



Psychiatric Comorbidity in Intermittent Explosive Disorder

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Impulsive aggressive behavior appears in psychiatric patients with diagnoses ranging from schizophrenia and other psychotic disorders as well as bipolar, depressive, anxiety, substance use, posttraumatic stress, and personality disorders, among others. Accordingly, clinicians have been reluctant to make the diagnosis of IED in the presence of other psychiatric diagnoses. In the DSM-III (American Psychiatric Association, 1980), the diagnosis of IED was, essentially, a disorder of exclusion. That is, if any other behavioral disorder was present to (possibly) explain impulsive aggressive, the diagnosis of IED was often not given.

DSM-IV (American Psychiatric Association, 1994) revised the IED criteria so that it could be more widely applied. This included relaxing the comorbidity exclusions such that IED could be diagnosed as long as another psychiatric disorder did not “better explain” the impulsive aggressiveness of the individual in question. Later, Research Diagnostic Criteria (Coccaro, 2011; Coccaro, Kavoussi, Berman, & Lish, 1998) and DSM-5 (American Psychiatric Association, 2013) criteria sets took this a step further and proposed that IED could be diagnosed along with other disorders (in most cases) as long as the individual also met criteria for IED at times when another disorder was not present. While this is true in general, IED is typically not diagnosed in the context of lifetime schizophrenia and lifetime bipolar

disorder so as to be diagnostically conservative and because the underlying presence of schizophrenia or bipolar disorder often, but not always, better explains impulsive aggressiveness than IED in such individuals.

In this chapter, we will review the issue of comorbidity in IED in adults based on available empiric data. Consideration is given to the co-occurrence of IED in the context of lifetime and current comorbid psychiatric disorders, the temporal sequence for the age of onset of IED and comorbid disorders, and the effect of comorbidity on measures of aggression in those with and without IED and the comorbid disorder in question. In analyzing our own clinical research, and reanalyzing published [e.g., the National Comorbidity Study-Replication (NCS-R); [Kessler et al., 2004](#)] data sets, we sought to examine, where possible, the relationships between current (past year), and lifetime, IED separately.



Overall Comorbidity With Psychiatric Syndromal and Personality Disorders

NCR-S Survey Study (Table 1). In our reanalysis of the NCS-R survey data set, individuals with current or lifetime DSM-5 IED ([American Psychiatric Association, 2013](#)) had a higher rate of comorbidity with other psychiatric disorders compared with those with non-IED disorders (66.4% vs. 23.8% for current disorders; 79.3% vs. 40.8% for lifetime disorders). While this degree of comorbidity is high, it is in the same range of overall comorbidity displayed by those indexed as having mood, anxiety, substance use, or posttraumatic stress disorders. Accordingly, despite the fact that DSM-5 IED is highly comorbid with other psychiatric disorders, it displays no more overall comorbidity compared with other psychiatric disorders examined in this survey.

Clinical Research Studies (Table 1). The same set of analyses were conducted with our clinical research data set of 1642 individuals (e.g., [Coccaro, Shima, & Lee, 2018](#)) containing 453 healthy, and 443 psychiatric, controls and 746 individuals with current or past DSM-5 IED; we also differentiated those with and without a history of personality disorders (i.e., formerly referred to as Axis I and Axis II disorders, respectively). As in the NCS-R reanalysis before, overall comorbidity was similar for IED and for those with mood, anxiety, and posttraumatic stress disorders for both current and lifetime comorbidity; substance use disorder was only examined for lifetime comorbidity because individuals with current substance use disorder were not included in these studies. The lower odds ratios observed in the clinical research data set were likely due

Table 1 General Comorbidity of IED Compared With That of Current Disorders

With Versus Without Disorder	NCS-R Reanalysis OR (95% CI) [% Dx vs. % Non-Dx]	Clinical Research Analysis OR (95% CI) [% Dx vs. % Non-Dx]
Current IED versus Non-IED	5.68 (4.31–7.52) [66.4% vs. 23.8%]	2.67 (2.11–3.37) [39.5% vs. 18.8%]
Current Mood Dx versus Nonmood Dx	7.94 (6.80–9.35) [66.6% vs. 18.5%]	4.03 (2.93–5.52) [73.6% vs. 39.3%]
Current Anxiety Dx versus Nonanxiety Dx	6.67 (5.58–7.58) [45.6% vs. 10.3%]	3.30 (2.43–4.48) [68.2% vs. 39.4%]
Current SUD versus Non-SUD	5.56 (4.59–6.76) [64.2% vs. 24.5%]	N/A
Current PTSD versus Non-PTSD	11.90 (8.85–15.87) [82.8% vs. 26.1%]	10.87 (5.15–22.73) [91.3% vs. 44.8%]
Lifetime IED versus Non-IED	5.32 (4.12–6.90) [79.3% vs. 40.8%]	7.46 (5.88–9.52) [80.8% vs. 35.4%]
Lifetime Mood Dx versus Nonmood Dx	7.81 (6.99–8.77) [75.2% vs. 27.3%]	8.77 (6.76–11.49) [85.7% vs. 40.1%]
Lifetime Anxiety Dx versus Nonanxiety Dx	7.14 (6.45–7.87) [64.7% vs. 20.1%]	9.52 (6.17–14.71) [91.7% vs. 55.0%]
Lifetime SUD versus Non-SUD	5.88 (5.13–6.76) [73.0% vs. 33.9%]	5.32 (4.02–7.04) [84.7% vs. 49.9%]
Lifetime PTSD versus Non-PTSD	16.67 (12.35–22.73) [91.9% vs. 39.2%]	90.91 (12.35–500) [99.3% vs. 59.7%]

