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Non-right-handedness in adolescents and adults with bipolar disorder

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To the Editor

An increased rate of non-right-handedness in individuals with bipolar disorder (BD), compared to healthy comparison (HC) individuals has been reported previously in adults (1). Although this implicates neurodevelopmental mechanisms, and increasing evidence supports BD as a disorder that alters neurodevelopment into adolescence (2–4), there is no previous report of a difference in handedness in adolescents with BD. We assessed the rate of non-right-handedness in individuals with BD, compared to HC individuals, including assessments of adolescents in addition to adults to test the hypotheses individuals with BD would show a higher rate of non-right-handedness and that these results would be present in adolescents with BD.

Methods

Participants included 155 individuals with BD [ages 13–21 years (n = 40), ages 22–64 years (n = 115), 48% euthymic, 26% depressed, and 26% in an elevated mood state (manic/hypomanic/mixed) at assessment] recruited through clinician referral and advertisement from the medical centers of the Yale School of Medicine and Veterans Affairs Connecticut Healthcare System (New Haven, CT, USA), and the surrounding community, and 179 HCs recruited from the surrounding community who were without an Axis I psychiatric disorder or first-degree relative with a major mood or psychotic disorder [ages 13–21 years (n = 87) and ages 22–64 years (n = 92)]. The presence or absence of Axis I disorders, and mood state at assessment, were confirmed by structured clinical interview (5,6). Non-right-handedness was assessed both by subjects' self-identification of handedness and scores on the 10-item Edinburgh Handedness Inventory (7). Group differences in handedness (right, non-right-handedness) between the overall BD and HC groups, and BD adolescent and HC adolescent

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groups, were assessed by chi-squared test. Main and interactive effects of Edinburgh handedness scores were assessed by ANOVA with age as a continuous factor. Following a complete description of the research, written informed consent was obtained from parents/guardians and participants 18 years and older, written informed assent from minors in accordance with the human investigation committees of the Yale School of Medicine and the Department of Veterans Affairs.

Results

There were significantly more non-right-handed subjects in the overall BD group (15.4%) than in the HC group (7.3%) ($p < 0.05$); consistent with this, Edinburgh scores were significantly lower in the BD group ($p < 0.05$). The difference in non-right-handedness rate was more pronounced in the adolescents with BD (20.0%) than in the HC adolescents (5.7%) ($p < 0.05$) and Edinburgh scores were lower in the adolescent BD group ($p < 0.05$). There were no significant effects of gender or mood state on the findings.

Conclusions

Consistent with previous findings in adults (1), we found approximately double the rate of non-right handedness in individuals with BD (15.4%), compared to rates reported in HC individuals (1, 8), and demonstrated a higher non-right-handedness rate (20%) in adolescents with BD. Our findings of increased non-right handedness in BD, particularly in adolescence, may support previous studies suggesting disruptions in the development of hemispheric connections and specialization in BD including recent neuroimaging studies demonstrating abnormalities in interhemispheric structural and functional connectivity in BD (9–11). We speculate that such disruptions may contribute to the hemispherically lateralized abnormalities associated with acute mood states of the disorder, such as the association between right frontotemporal abnormalities and mania (12–14).

An early study of youths with parents with BD showed increased non-right handedness and decreased hemispheric specialization on cognitive testing suggesting these may relate to risk for BD (15). Future studies that investigate mechanisms that contribute to increased non-right-handedness and associated neural circuitry in BD, especially those related to hemispheric specialization, may provide insights into risk factors for the development of BD.

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