Original article

Bipolar I and II versus unipolar depression: Clinical differences and impulsivity/aggression traits

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A B S T R A C T

Objective: To investigate distinguishing features between bipolar I, II and unipolar depression, and impulsivity/aggression traits in particular.

Methods: Six hundred and eighty-five (n = 685) patients in a major depressive episode with lifetime Unipolar (UP) depression (n = 455), Bipolar I (BP-I) disorder (n = 151), and Bipolar II (BP-II) (n = 79) disorder were compared in terms of their socio-demographic and clinical characteristics.

Results: Compared to unipolar patients, BP-I and BP-II depressed patients were significantly younger at onset of their first depressive episode, and were more likely to experience their first depressive episode before/at age of 15. They also had more previous affective episodes, more first- and second-degree relatives with history of mania, more current psychotic and subsyndromal manic symptoms, and received psychopharmacological and psychotherapy treatment at an earlier age. Furthermore, BP-I and BP-II depressed patients had higher lifetime impulsivity, aggression, and hostility scores. With regard to bipolar subtypes, BP-I patients had more trait-impulsivity and lifetime aggression than BP-II patients whereas the latter had more hostility than BP-I patients. As for co-morbid disorders, Cluster A and B Personality Disorders, alcohol and substance abuse/dependence and anxiety disorders were more prevalent in BP-I and BP-II than in unipolar patients. Whereas the three groups did not differ on other socio-demographic variables, BP-I patients were significantly more often unemployed that UP patients.

Conclusion: Our findings comport with major previous findings on differences between bipolar and unipolar depression. As for trait characteristics, bipolar I and II depressed patients had more life-time impulsivity and aggression/hostility than unipolar patients. In addition, bipolar I and II patients also differed on these trait characteristics.

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1. Introduction

Differences and similarities in the phenomenology of depression in Major Depressive Disorder (MDD) and Bipolar Disorder (BP) have remained a subject of continuous research interest [5,80,96]. Indeed, some suggest that eliciting specific features of the depressive episode itself (i.e. the quality of depressed mood) may assist in differentiating bipolar from unipolar disorder [91] early in the course of illness. Making this distinction is critical because initiating antidepressants without a mood stabilizer in BP can have negative sequelae [39,92].

Bipolar depression may be distinguished from unipolar depression by more frequent family history of bipolar disorders; [7,63,93] more lifetime affective episodes; [7,28,96] earlier age of onset; [18,63,79] and psychotic features [42,62,91]. Furthermore, pharmacologically induced hypomania [3,7,33] (now considered a criterion for bipolar disorder in DSM-5) [4]; poorer response to antidepressants; [57,84] atypical depressive symptoms; [46,62]
subsyndromal (hypomanic) symptoms, [15,54,72] postpartum depressive episodes, [25,55] rapid onset of a depressive episode (within one week and in absence of acute critical life events) [47] and a greater number of hospitalizations [73] are associated with bipolar depression.

As Smith & Craddock (2011) [90] stated, it is still unclear whether major mood disorders are better conceptualized as existing on a continuum or as a set of overlapping pathological processes. The use of both dimensional and categorical approach to psychopathology [90], and taking in account premorbid personality can contribute to optimal assessment and intervention. In this context, research on trait-like personality characteristics in bipolar vs. unipolar depressed patients is relatively scarce. It is worth noting that in DSM-5 [4] nosology, the presence of hypomanic or manic symptoms during a depressive episode does not in and of itself constitute evidence for bipolar disorder, when they occur in the absence of a history of manic or hypomanic episodes. These considerations underscore the importance of assessing trait-like characteristics related to personality/temperament (e.g. impulsivity/aggression) during depressive episodes as they could underlie mixed symptomatology, [37,89] and may also be associated with treatment response [27]. On the other hand, traits correlate significantly with self-reported symptoms in patients with affective disorders, possibly contributing to over-reporting of mood symptoms [32].

