Individual Differences in Cognitive Control: Gender, Culture, Languages
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Background
- Cognitive Control = Ability to prevent irrelevant information from interfering with ongoing goal-directed behaviour
- Normal aging and some psychiatric disorders cause changes in cognitive control(1-2)
- Here, we tested whether gender, cultural background, and bilingualism affected cognitive control

Method
- Fully factorial hybrid motor priming-Simon task with masked (subliminal) or non-masked (visible) primes(7)
- Respond to the identity of a target stimulus with a spatial (left- or right-hand) response, but ignore its spatial location
- Target location is either congruent (corresponds to the response hand) or incongruent (corresponds to the other hand)

Results I
- Interference Effects
  - Negative compatibility effects (NCEs) with masked primes
  - Positive compatibility effects (PCEs) with non-masked primes
  - Simon effect does not interact with NCE
  - Simon effect interacts with PCE

Results II
- Gender
  - Simon effects women > men
  - Modulation of Simon effects (Gratton effect) woman > men (with non-masked primes only)
  - PCE slope women > men
- Culture
  - PCE non-Chinese > Chinese
- Languages
  - No language effects

Conclusions
1. “Cognitive Control” is not a unitary phenomenon: Spatial (Simon) and identity (prime) interference are handled by different systems
2. Magnitude of interference effect is insufficient to determine if differences in inhibitory cognitive control exist time-series analyses provide a better insight
3. Gender and culture, but not bilingualism, affect high-level interference and control processes in priming and Simon tasks
4. Low-level interference control (NCE) is mediated by yet another system, which is

Logic
- a) Interference effects
  - If relevant and irrelevant information coincide, response execution is facilitated, if they are in conflict,
    interference occurs
  - Magnitude of Simon effect indicates high-level control over interference triggered by spatial information
  - Magnitude of priming effects indicates control over interference triggered by stimulus identity
  - High-level (consciously perceived) with supraliminal primes
  - Low-level (not consciously perceived) with subliminal prime

b) Gratton effects
  - Interference effects are typically smaller following conflict than following non-conflict trials (Gratton effect)
  - This has been interpreted as evidence for a high-level (frontally mediated) conflict control system, which prevents interfering information from gaining access to the response system(8)
  - Domain-specific Gratton effect
  - Influence of Simon-conflict on subsequent Simon effect
  - Influence of priming-conflict on subsequent priming effect
  - Domain general Gratton effect
  - Influence of Simon-conflict on subsequent priming effect
  - Influence of priming-conflict on subsequent Simon effect

References
7) Schlaghecken, Refta, & Mayor (2008).