

Cognitive–Behavioral Therapy for Intermittent Explosive Disorder: A Pilot Randomized Clinical Trial

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No randomized clinical trials have evaluated the efficacy of psychotherapy for intermittent explosive disorder (IED). In the present study, the authors tested the efficacy of 12-week group and individual cognitive–behavioral therapies (adapted from J. L. Deffenbacher & M. McKay, 2000) by comparing them with a wait-list control in a randomized clinical trial among adults with IED ($N = 45$). Aggression, anger, and associated symptoms were assessed at baseline, midtreatment, posttreatment, and 3-month follow-up. Group and individual cognitive–behavioral therapy tended not to differ, with each reducing aggression, anger, hostile thinking, and depressive symptoms, while improving anger control relative to wait-list participants. Posttreatment effect sizes were large. These effects were maintained at 3-month follow-up. Findings provide initial support for the use of multicomponent cognitive–behavioral therapy in the treatment of IED.

Keywords: intermittent explosive disorder, cognitive–behavioral therapy, randomized clinical trial, aggression

Intermittent explosive disorder (IED) is the diagnosis used to classify individuals who engage in repeated acts of impulsive aggression that are disproportionate to any provocation, and not better accounted for by the effects of a substance, medical condition, or other psychological disorder (American Psychiatric Association [APA], 2000). In short, IED is a disorder of impulsive aggression, the only such disorder in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; APA, 2000). Though initially thought to be rare (APA, 2000), recent studies have shown IED to be a common and underdiag-

nosed disorder existing in over 6% of the population (Coccaro, Posternak, & Zimmerman, 2005; Kessler et al., 2006). IED is also associated with considerable social and occupational impairment (McCloskey, Berman, Noblett, & Coccaro, 2006) that can include loss of work, relationship problems, legal difficulties, and intergenerational transmission of aggressive behavior. Furthermore, IED tends to run a chronic course when untreated.

With regard to treatment, there is limited evidence that selective serotonin reuptake inhibitors reduce aggression for patients diagnosed with IED (Coccaro & Kavoussi, 1997). However, despite its prevalence and burden, no published randomized clinical trials have examined the efficacy of psychosocial treatments for IED. In contrast to the dearth of treatment research for IED, the efficacy of psychosocial interventions for the related constructs of anger dyscontrol and interpersonal aggression is well documented. Five meta-analytic reviews of anger treatments (R. Beck & Fernandez, 1998; Bowman-Edmondson & Cohen-Conger, 1996; Del Vecchio & O’Leary, 2004; DiGuiseppe & Tafrate, 2003; Tafrate, 1995) support the conclusion that cognitive–behavioral therapies (e.g., relaxation training, self-inoculation training, cognitive restructuring, and multicomponent treatments) evidence a moderate to large effect for anger and aggression at the end of treatment with similar effects at follow-up. Overall, treatment efficacy does not appear dependent on the specific cognitive–behavioral intervention used, though multicomponent treatments containing both cognitive and behavioral components have the most empirical support. Furthermore, one review (Del Vecchio & O’Leary, 2004) has suggested

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that multicomponent treatment may be most effective for aggressive behavior. The inclusion of a treatment manual as well as adherence and competence measures was associated with a greater reduction of aggressive behaviors as well (DiGiuseppe & Tafrate, 2003). Also, though most anger treatment studies employed a group format, one meta-analysis found that individual therapy produced more consistent effects in reducing aggressive behavior (DiGiuseppe & Tafrate, 2003).

These findings suggest that manualized cognitive-behavioral treatments (CBTs) would be effective for individuals diagnosed with IED. However, the anger treatment literature often fails to discriminate between clinical anger problems with and without marked aggression. For example, in the meta-analyses discussed earlier, participants included angry students, angry volunteers, angry medical patients, aggressive drivers, criminals, abusive parents, and abusive partners, with the majority of samples consisting of angry students (Del Vecchio & O'Leary, 2004). Though some of these individuals may meet diagnostic criteria for IED, the levels of anger, aggressiveness, and associated deficits are likely more severe than for populations such as angry students or aggressive drivers (Galovski & Blanchard, 2002b).

Highly aggressive individuals may be more resistant to treatment. A separate meta-analysis of treatment for interpersonal (domestic) violence found that psychosocial interventions had only "small" effects on reducing aggression (Babcock, Green, & Robie, 2004). This would suggest that CBT would be of limited efficacy in treating IED. Batterers and individuals diagnosed with IED are similar in that they both engage in repeated acts of aggression. However, only a small portion of individuals diagnosed with IED have a history of domestic violence. Furthermore, for many batterers, aggression is used as a means to gain power and control (Jasinski, 2005; Leone, Johnson, Cohan, & Lloyd, 2004). In contrast, for individuals diagnosed with IED, revenge for a perceived slight or injustice is the motivation for aggression. Patients with IED represent a patient population that is overlapping but still distinct from those used in anger management and domestic violence treatment studies. Accordingly, although previous work on anger and aggression interventions may inform the treatment of IED, it is unknown how participants diagnosed with IED will respond to CBT.

Preliminary evidence suggests that CBT can be efficacious for patients diagnosed with IED, albeit not as effective as for angry individuals without IED. A study examining the efficacy of a brief (four 90-min sessions) cognitive-behavioral program for aggressive drivers found that CBT was more effective than self-monitoring in reducing anger and aggressive driving behavior. A subanalysis comparing drivers with IED and drivers without IED found a trend ($p = .06$) for drivers with IED to improve less than drivers without IED. This led the authors to suggest that individuals with IED may benefit from longer, more intensive therapy (Galovski & Blanchard, 2002a).

The objective of this pilot randomized clinical trial was to compare the efficacy of a 12-week multicomponent CBT presented in either group or individual format with a wait-list control (WAIT) group in the treatment of IED. The choice of multicomponent CBT, and specifically cognitive restructuring, relaxation and coping skills training (CRCST; Deffenbacher & McKay, 2000), was based on previous research showing this treatment to have the most empirical support (Del Vecchio & O'Leary, 2004).