Comparison studies of bipolar and unipolar patients revealed higher impulsiveness [83] and higher lifetime aggression [9,81] in bipolar than unipolar patients. However, bipolar I and II subtypes have rarely been differentiated in terms of trait characteristics. Of interest, a recent review [78] on distinguishing characteristics between BP-I and BP-II individuals found no differences in temperament and personality [37].

In order to further expand our knowledge on trait-like characteristics and their associations with mood disorders, we investigated in a large clinical sample 1) whether impulsive/aggressive traits are higher in currently depressed bipolar patients (BP-I and BP-II) compared with unipolar depression patients; and 2) whether there is a difference in these trait characteristics between BP-I and BP-II patients. Furthermore, we compared currently depressed BP-I, BP-II and MDD patients in terms of 3) course of illness, family history and treatment history; and 4) clinical characteristics and comorbid disorders.

2. Subjects and methods

2.1. Subjects

Six hundred and eighty-five \( n = 685 \) individuals in a Major Depressive Episode \( 151 \) with Bipolar I disorder, \( 79 \) with Bipolar II disorder and \( 455 \) with Major Depressive Disorder were recruited by advertisement or clinical referral for participation in the study. The mean age of the sample was \( 37.3 \) (\( \pm 13.0 \); range 17–85) years, \( 60.9\% \) \( n = 417 \) were female, \( 79.4\% \) \( n = 505 \) were white, and \( 39.5\% \) \( n = 266 \) currently employed. Mean education of the sample was \( 14.8 \) (\( \pm 2.9 \) ) years. Furthermore, \( 50.2\% \) \( n = 344 \) of the sample was currently married, and \( 40.6\% \) \( n = 264 \) had children. The research was conducted at the New York Psychiatric State Institute (NYSPI), and the Western Psychiatric Institute and Clinic and St. Francis Hospital in Pittsburgh. At the time of the assessment, \( 49\% \) \( n = 336 \) were inpatients and \( 51\% \) \( n = 349 \) were outpatients. Inclusion criteria included a 17-item-Hamilton Depression Rating Scale (HAM-D-17) [45] score greater than 15 points and, for the NYSPI campus willingness to participate in biological studies. Patients provided written informed consent and protocols were approved by the Institutional Review Board affiliated with each site. Exclusion criteria were comorbid substance abuse disorder in the past 2 months, substance dependence disorders in the past 6 months, IQ < 80, cognitive disorders, or neurological or medical conditions that could impede accurate diagnosis. Furthermore, 1.16% of all patients who met criteria for a Major Depressive Episode were excluded based on low HAMD scores.

2.2. Instruments and measures

Lifetime and current DSM-IV Axis I psychiatric disorders were diagnosed based on the Structured Clinical Interview for DSM-III-R (SCID) [92] and confirmed by a consensus conference led by experienced MD or PhD-level research clinicians. Presence or absence of Axis II personality pathology was assessed with the Structured Clinical Interview for DSM-III-R (SCID-II) [36]. Clinically rated depression was assessed with the 17-item Hamilton Depression Rating Scale (HAM17) [45]. Patients’ subjective perception of severity of depression was assessed by self-report using the Beck Depression Inventory (BDI) [12] and hopelessness was assessed by self-report with the Beck Hopelessness Scale (BHS) [13]. Global psychopathology was evaluated by using the Brief Psychiatric Rating Scale (BPRS) [76] and manic symptoms with Young Mania Rating Scale (YMRS) [98]. Trait-like characteristics such as impulsivity, aggression and hostility were assessed by Barratt Impulsivity Scale (BIS), [10] the Brown-Goodwin Aggression Inventory (BGI), [20] and the Buss-Durkee Hostility Inventory (BDHI), [21] respectively. The highest level of suicidal ideation in the two weeks prior to baseline assessment was measured using the Scale for Suicidal Ideation (SSI) [14]. Lifetime history of suicide attempts was obtained using the Columbia Suicide History Form [74]. The presence or absence of physical or sexual childhood abuse before the age of 15 was determined by patient’s responses to three direct questions from the Columbia Demographic and Treatment History Interview [19]: “Any history of physical and/or sexual abuse over lifetime” (yes/no); “If yes, describe and code: physical/sexual/both/not applicable”; “If yes, did abuse take place before age 15 years?” (yes/no/not applicable). Family history of DSM-IV affective disorders of first and second relatives was assessed using a structured family history approach with the Family Interview for Genetic Studies (FIGS) [70].

