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Intermittent explosive disorder: development of integrated research criteria for *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*

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Abstract

This study was designed to develop a revised diagnostic criteria set for intermittent explosive disorder (IED) for consideration for inclusion in *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-V*). This revised criteria set was developed by integrating previous research criteria with elements from the current *DSM-IV* set of diagnostic criteria. Evidence supporting the reliability and validity of IED-IR ("IED Integrated Criteria") in a new and well-characterized group of subjects with personality disorder is presented. Clinical, phenomenologic, and diagnostic data from 201 individuals with personality disorder were reviewed. All IED diagnoses were assigned using a best-estimate process (eg, kappa for IED-IR >0.85). In addition, subjects meeting IED-IR criteria had higher scores on dimensional measures of aggression and had lower global functioning scores than non–IED-IR subjects, even when related variables were controlled. The IED-IR criteria were more sensitive than the *DSM-IV* criteria only in identifying subjects with significant impulsive-aggressive behavior by a factor of 16. We conclude that the IED-IR criteria can be reliably applied and have sufficient validity to warrant consideration as *DSM-V* criteria for IED.

1. Introduction

Intermittent explosive disorder (IED) is a disorder of impulse control characterized by intermittent aggressive outbursts [1]. Despite its presence in the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition* (*DSM-III*) over the past 3 decades, little empirical research has been performed on IED. This is largely because, for its first 14 years, *DSM-III* and *DSM-III-R* criteria allowed few individuals with intermittent aggressive outbursts to meet the *DSM* criteria for this disorder. This was largely due to specific exclusion criteria, which did not allow individuals with generalized aggression and/or impulsivity to receive a *DSM* diagnosis of IED [2]. Because other issues with *DSM-III/R* criteria were also noted as problematic, some investigators proposed research criteria to address these issues [3].

Research criteria for IED (IED-R; 3), written in response to deficiencies in the *DSM-III/R* diagnostic criteria set, specified the nature (ie, impulsive rather than premeditated aggression), severity (ie, allowed nonphysical/destructive aggression provided that it was associated with personal distress and/or functional impairment), and frequency (ie, 2 aggressive outbursts per week on average for at least 1 month) of aggression. In addition, it required personal distress and/or functional impairment due to the aggressive outbursts, and it removed the presence of borderline or antisocial personality disorder (BPD/AsPD) as an exclusion to the diagnosis.

Initial study of individuals with and without recurrent, problematic, impulsive-aggressive behavior found preliminary evidence for the validity and reliability of these research criteria [3] and suggested that these criteria could serve as a template upon which to revise *DSM* IED criteria in the future. However, because research criteria were developed around the time *DSM-IV* was finalizing its work for its current edition, few of these changes could have been incorporated into the current *DSM-IV* criteria set for IED. Despite this, *DSM-IV* criteria were significantly improved by the removal of the criterion excluding intermittently aggressive individuals from the IED diagnosis if there was evidence of generalized aggression and/or impulsivity.

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Otherwise, *DSM-IV* criteria for IED continued to be problematic in ways already addressed by research criteria, specifically with regard to the nature, severity, and frequency of aggression; to the requirement for personal distress and/or functional impairment as a result of intermittent aggressive behavior; and to the allowance of individuals with BPD/AsPD.

This article examines data from on ongoing study of intermittent aggressive behavior to examine the original research criteria for IED in the context of the *DSM-IV* criteria for IED criteria and to attempt an integration of the 2 diagnostic criteria sets (IED-R and *DSM-IV*) in preparation for work on the diagnostic criteria for IED in the upcoming *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-V*). This work provides initial evidence that most individuals with problematic, intermittent aggressive behaviors can be identified through the use of this new integrated research diagnostic criteria set for IED (IED-IR).

2. Methods and materials

2.1. Subjects

This article reports data from 201 subjects meeting *DSM-IV* [1] criteria for personality disorder (male: n = 157; female: n = 44) systematically evaluated with regard to aggressive, suicidal, self-injurious, and other behaviors as part of a larger program designed to study the biological and treatment correlates of impulsive-aggressive behavior in personality disordered subjects. Data from the 188 subjects reported in a previous article on this topic [3] are not included in this data set. Subjects were recruited for this study by newspaper and public service announcements, which sought subjects with anger and aggression problems and, for comparison, subjects without self-reported anger or aggression problems. Written informed consent, using an institutional review board–approved consent document, was obtained from all subjects after all procedures were fully explained.