The treatment was extended from 8 to 12 sessions, as it was suggested that individuals diagnosed with IED may need a larger "dose" of treatment (Galovski & Blanchard, 2002a). Our primary hypothesis was that individuals receiving either group CRCST (CRCST-G) or individual CRCST (CRCST-I) would show a greater decrease in aggressive behavior than participants in the wait-list condition. We also expected the two CRCST conditions to show greater decreases in anger and hostility while increasing anger control. A secondary hypothesis was that CRCST-I would produce greater treatment effects than CRCST-G.

Method

Participants

Participants consisted of 45 individuals (30 men and 15 women) between the ages of 25 and 53 years ($M = 37.36$, $SD = 7.31$) who met integrated research criteria for IED (Coccaro et al., 2005). We diagnosed Axis I and Axis II disorders using structured clinical interviews (see *Measures* section). Recruitment occurred between 2002 and 2005, with 76% from media advertisements and 24% from local referrals. Participants were excluded if they had a lifetime diagnosis of psychosis or bipolar disorder, organic brain syndrome, mental retardation, or a current diagnosis of substance dependence or major depressive disorder. Additional exclusion criteria included current suicidal or homicidal ideation, or use of psychotropic medication or psychotherapy in the past 2 months.

Of the 131 participants who completed the initial screen, 45 were eligible for randomization (CRCST-I = 15; CRCST-G = 15; WAIT = 15). As Figure 1 shows, lack of an IED diagnosis and current depression or substance dependence were the most common reasons for being excluded. Of the 4 individuals who refused to be randomized, 3 stated they were not willing to be a part of group therapy (1 was not willing to be in the wait-list condition). Seven individuals who passed the screen did not return for the full evaluation. Two reported that they could not commit their time to the study protocol, and the other 5 were unable to be contacted.

The University of Chicago Institutional Review Board approved the protocol. All participants provided written informed consent prior to enrollment in the study.

Therapists and Treatment Integrity

CRCST-I was provided by one of three licensed clinical psychologists (Michael S. McCloskey, Kurtis L. Noblett, and Jackie K. Gollan), all of whom had experience using CBT to treat anger and/or aggression. CRCST-G was conducted with two cotherapists (Kurtis L. Noblett and Michael S. McCloskey). Jerry L. Deffenbacher provided initial training via a CRCST workshop at the University of Chicago. Additional training was provided by Michael S. McCloskey after the manual was revised for use with patients with IED by Michael S. McCloskey, Jerry L. Deffenbacher, and Emil F. Coccaro. Study therapists had regular supervision to check protocol adherence. A total of four randomly selected sessions from the other study therapists were viewed by Michael S. McCloskey to assess treatment adherence. There were no protocol violations. Therapist competence was not rated.

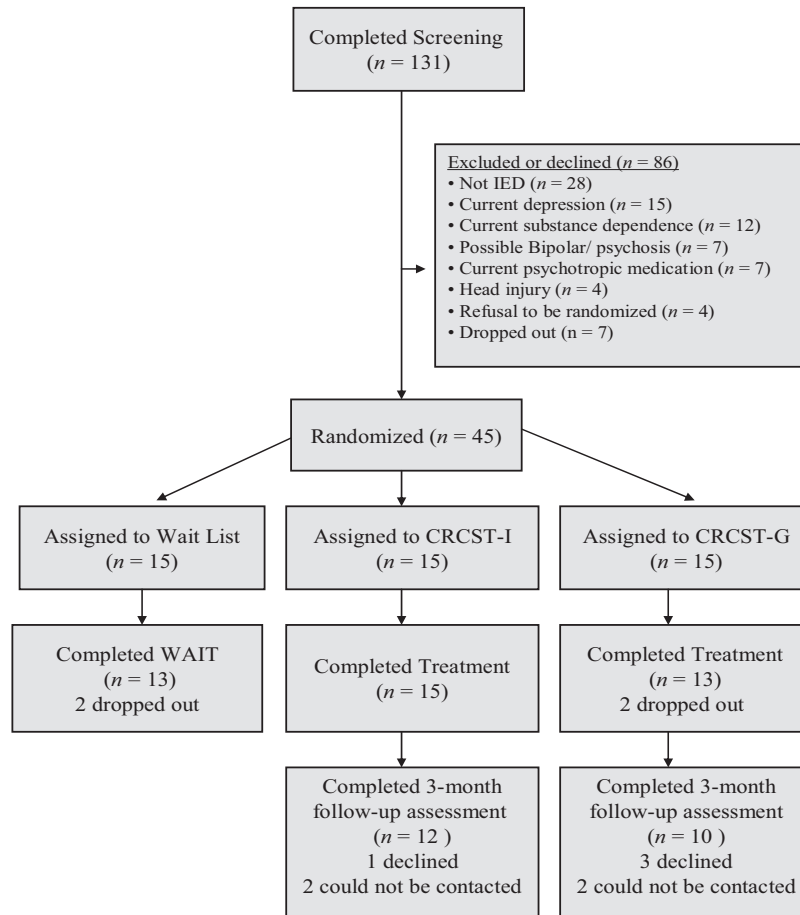


Figure 1. Participant flow chart. IED = intermittent explosive disorder; CRCST = cognitive restructuring, relaxation and coping skills training; I = individual format; G = group format; WAIT = wait-list control.

Treatments

CRCST. The two variants of CRCST used in the current study were adapted from the anger treatment manual by Deffenbacher and McKay (2000) to treat problems with general and specific anger. This manual was for an eight-session treatment, with the first three sessions devoted to relaxation training, and the fourth session devoted to cognitive restructuring, before combining the two in the form of coping skills training (i.e., hierarchical imaginal exposure) for the final four sessions. Modifications for the current study included extending the treatment to 12 weekly sessions (including two and a half sessions for cognitive restructuring), increased focus on strategies for resisting aggressive impulses (including the use of time-out), increased rehearsal of coping skills, and greater emphasis on relapse prevention (e.g., discussion of a “slip” vs. relapse) during the latter sessions. The treatment was extended to 12 sessions to provide more time for patients with IED, who may have executive functioning difficulties (Best, Williams, & Coccaro, 2002). Additional modifications for CRCST-G included extending the sessions to 75 min (CRCST-I sessions lasted 50 min), use of two cotherapists, and eliciting feedback and suggestions from participants for their fellow members.

