

An effect of inhibitory load in children while keeping working memory load constant.

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Abstract

Children are slower and more error-prone when the correct response is counter to their initial inclination (incongruent trials) than when they just need to do what comes naturally (congruent trials). Children are almost always tested on a congruent-trial block and then on an incongruent-trial block. That order of testing makes it impossible to determine whether worse performance on incongruent trials is due to the need to inhibit a pre-potent response, the need to clear the rule for Block 1 from working memory, some other demand of task-switching, or some combination of these. However, if the congruent block and incongruent blocks each have only one rule (e.g., "press on the same side as the stimulus" for congruent trials and "press on the side opposite the stimulus" for incongruent trials, as on the hearts and flowers task) and children's performance when the incongruent block is presented first is fully comparable to their performance when it is presented second, the only possible explanation for their worse performance on incongruent versus congruent trials would seem to be the added inhibitory demand on incongruent trials. Certainly, worse performance on Block 1 would not be due to inefficient clearing of working memory or task-switching demands. We tested 96 children (49 girls) 6-10 years of age on the hearts and flowers test with order of congruent and incongruent blocks counterbalanced across children. Children were slower and made more errors on incongruent trials regardless of task order. We expected task-switching demands to account for some of the variance, but to our surprise, performance was fully comparable on the incongruent block whether it came first or second. These results indicate that increasing inhibitory demands alone is sufficient to impair children's performance in the face of no change in working memory demands, suggesting that inhibition is a separate mental function from working memory.

KEYWORDS:

Simon task; cognitive control; executive control; executive function; inhibitory control; self-regulation; spatial Stroop task; stimulus-response compatibility