2.2. Diagnostic entry criteria and assessment

Only personality disorder subjects were eligible for study; subjects with a life history of mania/hypomania, schizophrenia (or other psychotic disorder), or current alcoholism or drug dependence were excluded from this study. Axis I and Axis II personality disorder diagnoses were made according to *DSM-IV* criteria. Diagnosis of alcoholism was made by modified research diagnostic criteria as in our previous reports [4,5]. Diagnoses were made using information from the following: (*a*) semistructured interviews conducted by trained masteral- or doctoral-level clinicians using the Schedule for Affective Disorders and Schizophrenia [6] modified to include modules for the diagnosis of *DSM* Axis I disorders not covered by the original Schedule for Affective Disorders and Schizophrenia, the *Structured Clinical Interview for DSM Diagnoses* [7] for Axis I disorders, and the Structured Interview for the Diagnosis of *DSM* Personality Disorder [7,8] for Axis II disorders; (*b*) clinical interview by a research psychiatrist; and (*c*) review of all other available clinical data. Final diagnoses were assigned by team best-estimate consensus procedures [9,10,11] involving at least 2 research psychiatrists and 3 clinical psychologists as previously described [4]. This methodology has previously been shown to enhance the accuracy of diagnosis over direct interview alone [12].

2.3. Development of research criteria for IED

In a previous article, Coccaro et al [3] proposed research diagnostic criteria for IED that (*a*) required that aggressive behavior be primarily impulsive in nature and associated with distress and/or psychosocial impairment; (*b*) allowed for frequent, though low-intensity, aggressive behavior provided it was associated with distress and/or psychosocial impairment; and (*c*) eliminated the exclusion of generalized impulsivity/aggression between episodes of aggression and the exclusion of BPD/AsPD as excluded comorbid disorders. Individuals meeting these proposed criteria were identified as meeting IED-R criteria and were found to have greater aggression and impulsivity, and lower global functioning scores compared to those who did not meet these criteria [3]. The IED-R criteria were developed in the late *DSM-III-R* era, however, and later revision of the *DSM* resulted in *DSM-IV* criteria that included at least 2 of the concepts of the IED-R criteria. First, *DSM-IV* criteria explicitly removed the exclusion of "generalized impulsivity/aggression between episodes of aggression." Second, *DSM-IV* tacitly allowed for a comorbid diagnosis of BPD/AsPD by adding the phrase "if not better accounted for by" disorders listed in the exclusionary criteria (eg, BPD/AsPD). Close examination of the *DSM-IV* criteria for IED, however, revealed that important limitations remained. First, the "A" criterion did not define the number of "aggressive acts" required for diagnosis. Second, there was no guideline on the time frame during which these acts occurred. Third, there was no definition of "serious assaultive acts" or "destruction of property." This led our group to propose first, that at least 3 "aggressive acts," during adulthood, would be required for a *DSM-IV* IED diagnosis (IED-IV), and second, that "aggressive acts" be defined as any act of physical aggression on another person whether or not it was associated with physical evidence of injury (eg, push/shove, slap) or destruction of property regardless of the value of the objects. Application of these criteria to the original set of 188 subjects from the study by Coccaro et al [3] revealed that these criteria based on *DSM-IV* criteria (herein referred to as IED-IV criteria) over the lifetime could be diagnosed with good reliability (kappa for lifetime IED-IV = .87 in a sample of 76 subjects). As expected, analyses of IED-IV subjects found that these subjects were more aggressive, more impulsive, and less

Table 1
Proposed integrated research criteria for IED for this study

A. Recurrent incidents of aggression manifest as either:
A1. Verbal or physical aggression toward other people, animals, or property occurring twice weekly on average for 1 month.
Or
A2. Three episodes involving physical assault against other people or destruction of property during the adult lifetime.[a]
B. The degree of aggressiveness expressed is grossly out of proportion to the provocation or any precipitating psychosocial stressors.
C. The aggressive behavior is generally not premeditated (eg, is impulsive) and is not committed to achieve some tangible objective (eg, money, power, intimidation).
D. The aggressive behavior causes either marked distress in the individual or impairment in occupational or interpersonal functioning.
E. The aggressive behavior is not better accounted for by another mental disorder (eg, major depressive/manic/psychotic disorder; attention-deficit/hyperactivity disorder); general medical condition (eg, head trauma, Alzheimer disease); or to the direct physiological effects of a substance.