WAIT. Possible random assignment to the WAIT condition was a condition of informed consent. Participants in the WAIT

condition were informed that they were in a self-motioning condition and that keeping track of their anger and aggression could reduce aggressive behavior. They were also informed that they would be eligible to receive the other treatment at the end of the 13 weeks. WAIT participants were asked to keep a running log of their anger and aggression throughout the 12 weeks and to return during Weeks 7 and 13 to complete the same assessment measure as participants in the two CRCST conditions.

Randomization

Using a computer-generated randomization table, we randomly assigned participants to one of three possible treatment conditions: CRCST-I, CRCST-G, or WAIT. Treatment condition was assigned for each participant by the project coordinator when the participant arrived for their pretreatment evaluation. This information was communicated to the research assistant in charge of enrolling the participants as well as the therapist(s) if applicable. Participants were not informed of their treatment condition until they completed all pre-session measures.

Measures

Participants completed both standardized clinical interview and self-report measures. Independent evaluators trained in the conduct

of interview protocols and other assessment devices conducted all of the evaluations in this study. These interviewers were blind to treatment condition throughout the study and were supervised weekly to monitor blinding and prevent rater drift.

Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Williams, & Gibbon, 1995). The SCID is a semistructured clinical interview used to assign diagnoses for mood disorders, psychotic disorders, substance abuse and dependence, anxiety disorders, somatoform disorders, eating disorders, and adjustment disorders. The purpose of administering the SCID was to diagnose *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; APA, 1994) Axis I disorders. The SCID has adequate interrater reliability with kappa values for modules reported to be between .70 and 1.00 (First et al., 1995).

Structured Clinical Interview for DSM-IV Personality (SID-P; Pfohl, Blum, & Zimmerman, 1995). The SID-P was employed to diagnose *DSM-IV* personality disorders. Estimates of interrater reliability for the SID-P are reported to be adequate to strong, with intraclass correlation coefficients as high as .88-.99 (Damen, De Jong, & Van der Kroft, 2004).

Intermittent Explosive Disorder Interview (IED Interview; McCloskey & Coccaro, 2003). The IED Interview is a semistructured clinical interview that was used to diagnose integrated research criteria for IED. The IED Interview enables the interviewer to obtain quantitative (e.g., frequency) and qualitative (e.g., description of most severe events) information for verbal aggression, aggression against property, and aggression against others, as well as aggression-related distress and psychosocial impairment and potential exclusionary information (i.e., aggressive acts occurring solely within the context of another Axis I disorder, substance use, or a medical condition). Preliminary data suggest that the IED Interview is a valid and reliable ($\kappa = .84$) instrument (McCloskey & Coccaro, 2003).

Global Assessment of Functioning (GAF; APA, 2000). The GAF is a 0-100 score that reflects the extent to which psychological problems have impaired social and occupational functioning. Lower scores reflect greater psychosocial impairment.

Life History of Aggression (LHA; Coccaro, Kavoussi, Berman, & Lish, 1998). The LHA is a self-report measure that provides a quantitative index of aggression, self-aggression, and antisocial behavior. The LHA-Aggression Scale (LHA-A) was used in the current study. The LHA-A contains five items related to life frequency of temper tantrums, general fighting, specific physical assault, specific property assault, and verbal assault. Items are scored on a 6-point scale ranging from 0 (*none*) to 5 (*more times than I can count*). LHA-A has high internal consistency ($\alpha = .87$), excellent interrater reliability (intraclass correlation = .95), and good test-retest reliability up to 1 year ($r = .80$). The LHA-A has predictive validity, discriminating patients with IED from both psychiatric groups without IED and healthy volunteers (McCloskey et al., 2006).

Overt Aggression Scale—Modified (OAS-M; Coccaro, Harvey, Kupsw-Lawrence, Herbert, & Bernstein, 1991). The OAS-M is a semistructured interview that assesses the frequency of aggressive behavior (i.e., verbal assault, assault against objects, and assault against others) over the past week. Within each behavior cluster, the OAS-M distinguishes five levels of aggression severity in each group that are weighted 1 (e.g., *snapped or yelled*) through 5 (e.g., *threatened to hit a stranger*). The OAS-M sums the

frequency of the severity-weighted aggressive acts to derive a single composite aggression score. The OAS-M has demonstrated good interrater reliability and validity (McCloskey & Coccaro, 2003). The OAS-M was the primary outcome variable in this study and was conducted by trained raters who were blind to participant condition.

Hostile Automatic Thoughts Questionnaire (HAT; Snyder, Crowson, Houston, Kurylo, & Poirier, 1997). The HAT is a 30-item measure of automatic hostile cognitions, and it was used in the current study as a general index of hostile, aggressive thinking. On the HAT, individuals were instructed to describe how often they have had thoughts associated with revenge, physical aggression, or the derogation of others “in the past few days.” Each item is answered on a 5-point Likert scale ranging from *not at all* to *all the time*. Snyder et al. (1997) found that the HAT total score was internally consistent, which was replicated with our sample (HAT total score $\alpha = .93-.98$). Convergent validity was shown via significant correlations with hostility measures. The lack of a significant correlation with positive thoughts provided discriminant validity.

State-Trait Anger Expression Inventory—2 (STAXI-2; Spielberger, 1999). The STAXI-2 is a 57-item, multidimensional self-report measure of anger and anger expression/control that is commonly used in behavioral medicine and anger treatment outcome research (Spielberger, 1999). All items are statements that participants endorse using a 4-point scale ranging from 1 (*not at all/almost never*) to 4 (*very much so/almost always*). Five of the STAXI-2 scales were used in the current study. The STAXI Trait Anger Scale measures the general tendency to feel angry. The STAXI Anger Expression-Out and Anger Expression-In measure how often angry feelings result in aggression (e.g., yelling, breaking things) and anger suppression (e.g., sit and “stew” over problem), respectively. The STAXI Anger Control-Out and Anger Control-In scales assess how often individuals attempt to reduce anger and express it constructively. As detailed in the STAXI-2 manual (Spielberger, 1999), the STAXI-2 scales have been shown to be valid and internally consistent ($\alpha = .73-.94$).

Beck Depression Inventory—II (BDI-II; A. T. Beck, Steer, Ball, & Ranieri, 1996). The BDI-II is a 21-item self-report measure designed to assess cognitive, physiological, behavioral, and emotive symptoms of depression. Each item includes a graded series of self-evaluative statements ranging from 0 to 3, with 3 being the most severe. The BDI-II has demonstrated reliability ($\alpha = .91$) and validity (A. T. Beck et al., 1996).

