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Researchers identify subject-specific component to perceptual learning ability

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Developing expertise usually requires a variety of skills, and some people can become experts while others can't. Common practice in perceptual learning research has treated ubiquitous individual learning

differences as random fluctuations or noise and made inferences based on aggregated data from multiple subjects.

Recent research, however, is paying more attention to individual learning differences.

For example, accumulating evidence suggests that individual differences reflect genetic and/or environmental influences on human behavior and can even be predicted from brain structure and neural activity. Nevertheless, researchers have been uncertain whether or not individual differences in perceptual learning reflect a consistent individual variability in learning ability across multiple perceptual learning tasks.

A new Chinese study has begun to answer this question.

Ph.D. candidate Yang Jia and her colleagues, under the guidance of Prof. Huang Changbing from the Institute of Psychology of the Chinese Academy of Sciences (CAS), and Lu Zhonglin from New York University (NYU) and NYU Shanghai recently collected and analyzed data from a large sample of subjects in seven visual, auditory and working memory training tasks.

They established a multivariate regression model and showed that initial performance, task, and individual differences all contributed significantly to the learning rates across the tasks.

Most importantly, they were able to identify both a task-specific but subject-invariant component of learning and a subject-specific but task-invariant perceptual learning ability. An additional least absolute shrinkage and selection operator (LASSO) regression analysis revealed that a number of personality traits, including intelligence quotient, extraversion, and neuroticism, made significant contributions to individual differences.

These findings reveal the multifaceted nature of perceptual learning and provide strong evidence for the existence of a consistent pattern of individual differences across multiple training tasks, suggesting that individual differences in perceptual learning are not 'noise'; rather, they reflect variability in learning ability across individuals.

"These results could have important implications for selecting potential trainees in occupations that require perceptual expertise and designing better training protocols to improve the efficiency of clinical rehabilitation," said Yang.

More information: Jia Yang el al., "General learning ability in perceptual learning," *PNAS* (2020). www.pnas.org/cgi/doi/10.1073/pnas.2002903117

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