[a] This is now proposed as "3 episodes in 1 year" (see text).

functional than non–IED-IV subjects. Further review of the same research records revealed substantial overlap between the 2 criteria sets with 69% meeting research criteria for both "IED-R and IED-IV," 20% for "IED-IV only," and 11% for "IED-R only." Despite important conceptual differences between IED-R and IED-IV, however, subsequent analysis of the Coccaro et al [3] sample found no differences among these 3 IED-R/IED-IV subgroups with respect to measures of aggression and impulsivity (Multivariate Analysis of Covariance [MANCOVA]: Wilks λ = .46, P = .348), suggesting that these 2 IED criteria sets may not meaningfully differentiate impulsive-aggressive subjects along the primary dimension of behavior and that the application of 1 criteria set, but not the other, will not fully identify the population of interest. Accordingly, a single, integrated, research diagnostic criteria set can be proposed that allows for most subjects from each of these 3 IED subgroups to be identified (Table 1).

2.4. Criteria for IED in this study

The IED subjects in this study are defined as meeting criteria for IED-IV (ie, *DSM-IV* IED criteria), and/or IED-R (ie, IED research criteria), and/or IED-IR (IED integrated research criteria). These diagnosis were made based on review of clinical and clinical research charts, records of the semistructured diagnostic interviews, and the data from Overt Aggression Scale-Modified for outpatients [13], as previously reported. The Overt Aggression Scale-Modified assesses the frequency and intensity of recent overt aggressive acts. Diagnoses of IED-IV, IED-R, and IED-IR diagnoses were assigned using the diagnostic best-estimate procedure described above. Interrater reliability for an IED diagnosis by these 3 criteria sets was very good (kappa >.85). Note that although all subjects meeting IED-R criteria, by definition, meet IED-IR criteria, the same is not true of subjects meeting IED-IV criteria. This is because IED-IR, but not IED-IV, criteria require aggressive behavior to be primarily impulsive in nature and be associated with significant subjective distress and/or psychosocial impairment.

2.5. Construct validity and behavioral assessments

Construct validity was explored by comparing the data on a variety of parameters in which IED subjects by the different research criteria sets were expected to differ from non-IED subjects. As in the previous study, differences between the groups (ie, IED > non-IED) were expected on measures of aggression and global function (ie, IED < non-IED). Aggression was assessed by interview (Life History of Aggression: LHA aggression score) [14] and self-report questionnaire (Buss-Durkee Hostility Inventory: BDHI aggression factor) [15]. Average global function of subjects over the past year was assessed by the Global Assessment of Function scale (GAF) [1]. Impulsivity was assessed by use of the Barratt Impulsiveness Scale, Version 11 (BIS-11) [16]. History of suicide attempt was assessed by interview during the clinical and structured diagnostic interview process described above.

2.6. Statistical analysis

Statistical analysis employed Kappa Coefficient, chi-square and/or Fisher exact test where appropriate, Student t test, Pearson correlation, and univariate and multivariate analysis of variance (ANOVA/MANOVA) and covariance (ANCOVA/MANCOVA) as appropriate. To be consistent between studies, the covariates used in this study were the same as in our previous study (age, gender, race, GAF score, number of current/lifetime Axis I disorder, and lifetime history of alcoholism or drug dependence). An analysis comparing the different research criteria sets was performed first to determine if the "Integrated" IED-IR criteria represented an inclusive criteria set that could be used in place of the *DSM-IV*–based IED research criteria set (IED-IV-R). Based on this analysis, analyses similar to those reported in the study by Coccaro et al [3] were performed to more fully characterize subjects meeting criteria for IED-IR. Finally, hierarchical multiple regression and logistic regression analysis were performed where appropriate. All statistical tests were conducted 2-tailed using an alpha value of .05.

