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Borderline personality disorder and aggressive behavior: A study based on the DSM-5 alternative model

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ABSTRACT

Introduction: Unplanned reactive aggressive acts are a clinical feature of particular interest in patients with borderline personality disorder (BPD). The early identification of personality traits correlated to aggressive behavior is certainly desirable in BDP populations. This study analyzes a clinical sample of 122 adult outpatients with BPD referred to Adult Mental Health Services of the Department of Mental Health of Bologna, in Italy.
Methods: The study examines the relationship with personality facets of the DSM-5 alternative model for personality disorders (AMPD), Personality Inventory for DSM (PID-5), with respect to the four main components of aggression measured by the Aggression Questionnaire (AQ): hostility, anger, verbal and physical aggression. Using robust regression models, the relationships between PID-5 facets and domains and the aggression components under consideration were identified.
Results: Verbal and physical aggression in our sample of BPD outpatients is mainly associated to PID-5 antagonism domain. Physically aggressive behavior is also related to callousness facet.
Conclusions: The traits most consistently associated with aggression were the domain of Antagonism and the facet of Hostility. The study findings highlight the need for clinicians working with individuals with BPD to pay particular attention to traits of hostility, callousness, and hostility to understand aggression.

1. Introduction

Borderline personality disorder (BPD) is characterized by a pervasive pattern of instability involving interpersonal relationships, self-image, and affects. Consequences of instability are poor impulse-control, recurrent self-harm behavior, and aggressive or violent acting out (Newhill et al., 2009); this latter can contribute to impair social functioning and lead to family conflicts and domestic violence (González et al., 2016).

Aggression is defined as any behavior directed toward another individual that is carried out with the intent to cause harm and which the offended person is motivated to avoid (Anderson and Bushman, 2002; Allen and Anderson, 2017). Aggression can be manifest itself through acts with minor impact (e.g., insults, pushing) or more serious ones (e.g., hitting, kicking). This behavior is underpinned by multiple factors including specific personality traits, as supported by the research on dimensional models and, more recently, on the *Alternative Model for Personality Disorders* (AMPD) introduced in Section III of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) (American Psychiatric Association (APA), 2013). Previous research on the AMPD found that aggression is consistently correlated to the domains of Antagonism and Disinhibition in undergraduate students (Dowgwillo et al., 2016; Sleep et al., 2018), in outpatients with personality disorders (Leclerc et al., 2022a), and in incarcerated offenders (Dunne et al., 2021); the most correlated facets were Hostility, Risk taking and Callousness (Dunne et al., 2018, Dunne et al., 2020; Somma et al., 2020, Leclerc et al., 2022b).

For individuals with BPD, aggression is typically conceptualized as being reactive in nature (Lobbestael et al., 2015) and characterized by impulsive acts occurring as a response to offenses, threats or perceived

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provocations. To our knowledge, there is only little evidence about the use of the AMPD model to investigate aggression in BPD. Few earlier studies also included patients with BPD but were not restricted to this diagnosis (Somma et al., 2020; Leclerc et al., 2022a). In a study by Munro and Sellbom (2020), intimate partner violence perpetration resulted to be associated with hostility, risk taking, and suspiciousness in a non-clinical sample of undergraduates.

The present study aims to evaluate the relationship between aggression and AMPD personality domains or facets in a specific clinical population of outpatients with a diagnosis of BPD. This condition is very common among individuals attending community mental health services (Ellison et al., 2018) and represents a real challenge for clinicians. For this reason, it would be important to identify the personality features associated with aggressive behavior in order to shed light on this problem and identify possible risk markers that could be considered as "red flags".

Based on previous research on personality disorders using the AMPD, we hypothesize that (a) the domains of Antagonism, and Disinhibition, and (b) the Hostility, Callousness and Risk taking facets would be significantly associated with physical aggression or violence in BPD. Moreover, (c) the Hostility facet would be also associated with verbal aggression, a topic which has received the least attention. Only one study investigated this specific comportment using the AMPD and found that hostility facet was the strongest predictor of verbal aggression (Somma et al., 2020).

