EMOTIONAL INTELLIGENCE AND IMPULSIVE AGGRESSION IN INTERMITTENT EXPLOSIVE DISORDER

Emil F. Coccaro, M.D., **Oscar Solis, B.A.**, **Jennifer Fanning, Ph.D.**, and **Royce Lee, M.D.**

Clinical Neuroscience Research Unit, Department of Psychiatry and Behavioral Neuroscience, Pritzker School of Medicine, The University of Chicago, Chicago, IL.

Abstract

Emotional Intelligence (EI) relates to one's ability to recognize and understand emotional information and then, to use it for planning and self-management. Given evidence of abnormalities of emotional processing in impulsively aggressive individuals, we hypothesized that EI would be reduced in subjects with Intermittent Explosive Disorder (IED: n = 43) compared with healthy (n = 44) and psychiatric (n = 44) controls. The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) was used to assess both Experiential EI and Strategic EI. Strategic, but not Experiential, EI was lower in IED compared with control subjects. These differences were not accounted for demographic characteristics, cognitive intelligence, or the presence of clinical syndromes or personality disorder. In contrast, the relationship between IED and Strategic EI was fully accounted for by a dimension of hostile cognition defined by hostile attribution and hostile automatic thoughts. Interventions targeted at improving Strategic EI and reducing hostile cognition will be key to reducing aggressive behavior in individuals with IED.

Address Correspondence to: F. Coccaro, M.D., Clinical Neuroscience Research Unit, Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, 5841 South Maryland Avenue, Chicago, IL 60637, (773) 834-4083 (PHONE), (773) 834-7427 (FAX)

Contributors:

Emil F. Coccaro, M.D.

Clinical Neuroscience and Psychopharmacology Research Unit, Department of Psychiatry and Behavioral Neuroscience, The Pritzker School of Medicine, The University of Chicago, Chicago, IL 60637

Oscar Solis, B.A.

Clinical Neuroscience and Psychopharmacology Research Unit, Department of Psychiatry and Behavioral Neuroscience, The Pritzker School of Medicine, The University of Chicago, Chicago, IL 60637

Jennifer Fanning, Ph.D.

Clinical Neuroscience and Psychopharmacology Research Unit, Department of Psychiatry and Behavioral Neuroscience, The Pritzker School of Medicine, The University of Chicago Chicago, IL 60637

Royce Lee, M.D.

Clinical Neuroscience and Psychopharmacology Research Unit, Department of Psychiatry and Behavioral Neuroscience, The Pritzker School of Medicine, The University of Chicago, Chicago, IL 60637

Keywords

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INTRODUCTION

Intermittent Explosive Disorder (IED), as defined in DSM-5, is characterized by recurrent, problematic, impulsive aggressive behavior (Coccaro 2012). Aggression in IED may be displayed as high frequency/low intensity aggression that is non-destructive or injurious, or as low frequency/high intensity aggression that is destructive and/or injurious. However expressed, the aggression is impulsive, and/or anger-based, in nature. Based on data analyzed for the DSM-5 Task Force, about 70% of individuals with IED display both forms of impulsive aggression while 20% display only the high frequency/low intensity aggression, and 10% display only the low frequency/high intensity aggression (Coccaro et al., 2014). Aggressive behavior in IED is most often provoked in social interactions. It is of interest then that individuals with IED demonstrate hostile cognitive distortions such as hostile automatic thoughts and hostile attribution bias, both of which render individuals with IED vulnerable to misinterpreting non-threatening social-emotional cues as potentially threatening, and responding inappropriately (Coccaro et al., 2009).

In addition to social cognition, affective processes likely shape aggressive responding. We have previously reported that the more hostile an individual believes another person is in the interaction, the more anger is reported by the individual (Coccaro, et al., 2009). Previous work examining neurobiological factors confirm that IED individuals are predisposed to having exaggerated responses to social and emotional stimuli. The functional activity of corticolimbic structures such as the amygdala is exaggerated in response to angry face stimuli in individuals with IED (Coccaro et al., 2011). Depletion of central serotonin with tryptophan depletion has been found to alter perception of angry faces and increase subjective angry mood in males with IED (Lee et al., 2012).

While previous work has focused specifically on cognitive factors like hostility and emotional factors like anger, work in the area of emotional intelligence (EI) integrates social and emotional processes more broadly. Currently, there are two basic models of emotional intelligence: the "trait" model and the "ability" model. The trait model, developed by Petrides (Petrides et al., 2007), posits emotional intelligence as a set of self-perceptions of emotions in the context of personality. In contrast, the ability model (Meyer and Salovey 1993) focuses on one's ability to perceive emotion, use emotions, understand emotions, and manage emotions. In the ability model, EI hypothesizes that emotional knowledge is embedded within a social context of communication and interaction and entails the ability to recognize emotions in ourselves and others. Coping with stressful events requires skill in the ability to attend, understand and label, communicate, and modulate emotions. These emotion processing competencies enable one to utilize emotional information adaptively in a variety of social situations. Individuals high in EI use these emotional skills in a manner that potentially benefits themselves and others. EI consists of multiple dimensions, including the

inclination to pay attention to one's feelings, have clarity in discriminating, and in repairing, dysphoric mood states.