3. Results

3.1. Identification of IED by IED-IV, IED-R, and IED-IR criteria sets

Overall, 125 (62.2%) of the 201 subjects in this data set met criteria for IED by at least 1 of the 3 diagnostic criteria sets used in the study. Of these, 7 (5.6%) met IED-IV criteria only; 14 (11.2%) subjects met IED-IV and IED-IR, but not IED-R, criteria; 44 (35.2%) met IED-R and IED-IR, but

Table 2
Different diagnostic groupings for IED (n = 125) in the sample

Meets which IED diagnostic criteria set	IED by any criteria (n = 125) Total group (N = 201)
Meets IED-IV only	7 (5.6% of IED group)/(3.5% of total group)
Meets IED-IV & IED-IR but not IED-R)	14 (11.2% of IED group)/(7.0% of total group)[a]
Meets IED-R and IED-IR (but not IED-IV)	44 (35.2% of IED group)/(21.9% of total group)[b]
Meets IED by all 3 diagnostic criteria sets	60 (40.0% of IED group)/(29.9% of total group)[c]

[a] Z score for difference between 7.0% and 3.5% = 2.51, $P = .012$.
[b] Z score for difference between 21.9% and 7.0% = 8.14, $P < .001$.
[c] Z score for difference between 29.9% and 21.9% = 2.66, $P = .010$.

not IED-IV, criteria; and 60 (48.0%) met criteria for IED by all diagnostic criteria sets. Examined separately, 64.8% of "all IED subjects" met IED-IV criteria, 83.2% met IED-R criteria, and 94.4% met IED-IR criteria (Table 2). The differences in proportions going from IED-IV to IED-R (ie, 0.40 to 0.52: $Z = 3.40$, $P < .001$) and from IED-IV to IED-IR (ie, 0.40 to 0.59: $Z = 5.43$, $P < .001$) were statistically significant. The difference in proportions going from IED-R to IED-IR was nearly statistically significant (ie, 0.52 to 0.59: $Z = 1.92$, $P = .055$).

3.2. Comparison of IED-IV, IED-R, and IED-IR criteria sets with respect to measures of aggression

Based on previous analyses on similar subjects that indicated that measures of aggression were the strongest correlates of IED [3], LHA and BDHI aggression scores were compared as a function of IED group status (ie, 5 groups: "non-IED," "IED-IV only," "IED-IV & IED-IR," "IED-R & IED-IR," and "IED by all criteria"). The MANOVA revealed a significant effect of IED group status on both LHA and BDHI scores (overall MANOVA $F_{8,188} = 8.53$, $P < .001$; LHA: $P < .001$; BDHI: $P = .001$). Post hoc analysis (Tukey honestly significant difference) revealed that "IED-IV only" subjects had LHA aggression scores similar to non-IED subjects. By contrast, LHA aggression scores of subjects who met criteria for "IED-IV & IED-IR" or "IED-R & IED-IR" were similar to each other and significantly higher than "non-IED" or "IED-IV only" subjects (Fig. 1). Post hoc analysis of BDHI aggression scores yielded a similar result but did not show the same degree of separation between the groups; in this analysis, a significant difference was only clearly noted for the comparison between "non-IED" and the "IED-IV & IED-IR" groups.

3.3. Characteristics of IED-IR subjects in this extension and replication sample

Although IED-IR and non–IED-IR subjects did not differ by sex in this data set, IED-IR subjects were more likely to be white (70.3% vs 38.6%) and less likely to be African American (23.7% vs 53.0%), and more likely to belong to a higher socioeconomic status (SES) class (ie, class I/II: 22% vs 4.5%) and less likely to belong to a lower SES class (ie, class V: 14.4% vs 31.3%), than non–IED-IR subjects. The IED-IR subjects were older (mean, 2.3 years) than non-IED subjects at a trend level of statistical significance (Table 3).

