

Relations between Contingent Negative Variation and Behavior under Psychoactive Drugs in Man

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We have tested the reliability of the contingent negative variation (CNV) as an index for behavioral evaluation under psychoactive drugs in fifteen voluntary subjects. Statistical analysis was performed of the relevant relationships between electrophysiological parameters [amplitudes of the pre-imperative negativity (N) and of the post-imperative positivity (P)] and reaction time (RT).

Five conditions were studied: (1) Standard (S1-L2), paired stimulations of the conditioning sound (S1) and an imperative light (L2) with motor response; (2) Disagreeable (S1-E2), with an electric shock as an imperative stimulus; (3) Uncertainty (S1-?), with a randomized suppression of the imperative stimulus and a separate averaging of complete and incomplete sequences; (4) Positive Reinforcement (S1-L2-RT) by indicating RT; (5) Negative Reinforcement (S1-L2-E3) with an electric shock when RT was too long.

In five patients CNVs were studied during three sessions before and after administration of chlorpromazine (CP) 10mg, morphine (Mo) 1cg or placebo (P1) (intravenous injection).

In ten patients CNV were recorded during three sessions, after oral administration of benzodiazepine (lorazepam - Lo; diazepam - Di) or placebo (P1). Placebo effect was seen only after intravenous injection (low increase of amplitude and greater dispersion of RT). CP and Mo modified the CNV in all the situations. There were increased N and P amplitudes of the CNV and increased the RT with CP. Under Mo, RT was unchanged while CNV decreased, the disappeared with reversal after 45 minutes. CNV and RT changes after Di and Lo were selective, only seen in reinforcement conditions (increased N, decreased P waves of the CNV and increased RT as compared to the standard conditions).

These data suggest that there is no linear relation between CNV amplitude and RT. Further CNV studies for the evaluation of psychoactive drugs must be referred to individual psychometric tests.