Given our interest in the ability of aggressive individuals to use and manage emotions, we chose a measure that assessed one's "ability" to navigate in social-emotional situations. For the "ability model", the most widely used measure is the Meyer, Caruso, Salovey Emotional Intelligence Test (MCSEIT; Mayer et al., 2007). The MCSEIT displays content (Tucker and Riggio 1988), structural (Ciarrochi et al., 2000), discriminant (Brackett and Mayer et al., 2003) and predictive (Lopes et al., 2003, 2004) validity. In this study, we used the MSCEIT to assess Experiential EI and Strategic EI. Experiential EI provides an index of the subject's ability to perceive emotional information, to relate it to other sensations such as color and taste, and to use it to facilitate thought. Strategic EI provides an index of the subject's ability to understand emotional information and use it strategically for planning and self-management. We hypothesized that both Experiential EI and Strategic EI would be lower in individuals with IED and that both forms of EI would correlate inversely with aggression and with measure of hostile cognition.

METHODS

Subjects

One-hundred thirty-six physically healthy subjects participated in this study. All subjects were medically healthy and were systematically evaluated in regard to aggressive, and other, behaviors as part of a larger program designed to study correlates of impulsive aggressive, and other personality-related, behaviors in human subjects. Subjects were recruited through public service announcements and newspaper advertisements seeking out individuals who: a) reported psychosocial difficulty related to one or more Axis I and Axis II conditions (Axis I / II subjects) or, b) had little evidence of psychopathology (Normal Control subjects). All subjects gave informed consent and signed the informed consent document approved by our Committee for the Protection of Human Subjects (IRB).

Diagnostic Assessment

Syndromal and personality disorder diagnoses were made according to DSM-5 criteria (American Psychiatric Association 2013). Diagnoses were made using information from: (a) the Structured Clinical Interview for DSM Diagnoses [SCID-I; (First et al., 1997)] for syndromal disorders and the Structured Interview for the Diagnosis of DSM Personality Disorder [SIDP; (Pfohl et al., 1997] for personality disorders; (b) clinical interview by a research psychiatrist; and, (c) review of all other available clinical data. The research diagnostic interviews were conducted by individuals with a masters or doctorate degree in Clinical Psychology. All diagnostic raters went through a rigorous training program that included lectures on DSM diagnoses and rating systems, videos of expert raters conducting SCID/SIDP interviews, and practice interviews and ratings until the rater were deemed reliable with the trainer. This process resulted in good to excellent inter-rater reliabilities (mean kappa of .84 ± .05; range: .79 to .93) across anxiety, mood, substance use, impulse control, and personality disorders. Final diagnoses were assigned by team best-estimate consensus procedures (Kosten & Rounsaville, 1992; Leckman et al., 1982) involving

research psychiatrists and clinical psychologists as previously described (Coccaro et al., 2012). This methodology has previously been shown to enhance the accuracy of diagnosis over direct interview alone (Klein et al., 1994). Subjects with a current history of a substance use disorder or of a life history of bipolar disorder, schizophrenia (or other psychotic disorder), or mental retardation, were excluded from study. Medical health of all subjects was documented by medical history and examination, and urine screen for illicit drugs.

Syndromal and personality disorder diagnoses are listed in Table I. Of the 87 subjects with DSM-5 diagnoses, most (69%) reported: a) history of formal psychiatric evaluation and/or treatment (53%) or, b) history of behavioral disturbance during which the subject, or others, thought they should have sought mental health services but did not (16%).

Assessment of Emotional and Cognitive Intelligence

Emotional intelligence (EI) was assessed using the Mayer-Salovey-Caruso Emotional Intelligence Test [MSCEIT; (Mayer, et al., 2007)]. The MSCEIT yields two main scores for experiential EI and strategic EI. In this context, EI is defined as the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to regulate emotions so as to promote emotional and intellectual growth (Mayer, et al., 2001). Experiential EI provides an index of the subject's ability to perceive emotional information, to relate it to other sensations such as color and taste, and to use it to facilitate thought. Strategic EI provides an index of the subject's ability to understand emotional information and use it strategically for planning and self-management. The scores underlying Experiential EI relate to perceiving emotions and facilitating thought. The former indicates the degree to which the subject identifies emotion in himself or herself and others while the latter indicates the degree to which the subject can use his or her emotions to improve thinking. The scores underlying Strategic EI relate to understanding emotions and emotional management. The former indicates how well the subject understands the complexities of emotional meanings, emotional transitions, and emotional situations and the latter indicates how well the subject is able to manage emotions in his or her own life and in the lives of others. Cognitive IQ for each subject was assessed using the vocabulary and matrix reasoning subtests from the WASI (Wechsler, 1999) in order to control for any influence cognitive IQ had on the findings in this study (Ermer et al., 2012).

