

# Diurnal Mood Variability Following Anterior Temporal Lobectomy



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## ABSTRACT

Findings of mood-related laterality effects following anterior temporal lobectomy (ATL) have been inconsistent at best. Although previous studies have examined mood at isolated points in time post-surgery, this approach provides little information about intrinsic diurnal variability. In the current study, we explored for the first time whether “variability” in emotional reactivity would be more associated with right versus left ATL.

**METHODS.** Twelve patients with unilateral ATL completed multiple measures of stress and mood, 5 times a day over the course of 5 days. Mood measures included ratings of stress, affect intensity, and valence using Likert scales. Patients completed ratings in their home environment at predetermined times relative to waking. To index variability in daily mood, we calculated daily standard deviations for each patient on each measure. These data were analyzed using repeated measures ANOVA.

**RESULTS.** The Right ATL group showed significantly more variability in their daily ratings of stress and affect intensity than the Left ATL group. These findings were not due to differential use of antidepressants or seizure medications with mood-stabilizing effects (i.e., Depakote, Lamictal) or the occurrence of seizures. The two groups did not differ on valence ratings or a standard depression measure (Beck). **CONCLUSIONS.** This is the first report that Right ATL patients display greater diurnal mood variability than Left ATL patients. Potential factors underlying this difference will be discussed including the possibility of lateralized alteration of hippocampal systems involved in HPA feedback regulation.

## BACKGROUND

Research and clinical findings suggest that emotional changes are not uncommon following anterior temporal lobectomy (ATL) for intractable epilepsy. Currently much of the research has focused on the presence of psychopathology such as depression or mood-related laterality effects following surgery. Although several studies have found increased negative affect associated with left rather than right ATL (e.g. Heilman & Bowers, 1984; Burton & Labar, 1999), the overall literature has been relatively inconsistent. Further, studies have generally focused on examining mood at isolated timepoints (e.g. 1-month post surgery, 6-months post surgery). To our knowledge, no studies have examined variability in mood over time, or more specifically, intrinsic diurnal variability, in ATL patients. Given that mood is not static, examining diurnal variability may give a more thorough description of emotional experience. In the current study, we explored for the first time whether “variability” in emotional reactivity would be more associated with right versus left ATL.

## SUBJECTS

- 12 patients with intractable temporal lobe epilepsy who underwent anterior temporal lobectomy (ATL)
  - 7 right ATL patients
  - 5 left ATL patients
- All patients, except one right ATL patient, were male.

### Demographic Data

	All Subjects	Right	Left
N	12	7	5
Age (mean)	41.8	37.9	47.4
Months since surgery (mean)	52	63.9	35.4
BDI	7.0	6.3	8.0
% on Anti-depressants	33%	43%	20%
% on Mood Stabilizing Anticonvulsants	42%	43%	40%
% with seizures controlled	67%	43%	100%
% with Engle rating = 1*	50%	29%	80%

\* All Engle ratings were either 1 or 0.

## PROCEDURES

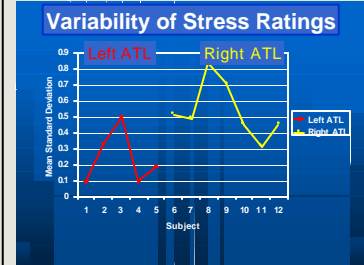
Subjects rated their mood five times per day over the course of 5 days (Monday through Friday). Subjects recorded their own ratings. At each time point subjects rated their mood according to their mood valence (pleasant-unpleasant), arousal (mood intensity), and stress level. Valence and arousal ratings were based on a 9 point likert scale, and stress level was based on a 5 point likert scale. Time points for ratings were determined based on the following pattern:

- Time 1 = immediately upon waking up
- Time 2 = Time 1 + 1 hour
- Time 3 = Time 1 + 4 hours
- Time 4 = Time 1 + 9 hours
- Time 5 = Time 1 + 11 hours

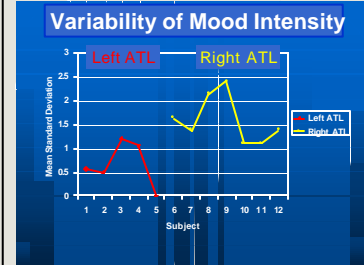
### Data Analysis

For each day, a standard deviation was calculated to represent each subject’s mood variability for each given measure on that day. A repeated measures ANOVA was performed to compare the daily standard deviations of left ATL subjects compared to right ATL subjects.

## RESULTS



- The right ATL group showed significantly more variability in their daily ratings of stress ( $F = 8.15, p = 0.017$ ) and mood intensity ( $F = 10.19, p = 0.010$ ) compared to the left ATL group.



- Differences between groups for mood valence were not significant ( $F = 2.02, p = 0.186$ ).

### Demographics and Other Factors (see table to left)

- Left and Right ATL subject groups did **not differ** on age, BDI scores, Engle ratings, time since surgery, or use of anti-depressants or medications with mood stabilizing effects. However, more right ATL patients were still experiencing seizures post surgery than left ATL patients.
- The following variables were **not significantly related** to mood variability: age, time since surgery, BDI scores, use of anti-depressants, seizure control, and Engle rating.

## CONCLUSION

- Right ATL patients displayed greater diurnal mood variability than left ATL patients.
- Diurnal mood variability was not related to patient age, time since surgery, seizure control, Engle rating, BDI scores, or use of anti-depressants.
- Laterality effects may suggest that the right temporal lobe systems have a special role in influencing stress reactivity and mood.
- Analyzing standard deviations of repeated mood measures is a useful and unique way to study emotional changes in epilepsy patients.