Event-Related Potential (ERP) Asymmetries to Hemifield Presentations of Emotional Stimuli Differ Between Individuals at High and Low Risk for Major Depression

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**Background:** Behavioral and electrophysiologic evidence suggests that major depression (MDD) involves right parietotemporal dysfunction, a region also known to be activated during perception of arousing affective stimuli. We examined whether these abnormalities also characterize individuals at clinical high risk for MDD.

**Methods:** Using a visual half-field paradigm with highly-controlled emotional stimuli (pictures of cosmetic surgery patients showing disordered [negative] or healed [neutral] facial areas before or after treatment), 72-channel ERPs were recorded from individuals at high (n = 76) and low (n = 54) risk for MDD based on family history. ERPs were transformed into reference-free current source density (CSD) waveforms, which included a distinct P1/N1 source/sink complex over occipital-parietal sites contralateral to the stimulated visual field (N1 peak latency 125 ms), and a prominent lateral parietal P3 source (390 ms), quantified by unrestricted Varimax-PCA.

**Results:** P3 source was greater to negative than neutral stimuli (p < 0.0001) and over the right than left hemisphere (p = 0.003), and the combined effect interacted with group (p = 0.02). In high-risk participants, the emotional content effect was markedly reduced and the hemisphere asymmetry was reversed, with the largest simple effect for the emotional content by group interaction at the right hemisphere (p = 0.0025). In contrast, groups did not differ in their valence or arousal ratings of these stimuli.

**Conclusions:** Results extend prior findings of abnormal affect evaluation to individuals at high risk for depression, presumably arising from a disengagement of right parietal regions essential for perceiving and processing emotional stimuli.

**Keywords:** depression risk, emotion, event-related potential (ERP), current source density (CSD), principal components analysis (PCA)

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