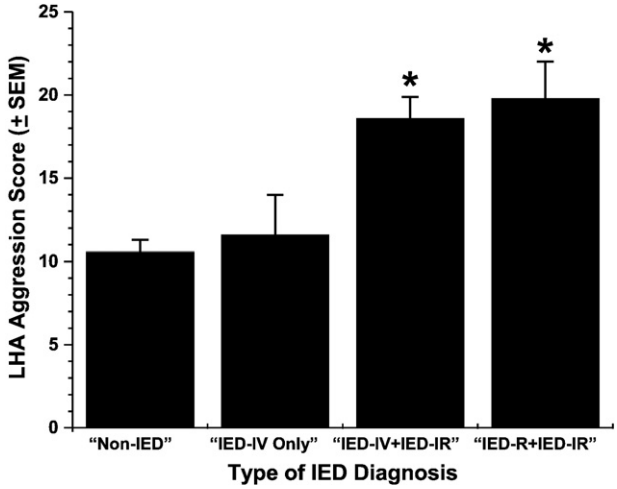

Fig. 1. The LHA aggression scores as a function of IED diagnostic status. *$P < .05$ from "non-IED" and "IED-IV only"; P = NS for "IED-IV & IED-IR" vs "IED-R & IED-IR"; P = NS for "non-IED" and "IED-IV only."

3.4. Construct validity: measures of other-directed aggression and impulsivity

As expected, IED-IR subjects had significantly greater scores than non–IED-IR subjects on LHA aggression, BDHI aggression, and BIS-11 impulsivity. The MANOVA entering all 3 aggression/impulsivity variables as dependent variables revealed a unique effect of IED-IR on the aggression but not the impulsivity variables (overall: $F_{3,90} = 23.01$, $P < .001$; LHA aggression: $F_{1,92} = 70.13$, $P < .001$; BDHI aggression: $F_{1,92} = 13.97$, $P < .001$; BIS-11 impulsivity: $F_{1,92} = 2.16$, $P = .145$). Subsequent MANCOVA entering all correlated (age, sex, race, GAF score, number of current/lifetime Axis I disorder, and lifetime history of alcoholism or drug dependence) revealed an effect of IED-IR status on LHA aggression (overall: $F_{3,83} = 13.83$, $P < .001$; LHA aggression: $F_{1,85} = 42.31$, $P < .001$), but not on the scores of the remaining variables (BDHI aggression: $F_{3,85} = 2.45$, $P = .121$; BIS-11 impulsivity: $F_{3,83} = .01$, $P = .91$). Subsequent logistic regression using the LHA aggression scores alone led to a correct classification of 81.1% of cases into IED-IR and non–IED-IR categories (Table 3).

3.5. Construct validity: history of self-directed aggression

Although IED-IR subjects were more likely than non–IED-IR subjects to have a life history of self-injurious behavior, IED-IR subjects did not differ from non–IED-IR subjects with regard to history of suicide attempt. Binary logistic regression confirmed this finding for self-injurious

Table 3
Demographic, behavioral, and functional variables

Variable	Non–IED-IR (n = 83)	IED-IR (n = 118)	Statistic	*P*
Demographic variables				
Age	32.9 ± 9.7	35.2 ± 8.8	$t = 1.74$ (df =199)	.083
Sex (male/female)	60/23	97/21	Fisher exact	.119
Race (white/AA/other)	32/44/7	83/28/7	$\chi^2 = 20.71$ ($df = 2$)	<.001
SES (I/II/III/IV/V)	0/4/23/30/26	2/24/32/43/17	$\chi^2 = 16.36$ ($df = 4$)	.003
Behavioral and functional variables				
LHA aggression	10.4 ± 5.6	18.6 ± 4.9	$t = 9.33$ (df =141)	<.001
BDHI aggression	22.6 ± 7.4	29.3 ± 7.1	$t = 5.44$ (df =134)	<.001
BIS-11 impulsivity	64.3 ± 10.4	68.2 ± 11.4	$t = 2.07$ (df =134)	.041
History of suicide attempt	11 (13.3%)	17 (14.4%)	$\chi^2 = 0.05$ ($df = 1$)	.816
History of self-injurious behavior	9 (10.8%)	30 (25.4%)	Fisher exact	.011
GAF score	59.8 ± 9.4	56.4 ± 6.1	$t = 2.91$ (df =129.9)	.004

behavior (Wald = 6.27, $df = 1$, $P = .012$). Addition of LHA (ie, residual scores after removal of correlated nonaggression variables) to the regression model reduced this finding to a trend level of statistical significance (Wald = 2.94, $df = 1$, $P = .083$) (Table 3).