to the fact that the clinical research, compared with that of the NCS-R data set (a large population-based sample) had a smaller number of participants overall (1642 vs. 9282), and a much smaller proportion of participants without psychopathology (27.5% vs. 74.3%). Including the presence of personality disorder in the analysis revealed that among those with current DSM-5 IED, nearly half (42.6%) had both a current syndromal psychiatric and personality disorder, or a personality disorder only (49.3%); 1.8% only had a current syndromal psychiatric disorder while 6.3% had no current comorbid disorder at all. For lifetime IED, however, far more individuals had both a lifetime syndromal psychiatric and a personality disorder compared with personality disorder only (68.7% vs. 23.3%); 3.7% had a lifetime syndromal psychiatric disorder only and 4.2% had no lifetime disorder at all.

Focusing on the comorbidity with personality disorders we found that the vast majority of individuals with DSM-5 IED met criteria for a personality disorder (91.9% for current, and 94.6% for past, IED). That said, the degree of comorbidity of personality disorder in those without current IED (e.g., depressive or anxiety) disorders was also substantial and not significantly different compared with those with current IED [IED: 91.7% vs. 43.7%, $P < .001$; OR: 14.08 (95% CI: 10.20–19.61); Depressive Disorder: 93.2% vs. 55.5%, $P < .001$; OR: 10.10 (6.21–17.54); Anxiety Disorder: 94.8% vs. 55.3%, $P < .001$; OR: 17.54 (95% CI: 9.52–31.25); Posttraumatic Stress Disorder: 95.7% vs. 58.8%, $P < .001$; OR: 14.93 (5.43–41.67)]. Thus the degree of comorbidity with general personality disorder may not meaningfully differ between those with current IED, depressive, anxiety, or post-traumatic stress disorders. That said, the finding that those with IED are highly comorbid with personality disorder is not unexpected given that several features displayed by those with IED apply toward meeting at least two, in not all, of the required General Criteria for DSM-5 Personality Disorder [i.e., issues with cognition (e.g., hostile attribution”), affectivity (e.g., intensity/appropriateness of emotional response), impulse control (e.g., impulsive aggression), and interpersonal dysfunction (distress and/or impairment associated with impulsive aggressive behavior)]. Finally, as will be discussed later, IED is more frequently observed in some personality disorders rather than others and is frequently observed in those with unspecified personality disorder (see [Table 3](#) and later).



Comorbidity With Psychiatric ([Table 2](#)) and Personality Disorders ([Table 3](#))

Overall Frequency of Comorbid Disorders. In the NCS-R data set, current DSM-5 IED was most frequently associated with current anxiety disorder (45.8%), followed by current substance use (23.9%), depressive (22.3%), posttraumatic stress (13.4%), and bipolar (8.4%) disorder. The pattern of results for lifetime comorbidity with IED was similar, but with higher frequency for each disorder: current anxiety disorder (58.7%), followed by any current substance use (41.0%), depressive (38.6%), bipolar (16.8%), and posttraumatic stress (16.5%) disorder. In the clinical research data set, current DSM-5 IED was most frequently associated with any current depressive disorder (21.1%), followed by anxiety (20.1%) and posttraumatic stress (11.7%) disorder; the remaining current disorders came in below 2.4%. The pattern of results for lifetime comorbidity with IED was similar except that lifetime