Psychometric Measures Relevant to Aggression, Impulsivity, and Psychopathy

Aggression and impulsivity are the core features of IED and were assessed in this study. Aggression was assessed by the Aggression score from the Life History of Aggression (LHA; Coccaro et al., 1997) and the Buss-Perry Aggression Questionnaire (BPAQ: Buss & Perry, 1992). LHA-Aggression assesses the number of times a person has engaged in aggressive behavior while BPAQ assesses the person's tendency to act aggressively as a personality trait. Impulsivity was assessed by the Life History of Impulsive Behavior (LHIB; Coccaro & Schmidt-Kaplan, 2012) and the Barratt Impulsivity Scale BIS-11; Patton et al., 1995). The LHIB assesses the number of times a person has engaged in impulsive behavior while the BIS-11 assesses the person's tendency to act impulsively as a personality trait. Self-directed aggression was assessed by history of suicidal behavior and self-injurious

behavior as assessed during the SCID interviews. Psychopathy was assessed in this study because of its relevance to aggression and because psychopathy may be inversely related to EI (Ermer et al., 2012). We used the Screening Version of the Psychopathy Checklist (PCL-SV; Hart et al., 2003) which was scored in the context of the diagnostic assessment phase described above. Total PCL-SV scores range from 0 to 24. Total scores of 12 and lower suggest the absence of psychopathic personality while scores from 13 and higher suggest the presence of psychopathic personality.

Psychometric Measures Relevant to Hostile Cognition

Measures reflecting hostile cognition have previously been shown to correlate with measures of aggression (e.g., (Coccaro et al., 2009; Crick & Dodge, 1996; Dodge & Crick, 1990) and thus, two related measures of this construct were also administered to the subjects in this study. These measures were the Hostile Attribution score from the Social Information Processing (SIP; Coccaro, et al., 2009) questionnaire and the Hostile Automatic Thought (HAT; Snyder, 1997) questionnaire. HA assesses the tendency to attribute hostile intent to others in the context of socially ambiguous situations. HA has good internal (alpha > .82), and test-retest (r > .74) reliability and correlates directly with measures of aggression. HAT assesses hostile thoughts and tendencies (e.g., physical aggression, derogation, and revenge) and measures the frequency of various hostile self-statements. The HAT has good internal reliability (alpha = .95), and also correlates directly with measures of aggression.

Statistical Analysis and Data Reduction

Comparisons of between group variables were performed by t-test, with correction for unequal variances where necessary, analysis of covariance (ANCOVA), and by X^2 tests. Correlational analyses included Pearson correlation, partial and part correlation, and multiple regression. A two-tailed alpha value of 0.05 was used to denote statistical significance for all analyses. MSCEIT scores in this paper are reported as empiric percentiles because the MSCEIT raw data were skewed. Empiric percentiles work to standardize raw scores so that if a raw score of .50 is equal to, or higher, than 75% of those tested in the norm sample, a raw score of .50 would be at the 75th percentile. In addition, composite variables for "aggression", "impulsivity", and "hostile cognition" were created in a data-reduction step. These composite variables were created by taking the average of each subject's z-scores for the primary behavioral measures (LHA and BPA for Composite Aggression, LHIB and BIS-11 for Composite Impulsivity, HAT and SIPQ for Composite Hostile Cognition).

RESULTS

Demographic Characteristics of the Sample (Table II)

HC, PC, and IED subjects did not differ in gender but did differ, marginally, in age, ethnicity, and socioeconomic score. The difference in age was due to an older mean age among IED compared with HC subjects (4.6 ± 9.1 years); the difference in ethnicity was due to greater frequency of white subjects (81% _vs_. 58%) in HC/PC, compared with IED, groups, the difference in SES score was due to lower scores among IED compared with HC or PC subjects. None of these variables affected the results of the analyses reported below.

Psychometric Characteristics of the Sample (Table III)

Source scores for aggression, impulsivity, and hostile cognition were significantly higher among IED subjects compared with HC and PC subjects. In addition, IQ scores differed significantly among the groups with IED subjects having significantly lower IQ scores compared with HC, but not compared with PC, subjects. The mean difference between IED and HC subjects, 8.1 ± 12.5 points, represents about one-half of one standard deviation (SD $= 15$) in IQ score.

Emotional Intelligence as a Function of Diagnostic Groups

Strategic EI ($F[2,128] = 6.24$, $p = .003$), but not Experiential EI ($F[2,128] = 0.33$, $p = .719$), differed as a function of diagnostic group with IED subjects having lower Strategic EI scores compared with PC or HC subjects (Table III). Adding gender to the ANCOVA model did not influence this result nor the difference between IED and PC or HC subjects (figure 1, left). While adding IQ score to the model also did not affect the overall result, the difference between PC and IED subjects was reduced to trend towards statistical significance (figure 1, center). In order to confirm that individual differences in Strategic EI among the groups were accounted by individual differences in aggression, we added Composite Aggression to the model. Adding this variable eliminated all differences between the groups (figure 1, right). Within Strategic EI, both relevant branch scores were also higher as a function diagnostic status (Wilks $\lambda = 0.90$, $F[4,254] = 3.35$, $p = .011$; Understanding Emotions: $F[2,128] = 4.24$, $p = .017$; Managing Emotions: $F[2,128] = 5.03$, $p = .008$). In contrast to Composite Aggression, Strategic EI did not differ significantly as a function of a life history of suicide attempt, or self-injurious behavior, among psychiatric subjects.