3.6. Construct validity: global function

In addition to having higher LHA aggression scores, IED-IR subjects had significantly lower GAF scores than non–IED-IR subjects (Table 4). Addition of LHA aggression scores (ie, residual scores after removal of correlated variables, see above) to the ANCOVA model reduced the group difference in GAF score to a nonstatistically significant result (marginal mean ± SEM: 57.1 ± 0.9 vs 59.1 ± 1.1; $F_{1,140} = 1.77$, $P = .186$) (Table 3).

3.7. Discriminant validity: Axis I disorders

Although IED-IR subjects had more current and lifetime Axis I disorders than non–IED-IR subjects, few differences were noted as a function of current or lifetime Axis I disorder. No group differences were noted among current Axis I disorders. Among lifetime Axis I disorders, only alcoholism and/or drug dependence was more frequent in the IED-IR group. The MANCOVA, with lifetime alcoholism/drug dependence (as an added covariate), yielded a similar result as described above with regard to the effect of IED-IR on LHA aggression scores (Table 4).

3.8. Discriminant validity: Axis II personality disorders

The IED-IR subjects did not differ from non–IED-IR subjects as a function of Axis II disorders by cluster or by

Table 4
Axis I diagnostic data

	Non–IED-IR (n = 83)	IED-IR (n = 118)	Statistic	*P*
Current Axis I diagnoses				
Current Axis I disorders (#)	0.7 ± 1.0	1.4 ± 1.0	$t = 4.50$ (df =199)	<.001
Any mood disorder	13 (15.7%)	19 (16.1%)	$\chi^2 = 0.01$($df = 1$)	.933
Any anxiety disorder	10 (12.0%)	17 (14.4%)	$\chi^2 = 0.23$ ($df = 1$)	.629
Alcoholism or drug dependence	0 (0.0%)	0 (0.0%)	N/A	1.000
Alcoholism	0 (0.0%)	0 (0.0%)	N/A	1.000
Drug dependence	0 (0.0%)	0 (0.0%)	N/A	1.000
Non-IED impulse control disorders	3 (3.6%)	5 (4.2%)	Fisher exact	1.000
Adjustment disorder	1 (1.2%)	5 (4.2%)	Fisher exact	.404
Eating disorder	3 (3.8%)	3 (2.5%)	Fisher exact	1.000
Somatoform disorder	1 (1.2%)	1 (0.8%)	Fisher exact	1.000
Lifetime Axis I diagnoses				
Lifetime Axis I disorders (#)	2.0 ± 1.9	3.1 ± 1.8	$t = 4.04$ (df =199)	<.001
Any mood disorder	37 (44.6%)	57 (48.3%)	$\chi^2 = 0.27$($df = 1$)	.602
Any anxiety disorder	18 (21.7%)	25 (21.2%)	$\chi^2 = 0.01$ ($df = 1$)	.932
Alcoholism or drug dependence	17 (20.5%)	49 (41.5%)	Fisher exact	.002
Alcoholism	12 (14.5%)	35 (29.7%)	Fisher exact	.017
Drug dependence	11 (13.3%)	29 (24.6%)	Fisher exact	.051
Non-IED impulse control disorders	6 (7.2%)	9 (7.6%)	Fisher exact	1.000
Adjustment disorder	3 (3.6%)	7 (5.9%)	Fisher exact	.529
Eating disorder	6 (7.2%)	4 (3.4%)	Fisher exact	.324
Somatoform disorder	1 (1.2%)	1 (0.8%)	Fisher exact	1.000

Table 5
Axis II personality disorders

	Non–IED-IR (n = 83)	IED-IR (n = 118)	Statistic	*P*
Axis II cluster A	13 (15.7%)	18 (15.4%)	Fisher exact	1.000
Axis II cluster B	29 (34.9%)	38 (32.5%)	Fisher exact	1.000
Axis II cluster C	20 (24.1%)	27 (23.1%)	Fisher exact	1.000
Axis II PD-NOS	36 (43.4%)	62 (52.5%)	Fisher exact	.252
BPD and/or AsPD	12 (14.5%)	27 (22.9%)	Fisher exact	.151
BPD	6 (7.2%)	14 (11.9%)	Fisher exact	.343
AsPD	8 (9.6%)	17 (14.4%)	Fisher exact	.388

PD-NOS = personality disorder-not otherwise specified.

individual Axis II diagnosis. Notably, IED-IR subjects did not differ from non–IED-IR subjects as a function of either BPD/AsPD. Overall, BPD/AsPD accounted for less than one-fourth (27 of 118: 22.9%) of subjects with IED-IR. Conversely, somewhat more than two-thirds of subjects with BPD/AsPD (27 of 39: 69.2%) met research criteria for IED-IR (Table 5).

