Implicit and Explicit Number-Space Associations Differentially Relate to Interference Control in Young Adults With ADHD

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Abstract

Behavioral evidence for the link between numerical and spatial representations comes from the spatial-numerical association of response codes (SNARC) effect, consisting in faster reaction times to small/large numbers with the left/right hand respectively. The SNARC effect is, however, characterized by considerable intra- and inter-individual variability. It depends not only on the explicit or implicit nature of the numerical task, but also relates to interference control. To determine whether the prevalence of the latter relation in the elderly could be ascribed to younger individuals' ceiling performances on executive control tasks, we determined whether the SNARC effect related to Stroop and/or Flanker effects in 26 young adults with ADHD. We observed a divergent pattern of correlation depending on the type of numerical task used to assess the SNARC effect and the type of interference control measure involved in number-space associations. Namely, stronger number-space associations during parity judgments involving implicit magnitude processing related to weaker interference control in the Stroop but not Flanker task. Conversely, stronger number-space associations during explicit magnitude classifications tended to be associated with better interference control in the Flanker but not Stroop paradigm. The association of stronger parity and magnitude SNARC effects with weaker and better interference control respectively indicates that different mechanisms underlie these relations. Activation of the magnitude-associated spatial code is irrelevant and potentially interferes with parity judgments, but in contrast assists explicit magnitude classifications. Altogether, the present study confirms the contribution of interference control to number-space associations also in young adults. It suggests that magnitude-associated spatial codes in implicit and explicit tasks are monitored by different interference control mechanisms, thereby explaining task-related intra-individual differences in number-space associations.