Attention, working memory and impulsiveness in high media multi-taskers

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ABSTRACT

Ophir, Nass, & Wagner (2009) developed the Media Multi-tasking Index (MMI) to measure the extent to which an individual engages in simultaneous use of different media such as texting while studying and listening to music. They proposed that high multi-taskers were worse at dealing with distracting information both from external sources and internal representations in memory. Using the MMI, we surveyed 160 students on their multi-tasking behavior as well as their self-reported impulsiveness and self-control. We also invited 27 high and 25 low multi-taskers into the laboratory and tested them on measures of predictable task-switching, the attention network test and an item recognition task high in interference. While we did find the MMI score to be positively correlated with impulsiveness and negatively correlated with self-control, we did not find any differences between heavy and light users in attention, task-switching or the ability to deal with interfering information in memory.

BACKGROUND

Media Multitasking Research

Media multitasking, engaging in different forms of media simultaneously, is growing with the advent of new technologies such as the internet and texting especially among younger adults (Foeher, 2006).

There is growing concern that multitasking behavior places a heavy demand on many cognitive mechanisms from planning and remembering, to attention switching and suppression of non-relevant stimuli (Thoma et al., 2008).

Ophir et al. (2009) identified and compared Heavy Media Multitasking individuals (HMMs) with Light Media Multitasking individuals (LMMs) on measures of distraction, working memory (N-back) and task-switching. They reported that HMMs were less effective at switching between tasks and more susceptible to irrelevant stimuli, both from external sources and internal sources.

Current Study

- We tested for attentional differences between HHMs and LMMs by using the Attention Network Task which provides estimates of three types of attention.
- We also compared LMMs and HHMs on their ability to switch in a predictable task-switching paradigm.
- We surveyed their self-reported impulsiveness and self-control.
- Finally, we tested the hypothesis that HMMs have difficulty keeping no longer relevant information out of working memory by using a recent probes item recognition task.

METHODS

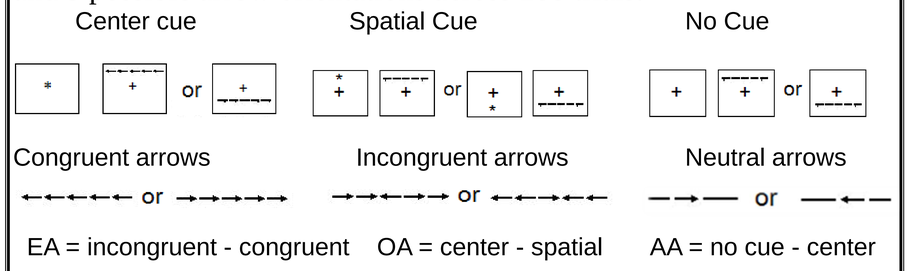
Participants:
160 College of Idaho undergraduates completed on-line surveys. 27 HMMs (M= 7.03, SD= 1.3) and 26 LMMs (M=2.01, SD=.72) participated in the laboratory tasks.

Online Surveys:
Media Use Questionnaire (Ophir et al., 2009),
Barratt Impulsiveness Scale (Patton et al., 1995),
Brief Self-Control Scale (Tangey, Baumeister & Boone, 2004)

Laboratory Tasks:

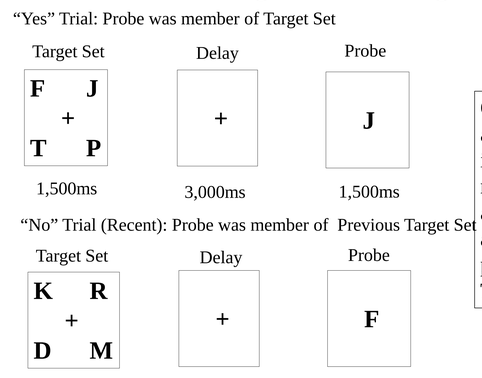
Task Switching:
We used a predictable switching paradigm with switches every 2 trials with a 226 ms interval between the cue and the target and a 950 ms interval between trials.

Attention Network Task:
The ANT measures three types of attention: Executive (EA), Alerting (AA), and Orienting (OA). It measures these through 3 different cues, and 3 possible arrow orientations across 288 trials.



Letter Recognition Task*

We used a letter recognition task high in interference.

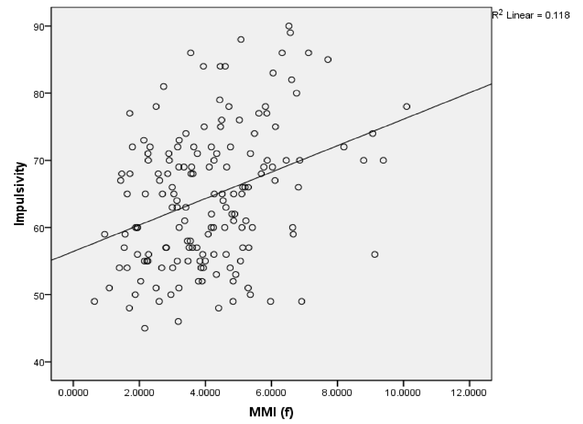


On each trial, participants must remember an array of 4 letters, after a delay, a probe is presented and they must answer yes or no, was this letter a member of the target array. 50% of probes were part of the array. Of the foils, 2/3rds were Recent (i.e. part of the target array for a previous trial). There were a total of 144 trials

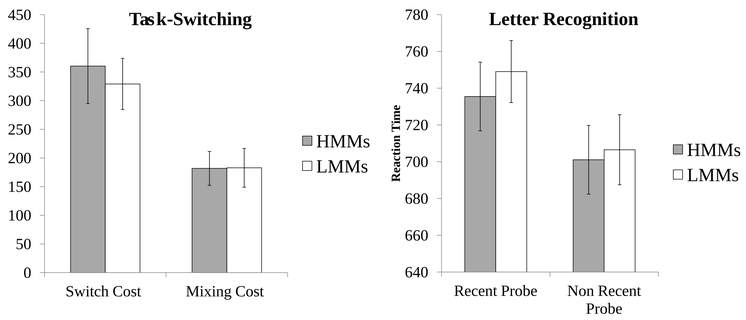
*Our thanks to the Reuter-Lorenz lab for providing us with this task.

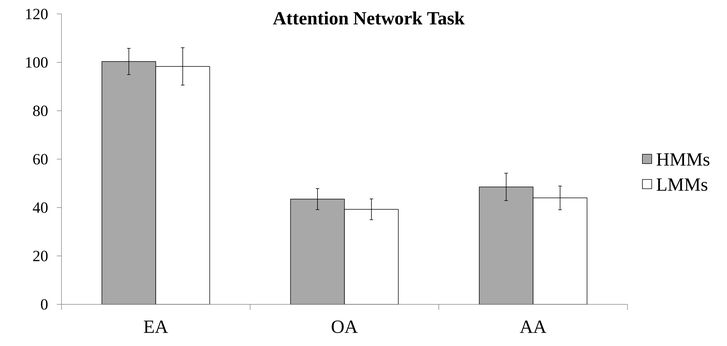
RESULTS

Survey results: MMI score was positively correlated with impulsiveness, $r = .34$, $p < .05$ and had a slight negative correlation with self-control, $r = -.15$, $p = .06$



No Group Differences on Task-switching, the ANT or the Letter Recognition task.





We found no evidence of differences in attention, task-switching or memory performance under high interference between Heavy and Light Media-Multi taskers in our sample. However, HHMs did self-report being more impulsive.