Table 2 Comorbidity of IED With Other Adult Psychiatric Syndromal Disorders

Adult Disorders	Current Comorbidity	Lifetime Comorbidity	Current Comorbidity	Lifetime Comorbidity
	NCS-R Reanalysis	NCS-R Reanalysis	Clinical Research Analysis	Clinical Research Analysis
	OR (95% CI) [% IED vs. % Non-IED]	OR (95% CI) [% IED vs. % Non-IED]	OR (95% CI) [% IED vs. % Non-IED]	OR (95% CI) [% IED vs. % Non-IED]
Bipolar Dx ¹	4.22 (2.99–5.99) [8.4% vs. 1.3%]	3.98 (2.95–5.41) [16.8% vs. 4.0%]	N/A	N/A
Depressive Dx ^{1,2,3}	3.04 (2.32–3.98) [22.3% vs. 7.5%]	2.83 (2.27–3.55) [38.6% vs. 19.3%]	2.07 (1.55–2.75) [21.1% vs. 10.5%]	4.98 (3.97–6.21) [59.7% vs. 22.7%]
Anxiety Dx ^{1,2,4}	4.17 (3.16–5.46) [45.8% vs. 16.4%]	3.89 (3.13–4.83) [58.7% vs. 27.5%]	2.70 (1.55–2.76) [20.1% vs. 10.9%]	2.92 (2.23–3.83) [27.2% vs. 11.7%]
Substance Use Dx ^{1,2}	3.98 (3.03–5.24) [23.9% vs. 5.1%]	3.79 (3.03–4.74) [41.0% vs. 12.9%]	N/A	4.13 (3.27–5.21) [46.7% vs. 17.1%]
Posttraumatic Stress Dx ^{1,2}	3.89 (2.74–5.52) [13.4% vs. 3.3%]	3.69 (2.73–4.98) [17.1% vs. 6.1%]	4.42 (2.75–7.14) 11.1% vs. 2.6%	6.63 (4.24–10.31) [16.4% vs. 3.0%]
Anorexia Nervosa ^{1,2}	N/A [0.0% vs. 0.0%]	1.20 (0.16–9.17) [0.3% vs. 0.2%]	0.52 (0.06–4.78) [0.2% vs. 0.4%]	2.04 (0.96–4.31) [2.5% vs. 1.4%]
Bulimia Nervosa ^{1,2}	8.33 (2.26–31.25) [1.3% vs. 0.1%]	4.13 (1.82–9.35) [1.9% vs. 0.5%]	3.98 (0.41–38.46) [0.5% vs. 0.1%]	1.20 (0.49–2.92) [1.6% vs. 1.1%]
Binge Eating Dx ^{1,2}	2.40 (0.73–7.87) [1.3% vs. 0.5%]	2.61 (1.33–5.12) [2.7% vs. 1.1%]	2.56 (1.07–6.10) [2.4% vs. 0.9%]	6.94 (2.82–16.95) [4.2% vs. 0.6%]
Obs-Comp Dx ²	N/A	N/A	4.40 (1.36–14.29) [1.9% vs. 0.4%]	5.26 (2.35–11.76) [4.2% vs. 0.9%]
Non-IED Impulse Control Dx ²	N/A	N/A	5.49 (1.45–20.83) [1.5% vs. 0.3%]	7.04 (2.64–18.52) [3.5% vs. 0.5%]

Notes: 1 = NCS-R Reanalysis; 2 = Coccaro (Data on File); 3 = [Coccaro \(2018\)](#) (Dep Dx submitted); 4 = [Coccaro \(2018\)](#) (Anx Dx submitted); 6 = [Jennings, Wildes, and Coccaro \(2017\)](#).

Table 3 Comorbidity of IED With Personality Disorders

Personality Disorder	Current Comorbidity (IED vs. Other)	Lifetime Comorbidity (IED vs. Other)
	Clinical Research Analysis	Clinical Research Analysis
	OR (95% CI) [% IED vs. % Non-IED]	OR (95% CI) [% IED vs. % Non-IED]
PD cluster group¹		
Odd	3.26 (2.30–4.16) [18.2% vs. 5.6%]	4.41 (2.99–6.49) [18.0% vs. 4.4%]
Dramatic	3.92 (3.50–5.65) [46.9% vs. 14.7%]	8.00 (6.06–10.53) [48.2% vs. 10.2%]
Anxious	1.84 (1.42–2.39) [25.0% vs. 14.7%]	2.51 (1.92–3.29) [26.6% vs. 12.4%]
NOS	2.77 (2.18–3.52) [32.4% vs. 15.2%]	3.08 (2.40–3.94) [31.0% vs. 14.4%]
PDs associated with IED¹		
Paranoid PD	4.10 (2.80–5.95) [17.3% vs. 4.2%]	6.02 (3.88–9.35) [16.9% vs. 3.1%]
Antisocial PD	5.81 (3.97–8.55) [31.8% vs. 9.0%]	17.86 (10.00–32.26) [33.0% vs. 5.6%]
Borderline PD	4.52 (3.39–6.06) [20.3% vs. 3.9%]	9.62 (6.76–13.89) [21.0% vs. 1.6%]
Narcissistic PD	2.69 (1.85–3.92) [13.5% vs. 4.9%]	4.33 (2.82–6.67) [14.3% vs. 3.3%]
Obsessive –Compulsive PD	2.28 (1.66–3.14) [17.6% vs. 8.0%]	3.17 (2.25–4.48) [18.6% vs. 6.5%]

Note: 1=Includes data from [Coccaro et al. \(2018\)](#) with more recent (unpublished) data.

substance use disorder (46.7%) followed depressive disorder (59.7%), instead of any anxiety disorder (27.2%); frequency of the other lifetime disorders was similar as with current disorders (e.g., posttraumatic stress disorder: 16.4%). Thus the most frequent comorbid classes of syndromal adult psychiatric disorders appear to be depressive, anxiety, substance use, and posttraumatic stress disorders. We discuss IED comorbidity with syndromal psychiatric disorders in greater detail along with the odds ratios for each comparison. Exploration of odds ratios provides insight as to the level of risk that each disorder is associated with IED regardless of the frequency that that disorder has in those with IED.