2.3. Diagnostic procedures

Interviews were conducted by masters-level and doctoral-level clinicians or psychiatric nurses who received didactic training in the administration of semi-structured interviews and attended weekly inter-rater reliability meetings. The assessment was done in one session which took a total of approximately 5 hours. Upon patient request, it was also possible to administer interviews in two sessions. Best-estimate diagnoses were made by consensus on the basis of all available data sources at diagnostic consensus conferences attended by research clinical staff, including senior diagnosticians. All instruments evidenced inter-rater reliability of .70 or greater.

2.4. Statistical analysis

Sociodemographic and clinical variables were compared in Bipolar I (BP-I), Bipolar II (BP-II), and Major Depressive Disorder (MDD) patients using Anova (with Bonferroni correction) for continuous variables and the chi-square test for categorical variables. Pearson correlations were performed in order to test correlations between impulsivity/aggression traits and scores on YMRS. Statistical analyses were performed with Statistical Package for Social Sciences, version 19 (SPSS 19.0).

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3. Results

3.1. Sociodemographic characteristics: bipolar I and bipolar II vs. major depressive disorder group

Among 685 patients with a current Major Depressive Episode, 455 (66.4%) had lifetime MDD (179 males and 277 females), 151 (22%) patients had BP-I disorder (60 males and 91 females) and 79 (11.5%) patients had BP-II disorder (29 males and 50 females); bipolar disorder not otherwise specified (NOS) were excluded. There were no significant differences in age, sex, race (white vs. non-white), marital status or having children between the three groups. Although the three groups did not significantly differ on education, there were significant differences in terms of occupational status (Table 1). Bipolar I patients were significantly less likely to be employed than MDD patients \( (\chi^2 = 9.4, df = 1, P = .002) \), whereas there were no significant differences in employment status between bipolar II and MDD patients \( (\chi^2 = 2.5, df = 1, P = .110) \) and bipolar I and II patients \( (\chi^2 = 0.52, df = 1, P = .471) \).

3.2. Clinical characteristics: bipolar I and bipolar II vs. major depressive disorder group

Compared to MDD patients, BP-I and BP-II patients were younger at onset of major depression and more likely to have onset of a first depressive episode before/at age of 15 (Table 2). BP-I and BP-II patients began medication, in particular antipsychotics and antidepressants, and psychotherapy at a younger age than MDD patients, and were more often treated with mood stabilizers. In terms of clinical characteristics (Table 3), BP-I and BP-II patients had higher impulsivity, hostility and aggression scores than MDD patients (Fig. 1). Impulsivity, aggression and hostility scores were positively correlated with YMRS scores \( (r = .183, n = 266, P = .003; r = .173, n = 294, P = .003; r = .292, n = 257, P < .001) \), respectively. The three groups did not differ on likelihood of history of childhood abuse (Table 3) or specific types of abuse (physical, sexual or combined) \( (\chi^2 = 5.0, df = 2, P = .279) \). Compared to MDD patients, BP-I and BP-II patients had higher rates of mania in first- and second-degree relatives, and were more likely to have alcohol and drug abuse/dependence, Cluster A and B personality disorders (PD), and anxiety disorders, including obsessive-compulsive disorders (Table 4).

3.3. Bipolar I vs. bipolar II depressed patients (Post hoc analyses)

Bipolar I depressed patients having earlier onset of the first depressive episode, were more likely to have been hospitalized, less likely to have received antidepressant treatment in the past, reported less subjective depressive symptoms and hopelessness, and had lower scores for objective depression than BP-II patients. The two groups did not differ in current manic or psychotic symptoms. In terms of trait-like characteristics, BP-I depressed patients had significantly higher impulsivity and aggression scores, but lower hostility scores than BP-II patients. There were no significant differences in terms of comorbid conditions.

