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## STABILITY AND FLEXIBILITY IN COGNITIVE CONTROL

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**Background:** Adaptive behaviour requires cognitive control for shielding current goals from distractors (stability) but at the same time for switching between alternative goals (flexibility).

**Aims:** In this behavioural study, we examine the balance between stability and flexibility of information processing in left- and right-handers. The work will offer new insights into individual differences in cognitive control and the relationship with handedness. It is argued that handedness influences hemispheric engagement, leading to variation of cognitive performance with left-handers showing increased flexibility for dealing with the task demands.

**Method:** We use computerised tasks that involve two types of decision-making, instructed (sensory cued) and voluntary (own choice), by means of distractor inhibition and hand/task switching.

**Results:** The data revealed that both groups showed opposite tendencies for instructed decision-making. Moreover, right-handers resisted distracting information more efficiently whereas left-handers showed superior switching abilities. When participants were involved in voluntary decision-making, no effects of handedness were noted, which suggests that free-choice processing alters the balance between stability and flexibility.

**Conclusions:** These data illustrate that handedness is an index of individual variation during instructed decision-making, biasing the proficiency of cognitive control towards stability and flexibility of information processing. These biases can however be overruled by top-down strategies that dominate during voluntary decision-making. Overall, the research underlines the antagonistic functions of stability and flexibility in decision-making, and offers an approach for examining cognitive control and the role of internal and external factors in balancing the stability-flexibility trade-off.

**Keywords:** Handedness, Laterality, Stability, Flexibility, Individual differences

### Publications:

Serrien DJ, O'Regan L (2019). Stability and flexibility in cognitive control: Interindividual dynamics and task context processing. *PLoS One*14:e0219397.

O'Regan L, Serrien DJ (2018). Individual Differences and Hemispheric Asymmetries for Language and Spatial Attention. *Frontiers in Human Neuroscience*, 12:380.

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