Mood Disorders: Bipolar Disorder (Table 2). Given that agitated, aggressive, and impulsive behavior is often present in bipolar disorder some clinical investigators suggest a relationship between these two disorders (McElroy, Soutullo, Beckman, Taylor Jr., & Keck Jr., 1998). For example, the co-occurrence of the two was reported as greater than half in one clinical study in which some individuals with IED by DSM-IV criteria appeared to have “micro-manic episodes” with manic-like affective symptoms (e.g., irritability, increased energy, and racing thoughts) occurring prior to, and during, aggressive episodes in up to 62%–99% of cases (McElroy et al., 1998). For nearly all other published studies, the current co-occurrence of bipolar disorder (BP I and BP II) is treated as exclusionary for the diagnosis of IED. Despite this, the lifetime co-occurrence rate of IED and bipolar disorder is not zero. In at least two published clinical studies, where such data were available, the lifetime co-occurrence of these two disorders was about 10% (Coccaro, Posternak, & Zimmerman, 2005; Kessler et al., 2006). In our NCS-R reanalysis we found significant comorbidity for current bipolar disorder in those with DSM-5 IED with an elevated odds ratio of at least fourfold for current IED with current bipolar disorder and an elevated odds ratio of fourfold for lifetime IED with lifetime bipolar disorder. The frequency of IED comorbid with bipolar disorder was 8.4% for current comorbidity and 16.8% for lifetime morbidity. The presence of bipolar disorder did not rule out IED in these cases, however, because age of onset of IED was earlier than that of bipolar disorder in each case by a mean difference of about 7 years indicating a substantial period of time when IED was present in the absence of bipolar disorder. While this suggests delimitation of the two disorders, it is possible that the early presence of IED may be a harbinger of a later bipolar disorder that has not yet clinically emerged.

Mood Disorders: Depressive Disorder (Table 2). In early clinical studies, lifetime IED, diagnosed using either Research or DSM-IV criteria, has been reported to co-occur with depressive disorder three to four more often relative to depressive disorder among those with non-IED disorders (Coccaro, 2011; Coccaro et al., 1998, 2005). In our NCS-R reanalysis, the odds ratio for current IED was threefold higher in those with current depressive disorder (major depression and dysthymia) without difference as a function of the type of depressive disorder; the odds ratio was similarly high for lifetime IED with lifetime depressive disorder. The frequency of IED with depressive disorder was 22.3% for current comorbidity and nearly twice that for lifetime comorbidity (38.6%). In our clinical research data set, current

DSM-5 IED was also significantly associated with current depressive disorder (i.e., major depression, persistent depressive disorder, or other specified depressive disorder) without difference as a function of the type of depressive disorder. The odds ratio trended up to two- to five-fold for current and lifetime comorbidity, respectively, and the frequency ranged from about a fifth for current comorbidity to nearly three-fifths for lifetime comorbidity making depressive disorder a key comorbid disorder occurring with IED.

Mood Disorders: Disruptive Mood Dysregulation Disorder (DMDD). The DSM-5 criteria sets for IED and DMDD are very similar and have only two important differences. First, DMDD requires three, as opposed to two, impulsive aggressive outbursts per week and, second, DMDD requires that persistent anger and/or irritability be present (e.g., $\geq 50\%$ of the time) in between impulsive aggressive outbursts. DMDD was developed to enable clinicians to utilize a nonbipolar diagnosis for children/adolescents who are persistently irritable, and who have frequent temper tantrums, but who do not otherwise meet criteria for pediatric bipolar disorder. Most importantly, empiric data demonstrates that DMDD is not related to bipolar disorder and that DMDD should be diagnosed instead of pediatric bipolar disorder when DMDD criteria are met (Fava & Leibenluft, 2018). In those with DMDD, the diagnosis of IED should not be made when the age of onset of the aggressive outbursts occurs prior to 10 years of age. Despite the similarities in the two disorders, we have found that DMDD criteria are, otherwise, not met in the vast majority of adults with DSM-5 IED since 92% of all DSM-5 individuals studied have short-lived periods of inter-outburst anger averaging less than 40% of the time between outbursts (Coccaro, 2018a). Further examination found that only 2% of the remaining individuals could have met DSM-5 criteria for DMDD. Thus it is unlikely that the presence of IED in adulthood is better explained by DMDD.

Anxiety Disorders (Table 2). Similar to depressive disorders, lifetime IED has also been associated with anxiety disorders in early clinical studies (Coccaro et al., 2005). In our NCS-R reanalysis, we found an elevated odds ratio of fourfold for current DSM-5 IED with any current DSM-5 anxiety disorder (Panic Disorder, Social Phobia, Simple Phobia, Generalized Anxiety Disorder, and Anxiety Disorder-Not Otherwise Specified); the same was true for lifetime comorbidity. The findings from our clinical research data set were similar except that the odds ratio for current anxiety disorder with IED was significantly lower.

