller et al., 2012). More specifically, Hosie et al. (2014) studied 55 male offenders, half of them convicted for violent offenses, and found that aggression was related to low agreeableness and low conscientiousness in this sample. Agreeableness and conscientiousness appeared to correlate negatively with trait anger and neuroticism positively with trait anger. Fazel and Danesh (2002) reviewed 62 surveys of male and female inmates in Western Europe, the United States, and Australia. They concluded that among the male inmates (81% of the studied group), 65% had a personality disorder and specifically an antisocial personality disorder in 47% of the cases. In a more recent review, Fazel and Sewald (2012) concluded that high levels of psychiatric morbidity are consistently reported in prisoners from many countries over four decades.

The mental processes of executive function are central to regulating anger, aggression, and goal-directed behavior. Their primary role is the cognitive control and planning of behavior and emotion regulation (e.g., Lowe & Ziemke, 2011; Williams et al. (2009). Studies have shown that executive functioning deficits are an individual factor that moderates aggressive behavior (e.g., Morgan & Lilienfeld, 2000). Shumlich et al. (2019) provided evidence of pervasive executive functioning deficits in forensic psychiatric and correctional populations. A large proportion of both forensic psychiatric patients (9.5–35.7%) and correctional offenders (5.2–27.3%) displayed clinically significant deficits in all components of executive functioning compared to what would be expected in the normative population (2.5%). This overlap in individual characteristics raises whether similar psychological factors contribute to forensic psychiatric patients' and prison inmates' anger and aggression. If that is the case, prison inmates might also profit from treatment programs that reduce anger and aggression and reduce recidivism, just as in forensic psychiatric patients. Specifically, the relatively high observed recidivism risk in inmates deserves further attention.

In the Netherlands, offenders who have committed a serious violent crime that is punishable with a maximum imprisonment of more than four years (e.g., murder, manslaughter, aggravated assault, or rape) can be detained under a hospital order (“TBS order”). When based on a psychiatric or

psychological examination in a specialized assessment center of the Ministry of Justice and Security, and a connection has been found between a psychiatric disorder and the committed offense (Van Marle, 2000), these patients are treated in a forensic psychiatric institution until the risk of recidivism is reduced to a socially acceptable level. Hornsveld et al. (2012) found in 80 patients that 70% had an antisocial personality disorder and 30% had a psychotic disorder combined with an antisocial personality disorder (DSM-5; American Psychiatric Association, 2013).

Long-term prison inmates also include offenders who have committed a serious violent offense punishable by a prison sentence of four years or more. However, they have not been diagnosed with a psychiatric disorder, or it is assumed that it does not lead to an unacceptable risk of recidivism. They, therefore, stay in a “normal” prison. Bulten et al. (2009) found that about 37% of the prison inmates who are not detained under a hospital order have an antisocial personality disorder. Consequently, it is not surprising that Hornsveld, Bulten et al. (2008) noticed only marginal differences in comparing 136 forensic inpatients with 100 long-term prisoners: the patients only scored significantly higher on antisocial lifestyle, neuroticism, and trait anger. However, 19% of all Dutch forensic psychiatric patients for which a sentence of four years or more applied appeared to reoffend after release (Wartna, El Harbachi et al., 2006), while on the other hand, 43% of all Dutch prison inmates sentenced to four years or more recidivated within two years after release (Wartna, Kalidien et al., 2006).

Forensic psychiatric patients' lower recidivism rates indicate that the care and treatment offered to these patients are beneficial. Moreover, well-defined cognitive-behavioral programs that focus on cognitive skills, cognitive restructuring, moral teaching, and reasoning effectively reduce criminal behavior among convicted offenders (Wilson et al., 2005). Similar criminogenic needs of forensic psychiatric inpatients and violent prison inmates might explain why research has shown that both groups can benefit from cognitive-behavioral treatment programs to reduce anger and aggression (French & Gendreau, 2006; Smith et al., 2009).