Strategic EI Scores and Comorbidity Among Psychiatric Subjects

In order to test the possibility that reduced Strategic EI scores in IED subjects was due to comorbidity with relevant syndromal, or personality, disorders we added these disorders to the ANOVA models. Adding current depressive, or current anxiety, disorder to these models did not change the result for the Strategic EI score differences between IED and PC subjects ($F[1,82] = 6.22$, $p = .015$). Similarly, adding lifetime depressive disorder, lifetime anxiety disorder, or lifetime alcohol or drug dependence to the ANOVA model did not change this result for IED _vs_. PC subjects ($F[1,80] = 5.88$, $p = .018$); Strategic EI did not differ as a function of these lifetime comorbid disorders. Finally, we added Borderline Personality Disorder (BPD) and Antisocial Personality Disorder (AsPD) to the ANOVA model because previous studies have reported lower EI scores among those with BPD Peter et al., 2013), or AsPD (Ermer et al., 2012), compared with controls. Including subjects with either BPD and/or AsPD did not affect the significance of the difference between PC and IED subjects ($F[1,83] = 4.24$, $p = .043$); Strategic EI did not differ as a function of BPD or AsPD. Strategic EI was lower as a function of psychopathic personality but this result did not reach statistical significance (PCL-SV score 13; 34.4 ± 20.1 _vs_. 47.6 ± 23.3, $F[1,129] = 1.87$, $p = .174$) and removing the six subjects meeting criteria for psychopathic personality (PCL-SV Score 13) did not change the results (Raw Data ANOVA: $F[1,122] = 5.23$, $p = .007$; ANCOVA with IQ: $F[1,121] = 3.24$, $p = .043$).

Correlates of EI with Aggression and Impulsivity

Given the relationship between EI and IED, we expected EI scores to correlate inversely with the core features of IED: aggression and impulsivity. Experiential EI correlated inversely with Composite Impulsivity (r = −.23, p = .01), but not with Composite Aggression (r = −.08, p = .390). In contrast, Strategic EI correlated inversely with both Composite Aggression (r = −.39, p < .001) and Composite Impulsivity (r = −.28, p = .001). The Strategic EI/Aggression correlation was significantly greater than the Experiential EI/ Aggression correlation (t$_{125}$ = 3.37, p = .001). Subsequent multiple regression analysis revealed that only Composite Aggression scores were significantly related to Strategic EI (R = .41, R^2 = .17; F[2,122] = 12.44, p < .001; Composite Aggression: B = − 8.79 ± 2.44, β = − .34, p < .001; Composite Impulsivity: B = − 3.51 ± 2.51, β = −.13, p < .166). Breaking down Composite Aggression into its source LHA and BPA scores, revealed that LHA, but not BPA, Aggression contributed significantly to Strategic EI scores (R = .40, R^2 = .16; F[2,112] = 10.57, p < .001; LHA: B = − 0.92 ± 0.37, β = − .27, p = .014; BPA: B = − 0.31 ± 0.20, β = −.17, p < .122). Adding IQ score and gender to LHA Aggression as independent variables (with Strategic EI as dependent variable), did not change this result for LHA Aggression which continued to correlate significantly with Strategic EI (LHA: B = − 0.71 ± 0.28, β = − .21, p = .013).

Hostile Cognition as a Function of Aggression, IQ, and Strategic EI

Hostile cognition is an important correlate of aggression and of IED (Coccaro et al., 2009). It occurs in response to social interaction that is perceived as adverse/threatening in nature (e.g., "this person wants to hurt me") and is a cognitive/emotional response that must be managed to prevent, or minimize, aggressive outbursts. As we hypothesized, we found that Composite Hostile Cognition was monotonically elevated in these subjects (HC < PC < IED). In addition, Composite Hostile Cognition correlated directly with Composite Aggression (r = .66, p < .001) and inversely with both Strategic EI (r = −.42, p < .001) and IQ (r = −.24, p < .001); Strategic EI and IQ were also correlated (r = .40, p < .001). Multiple regression analysis with Composite Aggression as dependent variable, and Strategic EI, IQ, Composite Hostile Cognition, and gender as independent variables, revealed that Composite Hostile Cognition scores and gender accounted for unique and significant variance in Composite Aggression scores (Hostile Cognition: B = 4.16 ± 0.61, β = .60, p < .001; Gender: B = − 3.46 ± 1.07, β = −.25, p = .002); neither Strategic EI (B = 0.00 ± 0.03, β = . 01, p = .907) nor IQ (B = 0.01 ± 0.05, β = .01, p = .891) accounted for any significant variance in Composite Aggression scores. This suggests that Hostile Cognition scores (and gender) fully mediate the relationship between Strategic EI, IQ, and Composite Aggression scores.

DISCUSSION

The primary finding in this study is that strategic, but not experiential, emotional intelligence is reduced in individuals with IED compared with both healthy and psychiatric controls. Strategic EI includes understanding and managing emotions, while Experiential EI includes perceiving emotions and facilitating thought. Thus, these data suggest that while individuals with IED are similar to both healthy and psychiatric controls in perceiving emotions, they

have a significant deficit in understanding what emotions they are feeling and how to resolve emotional conflicts. More importantly, both trait aggression and impulsivity correlated inversely with Strategic EI suggesting that the more aggressive (and impulsive) one is the lower one's Strategic EI. Further analysis revealed that aggression, especially history of actual aggressive behavior, rather than impulsivity, accounted for differences in Strategic EI between IED and psychiatric control subjects.