Addictive Disorders: Substance Use Disorders (Table 2). Similar to depressive and anxiety disorders, IED has also been associated with several substance

use disorders (SUD) such as alcohol and other drugs of abuse in early clinical studies (Coccaro et al., 2005). In our NCS-R reanalysis, the odds ratio for DSM-5 IED with SUD was about fourfold for current and lifetime comorbidity. Among the SUDs, significant comorbidity was observed for IED comorbidity with: alcohol use disorder [15.1% vs. 2.0%; OR = 5.26 (95% CI: 3.53–7.81)], cannabis use disorder [7.1% vs. 0.6%; OR = 6.45 (95% CI: 3.56–11.63)], and for nicotine use disorder [14.3% vs. 3.1%; OR = 4.24 (95% CI: 2.86–6.29)], Coccaro, Fanning, & Lee, 2017. In our clinical research data set, where current SUD was exclusionary for study entry, the odds ratio for lifetime IED with lifetime SUD was fourfold with a substantial frequency of nearly fifty percent (46.7%). Thus these three substance use disorders appear to account for the relationship between SUDs overall and IED.

Addictive Disorders: Behavioral Addictive Disorders. In its most recent edition, DSM-5 moved Pathological Gambling Disorder (PGD) from the Impulse Control Disorders section to the Addictions section. The NCS-R community survey including pathological gambling disorder (PGD) late in its study and such data was available in only a third of all NCS-R respondents. While an early paper (Kessler et al., 2008) suggested significant comorbidity between DSM-IV PGD and DSM-IV IED, our NCS-R reanalysis revealed no cases in which current DSM-5 IED was comorbid with current DSM-5 PGD. When examined as a function of lifetime comorbidity, no difference was seen between the rates of the two disorders [0.9% vs. 1.1%, OR = 0.82 (95% CI: 0.11–6.05), $P = .846$]. Analysis of our clinical research data, however, finds a statistically significant increase in comorbidity between IED and PDG [1.5% vs. 0.2%; OR = 6.65 (95% CI: 1.43–30.90), $P < .05$]. The number of comorbid cases was small but onset of IED preceded that of PGD in nearly all cases (88%) and the age of onset of IED preceded that of PGD by about 7 years (9.2 ± 3.4 years vs. 17.0 ± 8.6 years) PDG. Thus of the different potentially comorbid disorders studied, PDG seemed to have one of the weaker comorbidities with IED. To our knowledge there is no data on the comorbidity of IED with other behavioral addictive disorders.

Trauma and Stress Disorders: Posttraumatic Stress Disorder (Table 2). DSM-5 Posttraumatic Stress Disorder (PTSD) is the only trauma and stress disorder with a specific diagnostic criterion related to aggression. Accordingly, an excess of IED with PTSD should be expected. In our NCS-R reanalysis, the increase in odds ratio for DSM-5 IED with PTSD was fourfold for current comorbidity and fourfold for lifetime comorbidity. In our clinical

research studies, the increase in odds ratio for DSM-5 IED with PTSD was similar, as was the frequency of comorbidity for both current and lifetime disorders.

Trauma and Stress Disorders: Adjustment Disorder. While adjustment disorder was not included in the NCS-R data set, analysis of our clinical research data set reveals a nonsignificant increase in current Adjustment Disorder in those with current IED [1.6% vs. 0.9%; OR = 1.60 (95% CI: 0.76–4.63, $P = .232$)]. Thus this preliminary data suggests IED may not be associated with adjustment disorder, but further research in the area is needed.

Eating Disorders (Table 2). Epidemiologic studies suggest overlap among eating disorders, particularly bulimic spectrum disorders, and intermittent explosive disorder (IED). (Fernandez-Aranda et al., 2006; Hudson, Hiripi, Pope, & Kessler, 2007; Kessler et al., 2013). In our NCS-R reanalysis, an elevated odds ratio was observed for current DSM-5 and current bulimia only. Analysis of the clinical research data set (which did not include individuals younger than 18 years of age), however, found an elevated odds ratio for both IED and Bulimia Nervosa for both current and lifetime disorders and for lifetime IED and Binge Eating Disorder. That said our clinical research data set had far fewer individuals with eating disorders than the NCS-R data set. Thus the presence of IED appears to increase the risk of binge eating which occurs in both bulimia nervosa and binge eating disorder.

Obsessive-Compulsive and Related Disorders: Obsessive Compulsive Disorder (Table 2). While data on Obsessive Compulsive Disorder (OCD) is not available from the NCS-R study, analysis of our clinical research data set reveals a nearly 10-fold increase in current OCD in those with current DSM-5 IED. The increase in odds ratio for lifetime comorbidity, however, was much lower at nearly threefold. Given the small number of comorbid cases in both sets of analyses, however, these data must be viewed with caution until future studies are conducted.

