

Reassurance-Seeking and Frontal EEG Asymmetry as Interactive Diatheses for Depressive Symptoms in Clinical and College Student Populations

Jennifer A. Minnix, John P. Kline, Ginette C. Blackhart
Florida State University, Department of Psychology, Psychophysiology Laboratory



Introduction

Excessive reassurance seeking, which has been associated with depression in many studies, can be defined as the relatively stable tendency to seek assurance persistently from others (Joiner et al., 1999). Similar to patients with frontal lobe damage, these individuals have difficulty using feedback from environmental cues to regulate their behavior, such that they are impaired at developing novel strategies to deal with problems (Kolbet al., 1995). In addition, research suggests that these types of errors may be more common in patients with right frontal lobe lesions than those with left frontal lobe lesions (Haut et al., 1996). We suspected that although depression has been associated with left frontal EEG hypoactivity, reassurance-seekers may possess a unique diathesis that is more likely to be associated with increased left frontal activity. This is consistent with motivational models of frontal activation that correlate left frontal activity with approach-related behaviors.

Results

In the clinical sample, results of a general linear model analysis revealed that both BDI and DIRI-RS scores significantly predicted frontal asymmetry ($F(1,8) = 12.17, p < .01, \eta^2(1,8) = 17.35, p < .01$, respectively). More importantly, the interaction of BDI scores with DIRI-RS scores significantly predicted frontal asymmetry, $F(1,8) = 20.55, p < .01$. Using a median split, high RS (N=6) were separated from low RS (N=6) individuals, and subsequent analyses showed that BDI scores were positively correlated with frontal asymmetry in high RS individuals ($R = .70$), while BDI scores were negatively correlated with asymmetry in the low RS group ($R = -.55$). In the student sample, the interaction of BDI scores with DIRI-RS scores also significantly predicted frontal asymmetry, $F(1,41) = 4.15, p < .048$. Using a median split, high RS (N=26) were separated from low RS (N=18) individuals. Subsequent analyses showed that BDI scores were negatively correlated with frontal asymmetry in the low RS group ($R = -.40$), though no significant relation emerged between the high RS group and frontal asymmetry.

Method

Participants

In Study One, data were collected from 12 (6 male, 6 female) volunteers who were receiving therapeutic services from the Psychology Clinic at Florida State University. This sample included individuals diagnosed with Major Depression, Dysthymic Disorder, Social Phobia, and Bipolar I Disorder. Study Two included 44 undergraduate volunteers. All indices were averaged across two measurement occasions, at least three weeks apart.

Questionnaire Administration and Scoring

Handedness was assessed with the Edinburgh Handedness Inventory (Oldfield, 1971). Severity of depressive symptoms was assessed using the Beck Depression Inventory (BDI). A 4-item subscale of the Depressive Interpersonal Relationships Inventory was used to assess reassurance-seeking (DIRI-RS; Coyne, 1976).

EEG Recording and Quantification

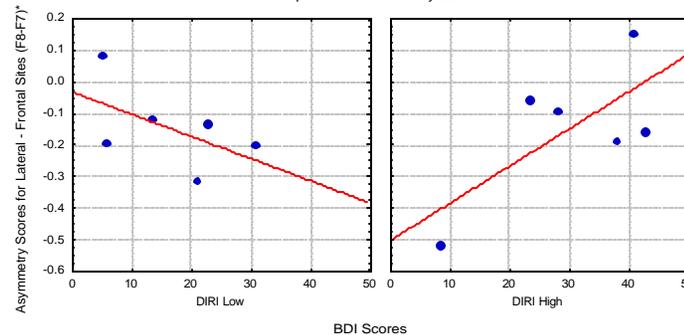
Resting EEG was recorded from 19 channels referenced to linked ears (Study One) or averaged ears (Study Two), and digitized on-line at 256 Hz (Study One) (band pass 2 to 64 Hz) or 2000 Hz (Study Two) (band pass 5 to 500Hz) during six 60-second baselines: Three with eyes open and three with eyes closed. Impedances were below 10 Kohm, and homologous leads were generally within 1 Kohm of one another. Ear electrode impedances were below 5 Kohm, and within approximately 1 Kohm of one another. EEG records containing bioelectric artifact greater than 75 microvolts in any channel were rejected.

Artifact-free epochs of 256 samples (Study One) or 2048 samples (Study Two) were windowed (Hanning) and submitted to Fast Fourier Transform. Average alpha (8-13 Hz) power (microvolts squared) was computed across all artifact-free epochs, and natural log transformed for normalization. Asymmetry scores were computed ($\log[\text{right}] - \log[\text{left}]$) for F4-F3, Fp2-Fp1, F8-F7, C4-C3, T4-T3, T6-T5, P4-P3, and O2-O1. Each ear impedance was measured with respect to the ground electrode on the scalp, FPz.

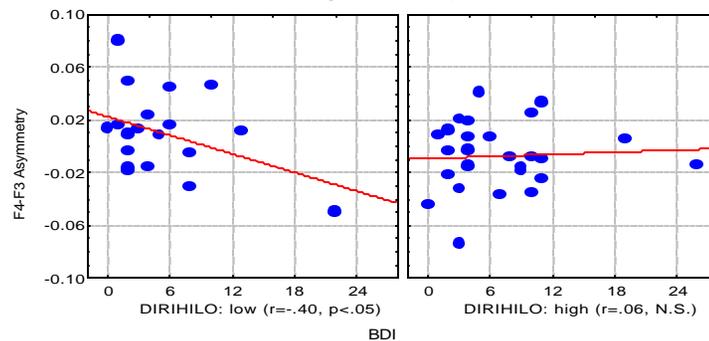
Hypothesis

We predicted that reassurance-seeking moderates the relation between depression and frontal asymmetry, such that depressed individuals who are reassurance-seekers are less likely to be right frontally active than depressed individuals who are not reassurance-seekers.

Asymmetry Across Both Sessions for High and Low Reassurance-Seekers
Reassurance Seeking measured by DIRI
Depression Measured by BDI



College Student Sample



Summary

As predicted, in both samples, stable relative right frontal activity was associated with increased symptoms of depression in those who were low on reassurance-seeking. Also as predicted, in the clinical sample, stable relative left frontal activity was associated with increased depression among high reassurance-seekers. No such relation emerged in the student sample.

It is possible that reassurance-seeking represents a unique diathesis for developing depressive symptoms, reflected in frontal brain wave patterns, that is inherently different from the diathesis usually associated with relative left frontal hypoactivity. Similar to patients with right frontal lesions, perhaps those who seek reassurance excessively do so because of their inability to alter their behavior even when environmental cues are no longer reinforcing, which can maintain or exacerbate their depressive symptoms.

Correspondence to Jennifer Minnix
minnix@psy.fsu.edu