OP 17: Acute effect of l-theanine on visual attention in a traffic-related reaction task in sleep-deprived young adults: A double-blind placebo-controlled, crossover study

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Introduction: L-theanine is a non-protein-forming amino acid found in tea. Limited evidence suggests that it improves selective attention. Sleep deprivation impairs attention and psychomotor reactions, potentially affecting automobile driving.

Objectives: To determine whether L-theanine improves neurobehavioral measures of visual attention in acutely sleep-deprived healthy adults in a traffic-based recognition reaction time task.

Methods: In a double-blind, placebo-controlled, counterbalanced, two-way crossover study, we compared the effects of a single 200-mg dose of L-theanine with a placebo (150 ml of distilled water) on a computerised, traffic-scene-based visual recognition reaction time task in 24 acutely sleep-deprived healthy volunteers (13 males, 11 females) aged 20-25 years. The participants made speeded button-presses to imminent accident scenes presented on a computer-screen (i.e., hits), while ignoring safe scenes. They were tested pre-dose and 45 minutes post-dose, each treatment administered one week apart.

Results: Hit rates were more than 90% in all sessions, and were similar in two treatments, pre- vs post-dose. Importantly, L-theanine significantly reduced (p=0.014) false alarm counts (i.e. responses to safe scenes), whereas placebo did not (p>0.05). L-theanine reduced reaction time to imminent accident scenes by 38.65ms (p=0.007), and placebo by 19.08ms (p=0.016), thus L-theanine showing a 20-ms advantage over placebo.

Conclusions: L-theanine improves selective visual attention by improving information processing speed and target-distractor discriminability. This is consistent with previous fMRI findings, where L-theanine suppressed distractor-processing and default-mode-network activity of the brain in visual selective attention tasks. Concurrent recording of brain electrophysiology in future experiments will provide a neurophysiological basis for these attentional effects.

Keywords: l-theanine, visual attention, driving, sleep deprivation, young adults, trial