Other Impulse Control Disorders (Table 2). In addition to IED, the current DSM-5 Impulse Control Disorders (ICD) include Pyromania, Kleptomania, and Conduct Disorder and Oppositional Defiant Disorder (formally in the DSM-IV section entitled, “Disorders First Appearing in Childhood”). While the latter two disorders have been included in recent community surveys (and will be discussed later), neither pyromania nor kleptomania has been included in any community survey. Analysis of our clinical research data set reveals only a small number of individuals with

current or past DSM-5 IED and lifetime Pyromania ($n=7$), Kleptomania ($n=6$), or Impulse Control Disorder-Not Otherwise Specified ($n=4$) and so we chose to examine all impulse control disorders (ICD; $n=8$ for current, $n=18$ for lifetime). While the association of current DSM-5 IED in those with current ICD was small in proportion, the comorbidity was statistically significant [1.7% vs. 0.3%; Odds Ratio: 6.69 (95% CI: 1.34–33.31), $P<.05$]. The association of lifetime IED with lifetime ICD was larger in magnitude [3.5% vs. 0.4%; Odds Ratio: 9.03 (95% CI: 2.60–31.38), $P<.001$]. While the data are limited, IED appears to show evidence of increased comorbidity with other impulse control disorders.

Disruptive Behavior Disorders First Appearing in Childhood. The nature of the relationship between IED and Disruptive Behavior Disorders as conceptualized in the DSM-IV [DBDs: Conduct Disorder (CD), Oppositional Defiant Disorder (ODD) and Attention Deficit/Hyperactivity Disorder (ADHD)]. This grouping was changed in DSM-5 with CD and ODD reassigned to the Disruptive and Impulse Control Disorders section. Examining this group is important because both sets of disorders begin before adulthood and clinicians, often, do not make the diagnosis of IED in the presence of these DBDs.

Some degree of co-occurrence between IED and DBDs is expected because some form of aggression and/or impulsivity (which is related to aggression) is included in the diagnostic criteria set for each disorder. Examples of predatory/premeditated aggression (e.g., robbery, extortion, sexual abuse, physical cruelty) are described in the CD criteria; examples of impulsive aggression (e.g., arguing, temper tantrums) are described in the ODD criteria; and examples of impulsivity (e.g., blurts out answers, interrupts others), but not aggression, are described in the ADHD criteria.

For example, in our NCS-R reanalysis, the order of frequency of current IED with DBD was highest for ADHD (14.3%), followed by CD (5.9%), and ODD (5.0%), with elevated odds ratios five-fold, or greater, for each. Odds ratios for lifetime comorbidity were similarly high although the order of frequency was flipped for ADHD (18.5%) and CD (22.7%); the frequency for ODD was 21.8%. Interestingly, comorbidity of any DBD with IED was associated with an increase in aggression score suggesting a synergy with DBD and IED with respect to aggression. Thus, a history of a DBD may well place an adult at greater risk of IED and of greater aggressiveness than IED alone.

Personality Disorders (Table 3). Impulsive and/or aggressive behavior is frequently observed in those with DSM-5 Personality Disorders, especially in those belonging to “dramatic cluster” (i.e., antisocial, borderline, histrionic, and narcissistic) personality disorders even though features related to impulsivity and/or aggression are only formally included in the diagnostic criteria for antisocial and borderline personality disorders. IED is also comorbid with other personality disorders such as paranoid, narcissistic, and obsessive compulsive personality disorders, none of which include impulsivity or aggression as a diagnostic criterion. In fact, it is difficult to know the true extent of comorbidity between IED and personality disorder in general because individuals with DSM-5 IED are also highly likely to meet the general criteria for DSM-5 Personality Disorder simply by having affect (e.g., anger) dysregulation and by having dysfunction in interpersonal relationships due to frequent impulsive aggressive outbursts. Moreover, we have found that the most frequent (though not greatest risk) personality disorder seen in those with IED is Personality Disorder–Not Otherwise Specified (PD–NOS) suggesting that the two go hand in hand because of the fluid diagnostic boundaries for personality disorder.

Not surprisingly, we found the frequency of current DSM-5 IED with comorbid dramatic cluster personality disorder was highest at 46.9% compared with 34.2% for PD–NOS, 25.0% for anxious cluster, and 18.2% for odd cluster personality disorders. Among the 10 specific personality disorder diagnoses, only five were associated with current or lifetime DSM-5 IED. In order of frequency, these were as follows: Antisocial PD (AsPD: 31.8% current; 33.0% lifetime), Borderline PD (BPD: 20.3% current; 21.0% lifetime), Obsessive–Compulsive PD (OC–PD: 17.6% current; 18.6% lifetime), Paranoid PD (PARA–PD: 17.3% current; 16.9% lifetime), and Narcissistic PD (NARC–PD: 13.5% current; 14.3% lifetime). Examination of all personality disorder traits revealed a significant association with five traits with elevated, and two traits with reduced, odds ratios for IED. Odds ratios for the former traits were as follows: “Intense Anger” in BPD [OR = 62.50 (95% CI: 37.04–111.11)], “Irritability/Aggressiveness” in ASPD [OR = 8.06 (95% CI: 4.18–15.63)], “Rigidity/Stubbornness” in OCPD [OR = 2.79 (95% CI: 1.71–4.55)], “Arrogant/Haughty” in NARC PD [OR = 2.25 (95% CI: 1.10–4.78)], and “Bears Grudges” in PARA–PD [–OR = 2.27 (95% CI: 1.29–3.98)]. The latter two traits were as follows: “Reluctance to Confide” in PARA–PD [–OR = 0.52 (95% CI: 0.23–0.94)] and “Rapid Shifting/Shallow Expression of Emotions”