### Table 1
Demographics of depressed patients with bipolar I, bipolar II disorder and major depressive disorder (n = 685).

<table>
<thead>
<tr>
<th></th>
<th>Bipolar I (n = 151)</th>
<th>Bipolar II (n = 79)</th>
<th>Major depressive disorder (n = 455)</th>
<th>Chi^2/F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>% (n) Mean (SD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>35.8 (SD = 11.2)</td>
<td>36.3 (SD = 11.1)</td>
<td>38.0 (SD = 11.7)</td>
<td>1.9 (df = 682)</td>
<td>.143</td>
</tr>
<tr>
<td>Sex (female)</td>
<td>60.3 (91)</td>
<td>63.1 (50)</td>
<td>60.7 (276)</td>
<td>.226 (df = 2)</td>
<td>.893</td>
</tr>
<tr>
<td>White</td>
<td>78.0 (110)</td>
<td>72.2 (52)</td>
<td>81.1 (343)</td>
<td>3.1 (df = 2)</td>
<td>.205</td>
</tr>
<tr>
<td>Marital status (married)</td>
<td>49.0 (74)</td>
<td>49.4 (39)</td>
<td>50.8 (231)</td>
<td>.167 (df = 2)</td>
<td>.920</td>
</tr>
<tr>
<td>With child</td>
<td>35.9 (51)</td>
<td>36.7 (29)</td>
<td>42.9 (184)</td>
<td>2.7 (df = 2)</td>
<td>.257</td>
</tr>
<tr>
<td>Education (years)</td>
<td>15.0 (SD = 2.4)</td>
<td>15.0 (SD = 2.7)</td>
<td>14.7 (SD = 3.0)</td>
<td>1.1 (df = 659)</td>
<td>.317</td>
</tr>
<tr>
<td>Currently employed</td>
<td>29.5 (44)</td>
<td>34.2 (27)</td>
<td>43.8 (195)</td>
<td>10.6 (df = 2)</td>
<td>.005</td>
</tr>
</tbody>
</table>