Beck Anxiety Inventory (BAI; A. T. Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-item Likert scale self-report measure of anxiety symptoms. The BAI has shown convergent validity (Osman, Kopper, Barrios, Osman, & Wade, 1997) and good 5-week test-retest reliability ($r = .83$; de Beurs, Wilson, Chambliss, Goldstein, & Feske, 1997).

Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q; Endicott, Nee, Harrison, & Blumenthal, 1993). The Q-LES-Q is a self-report measure of the degree of enjoyment and satisfaction experienced over the past week in areas such as physical health/activities, feelings, work, household duties, leisure time activities, and social relations. Higher scores denote greater levels of satisfaction. Because the full Q-LES-Q is very lengthy (93 items), we used the 15-item General Activities Summary scale, which showed high internal consistency ($\alpha = .90$) and strong

correlations with clinical global impression of disorder severity ($r = -.66$) and global improvement ($r = .50$) among the Q-LES-Q scales (Endicott et al., 1993).

Working Alliance Inventory (Tracey & Kokotovic, 1989). The Working Alliance Inventory consists of 12 items that are scored on a 7-point Likert scale (1 = *never*, 7 = *always*). These items assess convergence on goals, agreement on tasks, and the bond between therapist and client. The Working Alliance Inventory is completed by both the client (Working Alliance Inventory-C) and the therapist (Working Alliance Inventory-T). The Working Alliance Inventory has strong reliability ($\alpha = .71-.96$) and moderate predictive validity (Busseri & Tyler, 2003).

Procedure

Participants who successfully completed an initial phone screen were scheduled for an on-site diagnostic screen to provide informed consent and assess study eligibility. Participants deemed eligible returned for a full diagnostic evaluation for final determination of study eligibility. Once eligibility was determined, participants returned for a third visit, where they completed pretreatment self-report questionnaire (STAXI-2, HAT, Q-LES-Q, BDI-II, and BAI) and interview (OAS-M) measures. Participants were informed that they were randomized (a) CRCST-I, (b) CRCST-G, or (c) WAIT. Participants in the CRCST conditions met with a therapist to prepare them for treatment. Participants in the WAIT condition met with the research assistant to explain the logistics of the wait-list condition. All outcome measures were given at pretreatment and posttreatment (13 weeks after pretreatment assessment). Additionally, participants completed the OAS-M and STAXI-2 at midtreatment (7 weeks after pretreatment assessment) to begin to explore the time course of potential treatment effects. The Working Alliance Inventory was completed by CRCST participants and their therapists before Session 4 and after the end of treatment. Participants in the CRCST conditions returned 3 months

after the end of active treatment for a follow-up, during which time they again completed all of outcome measures.

Data Analysis

Analyses were conducted two-tailed at the .05 level of significance. Nonnormally distributed data were transformed. Analyses were performed on the intent to treat sample with last observation carried forward when necessary. Analysis of variance (ANOVA) and chi-square tests examined baseline differences in demographic variables and diagnostic severity/comorbidity. To identify any baseline differences on outcome measures between the groups, we also conducted one-way ANOVAs for each outcome measure at pretreatment. To identify treatment effects at midtreatment and posttreatment, we used one-way analyses of covariance (ANCOVAs) with pretreatment scores as covariates, followed by Tukey HSD post hoc tests when a significant main effect existed. We provide effect sizes with 95% confidence intervals for ANCOVA treatment effects using η_p^2 , where .02, .06, and .14 represent small, medium, and large effect sizes (Cohen, 1988). As this was a pilot study, the sample size was only sufficient to identify large treatment effects. To identify significant within-group effects, we used one-way repeated measures ANOVAs and post hoc *t* tests. To assess treatment effects at 3-month follow-up, we conducted paired *t* tests (pretreatment vs. 3-month follow-up) for within-group effects and ANCOVAs for between-groups (CRCST-I vs. CRCST-G) effects.

Results

Baseline Characteristics

We used one-way ANOVAs (Age, GAF, LHA-A) and chi-square analyses (all other variables) to compare the three treatment groups on demographic and clinical characteristics at baseline (pretreatment). As Table 1 shows, the groups did not differ on any

Table 1
Demographic and Baseline Characteristics of Participants ($N = 45$)

Variable	WAIT ($n = 15$)	CRCST-I ($n = 15$)	CRCST-G ($n = 15$)	<i>F</i>	χ^2
Gender: n (% male)	9 (60.00)	11 (73.33)	10 (66.67)		0.60
Race: n (% White)	13 (86.67)	8 (53.33)	10 (66.67)		3.94
Married: n (%)	9 (60.00)	8 (53.33)	7 (46.67)		0.54
College graduate: n (%)	8 (53.33)	8 (53.33)	8 (53.33)		0.00
Any current Axis I Dx: n (%)	7 (46.67)	5 (33.33)	6 (40.00)		0.55
Any lifetime Axis I Dx: n (%)	14 (93.33)	12 (80.00)	12 (80.00)		1.35
Any lifetime mood Dx: n (%)	7 (46.67)	7 (46.67)	11 (73.33)		2.88
Any lifetime anxiety Dx: n (%)	2 (13.33)	3 (20.00)	5 (33.33)		1.80
Any lifetime substance use Dx: n (%)	12 (80.00)	7 (46.67)	9 (60.00)		3.59
Any Axis II Dx: n (%)	13 (86.67)	13 (86.67)	14 (93.33)		0.45
BPD: n (%)	4 (26.67)	4 (26.67)	4 (26.67)		0.00
Age (years): M (SD)	36.60 (6.56)	38.40 (7.99)	37.07 (7.73)	0.79	
Current GAF: M (SD)	60.00 (9.63)	59.93 (10.02)	60.20 (6.78)	0.01	
LHA-A: M (SD)	19.40 (3.62)	18.93 (4.01)	19.43 (3.65)	0.08	

Note. WAIT = wait-list control; CRCST = cognitive restructuring, relaxation and coping skills training (for intermittent explosive disorder); I = individual format; G = group format; Dx = disorder; BPD = borderline personality disorder; GAF = Global Assessment of Functioning; LHA-A = Life History of Aggression–Aggression Scale.

baseline demographic or clinical characteristics (all $p > .10$). Across treatment groups, participants with IED showed high levels of lifetime aggression and comorbidity with Axis I and Axis II psychopathology. Their functioning was moderately impaired. As shown in Tables 2 and 3, participants in the three conditions also did not differ from each other on any of the outcome measures at pretreatment, with high levels of anger and aggression across groups. For example, STAXI Trait Anger and STAXI Anger Expression-Out scores were between the 95th and 99th percentile.