2. Material and methods

2.1. Setting and participants

This cross-sectional study was conducted within the Adult Community Mental Health Centres (CMHCs) of the Bologna Department of Mental Health from January 2017 to October 2022. Age of 18 years or more, referral to CMHCs and a clinical diagnosis of BPD were the inclusion criteria to be eligible to participate in this study. Exclusion criteria were: diagnosis of schizophrenia spectrum disorders (APA, 2013), intellectual disabilities (i.e., I.Q. < 70), and difficulties in understanding Italian language.

Data were collected from 134 subjects. Those with missing items on either the PID-5 or the AQ were excluded from the operational dataset ($n = 12$) through a pairwise deletion approach. The final sample consisted of 122 adult patients with BPD (mean age $= 29.0 \pm 9.6$ years). Most of them were female (73.4%), completed secondary school (21.3%), lived with parents or partners (68.1%), were married or cohabitant (42.6%), and were unemployed (20.5%). Twenty-five participants met criteria for another personality disorders and sixteen had comorbidities within the Cluster B.

2.2. Procedure

Eligible patients were informed about the study and asked to fill in the informed consent and sociodemographic and clinical forms, including information on psychiatric and physical comorbidities, onset of BPD symptoms, and attendance of mental health services. They were told that the data provided in the research would be anonymous and that participation in the study was completely voluntary. The Structured Clinical Interview for DSM IV-Axis II personality disorders (First et al., 2016) was used by trained personnel to formulate or confirm the diagnosis of BPD.

Data from two research projects on BPD approved by the Ethical Committee (EC) of the Bologna Local Health Unit were included in the present database: EC code 0002045 (November 25, 2013) and EC code 297/2018 (06/15/2018). This investigation has been also conducted in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) and its later amendments for experiments involving humans. The study was not pre-registered; all data and materials used are available upon reasonable request to the corresponding author.

2.3. Measures

The Personality Inventory for DSM-5 (PID-5) consists of 220 items for the assessment of maladaptive personality traits (Krueger et al., 2012; Fossati et al., 2013) according to the Alternative Model for Personality Disorders (Krueger and Markon, 2014). Each item can be assigned with a Likert score from 0 = "always false/often false" to 3 = "always true/often true". These traits are described through 25 facets grouped into 5 high-order domains: negative affectivity, detachment, antagonism, disinhibition, and psychoticism. Domains total scores were calculated using the APA-all facets approach (APA, 2013).

The Aggression Questionnaire (AQ) is a 29-item Likert-type, self-report questionnaire that measures different components of aggressiveness (Buss and Perry, 1992; Fossati et al., 2004). In the present study, we present data on two subscales: (a) physical aggression: hurting or harming others, pushing, hitting, (b) verbal aggression: shouting insults or threats.

2.4. Statistical strategy

Bivariate correlations were provided to describe the relationships between PID-5 facets and forms of aggression using Spearman's rank-order correlation analysis. At this stage of the analysis, the relationships between each PID facet and the AQ scores were examined. We tested reliability of the PID-5 and AQ throughout McDonald's Omega (Dunn et al., 2014).

A multiple regression analysis was set up to identify the PID-5 domains and facets predictors of AQ scores. We tested for the absence of outliers (Malhahobis distance) and distributional assumptions (Mardia test, Anderson-Darling test). These tests revealed the non-normality distribution of the AQ verbal aggression score. To account for this violation, we adopted a Multivariable Robust regression approach (MR), using an M-estimates (Huber, 1981; Hampel et al., 1986; Maronna et al., 2006; Heritier et al., 2009). This approach was used for all AQ scores along with a classical least square (LS) estimator-based estimation approach. By comparing robust M-estimates with classical LS-estimates, we observed that the former is inefficient compared with LS-estimates when the distributional assumptions are true. This is consistent with statistical theory (Huber, 1981; Hampel et al., 1986; Maronna et al., 2006; Heritier et al., 2009) and allows the utilization of an MR approach even for scores that don't violate the distributional normality assumption. Data analysis was conducted with R Studio (R Core Team, 2022), using robust base library.

