**CROSS-DIAGNOSTIC COMPARISON OF MISMATCH NEGATIVITY AND P3A IN BIPOLAR DISORDER AND SCHIZOPHRENIA**

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**ABSTRACT**

Objectives: Patients with bipolar disorder (BD) and schizophrenia (SZ) share common pathophysiological stressors and may have similar perceptual abnormalities. We sought to evaluate whether BD are impaired on Mismatch Negativity (MMN) and P3a – two event-related potentials associated with auditory preattentive processing – relative to SZ and healthy controls (HC). Methods: MMN and P3a were assessed in 52 BD patients, 30 SZ patients, and 27 HC during a duration-deviant auditory oddball paradigm.

**RESULTS**

- **Sample Characteristics**
  
<table>
<thead>
<tr>
<th>Age (M/SD)</th>
<th>Gender (% Male)</th>
<th>Personal Inced (M/SD)*</th>
<th>Parental Inced (M/SD)</th>
<th>Brief Psychiatric Rating Scale (M/SD)*</th>
<th>Hamilton Depression Rating Scale (M/SD)*</th>
<th>Young Mania Rating Scale (M/SD)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC (N=27)</td>
<td>39.5 (9.9)</td>
<td>66.6%</td>
<td>14.7 (6.6)</td>
<td>13.0 (3.2)</td>
<td>33.8 (7.4)</td>
<td>9.8 (7.6)</td>
</tr>
<tr>
<td>BD Patients (N=52)</td>
<td>45.2 (8.8)</td>
<td>70.8%</td>
<td>14.0 (2.2)</td>
<td>11.4 (4.4)</td>
<td>40.7 (9.1)</td>
<td>9.3 (6.4)</td>
</tr>
<tr>
<td>SZ Patients (N=30)</td>
<td>45.6 (8.7)</td>
<td>53.8%</td>
<td>12.0 (2.2)</td>
<td>11.0 (5.0)</td>
<td>40.7 (9.1)</td>
<td>9.3 (6.4)</td>
</tr>
</tbody>
</table>

- **MMN and P3a Group Differences**
  
  **ANOVA** for MMN revealed significant main effects of group and region:
  - SZ and BD had significantly reduced MMN relative to HC (p < 0.005).
  - Significant MMN differences between patient groups (p < 0.027).

  **MMN** was significantly smaller over the left region (M = -1.09; SD = 0.78) relative to the right (M = -1.28; SD = 0.69) and midline (M = -1.28; SD = 0.69) regions.

  **ANOVA** for P3a revealed significant main effect of group:
  - BD had significantly reduced P3a relative to HC (p < 0.003).
  - Significant P3a differences between patient groups (p = 0.043) or between SZ and HC (p < 0.003).

- **No significant main effect of region and no significant group x region interaction.**

**EFFECT OF LITHIUM ON MMN AND P3A**

- **ANOVA** for MMN comparing BD I (n = 54) and BD II (n = 18) patients revealed no significant main effect of group but a significant main effect of region.
  - Significant group x region interaction followed up with paired t-tests separately for each group. For BD I, there were no significant MMN differences among any of the regions. For BD II, MMN was significantly smaller over the left compared to the midline and right regions (p < 0.001).

  **ANOVA** for P3a revealed no significant main effects of group or region and no significant group x region interaction.

**BIPOLAR I VS. BIPOLAR II**

- **ANOVA** for MMN comparing BD I (n = 54) and BD II (n = 18) patients revealed no significant main effect of group but a significant main effect of region.
  - Significant group x region interaction followed up with paired t-tests separately for each group. For BD I, there were no significant MMN differences among any of the regions. For BD II, MMN was significantly smaller over the left compared to the midline and right regions (p < 0.001).

  **ANOVA** for P3a revealed no significant main effects of group or region and no significant group x region interaction.

**CONCLUSIONS**

- **Wide impairments in both MMN and P3a in BD patients.** The BD group's MMN was intermediate between that of the SZ and HC groups, whereas the BD group's P3a was intermediate between that of the BD and HC groups. There were significant differences in both MMN or P3a between the BD groups.

  - There was a main effect for laterality across all 3 groups (with the MMN response being smaller), and within the BD patients, there was a significant group x laterality interaction such that BD II patients showed the least effect, but BD I patients did not.

- **P3a** was not impaired in patients taking lithium compared to those not taking lithium. This finding suggests that lithium may exert some normalization of the P3 ERP component but has no influence on the MMN responses.

- **Taken together,** these results point to dysfunctional preattentive auditory processing in BD patients that is similar to what is typically seen in SZ patients.