4 participants who dropped out, 2 were in WAIT, and 2 were in CRCST-G. A chi-square revealed no effect of condition for attrition rate, $\chi^2(2, N = 45) = 2.19, p = .33$. Among those who did not drop out, there was no difference in number of sessions attended for CRCST-I ($M = 10.12, SD = 1.84$) and CRCST-G ($M = 9.34, SD = 2.02$), $t(26) = 1.07, p = .73$.

Nonspecific Therapy Factors

Neither client ratings nor therapist ratings of the Working Alliance Inventory scales differed between CRCST-I and CRCST-G conditions (see Table 4). This was true both at Week 4 and after Week 12 (all $ps > .05$). Across time and respondent, both CRCST-I and CRCST-G conditions showed a high level of agree-

Attrition and Number of Sessions Attended

Rates of attrition were low, with 4 of the 45 participants (9%) dropping out of the study before the end of the acute phase. Of the

Table 2
Aggression and Anger Measures at Each Assessment by Treatment Condition ($N = 45$)

Variable	WAIT		CRCST-I		CRCST-G		F	η_p^2 (95% CI)
	M	SD	M	SD	M	SD		
Overt Aggression Scale—Modified								
Pre	22.80	14.89	26.67	14.09	26.87	18.21	0.32	
Mid ^{a,b}	39.41	42.08	16.08	20.29	9.44	12.05	6.06**	.23 (0.03–0.40)
Post ^{a,b}	26.68	25.97	6.56	9.37	11.23	11.19	5.34**	.21 (0.02–0.38)
Fu (3 months)			11.02	13.89	11.65	10.23		
Hostile Automatic Thoughts Questionnaire								
Pre	66.27	19.05	63.93	25.35	68.80	27.37	0.15	
Post ^a	62.45	19.46	46.09	18.64	51.26	34.41	3.48*	.14 (0.00–0.31)
Fu (3 months)			42.84	9.17	48.51	21.23		
STAXI Trait Anger Scale								
Pre	29.20	6.07	28.87	5.90	28.07	6.34	0.14	
Mid	27.25	8.24	25.75	6.05	22.13	8.94	2.42	.11 (0.00–0.27)
Post ^{a,b}	26.31	7.97	20.35	7.15	19.01	7.25	6.20**	.23 (0.03–0.40)
Fu (3 months)			18.63	6.40	18.63	5.34		
STAXI Anger Expression-Out								
Pre	24.20	4.33	23.40	5.18	23.27	4.55	0.17	
Mid	22.09	5.76	20.81	4.56	19.30	5.85	1.42	.07 (0.00–0.21)
Post ^{a,b}	22.11	5.71	16.34	4.21	17.96	6.15	6.21**	.23 (0.03–0.40)
Fu (3 months)			16.57	6.40	17.36	5.34		
STAXI Anger Expression-In								
Pre	20.07	5.66	19.67	5.02	19.33	5.39	0.07	
Mid	18.72	6.04	17.42	4.82	16.47	5.72	1.28	.06 (0.00–0.21)
Post ^{a,b}	19.23	5.62	14.75	4.10	15.69	5.42	5.50**	.21 (0.02–0.38)
Fu (3 months)			13.68	3.10	14.98	4.25		
STAXI Anger Control-Out								
Pre	17.07	4.03	15.47	4.29	15.73	3.33	0.72	
Mid ^{a,b}	15.76	3.12	17.48	2.39	18.69	3.13	5.38**	.21 (0.02–0.38)
Post ^{a,b}	16.89	4.07	22.72	4.11	20.52	5.34	9.15***	.31 (0.07–0.47)
Fu (3 months)			21.97	4.55	19.93	4.48		
STAXI Anger Control-In								
Pre	17.00	4.57	15.73	4.37	16.13	5.36	0.28	
Mid ^{a,b}	16.42	6.12	20.80	5.36	22.25	4.67	7.64**	.27 (0.05–0.44)
Post ^{a,b}	16.33	4.93	26.09	5.30	23.45	6.66	19.23***	.48 (0.23–0.61)
Fu (3 months)			25.88	4.87	22.17	5.76		

Note. Pretreatment (Pre) means are unadjusted; midtreatment (Mid), posttreatment (Post), and 3-month follow-up (Fu) means are adjusted for pretreatment. Degrees of freedom are as follows: Pre = (2, 42); Mid and Post = (2, 41). WAIT = wait-list control; CRCST = cognitive restructuring, relaxation and coping skills training (for intermittent explosive disorder); I = individual format; G = group format; CI = confidence interval; STAXI = State-Trait Anger Expression Inventory—2.

^a CRCST-I versus WAIT is significant. ^b CRCST-G versus WAIT is significant.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Nontargeted Measures at Each Assessment by Treatment Condition (N = 45)

Variable	WAIT		CRCST-I		CRCST-G		F	η_p^2 (95% CI)
	M	SD	M	SD	M	SD		
Beck Depression Inventory—II								
Pre	12.93	8.62	12.40	9.51	13.00	9.30	0.02	
Post ^{a,b}	12.34	11.33	2.12	2.62	4.91	6.46	9.01***	.31 (0.07–0.47)
Fu (3 months)			1.68	2.59	4.39	4.43		
Beck Anxiety Inventory								
Pre	28.30	7.98	27.73	6.42	27.42	7.10	0.05	
Post	24.52	4.08	23.10	2.12	25.37	6.94	0.96	.05 (0.00–0.18)
Fu (3 months)	24.27	3.47	24.10	6.53				
Quality of Life Enjoyment and Satisfaction Questionnaire								
Pre	38.96	9.78	44.76	9.33	42.48	8.27	1.36	
Post ^a	43.28	10.25	51.14	7.80	47.13	9.56	4.02*	.16 (0.00–0.33)
Fu (3 months)	50.76	8.51	46.90	8.93				

Note. Pretreatment (Pre) means are unadjusted; midtreatment (Mid), posttreatment (Post), and 3-month follow-up (Fu) means are adjusted for pretreatment. Degrees of freedom are as follows: Pre = (2, 42); Mid and Post = (2, 41). WAIT = wait-list control; CRCST = cognitive restructuring, relaxation and coping skills training (for intermittent explosive disorder); I = individual format; G = group format; CI = confidence interval.