Hornsveld and Kraaimaat (2022) investigated psychological determinants of self-reported and observed aggression in forensic psychiatric inpatients. They found that state anger, antisocial lifestyle, and agreeableness were the main factors contributing to self-reported aggression. Also, the main factors contributing to observed aggression were trait anger and agreeableness. Open is the question do these person variables also contribute to inmates' anger and aggression. If that is the case, the relevant individual variables might steer the selection of those cognitive-behavioral programs in inmates that were effective in forensic psychiatric inpatients.

The present study's *first aim* is to replicate the Hornsveld et al. (2008) initial study with a larger group of subjects to support the overlap between inmates and forensic psychiatric inpatients in psychological factors related to anger and aggression.

The *second aim* of the present study is to investigate the psychological determinants of state anger and aggression in prison inmates. Relations were investigated of neuroticism, agreeableness, conscientiousness, hostility, and trait anger with state anger. Similarly, agreeableness, hostility, trait anger, and state anger were examined with aggression.

Method

Participants

The study was performed on a group of 102 male inmates of three Dutch penitentiary institutions with a mean age of 32.35 years ($SD = 9.50$; range 19–59 years) who had committed a violent offense punishable with a minimum of four years. Fifty-one inmates were willing to be interviewed by the first author using the PCL-R. Scores of one or two on items 2, 4, 5, 6, 7, 12, 14, 15, and 17 of the PCL-R were used for the preliminary diagnoses of an antisocial personality disorder. Since 41 of the 51 inmates met these criteria, the total sample's percentage of antisocial personality disorder was estimated to be 80%. No further psychiatric or psychological diagnosis was performed.

A comparison sample of 195 Dutch forensic psychiatric inpatients with a mean age of 33.55 years ($SD = 7.98$; range 19–60 years) was obtained from an earlier study by Hornsveld & Kraaimaat (2022). The patients in this study had an antisocial personality disorder or were classified as having a psychotic disorder combined with an antisocial personality disorder (DSM-5; American Psychiatric Association, 2013). According to the psychiatrists of the multidisciplinary composed staff, the condition of the psychotic patients had stabilized to such an extent that their antisocial personality disorder was most prominent, and the patients were able to follow the treatment program for aggressive behavior.

Measures

The *Psychopathy Checklist-Revised* (PCL-R; Hare, 1991; Dutch version: Vertommen, Verheul, De Ruiter, & Hildebrand, 2002) was employed for measuring psychopathy. The checklist consists of 20 items, which have to be rated on a three-point scale with 0 = “does not apply,” 1 = “applies to some extent,” and 2 = “applies.” Vertommen et al. (2002) found support for the Dutch version of the PCL-R's reliability and validity in the Dutch version. Also, they confirmed Hare's two-factor structure: “Callous and remorseless

use of others” (e.g., “Lack of remorse or guilt.”) and “Chronically unstable and antisocial lifestyle” (e.g., “Poor behavioral controls.”). Cronbach’s α of the two subscales in the present sample was respectively .71 and .70.

The *NEO Five-Factor Inventory* (NEO-FFI; Costa Jr. & McCrae, 1992) has 60 items

and measures the Big Five personality domains Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Participants score items on a five-point Likert scale, ranging from 1 = entirely disagree to 5 = entirely agree. Internal consistency and test-retest reliability of the NEO-FFI scales were good in samples of nonclinical adults (Hoekstra et al., 1996). In the present study, only the domains Neuroticism, Agreeableness, and Conscientiousness were used. The internal consistency, Cronbach’s α , in the present study was respectively .83, .60, and .73.

