

Qualitative vs. Quantitative Individual Differences: Implications for Cognitive Control

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Consider a task with a well-established effect such as the Stroop effect. In such tasks, there is often a canonical direction of the effect—responses to congruent items are faster than incongruent ones. And with this direction, there are three qualitatively different regions of performance: (a) a canonical effect, (b) no effect, or (c) an opposite or negative effect (for Stroop, responses to incongruent stimuli are faster than responses to congruent ones). Individual differences can be qualitative in that different people may truly occupy different regions; that is, some may have canonical effects while others may have the opposite effect. Or, alternatively, it may only be quantitative in that all people are truly in one region (all people have a true canonical effect). Which of these descriptions holds has two critical implications. The first is theoretical: Those tasks that admit qualitative differences may be more complex and subject to multiple processing pathways or strategies. Those tasks that do not admit qualitative differences may be explained more universally. The second is practical: it may be very difficult to document individual differences in a task or correlate individual differences across task if these tasks do not admit qualitative individual differences. In this talk, I develop trial-level hierarchical models of quantitative and qualitative individual differences and apply these models to cognitive control tasks. Not only is there no evidence for qualitative individual differences, the quantitative individual differences are so small that there is little hope of localizing correlations in true performance among these tasks.