2.5. Variable selection procedure

The selection of personality facets to include as regressors in the model was based on the existing literature (Dowgwillo et al., 2016; Dunne et al., 2018; Dunne et al., 2020; Somma et al., 2020; Munro and Sellbom, 2020). The first model was estimated by considering only those facets that showed a statistically significant relationship with aggression in more than one study (Callousness, Hostility, Risk taking, Withdrawal, Anxiousness). In the second model, we added 3 other personality facets that in our correlation analysis appeared to be related to verbal or physical aggression (Impulsivity, Deceitfulness, Manipulativeness). Considering that all PID-5 domains were correlated with aggression and to allow making direct comparisons across models, all five domains were incorporated into the analyses.

3. Results

Descriptive on PID-5 personality domains and facets are shown in Table 1. The mean AQ physical and verbal subscales were 23.1 ± 7.9

Table 1
Descriptive statistics of PID-5 factes, domains and AQ dimension.

Scale	Facets, domains, and dimensions	Median	Mean	SD	McDonald's omega (Ω)
PID-5 facets	Restricted affect	2	1.67	0.63	0.61
	Anhedonia	2	1.62	0.70	0.85
	Separation insecurity	2	1.96	0.75	0.71
	Anxiousness	2	2.25	0.69	0.83
	Unusual beliefs and experiences	1	1.12	0.70	0.82
	Depressivity	2	2.13	0.72	0.88
	Cognitive and perceptual dysregulation	2	1.61	0.67	0.74
	Distractibility	2	2.16	0.68	0.77
	Eccentricity	2	1.79	0.80	0.92
	Intimacy avoidance	2	1.61	0.68	0.76
	Grandiosity	1	1.23	0.68	0.94
	Impulsivity	2	1.95	0.75	0.71
	Deceitfulness	1	1.34	0.53	0.79
	Callousness	1	1.22	0.46	0.81
	Irresponsibility	2	1.61	0.58	0.77
	Emotional lability	2	1.98	0.59	0.79
	Manipulativeness	1	0.94	0.78	0.87
	Hostility	2	2.00	0.68	0.71
	Perfectionism	2	1.75	0.69	0.81
	Perseveration	2	1.89	0.61	0.79
	Attention-seeking	1	1.57	0.78	0.77
	Withdrawal	2	1.73	0.64	0.84
	Suspiciousness	2	1.86	0.52	0.71
	Submissiveness	2	1.54	0.90	0.70
	Risk taking	2	1.79	0.49	0.73
PID-5 domains	Negative affectivity	6	6.20	1.49	0.88
	Detachment	5	4.96	1.50	0.91
	Antagonism	3	3.50	1.66	0.88
	Disinhibition	6	5.71	1.54	0.87
	Psychoticism	4	4.53	1.75	0.61
AQ Subscale	Verbal aggression	16	15.45	4.04	0.76
	Physical aggression	23	23.07	7.93	0.78

Note – PID-5 = Personality Inventory for the DSM-5 personality disorders; AQ = Aggression Questionnaire; SD = standard deviation.

and 15.5 ± 4.1, respectively. McDonald's Omega provided acceptable results for reliability with the exception of Restricted Affectivity, which has a value of less than 0.70.

Looking at the bivariate correlations, we can see moderate relationships between certain personality facets and the different forms of aggression considered. The correlation with the Hostility facet occurs for the Verbal (r = 0.43) and Physical (r = 0.42) AQs. In addition, impulsivity, deceitfulness, and manipulativeness resulted to be correlated to both the AQ subscales (Table 2).

In the first regression model (literature based), the Hostility facet shows a statistically significant relationship with both Verbal and Physical aggression. Callousness also plays a significant role in the model explaining physical aggression. The domain analysis showed that Antagonism was significantly related to verbal and physical components of aggression. While the number of regressors in each model is comparable, the amount of explained variance is not (R^2 = 0.21 for facets, >0.12 for domains [when physical aggression is the predicted variable])

In the second regression model (literature and correlation based), Hostility remained significantly related to AQ Verbal and Physical aggression as Callousness with Physical aggression. AQ Verbal aggression scores is also significantly related to the Impulsivity facet (Table 3).