These results were not due to group differences in demographic variables, cognitive intelligence, or in the presence of comorbid psychiatric or personality disorders, or of PCL-SV defined psychopathic personality. Demographic differences among subjects were limited to differences in age and ethnicity and were only modest in magnitude and statistical significance; adding either to the statistical models did not affect the results. While gender distribution did not differ among the groups, female gender was associated with higher Strategic EI scores compared with males. Despite this, adding gender to the statistical models did not affect the differences among the groups. IQ was modestly lower among IED subjects and was inversely correlated with Strategic EI. Adding IQ to the statistical models did not affect differences in Strategic EI between IED and PC, compared with HC, subjects but did reduce the statistical significance of the remaining difference between IED and PC subjects to a statistical trend. Finally, neither adding the presence of current or lifetime psychiatric disorders,nor specific personality disorder such as BPD or AsPD affected the relationship between EI and IED.

While this is the first study exploring the nature of EI in IED, these data are consistent with previous human study reports. Specifically, psychopathic subjects have been reported as having lower EI, especially when IQ scores are added to statistical models (Ermer et al., 2012). We cannot know how many of those subjects would have met DSM-5 criteria for IED. In this study, few subjects met PCL-SV criteria for presence of psychopathic personality [n = 6; Mean ($\pm$ SD) Total PCL-SV Score = 15.0 $\pm$ 2.0]; those that did had non-significantly lower Strategic EI scores than those that did not and removal of those subjects did not change the results. In one study of adolescents, teenagers with lower EI scores were rated as more aggressive than others and engaged in more conflictual behavior than peers with higher EI scores (Rubin, 1999). Most recently, lower EI has been reported individuals with BPD (Peter et al., 2013). While we report lower Strategic EI in BPD in this sample, adding BPD to the statistical models did not eliminate the difference in Strategic EI scores between IED and PC subjects.

Placing these findings into the context of a model of Strategic EI and aggression, we note that the former is also highly related to a measure of hostile cognition. In this study, hostile cognition was assessed by tendency to have automatic, reflexive, hostile thoughts about others (HAT) and by the tendency to attribute hostile intent to others in socially ambiguous situations (HA). In fact, adding hostile cognition to the statistical models completely eliminated the relationship between Strategic EI and IED (and with history of actual aggressive behavior). This suggests that the relationship between Strategic EI and IED/Aggression appears to be fully accounted for by hostile cognition as defined in this study. Thus, while Strategic EI is low in IED, and is inversely related to aggressive behavior, these relationships are fully accounted for by the presence of hostile cognition. In this model,

perception of a potential threat by others, which may be no different among individuals with IED compared with controls (i.e., Experiential EI), quickly leads to hostile thoughts/ attribution regarding the other and in, all too typical, circumstances leads to aggressive action against the other. It is the deficit in Strategic EI that permits the individual's tendency to cast other's actions as hostile that is most proximal to actual aggressive behavior. The deficit in Strategic EI prevents the individual from fully understanding the intentions of others (clarity of emotions) and from using appropriate psychological mechanisms to reduce one's arousal from an unclear threat (repair of emotions). This insight may be critical in designing psychosocial interventions to reduce aggressive behavior in individuals with IED. Accordingly, interventions targeted at improving Strategic EI and reducing hostile cognition in IED will be key to reducing aggressive behavior in such individuals. A recent study using a cognitive behavioral approach to the treatment of aggression in IED reported a good behavioral response to cognitive restructuring which included elements of both approaches (McCloskey et al. 2008). It is possible that infusing more elements aimed at improving Strategic EI, and reducing hostile cognition, will be even more effective at reducing aggressive behavior in those with IED.

The strengths of this study include a well-characterized sample, multiple validated measures of aggression and impulsivity, and a well-validated ability-based EI measure that doesn't rely on self-report judgments of emotional skills. In addition, the IED subjects were compared to both healthy controls and with psychiatric controls. Limitations include the fact that subjects were not primarily recruited from treatment settings and that this study was cross-sectional nature. Psychiatric subjects in the study were primarily recruited from the community as "research volunteers". However, 69% had history of formal treatment for psychiatric disorder (53%) or of behavioral disturbance that should have been assessed by mental health professionals (16%). Thus, most of the psychiatric subjects in this study are likely similar to those from a treatment setting. The cross-sectional nature of the study raises questions about the stability of the various measures over time. That said, the MSCEIT has good to excellent psychometric properties, including test-retest reliability.

In summary, individuals with IED appear to have a deficit in Strategic, but not Experiential, EI. While those with IED may perceive emotional information as well as controls, and be able to relate it correctly to facilitate thought, they are impaired in understanding and managing their emotions in an optimally strategically fashion for planning and self-management. This impairment permits the activity of hostile thoughts and attribution to stimulate the drive for an aggressive response to perceived threat, even when such threat from another individual is minimal.