HIST-PD [-3 ; OR=0.47 (95% CI: 0.23–0.95)]. Thus while IED is comorbid with selective personality disorders, it is most related to personality traits related to anger and aggressiveness/irritability as well as traits that increase the likelihood of perceiving social threat in interactions with others (rigidity, stubbornness, arrogance, grudge bearing).



Age of Onset and Temporal Order of IED and Comorbid Disorders (Table 4A)

As shown before, IED has a rich pattern of comorbidity across several classes of psychiatric disorders. Examination of the relative age of onset, and temporal order, of IED and comorbid disorders provides insight into the nature of this comorbidity. Based on both the NCS-R and our own clinical research data sets, DSM-5 IED becomes apparent by childhood/early adolescence (Mean \pm SD: 13.4 ± 6.8 years and 14.2 ± 6.8 years from these respective data sets). Mean age of onset of IED typically precedes that of most comorbid disorders examined including mood, nonphobic anxiety (e.g., Panic Disorder, GAD, Anxiety Disorder-NOS), substance use, and trauma and stress disorders among others. The one exception for adult psychiatric disorders was for the age of onset of phobic anxiety disorders (e.g., Specific Phobia, Social Phobia), which have their onset about 4 years prior to the onset of IED, peaking during childhood. With the exception of phobic anxiety disorders, DSM-5 IED onsets about 4 to 7 years before the most frequent comorbid disorders in the NCS-R data set (see Table 4A). A similar result was observed in our clinical research data set ranging from nearly 2 to 10 years. Table 4B shows that the temporal order of onset for IED occurs before these disorders at a rate ranging from 58.7% to 82.2% for the NCS-R data set and from 50.9% to 81.2% for the clinical research data set, compared with the range of a comorbid disorder occurring before IED of 11.7% to 31.7% and 14.0% to 40.5% for the two data sets, respectively. The proportions for simultaneous onset of IED and comorbid disorder were lowest for both NCS-R and clinical research data sets. Thus for nearly all disorders examined, IED appears before the comorbid disorder indicating that the comorbid disorder in question does not lead to IED, though IED may increase the risk of the future comorbid disorder. It is also possible that IED and the comorbid disorders share an underlying propensity for both disorders in which IED appears first (see Table 4B).

Table 4A Mean Age of Onset (\pm SD) of IED in Individuals With Comorbid Adult Disorders
NCS-R Reanalysis Clinical Research Analysis

Adult Disorder	IED Age of Onset	Comorbid Dx Age of Onset	IED Age of Onset	Comorbid Dx Age of Onset
Bipolar Disorder	14.6 \pm 7.1***	21.5 \pm 10.8	N/A	N/A
Depressive Disorder	14.8 \pm 7.2***	20.9 \pm 11.5	13.9 \pm 5.9***	23.6 \pm 10.4
Anxiety Disorder	13.6 \pm 7.1	10.6 \pm 8.3***	14.0 \pm 6.2*	16.1 \pm 10.4
Nonphobic Anxiety Disorder	16.2 \pm 8.3***	20.0 \pm 10.4	14.1 \pm 6.1***	21.4 \pm 10.6
Phobic Anxiety Disorder	13.8 \pm 7.3	8.1 \pm 5.1***	13.9 \pm 6.0	11.5 \pm 6.8**
Substance Use Disorder	12.3 \pm 5.5***	19.5 \pm 6.8	14.2 \pm 6.8***	20.2 \pm 6.2
Posttraumatic Stress Disorder	15.4 \pm 8.2*	20.2 \pm 12.9	13.5 \pm 5.9 [†]	15.4 \pm 9.0

Notes: * $P < .05$, ** $P < .01$, *** $P < .001$, [†] $P < .075$, by paired t -test.

Table 4B Temporal Association of Disorder Onset in Individuals With IED and Comorbid Diagnoses

Adult Disorders	NCS-R Reanalysis			Clinical Research Analysis		
	IED First	IED Second	Same Age	IED First	IED Second	Same Age
Any Bipolar Disorder	75.8%*	14.5%	9.7%	N/A	N/A	N/A
Any Depressive Disorder	64.8%*	27.6%	7.6%	81.2%*	14.0%	4.8%
Any Anxiety Disorder	27.3%	64.8%*	7.9%	45.3%	44.8%	9.9%
Any Nonphobic Anxiety Disorder	59.3%*	31.5%	9.3%	70.3%*	25.4%	4.3%
Any Phobic Anxiety Disorder	23.3%	68.8%*	7.9%	21.8%	66.4%*	11.8%
Any Substance Use Disorder	82.2%*	11.7%	6.1%	76.7%*	19.3%	4.0%
Posttraumatic Stress Disorder	58.7%*	31.7%	9.5%	50.9%	40.5%	8.6%

Notes: * $P < .05$ by Sign Test.