### Table 2
Course of illness and previous treatment of patients with a current major depressive episode (n = 685) with diagnoses of bipolar I, bipolar II disorder and unipolar depression.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Bipolar I (n = 151)</th>
<th>Bipolar II (n = 79)</th>
<th>Major depressive disorder (n = 455)</th>
<th>F or ( \chi^2 ) (df)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course of illness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at the onset of the 1st depressive episode</td>
<td>17.5 (±13.7)</td>
<td>19.9 (±10.8)</td>
<td>25.0 (±14.5)</td>
<td>17.2 (df = 683)</td>
<td>&lt;.001b,c</td>
</tr>
<tr>
<td>First depressive episode at age ≤ 15</td>
<td>36.6 (48)</td>
<td>41.1 (30)</td>
<td>23.0 (96)</td>
<td>16.3 (df = 2)</td>
<td>.001b</td>
</tr>
<tr>
<td>Number of previous depressive episodes</td>
<td>6.4 (±6.7)</td>
<td>7.8 (±7.3)</td>
<td>5.1 (±3.7)</td>
<td>7.0 (df = 631)</td>
<td>.017b</td>
</tr>
<tr>
<td>Number of previous affective episodes</td>
<td>10.8 (±11.8)</td>
<td>10.1 (±11.5)</td>
<td>6.0 (7.32)</td>
<td>17.8 (df = 619)</td>
<td>.003b</td>
</tr>
<tr>
<td>Treatment-related variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at which the first medication was prescribed</td>
<td>26.2 (±9.8)</td>
<td>26.0 (±10.9)</td>
<td>31.0 (±13.7)</td>
<td>7.2 (df = 437)</td>
<td>.001b</td>
</tr>
<tr>
<td>Past treatment with antidepressants</td>
<td>64.9% (98)</td>
<td>84.8% (67)</td>
<td>65.7% (299)</td>
<td>11.9 (df = 2)</td>
<td>.003b</td>
</tr>
<tr>
<td>Age at the start of antidepresant medication</td>
<td>28.3% (±8.4)</td>
<td>27.9% (±10.7)</td>
<td>32.1% (±13.6)</td>
<td>5.4 (df = 463)</td>
<td>.005b</td>
</tr>
<tr>
<td>Past treatment with antipsychotics</td>
<td>73.5% (111)</td>
<td>83.5% (66)</td>
<td>65.3% (297)</td>
<td>12.2 (df = 2)</td>
<td>.002b</td>
</tr>
<tr>
<td>Age at the start of antipsychotic medication</td>
<td>29.2% (±10.5)</td>
<td>31.7% (±2.1)</td>
<td>35.6% (±16.1)</td>
<td>4.4 (df = 206)</td>
<td>.013b</td>
</tr>
<tr>
<td>Past treatment with mood stabilizers</td>
<td>17.2% (26)</td>
<td>19.0% (15)</td>
<td>26.2% (12)</td>
<td>49.5 (df = 2)</td>
<td>&lt;.001b</td>
</tr>
<tr>
<td>Age at start of medication with mood stabilizers</td>
<td>32.7% (10.7)</td>
<td>33.2% (12.2)</td>
<td>33.6% (±10.7)</td>
<td>.027 (df = 52)</td>
<td>.973</td>
</tr>
<tr>
<td>Past psychotherapeutic treatment</td>
<td>86.0% (123)</td>
<td>93.8% (69)</td>
<td>75.8% (311)</td>
<td>9.8 (df = 2)</td>
<td>.007b</td>
</tr>
<tr>
<td>Age at the start of the psychotherapy</td>
<td>21.9% (±10.0)</td>
<td>22.0% (9.7)</td>
<td>24.8% (±13.1)</td>
<td>3.4 (df = 502)</td>
<td>.031b</td>
</tr>
<tr>
<td>Past hospitalizations</td>
<td>74.0% (110)</td>
<td>55.7% (44)</td>
<td>50.2% (219)</td>
<td>27.0 (df = 2)</td>
<td>&lt;.001b</td>
</tr>
<tr>
<td>Age at first hospitalization</td>
<td>27.1% (±11.3)</td>
<td>29.7% (±12.2)</td>
<td>32.4% (±14.5)</td>
<td>6.8 (df = 455)</td>
<td>.001b</td>
</tr>
</tbody>
</table>