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REFERENCES

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders: Fifth Edition. 5 ed.. American Pyschiatric Press., Inc.; Washington, DC: 2013.

Bar-On, R. The Emotional Quotient Inventory (EQ-i): A test of emotional intelligence. Multi-Health Systems, Inc.; Toronto, Canada: 1997.

Brackett MA, Mayer JD. Convergent, discriminant and incremental validity of competing measures of emotional intelligence. Personality and Social Psychology Bulletin. 2003; 29:1147–1158. [PubMed: 15189610]

Buss AH, Perry M. The aggression questionnaire. J Pers Soc Psychol. 1992; 63(3):452–459. [PubMed: 1403624]

Ciarrochi JV, Chan AYC, Caputi P. A critical evaluation of the emotional intelligence concept. Personality and Individual Differences. 2000; 28:539–561.

Coccaro EF. Intermittent explosive disorder as a disorder of impulsive aggression for DSM-5. The American journal of psychiatry. 2012; 169(6):577–588. doi: 10.1176/appi.ajp.2012.11081259. [PubMed: 22535310]

Coccaro EF, Sripada CS, Yanowitch RN, Phan KL. Corticolimbic function in impulsive aggressive behavior. Biol Psychiatry. 2011; 69(12):1153–1159. [PubMed: 21531387]

Coccaro EF, Berman ME, Kavoussi RJ. Assessment of life history of aggression: development and psychometric characteristics. Psychiatry Research. 1997; 73(3):147–157. [PubMed: 9481806]

Coccaro EF, Lee R, McCloskey MS. Validity of the new A1 and A2 criteria for DSM-5 intermittent explosive disorder. Compr Psychiatry. 2014; 55(2):260–267. [PubMed: 24321204]

Coccaro EF, Nayyer H, McCloskey MS. Personality disorder-not otherwise specified evidence of validity and consideration for DSM-5. Comprehensive psychiatry. 2012 doi: 10.1016/j.comppsych. 2012.03.007.

Coccaro EF, Noblett KL, McCloskey MS. Attributional and emotional responses to socially ambiguous cues: validation of a new assessment of social/emotional information processing in healthy adults and impulsive aggressive patients. J Psychiatric Research. 2009; 43:915–925.

Coccaro EF, Schmidt-Kaplan CA. Life history of impulsive behavior: development and validation of a new questionnaire. Journal of Psychiatric Research. 2012; 46:346–352. doi: 10.1016/j.jpsychires. 2011.11.008. [PubMed: 22212770]

Crick NR, Dodge KA. Social information-processing mechanisms in reactive and proactive aggression. Child Dev. 1996; 67(3):993–1002. [PubMed: 8706540]

Dodge KA, Crick NR. Social information-processing bases of aggressive behavior in children. Personality and Social Psychology Bulletin. 1990; 16(1):8.

Ermer E, Kahn RE, Salovey P, Kiehl KA. Emotional intelligence in incarcerated men with psychopathic traits. J Pers Soc Psychol. 2012; 103(1):194–204. [PubMed: 22329657]

First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. Structured Clinical Interview for DSM-IV Axis I Disorders (SCID). Psychiatric Institute, Biometrics Research; New York: 1997.

Hart, SD.; Cox, DN.; Hare, RD. Hare Psychopathy Checklist: Screening Version (PCL-SV). MHS.; Totonto, Ontario, Canada: 2003.

Klein DN, Ouimette PC, Kelly HS, Ferro T, Riso LP. Test-retest reliability of team consensus best-estimate diagnoses of axis I and II disorders in a family study. Am J Psychiatry. 1994; 151(7): 1043–1047. [PubMed: 8010362]

Kosten TA, Rounsaville BJ. Sensitivity of psychiatric diagnosis based on the best estimate procedure. Am J Psychiatry. 1992; 149(9):1225–1227. [PubMed: 1503136]

Leckman JF, Sholomskas D, Thompson WD, Belanger A, Weissman MM. Best estimate of lifetime psychiatric diagnosis: a methodological study. Arch Gen Psychiatry. 1982; 39(8):879–883. [PubMed: 7103676]

Lopes PN, Brackett MA, Nezlek JB, Schutz A, Sellin I, Salovey P. Emotional intelligence and social interaction. Personality and Social Psychology Bulletin. 2004; 30:1018–1034. [PubMed: 15257786]

Lopes PN, Salovey P, Straus R. Emotional intelligence, personality and the perceived quality of social relationships. Personality and Individual Differences. 2003; 3:641–659.

Mayer, JD.; Salovey, P.; Caruso, DR. MSCEIT User Manual. Multi-Health Systems; Toronto, CA: 2007.

Mayer JD, Salovey P, Caruso DR, Sitarenios G. Emotional intelligence as a standard intelligence. Emotion. 2001; 1(3):232–242. [PubMed: 12934682]

Patton J, Stanford M, Barratt E. Factor structure of the Barratt impulsiveness scale. J Clin Psychol. 1995; 51(6):768–774. [PubMed: 8778124]

Peter M, Schuurmans H, Vingerhoets AJ, Smeets G, Verkoeijen P, Arntz A. Borderline personality disorder and emotional intelligence. J Nerv Ment Dis. 2013; 201(2):99–104. [PubMed: 23364117]

Petrides KV, Pita R, Kokkinaki F. The location of trait emotional intelligence in personality factor space. British Journal of Psychology. 2007; 98:273–289. [PubMed: 17456273]

Pfohl, B.; Blum, N.; Zimmerman, M.; University of Iowa. Dept. of, P.. Structured interview for DSM-IV Personality Disorder: SIDP-IV. American Psychiatric Press; Washington D.C.: 1997.