^a CRCST-I versus WAIT is significant. ^b CRCST-G versus WAIT is significant.

* $p < .05$. *** $p < .001$.

ment on the goals and tasks of therapy as well as a strong bond between therapist and client. This suggests a positive working alliance was obtained for both CRCST-I and CRCST-G.

Treatment Effects

Aggressive behavior. Both variants of CRCST were significantly different from WAIT at posttreatment on most measures of anger and aggression (see Table 2). Reported aggressive behavior (i.e., OAS–M aggression score) was our primary outcome variable. Miltreatment and posttreatment assessments revealed a significant group effect on OAS–M aggression scores. CRCST-I and CRCST-G groups reported less aggressive behavior than WAIT participants. Within-group ANOVAs showed no effect of time for WAIT members, $F(2, 28) = 2.45, p > .10$, but significant effects of time for CRCST-I participants, $F(2, 28) = 10.33, p < .001$, and

CRCST-G participants, $F(2, 28) = 6.44, p = .005$. CRCST-I patients showed a drop in OAS–M scores from pre- to midtreatment and from mid- to posttreatment. CRCST-G patients showed a significant drop from pre- to midtreatment that remained at posttreatment. In real-world terms, CRCST participants went from an OAS–M aggression score consistent with two physical assaults and five arguments a week at baseline to an OAS–M aggression score consistent with two arguments with (CRCST-G) or without (CRCST-I) one assault at posttreatment.

We computed controlled effect sizes comparing CRCST-I, CRCST-G, and WAIT for the OAS–M using the formula for Cohen’s d [posttreatment M (adjusted) A – posttreatment M (adjusted) B/pooled SD]. Compared with WAIT, the controlled effect size for CRCST-I ($d = 1.13$; 95 % CI = 0.37, 1.90) and CRCST-G ($d = 0.82$; 95% CI = 0.08, 1.57) were large. The posttreatment controlled effect size for CRCST-I compared with

Table 4
Mean (and Standard Deviation) Working Alliance Inventory Scale Scores as a Function of Type of CRCST (N = 30)

Variable	Week 4					Week 12				
	CRCST-I		CRCST-G		$t(28)$	CRCST-I		CRCST-G		$t(28)$
	M	SD	M	SD		M	SD	M	SD	
Subject										
Goals	24.60	3.24	22.43	3.00	1.86	25.07	3.35	23.14	3.99	1.40
Task	24.53	3.56	22.29	2.64	1.91	25.00	4.00	23.36	4.82	1.00
Bond	24.67	3.53	22.07	3.70	1.63	24.73	3.94	22.71	4.35	1.31
Therapist										
Goals	22.73	2.71	23.57	1.74	0.98	23.13	2.29	22.93	2.16	0.25
Task	21.93	2.71	21.54	2.02	0.41	22.73	2.76	21.64	2.98	1.02
Bond	22.80	2.73	23.86	1.91	1.20	23.93	2.12	23.78	2.49	0.17

Note. CRCST = cognitive restructuring, relaxation and coping skills training (for intermittent explosive disorder); I = individual format; G = group format.

CRCST-G ($d = 0.45$; 95% CI = $-0.27, 1.16$) was near the upper bound of the small range.

Remission status was operationally defined as no verbal (e.g., arguments, threats) or physical (e.g., assault, property destruction) aggression on the posttreatment OAS-M. Using this criteria, 7 CRCST-I participants (47%), 2 CRCST-G participants (13%), and 1 WAIT participant (7%) were remitted at the end of treatment. Fishers exact probability tests showed that CRCST-I had a higher remission rate than WAIT ($p = .03$). CRCST-I also showed a nonsignificant trend toward higher remission rate when compared with CRCST-G ($p = .10$).

Anger. STAXI Trait Anger scores revealed no group differences at midtreatment but a large treatment effect at posttreatment (see Table 2). Participants in each CRCST condition were lower than WAIT in trait anger by the end of treatment. One-way ANOVAs showed a marginal time effect for WAIT, $F(2, 28) = 3.81, p = .05$, and significant time effects for CRCST-I, $F(2, 28) = 21.74, p < .001$, and CRCST-G, $F(2, 28) = 10.10, p < .001$. In all conditions, trait anger decreased from baseline to posttreatment.

Hostile thoughts. There was also a significant group effect at posttreatment on hostile automatic thoughts (see Table 2). CRCST-I members had lower HAT scores than WAIT participants, whereas the CRCST-G condition was not significantly different from the other groups. Within-subjects t tests showed that CRCST-I, $t(14) = 4.49, p = .003$, and CRCST-G, $t(14) = 2.72, p = .02$, showed a significant decrease, whereas the WAIT condition did not change, $t(14) = 1.03, p = .32$.

Anger expression. For both STAXI Anger Expression-Out and Anger Expression-In scales, a similar pattern emerged (see Table 2). There was a large, significant group effect at post- but not midtreatment in which CRCST-I and CRCST-G were significantly lower than WAIT. There was no time effect for WAIT on the STAXI Anger Expression-Out, $F(2, 28) = 1.90, p = .17$, or STAXI Anger Expression-In, $F(2, 28) = 0.85, p = .44$. In contrast, main effects of time were found for CRCST-I—STAXI Anger Expression-Out, $F(2, 28) = 18.19, p < .001$; STAXI Anger Expression-In, $F(2, 28) = 10.60, p < .001$ —and CRCST-G—STAXI Anger Expression-Out, $F(2, 28) = 9.86, p = .001$; STAXI Anger Expression-In, $F(2, 28) = 6.01, p = .007$ —with decreases in anger expression from pre- to posttreatment.

