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AGE-DIFFERENCES IN P300 AND ITS RELATIONSHIP TO ACTIVITY IN THE ELDERLY

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Sandman, C.A., & Donnelly, J. (University of California, Irvine, and Fairview Hospital) **Age differences in P300 and its relationship to activity in the elderly.** The present set of studies examined the relationships of age (study 1 and 2) and of activity in the elderly (study 3 and 4) to P300 responses (analysis was complete for 1 and 3 and preliminary for 2 and 4). The subjects were tested in two conditions, one with a fixed distribution of common to rare stimuli and a second condition in which the occurrence of the rare stimulus was probabilistically determined. Comparison of these two conditions should provide an electrophysiological index of memory.

Event-related potentials were measured from F_z , C_3 , C_4 and P_z and averaged for 40 stimulus presentations. The ratio of rare (450 Hz) to common (400 Hz) stimuli for both fixed and random conditions was 1:4. In studies 1 and 3, 60 subjects ranging in age from 9–86 were tested. In study 1, subjects were required to count and report the number of rare tones and in experiment 3, the subjects depressed a telegraphic key each time a rare tone was presented. The results were analyzed with correlations, stepwise discriminant analysis, and analysis of variance. Latency of P300 was linearly related to age ($r = .60$). The differences in P300 amplitude between the fixed and common modes were greatest in subjects between 20–60, and least in the elderly, especially at F_z ($p < .01$). Thus, age differences were established with an electrophysiological index of memory.

Since improvements in health and cognitive functioning have been reported in the elderly who are active, studies 2 and 4 compared elderly subjects who had participated in a Foster Grandparent Program (FGP) for two or more years, with age-matched subjects just beginning the FGP. They were tested with the same procedure described above. Differences in P300 amplitude between the fixed and random modes were statistically significant ($p < .01$) for the old and new FGP participants, especially at P_z . These data indicated that age-related decline can be measured with our procedure and that this decline can be attenuated by activity. stimulus would predict cardiac orienting responses to soft tones which were given in the presence of the phobic stimulus. It was predicted that heart rate accelerations to phobic material, characteristic of phobic anxiety, would lead to a deficit in orienting behaviour.