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## ASSOCIATIONS OF SMARTPHONE USE WITH NEUROPSYCHOLOGICAL FUNCTION AND REWARD SENSITIVITY IN UNIVERSITY STUDENTS: IMPLICATIONS FOR PSYCHOLOGICAL HEALTH

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**Keywords: Addiction; mobile technology; neuropsychology; smartphone; internet; reward sensitivity**

**Introduction:** Smartphone use provides unprecedented levels of interpersonal communication and access to information. Constant presence of the technology permits frequent and prolonged use, providing social reward signals and competing for attention with non-online life. University students typically spend over 6 hours per day directly interacting with smartphones, more than one-third of their entire time spent awake, and can potentially receive unsolicited alerts and feedback over the entire 24-hour cycle. This represents a significant increase in how people are exposed to attention demanding stimuli and social reinforcement signals, and potentially could be associated with changes to cognitive ability, and to dependence.

**Methods:** We investigated reward processing and neuropsychological functioning in a sample of 121 undergraduate students in Quito, Ecuador. Reward sensitivity was assessed with a laboratory psychomotor task performed with and without financial rewards. The neuropsychological assessment focused on reasoning, executive function, sustained attention and social cognition. Participants completed a psychometric questionnaire on problematic phone use and were observed to derive measures of frequency of phone checking behavior and of the number of messenger services used. Correlations between smartphone use variables and reward and neuropsychological function were examined. Nuisance variables were controlled for with partial correlations.

**Results:** Keeping a smartphone close at hand and frequent checking was associated with worse performance on neuropsychological tests of reasoning and sustained attention. There were no associations with other cognitive or social-cognitive functions. Sensitivity to rewards, a known risk-factor for addiction, was positively correlated with the use of messenger services. There were no associations with the psychometric measure of smartphone use.

**Conclusion:** Smartphone use, particularly compulsive use such as frequent checking, is associated with poor cognitive functioning. This finding contributes to a small body of research suggesting that a consequence of continuous presence of this technology may be reduced analytical reasoning and ability to sustain attention. The use of multiple messenger services is associated with high reward sensitivity, which is a known risk factor for substance dependence, and may thus constitute a risk factor for smartphone addiction.