a Denotes BP-I ≠ UP.
b Denotes BP-II ≠ UP.
c Denotes BP-I ≠ BP-II.
Table 3
Clinical characteristics and family history of patients with a current major depressive episode (n=685) with diagnoses of bipolar I, bipolar II disorder and major depressive disorder.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Bipolar I (n=151)</th>
<th>Bipolar II (n=79)</th>
<th>Major depressive disorder (n=455)</th>
<th>F or χ² (df)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean (± SD) or % (n)</strong></td>
<td><strong>Mean (± SD) or % (n)</strong></td>
<td><strong>Mean (± SD) or % (n)</strong></td>
<td><strong>F or χ² (df)</strong></td>
<td><strong>P</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Clinical characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-reported depression (BDI)</td>
<td>23.7 (± 11.8)</td>
<td>29.1 (± 10.2)</td>
<td>25.8 (± 12.3)</td>
<td>3.1 (df=513)</td>
<td>.045&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Clinician-rated depression (HAM-17)</td>
<td>16.8 (± 6.7)</td>
<td>20.0 (± 6.2)</td>
<td>19.1 (± 7.4)</td>
<td>4.4 (df=588)</td>
<td>.013&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hopelessness (BHI)</td>
<td>10.0 (± 6.1)</td>
<td>12.6 (± 5.2)</td>
<td>11.4 (± 6.2)</td>
<td>4.6 (df=588)</td>
<td>.010&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Brief Psychiatric Rating Scale (BPRS)</td>
<td>36.9 (± 10.3)</td>
<td>36.1 (± 8.0)</td>
<td>33.7 (± 8.0)</td>
<td>6.1 (df=553)</td>
<td>.002&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Severity of manic symptoms (YMRS)</td>
<td>5.3 (± 7.0)</td>
<td>5.6 (± 7.5)</td>
<td>3.0 (± 4.3)</td>
<td>6.5 (df=304)</td>
<td>.002&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Psychotic symptoms at study entry</td>
<td>17.5% (25)</td>
<td>14.7% (11)</td>
<td>6.5% (27)</td>
<td>16.2 (df=2)</td>
<td>.001&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Buss-Durkee Hostility Inventory</td>
<td>61.8 (± 19.9)</td>
<td>59.6 (± 17.1)</td>
<td>50.7 (± 16.1)</td>
<td>22.1 (df=530)</td>
<td>&lt;.001&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Brown-Goodwin Aggression Scale</td>
<td>21.2% (6.4)</td>
<td>19.3% (5.8)</td>
<td>18.2% (5.4)</td>
<td>15.2 (df=609)</td>
<td>&lt;.001&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Family history of mood disorders</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First- and second-degree relatives with Depression</td>
<td>75.0% (105)</td>
<td>72.2% (52)</td>
<td>63.1% (258)</td>
<td>7.7 (df=2)</td>
<td>.021&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>First- and second-degree relatives with Mania</td>
<td>15.7% (22)</td>
<td>19.4% (14)</td>
<td>5.4% (22)</td>
<td>23.0 (df=2)</td>
<td>&lt;.001&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>History of childhood abuse</td>
<td>50.7% (70)</td>
<td>50.7% (38)</td>
<td>41.8% (153)</td>
<td>4.3 (df=2)</td>
<td>.116</td>
</tr>
</tbody>
</table>

<sup>a</sup> Denotes BP1 ≠ UP.
<sup>b</sup> Denotes BP2 ≠ UP.
<sup>c</sup> Denotes BP1 ≠ BP2.

3.4. Bipolar I depressed patients vs. major depressive disorder patients (Post hoc analyses)

BP-I patients were hospitalized more often and earlier and were less likely to be employed than MDD patients. BP-I patients reported less subjective depressive symptoms and hopelessness, had lower scores for clinician-rated depression, but more global psychopathology measured by BPRS than MDD patients. Moreover, BP-I patients were more likely to have eating disorders and a history of depression in first and second-degree relatives than MDD patients.

3.5. Bipolar II depressed patients vs. major depressive disorder patients (Post hoc analyses)

BP-II patients had more previous depressive episodes, and were more likely to have been treated with antipsychotics and antidepressants in the past than MDD patients.

4. Discussion

Our findings comport with previous reports that an earlier onset of the first depressive episode, [65] and onset in childhood/
early adolescence in particular, [29,49] family history of mania, [96,97] more affective episodes, [7,28,86] and receiving treatment for depression at younger age, [65] differentiate bipolar I and II depression from unipolar depression. These findings highlight the importance of comprehensive history taking and of course of illness-related data in order to ascertain the diagnosis. Furthermore, consistent with previous reports, bipolar II patients in our study had more depressive episodes than MDD patients, [2,16] and BP-I patients had more hospitalizations than BP-II and MDD groups [51,87]. Moreover, in line with the literature, bipolar I and II depressed patients in our study had more psychotic features while depressed [63,93] and also more subsyndromal manic symptoms [35,43,54] during the current depressive episode than MDD patients. In this context, mixed depression – hypomanic features during a major depressive episode – is suggestive of bipolar susceptibility as described by Benazzi [16] and Angst [7].