The *Adapted Version of Rosenzweig’s (1978) Picture-Frustration Study* (PFS-AV; Hornsveld et al., 2007) was used to measure hostility. Hostility is defined as the inclination to attribute negative intentions to others (e.g., Berkowitz, 1993; Buss, 1961). The PFS-AV asks participants to write down their reactions to 12 cartoon-like pictures. Then, respondents are instructed to examine the situation shown in the pictures and write the first appropriate reply that enters their minds in the blank text box. Answers are scored by an experienced and independent research assistant (psychologist) on a seven-point scale, ranging from 1 = not at all hostile to 7 = extremely hostile. Internal consistency, test-retest reliability, and interrater reliability are moderate to good. Furthermore, evidence was found for the test’s convergent validity as scores correlated with agreeableness and aggressive behavior (Hornsveld et al., 2007). The present study’s internal consistency, coefficient α , of this scale was .83.

The *Inventory of Interpersonal Situations* (IIS; Kraaimaat, 2020; C. M. J. Van Dam-Baggen & Kraaimaat, 1990; R. Van Dam-Baggen & Kraaimaat, 1999) is a self-report questionnaire with two scales. One scale indicates the negative emotion of social discomfort/anxiety; the other scale concerns the frequency of performance of social responses (i.e., social skills). Each scale consists of the same 35 items formulated as responses to specific social situations. Cronbach’s α ’s revealed a high internal consistency on both scales, while the conceptual structure was shown to be relatively invariant across socially anxious and non-socially anxious groups. The IIS scales discriminated between socially anxious and non-socially anxious samples and showed significant relationships with independent social anxiety measures. The IIS scales demonstrated high predictive validity for overt behavior in social situations (R. Van Dam-Baggen & Kraaimaat, 1999). The coefficients Cronbach α in the present study were .94 and .91.

The *Trait Anger subscale* of Spielberger’s (1980) *State-Trait Anger Scale* (ZAV; Van der Ploeg et al., 1982) measures the general disposition to experience the negative emotion of anger. Participants rate each item how they

generally feel using a four-point Likert scale: 1 = “almost never,” 2 = “sometimes,” 3 = “often,” and 4 = “almost always.” In a group of 150 Dutch male university students, the trait anger scale’s internal consistency (α coefficient) was .78, and test-retest reliability of .78 was documented in a subgroup of 70 students. The convergent validity of the trait anger scale also proved to be satisfactory (Van der Ploeg et al., 1982). The internal consistency coefficient α in the present study was .92.

The *NAS part A of the Novaco Anger Scale–Provocation Inventory* (NAS-PI; Novaco, 2003; Dutch version: Hornsveld et al., 2011) was used to measure state anger and concerned the self-reported responses relating to cognitive, arousal, and behavioral components of anger in 48 anger-eliciting situations. The items are scored on a 3-point Likert-type scale: 1 = never true, 2 = sometimes true, and 3 = always true. In a sample of 194 Dutch violent forensic psychiatric outpatients (all males), for the NAS total score, the internal consistency (Cronbach’s α) was found to be .95, and the test-retest reliability in a subgroup of 90 outpatients was .80 (Hornsveld et al., 2011). In the present study, an internal consistency, coefficient α , was obtained of .94.

The *Aggression Questionnaire-Reactive/Proactive Form* is derived from Buss and Durkee’s Aggression Questionnaire with 29 items (AQ; Buss & Perry, 1992; Dutch version: Meesters et al., 1996), which spread among four subscales, namely Physical Aggression (9 items), Verbal Aggression (5 items), Anger (7 items), and Hostility (8 items). Respondents answer the items using a five-point scale ranging from 1 = not at all like me to 5 = completely like me. In a group of 138 Dutch violent forensic psychiatric inpatients (all males), Hornsveld et al. (2009) found for the AQ total an internal consistency (Cronbach’s α) of .83 and for the four subscales an internal consistency of .72, .34, .57, and .81 successively. In a subgroup of 90 outpatients, the test-retest reliability was for the AQ total .72 and the four subscales .76, .58, .65, and .54, respectively. In the present study, only Physical Aggression (item example: “Given enough provocation, I may hit another person.”) and Verbal Aggression (item example: “I can’t help getting into arguments when people disagree with me.”) subscales were used. The correlation between both scales was .61. The scores on these two subscales were added to measure verbal and physical aggression’s behavioral and cognitive components. The internal consistency of the combined scale was $\alpha = .83$.

