
P50 Sensory Gating:

Impact of High vs Low Schizotypy Personality and Smoking Status

Li Wan

Committee Chair: Helen J. Crawford

Psychology

Abstract

Sensory gating helps prevent incoming irrelevant sensory information from entering into the higher cortex and ensures normal information processing. Sensory gating is seen as the ability of the nervous system to modulate its sensitivity to incoming stimuli (Braff & Geyer, 1990; Adler, Olincy, Waldo, Harris & Griffith, et al., 1998). Smoking tobacco can facilitate early sensory gating in schizophrenics, and enhance prepulse inhibition asymmetry (right greater than left) in individuals with schizotypal personality.

The purpose of this study was to test the following hypotheses: 1) Individuals with schizotypal personalities have poorer sensory gating than those without them. 2) Among individuals with schizotypy (high schizotypy), those who smoke have better sensory gating than those who do not smoke; among those without schizotypy (low schizotypy), smokers will demonstrate better sensory gating. 3) After abstaining, schizotypal smokers will show increased sensory gating due to smoking. 4) Individuals with schizotypy will show greater P50 deficits in the left hemisphere, and smoking can enhance this asymmetry (left greater than right).

From 613 online-surveyed participants, 39 (18 men) right-handed undergraduates (Mean age = 18.87) were selected to represent four groups: High and Low Schizotypy, half of which were smokers, and half were non-smokers. Smokers were tested while abstaining and after smoking. Non-smokers were tested twice in the same manner without smoking. P50 sensory gating, P50 amplitude and P50 latency were analyzed separately at frontal (F3, F4, Fz), fronto-central (FC3, FC4, FCz), central (C3, C4, Cz), centro-parietal (CP3, CP4, Cpz) and parietal (P3, P4, Pz) regions.

With respect to the hypotheses of the study, it was found that: 1) Sensory gating, as assessed by S2 (P50-N40)/S1 (P50-N40), was greater at frontal-central and central regions in comparison to mid-frontal and parietal regions. 2) Furthermore, sensory gating was significantly greater at midline than left or right hemispheres. 3) Condition 1 showed better sensory gating than Condition 2. 4) The High Schizotypy group showed poorer sensory gating than the Low Schizotypy group among non-smokers. 5) Smokers showed poorer sensory gating than non-smokers in the Low Schizotypy group.

In terms of P50 amplitude, it was found that: 1) FCz and Cz showed the highest P50 amplitude, greater than all other sites. 2) S1 had higher P50 amplitude than S2. 3) The low schizotypy individuals had significantly greater P50 amplitude in the left than in the right fronto-central region, but the high schizotypy individuals showed more P50 amplitude in the right hemisphere than did the low schizotypy individuals. 4) Smokers showed a greater left than right P50 amplitude in centro-parietal region, whereas the non-smokers showed the opposite asymmetry with a greater right than left P50 amplitude in central, centro-parietal and parietal regions.

In terms of P50 latency, it was found that: 1) The P50 latency became significantly slower from posterior to anterior sites. 2) In HiS/S and LoS/NS groups, Condition1 was faster than Condition 2. In LoS/S and HiS/NS groups, Condition1 was slower than Condition 2. 3) Among smokers, left hemisphere latency was shorter than right hemisphere for S1, but for S2, left hemisphere was slower than right hemisphere. Among non-smokers, left and right hemisphere latencies were almost the same for S1 and S2.

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