Magnitude of Aggression Scores as a Function of Comorbidity

An important consideration in understanding the nature of the comorbidity between IED and other disorders is how levels of aggression compare between those with IED alone, with the comorbid disorder alone, and those with both disorders (and compared with healthy and psychiatric controls). Table 5 shows that, for all relevant comorbid disorders, mean (\pm sem) scores of Life History of Aggression (LHA; after correcting for demographic variables) were higher for the comorbid disorder alone compared with both psychiatric and healthy controls. Notably, mean LHA scores for those with DSM-5 IED alone were substantially higher than those among those with the comorbid disorder alone (or any other non-IED group) and that the combination of DSM-5 IED with the comorbid disorder resulted in mean LHA scores of similar magnitude of those with IED alone. This strongly suggests that high aggression scores go with aggressive disorders (IED) regardless of the presence of the comorbid disorder since those with IED alone are as aggressive as those with IED and another comorbid disorder and, in turn, more aggressive than those with the comorbid disorder alone. Where data were available, we have also shown that scores relevant to the severity of depression, anxiety, and substance use display the complementary pattern in which, for example, high mean depression scores are observed in those with depressive disorder alone and in those with IED and depressive disorder.

Table 5 Life History of Aggression Score as a Function of Adult Disorder Comorbidity With IED: Clinical Research Analysis (ANCOVA Marginal Means \pm SEM)

Adult Disorders ^a	HC	PC	Comorbid Disorder	IED	IED + Comorbid Disorder
Depressive Disorder	4.8 \pm 0.2	7.3 \pm 0.3	9.0 \pm 0.3	18.0 \pm 0.3	17.9 \pm 0.2 ^b
Anxiety Disorder	4.8 \pm 0.2	7.8 \pm 0.3	8.6 \pm 0.5	18.0 \pm 0.2	17.7 \pm 0.4 ^b
Substance Use Disorder	4.8 \pm 0.2	7.3 \pm 0.3	9.3 \pm 0.4	17.6 \pm 0.3	18.3 \pm 0.3 ^b
Posttraumatic Stress Disorder	4.8 \pm 0.2	7.8 \pm 0.2	10.5 \pm 0.9	17.7 \pm 0.2	19.1 \pm 0.5 ^c
“Aggressive” Personality Disorder	4.8 \pm 0.2	7.3 \pm 0.3	9.7 \pm 0.4	17.2 \pm 0.3	18.5 \pm 0.5 ^c

^aAsPD, BPD, NARC-PD, PARA-PD, OC-PD.
^bIED + Comorbid Dx = IED > Comorbid Dx > PC > HC.
^cIED + Comorbid Dx > IED > Comorbid Dx > PC > HC.
Notes: HC, healthy controls; PC, psychiatric controls; IED, intermittent explosive disorder.



Summary

From a cross-sectional viewpoint, IED, as with other DSM-5 disorders, frequently occurs with other psychiatric and personality disorders. In fact, analyses of extant data suggest that the extent of comorbidity of IED with other syndromal psychiatric disorders is about the same as is the extent of comorbidity of other syndromal psychiatric (e.g., mood, anxiety, substance use disorders) with other syndromal psychiatric disorders. The most common disorders include mood, anxiety, substance use, and posttraumatic stress disorders with the most common personality disorders including antisocial, borderline, obsessive compulsive, narcissistic, and obsessive-compulsive personality disorders. Among personality disorder traits, IED is most frequently associated with anger and aggression/irritability and with personality disordered traits that increase the likelihood of perceiving social threat in interactions with others (rigidity, stubbornness, arrogance, grudge bearing). Importantly, with the exception of phobic anxiety disorders (i.e., social and simple phobias), the mean age of onset of IED is lower than that of other syndromal psychiatric disorders and typically begins before the comorbid disorder in question. Further, aggression scores of those with IED and the comorbid disorder in question are similar to those who have IED but not the comorbid disorder in question and higher than that in those without IED but with the comorbid disorder in question. Where available, we have also found that behavioral scores relevant to other psychiatric disorders go with the presence of the comorbid disorder regardless of the presence of IED (Coccaro, 2012, 2018b, 2018c). For example, aggression scores are highest in those with IED and depressive disorder with IED while depression scores are highest in those with depressive disorder alone and in those with IED and depressive disorder. This strongly suggests a separation of aggression and other psychopathology in those with IED and other psychiatric disorders. Accordingly, these data support the idea that when recurrent, problematic, impulsive aggression is sufficient to make the diagnosis of IED, the diagnosis of IED should be made in the presence of other syndromal psychiatric/personality disorders unless there is evidence that impulsive aggressive behaviors only occur during the course of a comorbid disorder.

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Further Reading

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