Anger control. For the two STAXI-2 anger control scales, CRCST-I and CRCST-G were higher than WAIT at both mid- and posttreatment, with very large treatment effects at posttreatment (see Table 2). ANOVAs showed no time effect for WAIT—STAXI Anger Control-Out, $F(2, 28) = 1.74, p = .19$; STAXI Anger Control-In, $F(2, 28) = 0.01, p = .99$ —but significant time effects for CRCST-I—STAXI Anger Control-Out, $F(2, 28) = 28.88, p < .001$; STAXI Anger Control-In, $F(2, 28) = 24.51, p < .001$ —and CRCST-G—STAXI Anger Control-Out, $F(2, 28) = 8.19, p = .002$; STAXI Anger Control-In, $F(2, 28) = 16.58, p < .001$. For both STAXI Anger Control-Out and STAXI Anger Control-In, CRCST-G participants increased from pre- to midtreatment, and they maintained their gains at posttreatment. This was also true of CRCST-I participants for STAXI Anger Control-In. CRCST-I participants showed a later increase in STAXI Anger Control-Out scores, with posttreatment scores significantly higher than pre- or midtreatment.

Treatment Effect on Nontargeted Measures

Although not differing from each other, participants in both active treatment conditions demonstrated lower BDI-II scores than WAIT at posttreatment (see Table 3). Within-group t tests showed that both CRCST-I, $t(14) = 4.30, p = .001$, and CRCST-G, $t(14) = 3.24, p = .006$, had a significant decrease in BDI-II scores from pre- to posttreatment, whereas WAIT did not change over time, $t(14) = 0.31, p = .77$. For anxiety, there was no effect of group at posttreatment (see Table 3).

There was also a posttreatment group effect for quality of life (see Table 3). CRCST-I participants reported higher Q-LES-Q scores than WAIT participants, whereas CRCST-G participants were not significantly different from either other condition. Within-subjects t tests showed that only CRCST-I participants reported improved quality of life from pre- to posttreatment, $t(14) = 3.91, p = .002$. CRCST-G participants showed a nonsignificant trend, $t(14) = 1.91, p = .08$, for increased quality of life. WAIT participants did not change, $t(14) = 1.47, p = .17$.

Completer Analyses

Parallel ANCOVAs including only participants who completed the study through the posttreatment assessments (CRCST-I = 15; CRCST-G = 13; WAIT = 13) resulted in the same pattern of results with one exception; CRCST-G participants scored higher than WAIT in the Q-LES-Q at posttreatment.

Maintenance of Treatment Gains

To assess differential maintenance of treatment gains, we readministered the OAS-M, STAXI-2, BDI-II, BAI, HAT, and Q-LES-Q at the 3-month follow-up (see Tables 2 and 3). Paired t tests showed CRCST-I was significantly better at follow-up as compared with pretreatment for all outcome measures except BAI, which showed only a marginally significant trend toward lower follow-up scores, $t(14) = 2.34, p = .05$. CRCST-G was also significantly better at follow-up as compared with pretreatment for all outcome measures except BAI, $t(14) = 1.17, p = .26$, and Q-LES-Q, $t(14) = 1.55, p = .15$. Additional t tests comparing posttreatment and follow-up scores on all outcome measures showed no significant reductions in treatment gains at 3-month follow-up (all $ps > .15$). Finally, one-way ANCOVAs (controlling for baseline scores) on 3-month follow-up data showed a trend for CRCST-I to be higher than CRCST-G on STAXI Anger Control-In, $F(2, 27) = 4.15, p = .05$. The two conditions did not differ on any other outcome measure (all $ps > .10$).

Discussion

The results of this study support the efficacy of cognitive-behavioral therapy, specifically CRCST, in the treatment of IED. The results also provide preliminary evidence that CRCST is efficacious in both individual and group formats. As a function of treatment, CRCST members were less aggressive, angry, and (in the case of CRCST-I) hostile than their WAIT counterparts. CRCST participant used more anger control strategies, were less depressed, and (in the case of CRCST-I) reported an improvement in their overall quality of life. These effects persisted at 3-month

follow-up. This represents the first published randomized clinical trial to find empirical support for the use of CBT to treat IED.

CRCST Versus WAIT

Individual and CRCST-G reduced aggressive behavior (OAS-M), with effect sizes for the treatments (as compared with WAIT) ranging from 0.82 (CRCST-G) to 1.13 (CRCST-I). These improvements were maintained at 3-month follow-up. These results are consistent with aggression reduction effects of CBT treatments on general anger populations (DiGiuseppe & Tafrate, 2003) and suggest that modified CRCST is an efficacious treatment for IED. The finding that a modified anger treatment was efficacious in reducing aggressive behavior among IED participants also provides evidence that anger dysregulation is a key component of impulsive aggression.

CRCST-I and CRCST-G outperformed WAIT in reducing self-reported external (i.e. aggression) and internal (e.g., ruminating) behavioral expressions of anger, with both CRCST variants showing approximately a 25%–30% reduction in STAXI Anger Expression-Out and Anger Expression-In at posttreatment and 3-month follow-up. Thus, both aggressive behavior (OAS-M) and aggressive tendencies (STAXI Anger Expression-Out) decreased as a function of CRCST. It should be noted that posttreatment and follow-up OAS-M scores dropped over 50% in both CRCST conditions, as compared with 25%–30% for STAXI Anger Expression scores. This suggests that changes in actual aggressive behavior may occur at a steeper rate than awareness of reduced aggressiveness.

CRCST-I and CRCST-G showed a large group effect, outperforming WAIT in reducing angry feelings (STAXI Trait Anger scale). By the end of treatment, CRCST participants decreased their trait anger by about one third. Thus, CRCST reduced negative angry affect. This suggests one mechanism for aggression reduction in CRCST is via reduction of the anger that often covaries with, and may motivate and prompt, aggressive outbursts.

A group effect was also found for use of strategies to control internal and external expression of anger. CRCST-I and CRCST-G conditions reduced both suppressed and outward, negatively expressed anger by midtreatment and persisted through the end of treatment and follow-up. Anger control efforts persisted after treatment, which likely aided in the maintenance of anger and aggression reduction.