Procedure

All participants in the study were male and had a sufficient command of the Dutch language in speech and writing. Informed consent was obtained from the staff and participating prisoners of the penitentiary institutions. The questionnaires were administered in groups under the supervision of the first author prior to the aggressive behavior treatment program. After

completion, the prisoners enclosed the questionnaires in an envelope and were paid € 10. The Regional Ethics Committee, CMO of Rotterdam, the Netherlands, approved the study.

Statistics

Data were analyzed with SPSS, version 20. T-tests were performed to compare the data of the inmates with the forensic psychiatric inpatients. First, the relationship between the offenders' personality characteristics, trait anger, state anger, and aggression was examined using Pearson correlation coefficients. A linear regression analysis (Forward method) was then carried out with state anger as the dependent variable. The NEO personality domains were neuroticism and agreeableness, trait anger, and hostility as independent variables. Next, a second linear regression analysis was performed with aggression as the dependent variable and neuroticism, agreeableness, trait anger, hostility, and state anger as independent variables. Finally, mediation effects were explored by AMOS 26.

Results

Characteristics of participants

Distributions of all variables were investigated and considered to be normal as skewness and kurtosis were within $| 3 |$ (Tabachnick & Fidell, 2007). The internal consistency of all measures was satisfactory, with the exception of a relatively low internal consistency of agreeableness (NEO-FFI; $\alpha = .60$).

In Table 1, the mean, standard deviation, and the number of cases are presented of the measures that were obtained from the inmates. Also, data are presented from a sample of 195 male forensic psychiatric inpatients from an earlier study by Hornsveld and Kraaimaat (2022). Compared with the forensic psychiatric patients, the inmates demonstrated a lower antisocial lifestyle and scored lower on neuroticism, agreeableness, social skills, and trait anger. In addition, they scored higher on hostility and trait anger than the forensic patients. Calculated effect sizes of these significant differences showed minor effects (Cohen, 1988). When a Bonferroni correction ($p/11$) was performed, only significant differences between both groups concerning neuroticism and agreeableness were revealed. Verbal and physical aggression did not differ between inmates and inpatients.

Due to some missing values, the SPSS pairwise procedure was applied with the 102 inmates' dataset to calculate Pearson correlation coefficients and perform linear regression analyses (Forward method). Results are presented in Table 2.

Table 2 shows that state anger (NAS-PI) was positively related to neuroticism (NEO-FFI, hostility (PFS-AV), trait anger (STAS), and social anxiety (IIS), and negatively to agreeableness (NEO-FFI). Physical and verbal

Table 1. Characteristics of the participants.

Measure	Domains/Factors/Scales	Inmates			Forensic psychiatric inpatients			<i>t</i>	Effect sizes <i>Cohen's d</i>
		<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>		
Age		32.35	9.50	98	33.56	7.98	173	1.18	.14
PCL-R	Callousness	10.16	3.06	51	9.23	3.75	195	-1.62	-.26
	Antisocial lifestyle	9.12	3.74	51	10.64	3.97	194	2.74**	.39
NEO-FFI	Neuroticism	29.93	8.52	100	33.50	8.06	184	3.49***	.43
	Agreeableness	38.85	5.47	100	41.21	4.95	184	3.70***	.46
	Conscientiousness	45.73	6.01	100	45.10	5.44	184	-.90	-.11
IIS	Social anxiety	64.95	26.73	102	64.43	21.77	173	-.18	-.03
	Social skills	112.27	24.21	101	118.62	19.40	174	2.39*	.31
PFS-AV	Hostility	31.60	9.65	101	29.03	10.39	162	-2.00*	-.25
STAS	Trait anger	16.71	6.25	102	19.04	7.90	170	2.55**	.32
NAS-PI	State anger	87.74	16.78	101	83.11	13.63	162	-2.44*	-.31
AQ	Physical + Verbal aggression	40.97	9.53	101	39.55	8.55	175	-1.27	-.16