Pronounced impulsivity/aggression traits distinguished bipolar I and II from MDD depressed patients in our study, which is consistent with the handful of previous findings [9,81,83]. This is also consistent with previous reports on the association between impulsivity and bipolarity, [23,34,52,68,69] and aggression and bipolar disorder [8,31,89]. It has been previously suggested that impulsivity is not only state-related, but also a trait component of bipolar disorder which might represent a core feature of the illness [34,68,69]. Of note, impulsivity was reported to decrease with improvement of depressive symptomatology [24]. Moreover, trait impulsivity is also reported to be higher in cyclothymic than in non-cyclothymic and control subjects, [82] and the association between cyclothymic temperament and bipolarity in adults [50,60,61] and youths [56] is well known. In this context, although Attention-Deficit/Hyperactivity Disorder (ADHD) was not assessed in this study, it should be mentioned that impulsivity is also a prominent component of this disorder and its prevalence is more common in bipolar and unipolar individuals (15.7% and 7.5%, respectively) than in healthy controls (3.3%) [30].

As for trait characteristics of bipolar subtypes, bipolar I patients had more trait impulsivity and lifetime aggression than bipolar II patients, whereas bipolar II patients had higher hostility scores than bipolar I patients. Of interest, the BDHI [21] which assesses hostility is reported to correlate with depression scores [66] and may not be as trait-like as aggression as measured by the BGAI [20]. Indeed, besides higher hostility scores, BP-II patients had more self-reported and clinician-rated depression than BP-I patients. Our findings regarding differences in trait characteristics between BP-I and II patients contrast with previous reports [9,93]. However, these studies used different assessment tools or were conducted in a smaller sample.

Bipolar I and II patients had higher prevalence of first major depressive episode before/at age of 15 than unipolar, consistent with prospective studies showing that childhood onset of depression is related to subsequent bipolar disorder [29,49]. Indeed, onset of the first depressive episode before the age of 21 years was reported to differentiate bipolar from unipolar depression [17] and, in a study by Benazzi and Akiskal, [17] early onset of depression was the only variable which was significantly associated with all studied bipolar indicators. Psychiatric assessment of a depressed child should always include comprehensive family history, which may have predictive utility for distinguishing between bipolar and major depression [64,79], although not all studies agree [75]. Also, research suggests a higher prevalence of certain comorbid conditions in bipolar vs. unipolar depressed children, [58] such as early externalizing disorders/disruptive behaviors [48,71] and anxiety disorders [26,85]. However, childhood/adolescent symptoms should be weighed in the context of the clinical picture, developmental perspective, and related impairment, but also labeling and stigma [22,26,77].

More frequent comorbid alcohol and drug abuse/dependence in bipolar I and II than in unipolar depressed individuals in our study is consistent with previous findings [7,44,65,94]. Bipolar disorders have higher prevalence of substance use disorders than any other psychiatric illness, and the two diagnostic entities share common characteristics such as impulsivity [22,94]. Moreover, we found higher prevalence of cluster A and cluster B PD among bipolar I and II depressed patients than in unipolar patients. This is consistent with reports of significantly higher prevalence of paranoid [65,95] and schizoid [65] PD from Cluster A, and higher prevalence of histrionic, [65,95] borderline, [11,65,95] and antisocial PD [65] from Cluster B among bipolar patients. Indeed, early onset of bipolar disorder is reported to increase the probability of developing comorbid borderline personality disorder, independently of the effect of severe trauma or child abuse [41]. Furthermore, in line with previous reports, bipolar I and II patients in our study had more comorbid anxiety disorders, [40,86] including obsessive-compulsive disorder [6,53] than unipolar patients, whereas bipolar I had more frequent eating disorders [38,59] than unipolar patients.

Although the three groups did not differ on other demographic characteristics, BP-I patients were more frequently unemployed compared with unipolar patients. This is consistent with previous reports [88] on higher unemployment rates in bipolar vs. depressed patients and evidence for fewer personal resources, lower work productivity, and greater personal limitations among the former. In fact, BP-I patients also had significantly higher global psychopathology scores on BPRS and were hospitalized earlier than MDD patients. Of interest, recent reports suggest that overall

Table 4
Comorbidity in depressed patients with bipolar I, bipolar II disorder and major depressive disorder (n = 685).

