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

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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 (Kolb et 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.

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, Dysthmic 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 (DIRI) was used to assess reassurance-seeking (DIRI-RS; Coyne, 1976).

EEG Recording and Quantification
Resting EEG was recorded from 10 electrodes referenced to linked ears (Study One) or averaged ears (Study Two), and digitized online at 256 Hz (Study One) (band pass 2 to 64 Hz) or 2000 Hz (Study Two) (band pass .5 to 500 Hz) 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 50Kohm, and within approximately 1 Kohm of one another. EEG records containing biologic artifact greater than 70 microvolts in any channel were rejected.

Results
In the college student sample, results of a general linear model analysis revealed that BDI and DIRI-RS scores significantly predicted frontal asymmetry (left > right, using log[10] ratio) for F8-F7, C4-C3, T4-T3, T6-T5, P4-P3, and O2-O1. More importantly, the interaction of BDI scores with DIRI-RS scores significantly predicted frontal asymmetry. F (1,8) = 12.17, p < .01. Using a median split, high RS (1,8) = -.55). In the clinical sample, results of a general linear model analysis revealed that both BDI and DIRI-RS scores significantly predicted frontal asymmetry (E (1,8) = 12.17, E (1,8) = 17.35, E (1,8) = .70), while asymmetry..

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.

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.

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