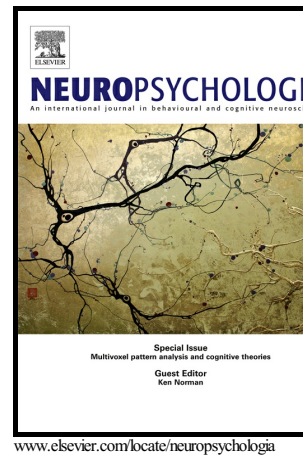


# Author's Accepted Manuscript

Decreasing propensity to mind-wander with  
Transcranial direct current stimulation

Shogo Kajimura, Michio Nomura



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Title: Decreasing propensity to mind-wander with transcranial direct current stimulation

Authors: Shogo Kajimura and Michio Nomura

Affiliation: Department of Cognitive Psychology in Education, Graduate School of Education, Kyoto University, Kyoto, Japan

Corresponding author: Shogo Kajimura

Graduate School of Education, Kyoto University, Kyoto, Japan, 606-8501.

E-mail address: kajimura.shogo.25e@st.kyoto-u.ac.jp

Tel and FAX: +81 75 753 3004

## Abstract

Mind wandering or task-unrelated thought (TUT) is associated with various impairments as well as with adaptive functions, indicating the importance of regulating this process. Although Axelrod and colleagues (2015) have shown that anodal/cathodal transcranial direct current stimulation (tDCS) of the left/right lateral prefrontal cortex (LPFC) could increase the propensity for mind wandering, it remains unclear whether a different tDCS protocol could have the reverse effect. The present study investigated whether and how simultaneous stimulation of the left LPFC and right inferior parietal lobule (IPL) could modulate TUTs. These areas may be crucial for regulating both TUTs and its neural underpinning (default mode network). We applied tDCS to the right IPL/left LPFC prior to a perceptually demanding flanker task and compared TUT propensity during the task among tDCS groups. We found that TUT propensity was reduced by anodal/cathodal tDCS of the right IPL/left LPFC compared with cathodal/anodal tDCS, and the results for the sham group were intermediate between these two groups. This is the first study to demonstrate that tDCS can decrease, as well as increase, TUT propensity.

Keywords: Task-unrelated thoughts; transcranial direct current stimulation; default mode network; right inferior parietal lobule; perceptual load task

## Article body

### Introduction

Mind wandering is the spontaneous transition of internal attention mainly to self-generated thoughts and occupies up to half of our waking hours (Axelrod et al. 2015). Mind wandering is related to adaptive functions such as planning, creativity, and a coherent sense of self (Andrews-Hanna, Smallwood, and Spreng 2014). However, mind wandering, also referred to as task-unrelated thoughts (TUTs), causes intermittent shifts of attention from the task at hand and dampens sensory information

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