

# **Amplitude of Visual P3 Event-Related Potential as a Phenotypic Marker for a Predisposition to Alcoholism: Preliminary Results from the COGA Project**

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Recent data collected at six identical electrophysiological laboratories from the large national multisite Collaborative Study on the Genetics of Alcoholism provide evidence for considering the P3 amplitude of the event-related potential as a phenotypic marker for the risk of alcoholism. The distribution of P3 amplitude to target stimuli at the Pz electrode in individuals 16 years of age and over from 163 randomly ascertained control families ( $n = 687$ ) was compared with those from 219 densely affected alcoholic families ( $n = 1276$ ) in which three directly interviewed first-degree relatives met both DSM-III-R and Feighner criteria at the definite level for alcohol dependence (stage II). The control sample did not exclude individuals with psychiatric illness or alcoholism to obtain incidence rates of psychiatric disorders similar to those of the general population. P3 amplitude data from control families was converted to Z-scores, and a P3 amplitude beyond 2 SD's below the mean was considered an "abnormal trait." When age- and sex-matched distributions of P3 amplitude were compared, members of densely affected stage II families were more likely to manifest low P3 amplitudes (2 SD below the mean) than members of control families, comparing affected and unaffected offspring, and all individuals; all comparisons of these distributions between groups were significant ( $p < 0.00001$ ). P3 amplitude means were also significantly lower in stage II family members, compared with control family members for all comparisons, namely probands, affected and unaffected individuals ( $p < 0.0001$ ), and offspring ( $p < 0.01$ ). Furthermore, affected individuals from stage II families, but not control families, had significantly lower P3 amplitudes than unaffected individuals ( $p < 0.001$ ). Affected males from stage II families had significantly lower P3 amplitudes than affected females ( $p < 0.001$ ). Recent linkage analyses indicate that visual P3 amplitude provides a biological phenotypic marker that has genetic underpinnings.

**Key Words:** Phenotypic Markers, ERPs, Alcoholism, Genetics.