Note. PCL- R = Psychopathy Checklist-Revised; NEO-FFI = Five Factor Inventory; IIS = Inventory of Interpersonal Situations; PFS-AV = Adapted Version of the Picture-Frustration Study; STAS = State-Trait Anger Scale; NAS-PI = Novaco Anger Scale-Provocation Inventory (1994 version); AQ = Aggression Questionnaire. * $p < .05$; ** $p < .01$, *** $p < .005$ (Bonferroni correction)

aggression (AQ) was positively related to hostility (PFS-AV0, trait anger (STAS), and state anger (NAS-PI) and negatively related to agreeableness (NEO-FFI). Conscientiousness (NEO-FFI) and social skills (IIS) were not associated with either state anger or aggression.

Predictors of state anger

A linear regression analysis (Forward method) was performed to study the relative contribution of the significantly related factors to state anger (NAS-PI). Variables were entered in the equation in order of their contribution to the dependent variable. A summary of the results is presented in Table 3.

The analysis resulted in three models. The last model 3 explained 55% of the variance of state anger (NAS-PI), with trait anger (STAS) and neuroticism (NEO-FFI) contributing positively and agreeableness (NEO-FFI) negatively. The explained variance of 55% and a Cohen's effect size $f^2 = 1.22$ are indicative of a large effect. Exploration of mediated effects on state anger using AMOS 26 revealed insignificant indices of mediation (Preacher & Hays, 2008) for neuroticism (standardized indirect effect = .07) and agreeableness (standardized indirect effect = .00).

Predictors of verbal and physical aggression

A linear regression analysis (Forward method) was carried out to study the relative contribution of the significantly related factors to self-reported aggression (AQ). Variables were entered in the equation in order of their contribution to the dependent variable. A summary of the results is presented in Table 4.

Table 2. Correlations between measures.

Measure	NEO-FFI		IIS		PSF-AV	STAS	NAS-PI	AQ
	Neuroticism	Agreeableness	Social anxiety	Social skills				
NEO-FFI								
Neuroticism	-.11	-.						
Agreeableness	-.44**	.17						
Conscientiousness	.33**	-.16	-.28**	-.				
Social anxiety	-.08	.01	.37**	-.47**				
Social skills	-.02	-.32**	-.24**	.09				
Hostility	.18	-.58**	-.10	-.10				
Trait anger	.30**	-.57**	.27**	.08	.35**			
State anger	-.02	-.41**	-.12	.12	.36**	.70**		
Physical + Verbal aggression	.83	.60	.03	.13	.38**	.59**	.72**	
Internal consistency			.94	.91	.83	.92	.94	.83

Note. PCL-R = Psychopathy Checklist-Revised; NEO-FFI = Five Factor Inventory; IIS = Inventory of Interpersonal Situations; PSF-AV = Adapted Version of the Picture-Frustration Study; STAS = State-Trait Anger Scale; NAS-PI = Novaco Anger Scale-Provocation Inventory (1994 version); AQ = Aggression Questionnaire. * $p < .05$, ** $p < .01$

Table 3. Linear regression analysis results: Predicting state anger (NAS-PI) .

Measure	Domains/Factors/ Scales	β	Standardized B	R ² adjusted	R ² change
Model 1					
STAS	Trait anger	1.88**	.70**	.49**	.49**
Model 2				.52**	.04**
STAS	Trait anger	1.51**	.56**		
NEO-FFI	Neuroticism	-.74**	-.24**		
Model 3				.55**	.03**
STAS	Trait anger	1.43**	.53**		
NEO-FFI	Agreeableness	-.74**	-.24**		
	Neuroticism	.35	.18**		

Note. NEO-FFI = Five Factor Inventory; STAS = State-Trait Anger Scale; NAS-PI = Novaco Anger Scale-Provocation Inventory (1994 version). * $p < .05$; ** $p < .01$

Table 4. Linear regression analysis results: Predicting physical and verbal aggression (AQ) .