Both CRCST conditions showed decreased hostile, aggressive thoughts, though only CRCST-I showed a greater decrease of scores compared with WAIT. At follow-up, both CRCST conditions continued to evidence reduced hostile automatic thoughts compared with baseline. Considering that cognitive restructuring was a key component of both CRCST-I and CRCST-G, it was not surprising that these conditions reduced automatic hostile thoughts. It was unexpected, however, that the difference between CRCST-G and WAIT improvement at postintervention was not statistically significant. Though the group treatment included a larger “dose” of cognitive restructuring, less cognitive restructuring was directly related to anger incidents of any single group member, which may have limited the efficacy of cognitive restructuring for group participants. Notably, data indicated that individuals with IED may have impaired executive functioning, which may limit their ability to abstract and utilize examples from

other individuals (Best et al., 2002). It is possible that we captured this process in the trial. Clinically, therapist perception was that IED participants initially had greater difficulty with cognitive restructuring than previous anger participants without marked aggression, and they benefited more from personally relevant examples. However, this was not tested empirically.

Levels of depression, as measured by the BDI-II at posttest, were significantly reduced in both active treatment conditions and were superior compared with WAIT. Similar results were found at the 3-month follow-up. Given these results, it appears that CRCST has a sustained effect for aggressive individuals. IED is associated with increased risk for a comorbid mood disorder (Kessler et al., 2006), and research indicates depression-associated anger attacks are not uncommon (Fava, 1998). Thus, it could be argued that aggression levels in these participants are a by-product of depression. However, our clinical assessment precludes this explanation. Specifically, participants may not qualify for the IED diagnosis if they met full criteria for IED only during a major depressive episode. Moreover, patients with current *DSM-IV* major depressive disorder or lifetime bipolar disorder were excluded from our study. The more likely explanation, one that is supported by client reports to the therapist during treatment, is that as the aggressive behavior and the resultant negative consequence (e.g., relationship and work problems) decreased, the participants began to feel less sad and irritable, and more hopeful.

CRCST did not lower anxiety compared with the control. This is surprising considering the nature of the treatment and its overlap with treatments for anxiety disorders (e.g., use of relaxation, imaginal exposure, focus on cognitive distortions). One possibility is that the self-monitoring that was conducted by the WAIT group had a mild anxiolytic effect, as the WAIT group showed a non-significant trend for lower BAI scores. However, it would still be expected that CRCST would have a greater anxiolytic effect, which it did not.

CRCST-I led to a significant improvement in quality of life at the end of treatment. This was also evident at a trend level for CRCST-G participants. Treatment gains remained at follow-up. For CRCST-I participants, and to a lesser extent CRCST-G participants, the decreases in aggression, anger, and associated symptoms were powerful enough to be associated with an overall improvement in functioning and life satisfaction.

CRCST-I Versus CRCST-G

Overall both CRCST-I and CRCST-G produced similar effects on most measures of aggression, anger, and related constructs. Both conditions produced a large effect in decreasing aggression as compared with WAIT, and though CRCST-I had a small effect of decreasing aggression compared with CRCST-G, at the end of treatment (which was also reflected in greater portion of remitted participants), the two groups were virtually identical at 3-month follow-up. CRCST-I and CRCST-G were equally effective in reducing trait anger, suppressed anger, and expressed anger while increasing use of strategies to control expressed anger at posttreatment and follow-up. CRCST-I reported marginally greater use of strategies to control suppressed anger (STAXI Anger Control-In) at 3-month follow-up compared with CRCST-G. However, both CRCST variants significantly increased STAXI Anger Control-In

from pretreatment to posttreatment (outperforming WAIT) as well as follow-up.

Unlike CRCST-I, CRCST-G did not show a greater reduction in hostile thoughts than the control. This occurred despite no difference between CRCST-I and CRCST-G at posttreatment or at follow-up. Finding for hostile thoughts may be related to the high variability of HAT scores for participants in the CRCST-G condition. It has been suggested that group therapy results in more variable treatment effects across participants (DiGuiseppe & Tafare, 2003). One possible reason for this in our study is that the therapist was less able to focus on specific cognitions of particular clients or on individuals who were having difficulty with cognitive restructuring. This also may be related to the tendency for CRCST-G participants to use these anger control strategies less often. Future research will be needed to see whether this finding persists, and if so, what the likely causes are. However, the primary finding is that both CRCST variants resulted in participants who were less angry and aggressive.

CRCST-I and CRCST-G did not significantly differ at either posttreatment or follow-up on measures of depression, anxiety, or quality of life. However, for quality of life, only CRCST-I showed improvement relative to WAIT. Furthermore, unlike CRCST-I, CRCST-G participants did not improve in self-reported quality of life from baseline to postintervention or follow-up (though it did show a trend at posttreatment). The lack of a significant increase in quality of life for CRCST-G participants is more puzzling, especially in light of the effects of CRCST-G on anger and aggression. It does not appear to be related to increased variability of scores, as the standard deviations for CRCST-G are comparable with CRCST-I. One issue is limited power, as CRCST-G showed a moderate ($d = 0.52$), albeit nonsignificant ($p = .08$), trend toward improved quality of life at posttreatment. Also, when only treatment completers were considered, CRCST-G outperformed WAIT on the quality of life measure at posttreatment.

Timing of Response

Reduction in aggressive behavior and increased use of anger control strategies were evident in both CRCST conditions by the midpoint. However, CRCST participants did not identify significant change in their tendency to be angry or to respond to provocative situations with anger and aggression until the end of treatment. Thus, CRCST member behavior improved fairly quickly, but identification and/or acceptance of that behavioral change as reflecting a reduced tendency to anger and aggression took additional time. This is likely a by-product of the fluctuating nature of aggression in people who have often had periods of relative quiescence only to later resume their aggressive behavior. Clinically, this was seen as clients being excited but wary about early improvements.

Limitations/Future Directions

A number of limitations should be noted. This was a pilot study with a small sample in which the author and coauthors also served as therapist and conducted admittedly limited adherence monitoring. There was also very limited process measurement and a fairly short follow-up of 3 months. Whether these results will be replicated with larger samples, other clinicians, and more stringent

adherence and competence monitoring is unknown. If these results are replicated, it is important to know whether the treatment effects persist over a longer period of time. To address these issues, we are currently conducting a follow-up study with a larger sample, 1-year follow-up, different therapists, and adherence and competence assessments by independent evaluators. Clinical trials by other research groups will also be needed before stronger conclusion about the efficacy of CBT for IED can be made. Despite the aforementioned limitations, however, the preliminary results offered by this pilot randomized clinical trial provide promising support for the efficacy of CRCST in the treatment of impulsive aggression.

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