Better task-switching performance in expert video game players: Superior preparation?

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BACKGROUND

•A number of studies have shown improved attentional processing with video game play using both comparisons of expert video game players (VGPs) to non-players (NVGPs) and novice video game players both before and after receiving training on video games (Dye, Green & Bavelier, 2009).

•However, less is known about the extent to which playing video games may affect executive processes. Several studies have looked at the effect of video game use on task-switching performance with equivocal results. Karle, Watter & Shedden (2010) reported finding no differences between VGPs and NVGPs on a cued random switching paradigm. However, both Boot et al. (2008) and Colzato et al. (2010) reported smaller switch costs for VGPs using predictable switching paradigms. Therefore, the type of switch as well as the amount of preparation time may affect whether differences are seen between VGPs and NVGPs.

DESIGN

We used a Mixed Factorial Design with Block Type (Predictable v. Random) x CSI (200 v. 1200) and Trial Type (Switch v. No-Switch) as within-subjects factors and Group (VGPs v. NVGPs) as a between subjects factor. We also included a Random switching block with a 200 CSI and a 1,000 RSI to help interpret any differences between the Random 200 and Random 1200 blocks.

Predictions

P1: If VGPs are better at rapid switches then should see smaller switch costs for VGPs in short CSI (200) blocks.

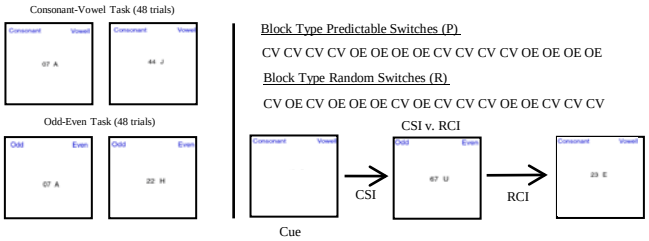
P2 : If VGPs are better at unexpected switches then VGPs will show a smaller switch cost in Random than in Predictable blocks.

P3 : If VGPs are better at forward planning then VGPs will show smaller switch cost in Predictable than in Random blocks

METHODS

Participants:
Participants were students at The College of Idaho and volunteered for the study. 12 expert video game players (VGPs) who reported playing video games at least 19 hours per week (11 Male, 1 Female) and 14 controls who reported playing less than 3 hours of video games per week (10 Males, 4 female) .

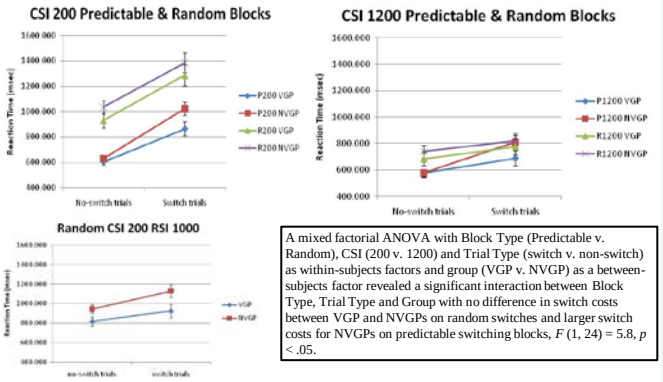
Tasks:



Participants first completed 2 single-task blocks of 48 trials each.

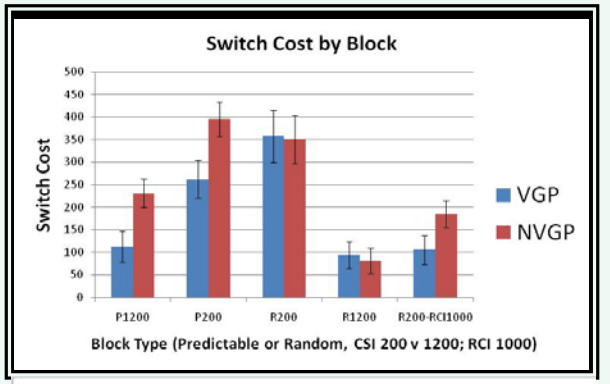
Then there were 5 switching blocks with 144 trials per block: Predictable block using a 200 CSI, Predictable with a 1200 CSI, Random with a 200 CSI, Random with a 1200 CSI and a Random block with a 200 CSI and a 1000 RCI. The order of these blocks was randomized across participants.

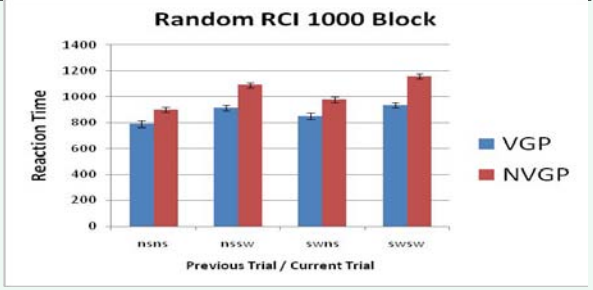
RESULTS



A mixed factorial ANOVA with Block Type (Predictable v. Random), CSI (200 v. 1200) and Trial Type (switch v. non-switch) as within-subjects factors and group (VGP v. NVGP) as a between-subjects factor revealed a significant interaction between Block Type, Trial Type and Group with no difference in switch costs between VGP and NVGPs on random switches and larger switch costs for NVGPs on predictable switching blocks, $F(1, 24) = 5.8$, $p < .05$.

RESULTS





DISCUSSION

VGPs had smaller switch costs in both Predictable blocks as well as the Random block with a long RCI. The smaller switch costs for VGPs in Predictable blocks support the hypothesis that VGPs may be better at forward planning. However, the results from the Random RCI 1000 block suggests that it was not simply that VGPs were able to take advantage of a predictable sequence, but that they are able to optimally adjust their task-set bias given time. It may be that during the RCI, the VGPs adjust the relative activation of the two task sets to be ready for either task. Therefore, we suggest that expert video game players may demonstrate improved proactive control in that they can attenuate their task-set readiness to be optimally prepared in situations such as predictable switches and possibly in random switching blocks when there is significant downtime between trials.