Measure	Domains/Factors/ Scales	Self-reported aggression (AQ)			
		B	Standardized B	R ² adjusted	R ² change
Model 1				.51**	.52**
NAS-PI	State anger	.41	.72**		

Note. NAS-PI = Novaco Anger Scale-Provocation Inventory (1994 version); AQ = Aggression Questionnaire; * $p < .05$.
A model for the maintenance of aggressive behavior in violent male inmates.

The regression analysis resulted in one model explaining 51% of the variance of verbal and physical aggression (AQ). State anger (NAS-PI) was found to be the primary contributing variable to verbal and physical aggression. The explained variance of 51% and Cohen's effect size of $f^2 = 1.04$ indicate a large effect.

Discussion

In comparing prison inmates with forensic psychiatric inpatients concerning criminogenic factors, considerable correspondence was found between both groups in expressing these factors. Verbal and physical aggression did not differ between both groups. However, after Bonferroni's correction, inmates were characterized by lower neuroticism and lower agreeableness than violent forensic psychiatric patients. The present results further support the initial study findings concerning the overlap in criminogenic factors between both groups of offenders (Hornsveld, Bulten et al., 2008).

High scores on trait anger, neuroticism, and low scores on agreeableness were associated with the inmates' state anger explaining about 53% of the total variance. Next, high scores on trait anger were related to verbal and physical aggression. Thus, the present results support our functional analysis's reactive part of aggression (Hornsveld, Kraaimaat, Nunes et al., 2019) and align with findings of studies on the general population and forensic psychiatric patients (e.g., Jones et al., 2011).

Of particular interest are neuroticism's positive contribution and agreeableness's negative contribution to the inmates' state anger. First, the higher-order factor of neuroticism is known to be indicative of a person's susceptibility to disturbed emotional regulation, as demonstrated by heightened negative emotional states such as fear, anxiety, and aggression (Barlow et al., 2014; Ormel et al., 2013). Due to a disrupted emotion regulation process, inmates with a relatively high score of neuroticism may be inclined to respond in conflict situations with negative emotions that result in flight in the case of anxiety and aggression in the case of anger. Next, the higher-order factor of agreeableness is suggested to be related to the executive functions of cognitive control and self-regulation in healthy subjects. Specifically, agreeableness is suggested to reflect internalized tendencies in the regulation of frustration and anger. Highly agreeable individuals better control their anger (Graziano et al., 1996). Moreover, agreeableness was associated with people's perception and response to conflict situations (Graziano et al. (1996); Jones et al. (2011); Quan et al. (2021)). Thus, the positive relation of neuroticism and the negative relation of agreeableness with state anger might indicate that emotional and cognitive regulation deficits are underlying mechanisms in the inmates' emotional reaction of anger.

The considerable correspondence between prison inmates and forensic psychiatric inpatients on the factors contributing to state anger and aggression suggests that inmates profit from cognitive-behavioral treatment programs developed for forensic psychiatric inpatients. Hornsveld, Nijman et al. (2008) found that male forensic psychiatric inpatients with an antisocial personality disorder benefited from a treatment program that involves anger management, social skills, and prosocial norms and values. It is reasonable to assume that hostile, angry, and violent prison inmates might benefit from such programs. French and Gendreau (2006) concluded, based on a meta-analysis of 68 studies, that cognitive-behavioral programs produced the greatest effect in reducing institutional misconduct and recidivism. Similar results were, for instance, found in Canada (Mela et al., 2008), the USA (Lipton et al., 2002), the UK (McGuire, 2006), and Australia (Day, 2020). Several authors mention as essential conditions for effective programs that the interventions are aimed at the most important dynamic criminogenic needs of the offenders and meet the requirements of good treatment integrity.

