ERPs During Tonal and Phonetic Oddball Tasks in Patients Having Depressive and Anxiety Disorders

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Abstract

P3 component scores were submitted to a repeated measures ANOVA for targets only.

Between-Group Factors

- Anxiety Disorder (yes/no)
- Depressive Disorder (yes/no)
- Task (tonal/phonetic)

Within-Subjects Factors

- Hemisphere (right/left)
- Site (13 symmetric electrode pairs)

PCA Factor Loadings

- P115: Early P1 component
- N100: Early N1 component
- P315: Early P3 component
- P400: Late P3 component
- N200: Late N2 component

Results

- Patients having an anxiety disorder alone had the smallest task-related N2/P3 asymmetry, with little evidence of greater N2/P3 over left parietal sites in a phonetic oddball task.
- There was a difference in P3 subcomponents among groups. The early P3 subcomponent (P315) was studied in depressed patients when compared to non-depressed subjects. Also, patients having comorbidity of depressive and anxiety disorders had larger P3 amplitude over left hemisphere regions in the phonetic task (Figure 5).

Summary and Conclusions

- The results show task-dependent hemispheric asymmetries for the N2/P3 complex, which are a result of the task and site of stimulus presentation. In non-depressed groups, there is a larger N2/P3 over left hemisphere regions in a phonetic oddball task, whereas in depressed groups, there is a larger N2/P3 over right hemisphere regions in a phonetic oddball task. This suggests that the N2/P3 complex may be a biomarker for depression and anxiety disorders, and may have clinical implications for the diagnosis and treatment of these conditions.

References

PCA Factor Loadings

- P400: 40.6%
- S850: 27.6%
- P315: 11.2%
- N215: 6.4%
- N100: 2.8%

Explained Variance: 88.6%
Tonal Targets

PCA factor loadings

- HEOG
- VEOG
- P315
- P400
- P650
- S850
- N100
- N215
- FP1
- FP2
- F7
- F3
- FZ
- F4
- F8
- FT9
- FT10
- F7
- C3
- C2
- C4
- T7
- T8
- CP5
- CP6
- TP9
- TP10
- P7
- P3
- PZ
- P4
- P8
- P9
- P10
- O1
- OZ
- O2
- O1
- O2

3.0  PCA factor loadings

Latency [ms]

- Control (n=49)
- Depression (n=58)
- Comorbidity (n=18)
- Anxiety (n=22)
Phonetic Targets

PCA factor loadings

3.0

Latency [ms]

Control (n=49)
Depression (n=58)
Comorbidity (n=18)
Anxiety (n=22)
Depression (n=58)
Comorbidity (n=18)

PCA factor loadings

Control (n=49)
Depression (n=58)
Comorbidity (n=18)
Anxiety (n=22)

Targets at Cz

Latency [ms]

Latency [ms]