Rubin, MM. Emotional intelligence and its role in mitigating aggression: A correlational study of the relationship between emotional intelligence and aggression in urban adolescents. Psy.D., Immaculata College; Immaculata, Pennsylvania: 1999.

Snyder CR, Crowson JJ, Houston BK, Kurylo M, Poirier J. Assessing hostile automatic thoughts: Development and validation of the HAT scale. Cognitive Therapy and Research. 1997; 21:477–492.

Tucker JS, Riggio RE. The role of social skills in encoding posed and spontaneous facial expressions. Journal of Nonverbal Behavior. 1988; 12:87–97.

Wechsler, D. Wechsler Abbreviated Scales of Intelligence (Manual). Psychological Corporation; San Antonio, TX: 1999.

Highlights

Intermittent Explosive Disorder (IED) and healthy and psychiatric controls were studied.

IED subjects had lower scores on strategic emotional intelligence compared with HC and PC subjects.

This deficit was associated and accounted for by greater hostile cognition.

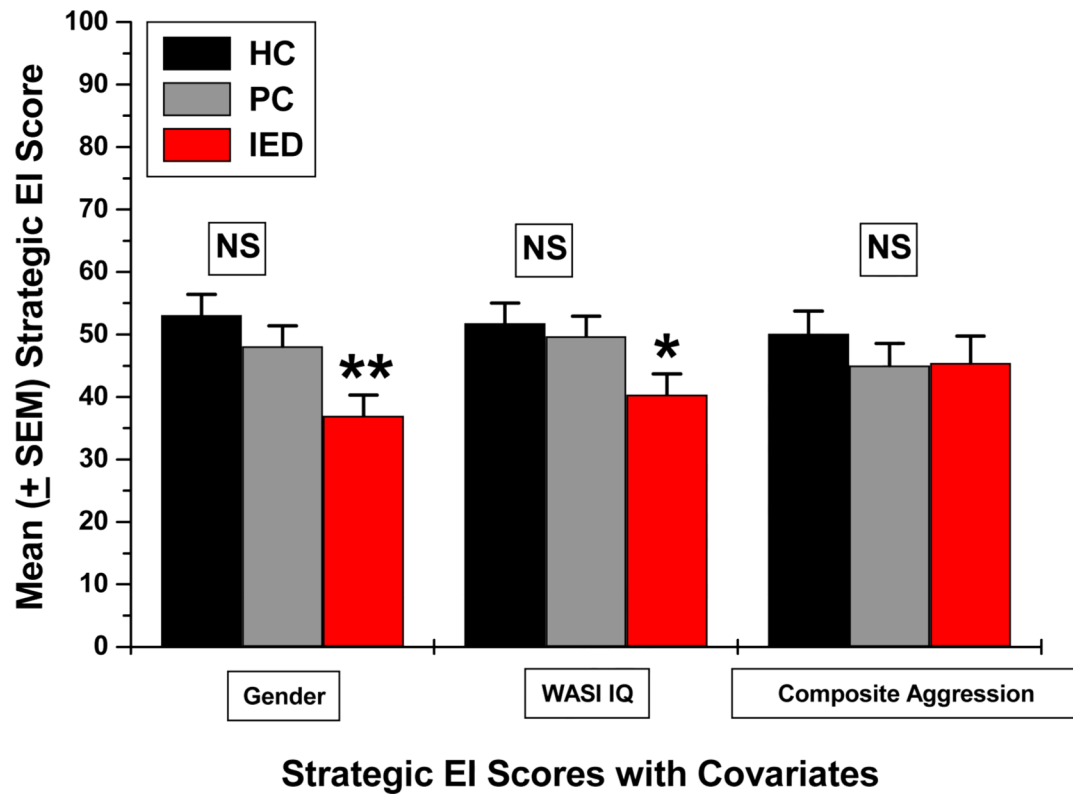Treatment for impulsive aggression should target hostile cognition.

Figure 1.
Mean (± SEM) Strategic Emotional Intelligence (MSCEIT) scores among the groups with gender (left), WASI IQ (center), or Composite Aggression (right) added to the ANCOVA models. Probabilities after significant ANCOVA: ** = p < .05 from HC and PC; * = p < .05 from HC, p < .10 from PC.

