Title

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Visual, auditory, and temporal sensorimotor discrimination abilities and their relationships with complex cognition

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Abstract

At dawn of cognitive science, it was hypothesized that performance on diverse sensorimotor tasks is rooted in unitary sensory discrimination ability that shares the same neural resource with complex cognition. A century of research yielded inconclusive evidence. We modelled the factor structure for 33 diverse visual sensorimotor, memory, and reasoning tasks, completed by 234 young adults. Covariance structure models indicated two considerably correlated, yet statistically separate, sensorimotor abilities reflecting temporal vs. non-temporal processing. However, initially moderate relationships of each simple ability with reasoning disappeared when mediated by working memory, suggesting that sensory discrimination plays no explanatory role for complex cognition. These results were replicated in another study of 255 young adults, who additionally attempted auditory sensorimotor tasks. The latter appeared to be separate from temporal and visual abilities. Overall, sensory discrimination does not constitute unitary ability. Moreover, individual differences in complex cognition cannot be reduced to sensory discrimination.