4. Discussion

The present study aimed to investigate the relationship between personality features and aggressive behavior in a clinical sample of patients with BPD. Surprisingly, the disinhibition domain and the risk taking facet resulted not to be associated to physical aggression. Impulsivity was associated only to verbal aggression, consistently with typical core features of the BPD including intermittent verbal aggression (Goodman and New, 2000). It is interesting to notice that only impulsivity, and not risk-taking, significantly correlated with aggression in our sample. There was a lack of clarity and data on the convergence between impulsivity and risk taking. Neuroimaging findings seem to support a separation between the inclination towards high-risk behavior and impulsivity (Kolla et al., 2023). In addition, our sample contained more women than men, while it has been suggested that risk taking could make a much more modest contribution to the associations with aggression among women (Leclerc et al., 2022b). It is possible that the gender imbalance, combined with the modest amount of statistical power, masked this regressor completely. Finally, patients with BPD seek help to mental health services often when experience crises characterized by poor impulse control and self-harm, and receive a clinical management aimed to reduce risk situations.

As hypothesized, the antagonism domain and the hostility and callousness facets resulted to be associated to physical aggression in BPD. These findings are consistent with previous research on the AMPD model in samples including all personality disorders (Dunne et al., 2018; Somma et al., 2020; Leclerc et al., 2022a, b). The hostility facet was also related to verbal aggression in our sample, replicating the finding from Somma et al., 2020). In addition, in line with previous works (Dunne et al., 2018; Leclerc et al., 2022b), we found that facets seem to explain more variance than domains in the associations with aggression.

Subjects with a high level of hostility are characterized by negative beliefs and a negative attitude towards others (including cynicism, distrust, and denigration) and this could lead to persistent anger and irritability, potential antecedents of aggressive behavior. In patients with BPD, hostile distrust may interact with interpersonal sensitivity and background dysphoria to constitute a predisposition for intense emotional states that are triggered by events as conflicts with others, exposure to criticism or interruption of a relationship (D'Agostino et al., 2018).

Callousness is included among the typical features of AntiSocial Personality Disorder (ASPD), which is also characterized by dishonesty, lack of concern for the feelings of others, and lack of remorse when dangerous actions cause consequences for others. The association

Table 2
Bivariate correlations between PID-5 personality facets/domains and AQ scores.

PID-5 Facets	AQ Verbal Aggression	AQ Physical Aggression
Restricted affect	0.14	0.10
Anhedonia	0.24*	0.26*
Separation insecurity	0.22*	0.21*
Anxiousness	0.06	0.15
Unusual beliefs and experiences	0.05	0.14
Depressivity	0.05	0.14
Cognitive and perceptual dysregulation	0.11	0.15
Distractibility	0.07	0.06
Eccentricity	0.26*	0.27*
Avoidance	0.16	0.12
Grandiosity	0.19**	0.08
Impulsivity	**0.34*** **	**0.34*** **
Deceitfulness	**0.38*** **	**0.41*** **
Callousness	0.27***	**0.36*** **
Irresponsibility	0.16	0.20**
Emotional lability	0.26***	0.22*
Manipulativeness	**0.32*** **	**0.36*** **
Hostility	**0.43*** **	**0.42*** **
Perfectionism	0.09	0.19**
Perseveration	0.07	0.14
Attention-seeking	0.27***	0.28***
Withdrawal	0.03	0.08
Suspiciousness	0.12	0.09
Submissiveness	−0.19	0.02
Risk taking	0.23**	**0.30*** **
PID-5 Domains		
Negative affectivity	0.14	0.10
Detachment	0.16	0.24**
Antagonism	**0.30*** **	**0.36*** **
Disinhibition	0.28***	0.27***
Psychoticism	0.18*	0.26**

Note – PID-5 = Personality Inventory for the DSM-5 personality disorders. Significance codes: '***' 0.001 '**' 0.01 '*' 0.05. Correlation values greater than 0.30 are shown in bold.

Table 3
Aggression Questionnaire (AQ) subscales: estimates from Multivariate Robust regression models.