TABLE I

Syndromal and Personality Disorder Diagnoses in PC/IED Subjects

	PC (n = 44)	IED (N = 43)
Current Syndromal Disorders:		
Intermittent Explosive Disorder	0 (0.0%)	31 (72.1%)
Any Depressive Disorder	4 (9.3%)	6 (14.0%)
Any Anxiety Disorder	12 (27.3%)	7 (16.3%)
Any Substance Use Disorder	0 (0.0%)	0 (0.0%)
Any Stress and Trauma Disorder	4 (9.3%)	7 (16.3%)
Any Eating Disorder	0 (0.0%)	3 (7.0%)
Any Obsessive-Compulsive Disorder	0 (0.0%)	1 (2.3%)
Any Somatoform Disorder	0 (0.0%)	1 (2.3%)
Non-IED Impulse Control Disorder	0 (0.0%)	1 (2.3%)
Lifetime Syndromal Disorders:		
Intermittent Explosive Disorder	0 (0.0%)	43 (100.0%)
Any Depressive Disorder	16 (37.2%)	25 (58.1%)
Any Anxiety Disorder	15 (34.5%)	10 (23.2%)
Any Substance Use Disorder	10 (22.7%)	16 (37.2%)
Any Stress and Trauma Disorder	8 (19.6%)	9 (20.9%)
Any Eating Disorder	4 (9.3%)	6 (14.0%)
Any Obsessive-Compulsive Disorder	1 (2.3%)	3 (7.0%)
Any Somatoform Disorder	0 (0.0%)	1 (2.3%)
Non-IED Impulse Control Disorder	0 (0.0%)	3 (4.5%)
Personality Disorders:		
Any Personality Disorder	16 (37.2%)	34 (79.1%)
Specific Personality Disorder	10 (22.7%)	17 (40.0%)
Cluster A (Odd)	2 (4.7%)	5 (11.6%)
Cluster B (Dramatic)	4 (9.3%)	11 (25.6%)
Cluster C (Anxious)	7 (16.3%)	6 (14.0%)
PD-NOS	6 (13.6%)	17 (40.0%)

Table II

Demographic Data for Sample

	HEALTHY CONTROLS (N = 44)	PSYCHIATRIC CONTROLS (N = 44)	INTERMITTENT EXPLOSIVE DISORDER (N = 43)	P VALUE
Age (Years ± SD)	39.4 ± 8.5	38.9 ± 9.5	44.0 ± 9.8	= .020[1]
Gender (% Male)	41	39	44	= .870[2]
Race (%White / AA / Other)	75 /16 / 9	86 / 11 / 3	58 / 35 / 7	= .049[2]
SES Score	48.0 ± 11.0	49.3 ± 10.1	42.0 ± 13.1	= .008[1]

[1]Significance after ANOVA. Post-hoc significance for SES: HC = PC > IED.

[2]Significance after X^2 test.

Table III

Psychometric Data for Sample

	HEALTHY CONTROLS (N = 44)	PSYCHIATRIC CONTROLS (N = 44)	INTERMITTENT EXPLOSIVE DISORDER (N = 43)	P[1]	GROUP DIFFERENCES
GENERAL INTELLIGENCE:					
WASI IQ	113.8 ± 11.3	111.2 ± 12.8	105.8 ± 13.8	= .012	HC = PC ≥ IED[2]
EMOTIONAL INTELLIGENCE:					
Experiential EI	60.2 ± 29.0	59.6 ± 28.7	55.5 ± 29.5	= .719	HC = PC = IED
Strategic EI	54.0 ± 20.6	49.2 ± 23.1	37.6 ± 23.2	= .003	HC = PC < IED
AGGRESSION:					
LHA Aggression	5.2 ± 3.5	6.2 ± 4.4	16.8 ± 5.4	< .001	HC = PC < IED
BPA Aggression	28.8 ± 9.9	29.7 ± 9.2	42.0 ± 13.9	< .001	HC = PC < IED
IMPULSIVITY:					
LHIB Impulsivity	31.6 ± 14.4	43.3 ± 19.2	58.2 ± 18.0	< .001	HC < PC < IED
BIS Impulsivity	55.2 ± 10.1	61.8 ± 8.8	69.6 ± 10.8	< .001	HC < PC < IED
HOSTILE COGNITION:					
Hostile Automatic Thoughts	40.7 ± 11.0	42.2 ± 11.1	69.8 ± 29.9	< .001	HC = PC < IED
Hostile Attribution Bias	0.7 ± 0.4	0.9 ± 0.4	1.1 ± 0.5	< .001	HC = PC ≤ IED[2]
PCL-SV SCORE	0.9 ± 1.3	2.0 ± 3.1	6.7 ± 4.5	< .001	HC = PC < IED[2]

[1]Significance after ANOVA.

[2]Less than/equal ( ) and more than/equals sign ( ) indicates p < .10

Table IV

Correlations Among Variables of Interest

	Composite Impulsivity	Experiential EI	Strategic EI	WASII IQ	Composite Hostile Cognition
Composite Aggression	r = .46 (p < .001)	r = − .08 (p = .390)	r = −.39 (p = .001)	r = −.24 (p = .007)	r = .66 (p < .001)
Composite Impulsivity	-----	r = −.23 (p =.01)	r = −.28 (p = .001)	r = −.17 (p = .066)	r = .42 (p < .001)
Experiential EI		-----	r = .39 (p < .001)	r = .09 (p = .321)	r = −.15 (p = .083)
Strategic EI			-----	r = .40 (p < .001)	r = −.52 (p < .001)
WASII IQ				-----	r = −.42 (p < .001)