There is a continuing discussion about using risk assessment versus self-report in predicting aggression and recidivism. In contrast with risk assessment measures, self-report is often criticized for its vulnerability to deceit, the influence of reading ability, and the respondent's insight. Despite these criticisms, the contribution of risk appraisal and self-report measures was more or less equivocal in a meta-analysis (e.g., Walters, 2006). Therefore, self-report measures for dynamic factors can make, in our opinion, a valuable contribution to the risk assessment of offenders (Douglas & Skeem, 2005; Van den Berg

et al., 2017). With bearing in mind, the limitations of self-report, assessment, and interventions for cognitions and emotions depend primarily on the person's self-report.

Quite a different question is how to screen offenders for anger and aggression management programs. Although the present study gives some insight into the profile of factors contributing to anger and aggression, our findings preclude using the instruments as a selection for referral to intervention programs. Instead, in offender populations, it is recommended that self-report measures are used additionally but not exclusively as assessment tools next to clinical judgment and a thorough review of historical information (e.g., Foley et al., 2002).

The present study has several limitations. First, as only male inmates were enrolled in the study, the extent to which the findings generalize to female inmates is unknown. Another limitation is that all inmates participated voluntarily in the study. Thus, no information was available about whether these inmates were representative of all inmates with imprisonment of four years or more in the three penitentiary institutions under investigation. A further limitation concerning comparing prison inmates and forensic psychiatric inpatients was that the estimated presence of an antisocial personality disorder in the inmates was based on scores of only 51 inmates on some PCL-R items and not on an extensive semi-structured interview for DSM-5 classification. Although experienced psychiatrists had classified these inpatients, no structured interview was used in most cases. However, the present estimated 82% antisocial personality disorder supports other findings in the violent prison population (e.g., Azevedo et al., 2020).

Though the scores on the self-report questionnaires showed a mutually consistent picture, we should keep in mind that respondents may allow their responses to be influenced by their desire to make a positive impression, inadequate self-insight, and/or lack of awareness of their anger and aggression (Hornsveld, Kraaimaat, Nijman et al., 2019). Note that the correlations of agreeableness with related constructs support the construct validity of this measure. However, the relatively low content validity ($\alpha = .60$) warrants further investigation of this domain's separate facets.

Last, the present study's findings are limited to male incarcerated subjects and cannot be extrapolated to those, not in prison. The prison context is fundamentally different from a free society, and many factors predictive of violence in the community do not extend to the prison environment (Cunningham et al., 2005).

Acts of instrumental aggression do not necessarily involve trait and state anger. Therefore, extrapolation of the present findings to individuals whose behavior primarily involves antisocial instrumental aggression is not justified. Further research is needed concerning the factors contributing to the inmates' proactive aggression. For a future study of proactive, aggressive behavior,

a specially designed instrument may be used to measure reactive and proactive aggression, for example, the Reactive Proactive Questionnaire (RPQ; Raine et al., 2006).

Since the present study is a cross-sectional study, further research into the possible causal relationships between the different determinants and anger and aggression is needed as the determinants examined in this study are rather general. Such as research into the specific processes involved in emotion dysregulation, such as attention, perception, and information processing (e.g., Wilkowski & Robinson, 2010). Interventions aimed at behavioral change can also contribute to a further understanding of the relationship between the various determinants on the one hand and anger and aggression on the other.

In conclusion, there are indications that trait anger, neuroticism, and agreeableness are essential determinants of state anger and aggression in inmates. Furthermore, our findings suggest that inmates who score relatively high on these determinants might profit from treatment programs developed for forensic psychiatric inpatients (Hornsveld & Kraaimaat, 2019; Mela et al., 2008). However, future research is warranted to support the latter suggestion.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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