Several previous investigations (Savage, 1964; Fenton and Scoton, 1967; Brodhurst and Glass, 1969; Young, Lader and Fenton, 1971; Kondo, Travis and Knott, 1972; Travis, Kondo and Knott, 1974) have reported conflicting results concerning possible relationships between occipital alpha and Neuroticism and Extraversion, as measured by the Eysenck Personality Inventory (EPI). The present study enters into that controversy by using a method of measuring occipital alpha different from those used by the above-mentioned authors.

Method and Procedures

Subjects. Subjects were 60 (30 male, 30 female) students and employees of the University of Iowa. These subjects were paid $2.00 an hour for participating in the present study and ranged in age from 18 to 24 years.

Apparatus. A Grass Model 78 polygraph was used for all recording. EEG was recorded by a wide-band AC pre-amplifier and filtered for alpha (8-13 c/sec) using a band-pass filter which gave 80 per cent attenuation at 7 and 14 cycles per second. The filtered alpha was then fed into G1 and G2 of a Grass Model 7P3 RC integrator pre-amplifier. An output of this pre-amplifier (at J33) was integrated by a Grass 7P10 integrator pre-amplifier. This system was calibrated before each subject was run using a signal of known frequency (9 Hz) and known amplitude (50 microvolts), such that the 7P10 (true integrator) reset each time it had accumulated 100 microvolt-seconds of alpha. Subjects were seated in a comfortable chair inside a sound-attenuated chamber (Acoustics Research Model 403). Temperature ranged 72°±2°, with illumination of approximately one foot candle.

Procedures. Occipital alpha was recorded between O2 and the right mastoid. Impedance of this electrode pair was routinely kept below 5 Kilohms. A wrist ground was used. Subjects sat in the chamber for approximately three minutes prior to the actual recording of occipital alpha. The recording session took five minutes, during which the subjects were instructed to close their eyes, sit back and relax.

The Eysenck Personality Inventory (EPI; Eysenck and Eysenck, 1960), Form A, was administered to all subjects at the end of the experiment. All scores were graded and converted to percentile scores, using American College Population Norms. Subjects with the fifteen highest and fifteen lowest percentile scores on the Neuroticism and Extraversion
dimensions of the tests were compared with respect to the amount of integrated (i.e. microvolt-seconds) alpha produced.

Results
Table I shows mean EPI and integrated alpha scores for subjects in the highest and lowest quartiles. No differences in integrated alpha were found between subjects who scored high and those who scored low on the Neuroticism (N) Scale of the EPI (t = 0.9773; df = 29; P > 0.10). Subjects who scored high on the Extraversion (E) Scale (mean E score = 81.4), however, produced significantly less integrated alpha than did subjects who scored low (mean E score = 13.00) on the Extraversion Scale (t = -2.215; df = 29; P < 0.05, two-tailed).

Discussion
The results of the present study tend to support those of Brodhurst and Glass (1969), who noted that both alpha amplitude and prevalence tended to bear an inverse relationship to Extraversion scores. Since integrated alpha is a combination of both amplitude and per cent time alpha, the similarity of the results between that study and the present one would be expected. The data do not support Eysenck’s hypothesis concerning the relationship of cortical activity to personality types.

Differences between the present study and those (e.g. Young, Lader and Fenton, 1971) which show no consistent relationship between the EPI and alpha may possibly be due to differences in methods of measuring alpha. In the study by Young et al, for instance, both peak to peak amplitude and alpha index were determined during the last minute of a five-minute recording session. It may be that in that time the one minute sample may have been too short. Another difference between the present study and that of the three authors mentioned above is that they used a different form of the Eysenck test to that used in the present study. Thirdly, it would appear that they used raw scores to determine their grouping, whereas, as noted above, the present study used percentile rating derived from American College Population Norm.

The most interesting difference, however, obtains, between the results of the present study and those reported by our laboratory earlier (Kondo et al, 1972; Travis et al, 1974). Those reports noted that subjects with high N scores tended to produce more alpha than did low N subjects during eyes-open biofeedback training. Taken together with the present results, it would appear that both scales of the EPI can be reliably related to occipital alpha.

That occipital alpha and personality traits may predict one another is an interesting phenomenon. Further investigation would certainly be of interest and may provide useful objective measures of otherwise quite subjective behaviour.

References
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