<table>
<thead>
<tr>
<th>Bipolar I (n = 151)</th>
<th>Bipolar II (n = 79)</th>
<th>Major depressive disorder (n = 455)</th>
<th>Chi²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axis I Disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety disorders</td>
<td>34.4% (54)</td>
<td>32.9% (26)</td>
<td>23.1% (105)</td>
<td>9.2 (df=2)</td>
</tr>
<tr>
<td>Eating disorders</td>
<td>16.6% (25)</td>
<td>11.4% (9)</td>
<td>7.7% (35)</td>
<td>10.0 (df=2)</td>
</tr>
<tr>
<td>Past alcohol abuse/dependence</td>
<td>40.4% (61)</td>
<td>32.9% (26)</td>
<td>20.7% (94)</td>
<td>24.6 (df=2)</td>
</tr>
<tr>
<td>Past substance abuse/dependence</td>
<td>32.5% (49)</td>
<td>26.6% (21)</td>
<td>17.6% (80)</td>
<td>15.8 (df=2)</td>
</tr>
<tr>
<td>Axis II Disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster A Personality Disorders</td>
<td>11.3% (17)</td>
<td>11.4% (9)</td>
<td>3.5% (16)</td>
<td>16.1 (df=2)</td>
</tr>
<tr>
<td>Cluster B Personality Disorders</td>
<td>31.1% (47)</td>
<td>36.7% (29)</td>
<td>19.6% (89)</td>
<td>16.0 (df=2)</td>
</tr>
<tr>
<td>Cluster C Personality Disorders</td>
<td>10.6% (16)</td>
<td>17.7% (14)</td>
<td>9.7% (44)</td>
<td>4.5 (df=2)</td>
</tr>
</tbody>
</table>

<sup>a</sup> Denotes BP1 χ UP.  
<sup>b</sup> Denotes BP2 χ UP.  
<sup>c</sup> Denotes BP1 + BP2.
functional impairment in bipolar disorder might be associated with impulsivity [52].

5. Limitations
At the time of assessment, about a half the patients in our sample were inpatients participating in biological research, and the sample may not reflect patients in the community. Also, this sample was collected in a tertiary care facility. Furthermore, 2.33% of patients were excluded due to presence of alcohol or substance abuse once they were scheduled to come in for an interview. Our phone screening procedure does limit the number of patients with alcohol or substance problem invited for interview. Moreover, information related to the course of illness and previous treatment was elicited retrospectively, and recall bias is possible. However, obtaining psychiatric history is one of the essential parts of clinical assessment, and in the real-world, the clinician relies on retrospective information.

6. Conclusion
In addition to replication of major previous findings on differences between bipolar and unipolar depression in this large clinical sample, we found that bipolar I and II depressed patients had more lifetime impulsivity, trait aggression and hostility than unipolar patients. Nonetheless, our findings should be seen in context of reported temperamental differences between bipolar and unipolar patients [1], which also appear to influence treatment response [27]. Furthermore, we found differences in trait characteristics between BP-I and BP-II subtypes, with BP-I individuals having comparably more impulsivity and aggression, and BP-II individuals more hostility, which adds to currently scarce knowledge on traits differences between the two groups.

Disclosure of interest

Drs. Dervic, Garcia-Amador, Freed, Harkavy-Friedman, Sudol have nothing to disclose. Dr. Brent reports grants from NIMH, during the conduct of the study; personal fees from UPMC, Western Psychiatric Institute and Clinic, University of Pittsburgh; grants from NIMH; personal fees from Continuing Medical Education events; personal fees from Oxford Press; personal fees from Guilford Press; ERT, Inc., personal fees from CME Presentations, personal fees from UptoDate, outside the submitted work. Dr. Mann reports grants from GSK, grants from Novartis, outside the submitted work. In addition, Dr. Mann has patent royalties from commercial use of C-SSRS from Research Foundation for Mental Health with royalties paid. Dr. Oquendo reports grants from Pfizer, grants from Astra-Zeneca, Bristol Myers Squibb, Eli Lilly, Janssen, Otsuico, Pfizer, Sanofi-Aventis, and Shire; other from Columbia Suicide Severity Rating Scale; other from Stock/stock options; other from Travel/accommodations/meeting expenses unrelated to activities listed, outside the submitted work.

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