4. Discussion

This study represents a replication and refinement for research criteria for IED [3]. In this analysis of 201 new subjects, not previously reported, an integrated criteria set that combines the essence of IED by *DSM-IV* and IED-R was found to maximally identify subjects with prominent histories of recurrent, problematic, impulsive aggression with IED-IR. This was confirmed by the fact that the sequential addition of subjects using research criteria sets (IED-R, IED-IR) significantly added to the proportion of overall impulsive-aggressive subjects identified as "IED" compared to the use of the *DSM-IV* criteria only.

These data also suggest that meeting *DSM-IV* criteria for IED, only, may not identify subjects with clinically meaningful issues of impulsive aggression. Of the 125 subjects meeting criteria for IED by any criteria set, only 7 (5.6%) met *DSM-IV* IED only (ie, did not meet IED-R or IED-IR) criteria. These subjects either did not have evidence of impulsive aggression and/or did not have social or occupational distress or impairment associated with their aggressive outbursts. It is notable that aggression scores for these subjects were lower than those among the remaining IED subjects and were the same as that of non-IED subjects. This suggests that simply having at least 3 seriously aggressive outbursts in one's life is not enough to put one in the same category of individuals who are regularly engaging in aggressive outbursts. This finding, as well as data from the National Comorbidity Survey Replication [17], suggest that the time frame for low-frequency, but high-intensity, aggressive outbursts should be limited to 1 year rather than the entire adult lifetime.

Construct validity is supported by the observation that IED-IR subjects by several observations, including the higher aggression scores, lower functionality, and relatively little differential comorbidity, compared with non–IED-IR subjects. Controlling for aggression scores accounted for the differences between the subjects in terms of IED-IR diagnosis and in global function. Notably, the life history aggression score, alone, was able to identify more than 80% of IED-IR subjects among the entire group. The observation that impulsivity scores did not differ between IED-IR and non–IED-IR subjects, as it did not in the previous study on IED-R criteria [3], suggests strongly that it is not the level of generalized impulsivity that differentiates IED-IR from non–IED-IR subjects but the impulsive nature of the aggressive outbursts. As for comorbidity, no specific current Axis I disorder, or Axis II disorder, occurred more frequently in IED-IR compared with non–IED-IR subjects in this study. Only lifetime diagnoses of alcohol and/or drug dependence were more frequent in IED-IR compared with non–IED-IR subjects. Notably, aggression remained elevated in IED-IR subjects when history of alcohol and drug dependence disorders was accounted for, suggesting that these comorbidities may have little effect on the level of aggressiveness observed in subjects with IED-IR.

4.1. Caveats

The primary caveat for this study is that all subjects in this sample had personality disorder. This was because the primary study into which subjects were recruited required subjects to meet criteria for personality disorder. Accordingly, these data may not necessarily be generalized to potential IED-IR subjects without personality disorder. However, it should be noted that the *DSM-IV* criteria for personality disorder make it very likely that most of subjects with IED-IR would also have a personality disorder. This is because subjects with IED-IR will almost always meet criteria for having problems with anger control and for having problems in interpersonal relationships because of the specifics of the diagnostic criteria.

4.2. Conclusion

This refinement of research criteria for IED should improve the identification of individuals with recurrent, problematic, impulsive-aggressive behavior and should further allow research in which these individuals can be studied with any of a variety of methodologies, including psychobiology and neuroscience. Using research criteria for IED, for example, we have found that IED-IR subjects have lower prolactin responses to *d*-Fenfluramine and that IED-R and IED-IR subjects have fewer platelet 5-HT transporter sites than subjects only meeting the *DSM-IV* criteria for IED [18,19]. Accordingly, in addition to the psychometric data presented in this study, these biological marker data provide important aspects of validity for IED-IR criteria. In conclusion, we suggest that IED-IR criteria can be reliably applied and has sufficient validity to warrant consideration as revised criteria for the diagnosis of IED in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*.

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