First model (literature based)		AQ Verbal Aggression	AQ Physical Aggression
PID-5 Facets	Callousness	0.91	4.30**
	Hostility	2.81***	3.84***
	Risk taking	0.59	1.54
	Withdrawal	−0.84	−1.58
	Anxiousness	−0.36	0.89
	R^2 adj	**0.19**	**0.21**
PID-5 Domains	Negative affectivity	−0.04	1.63
	Detachment	0.57	−0.77
	Antagonism	1.43*	3.19*
	Disinhibition	1.39	2.05
	Psychoticism	−0.10	−0.14
	R^2 adj	**0.05**	**0.12**
second model (literature and correlation based)		**AQ Verbal Aggression**	**AQ Physical Aggression**
PID-5 Factes	Callousness	0.85	3.38*
	Hostility	2.20**	2.36*
	Risk taking	−0.54	0.91
	Withdrawal	−0.92	1.67
	Anxiousness	−0.22	1.02
	Impulsivity	1.15*	2.25
	Deceitfulness	0.62	3.22
	Manipulativeness	0.03	−0.58
	R^2 adj	**0.19**	**0.22**

Note: PID-5 = Personality Inventory for the DSM-5 personality disorders. Estimates from a multivariate robust regression model (M-estimator) are reported. Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.

between BPD–ASPD comorbidity and aggressiveness is frequent and correlated with high rates of violent behaviors (Newhill et al., 2009; Freestone et al., 2013). These data also support the observation that in patients with BPD, violence was often accounted for comorbid ASPD traits (González et al., 2016).

4.1. Limitations

The sample size was limited and it did not allow for interaction analyses, for example to evaluate the impact of gender or age group since they are at high risk of Type II error. Moreover, our monomethod design limited the scope of findings. The study detected self-reported aggression through a questionnaire widely used in the literature but did not use other sources such as medical records, judicial data or key informants. It is possible that in this way the aggressiveness was underestimated mainly due to the patient's reluctance to divulge socially reprehensible acts.

Additionally, we could not assess gender aspects of aggressive behavior, although violence may follow different paths in the two genders (Herpertz et al., 2017). In this respect, a previous study on BPD traits showed that antagonism was associated with intimate partner violence mostly in women, while disinhibition was associated mainly in men (Dowgwillo et al., 2016). Data on this topic from larger and more gender-balanced samples are thus needed. Finally, the study had a cross-sectional design and it was therefore unable to test for predictive ability of PID-5 traits with respect to aggressive behavior.

4.2. Future directions

Future studies are needed to examine the relationships between the AMPD model and forensic instruments evaluating aggressiveness and the risk of violence and recidivism in forensic psychiatric patients (Pelizza et al., 2021a; Pelizza et al., 2021b).

The evaluation of maladaptive personality traits with suitable and psychometrically validated tools is of particular importance also in clinical practice. Our findings suggest that clinicians should carefully evaluate the presence of specific personality traits that could be related to aggression in patients with BPD (Niemeyer et al., 2022). Knowing the specific AMPD domains/facets that play a key role in the possible manifestation of aggressive behaviors, they could pay attention to patients with high scores on callousness and hostility, and refer them to interventions that could potentially reduce the risk of violence (such as the Dialectical Behavior Therapy that significantly reduced self-reported anger, hostility, and/or aggressive/violent behavior, especially in men with BPD and antisocial behavior) (Frazier and Vela, 2014; Ciesinski et al., 2022).

5. Conclusions

The AMPD represents a promising approach to identify clinical features correlated with aggression. Patients with BPD and high levels of antagonism, hostility, callousness and impulsivity may be considered more prone to the most relevant aggressive behaviors, which should be detected early to reduce the risk of serious interpersonal and legal problems. Our findings could inform future studies on BPD that should further investigate and corroborate the possible predictive value of AMPD domains/facets for aggressive behavior.

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Anna Caterina Leucci: Writing – review & editing, Writing –

original draft, Formal analysis, Data curation. **Ilaria De Giorgi:** Writing – original draft, Data curation. **Lorenzo Pelizza:** Writing – review & editing, Writing – original draft, Supervision, Data curation, Conceptualization. **Biancamaria Bortolotti:** Writing – review & editing, Data curation. **Francesca D'Adda:** Writing – review & editing, Data curation. **Lorenzo Gammino:** Writing – review & editing, Data curation. **Sara Gibiino:** Writing – original draft, Data curation. **Loredana Lia:** Writing – review & editing, Data curation. **Margherita Magro:** Writing – review & editing, Data curation. **Luca Pellegrini:** Writing – review & editing. **Marco Menchetti:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

None.

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