Please Remain Standing: Standing Alters Perception and Cognition

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Background

- Davoli et al. (2009) and Rosenbaum et al. (2017) have shown that standing reduces Stroop interference.[2,4]
- One possibility is that standing entails additional load and stress, which may enhance selectivity of attention.[4]
- We wanted to determine if standing alters performance on tasks that require selectivity of attention.
- Specifically, we examined Stroop, task-switching, and visual search.

Research Question

- Does posture affect tasks related to attention?

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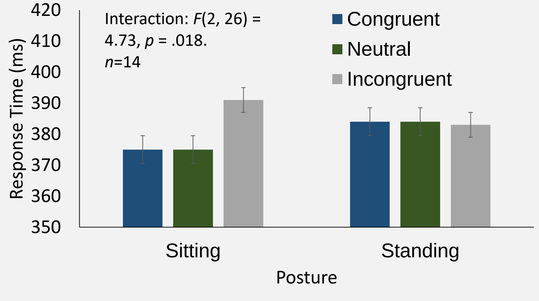
Experiment 1

Does standing affect Stroop interference?

- Participants were presented with a letter string that was displayed in either red or green font.
  - There were three types of letter strings:
    - Congruent
      RED
    - Incongruent
      RED
    - Neutral
      XXX
- Posture was counterbalanced and manipulated within participants.
- **Task:** Participants indicated "red" or "green" with buttons. They responded to the font color, not the word itself.

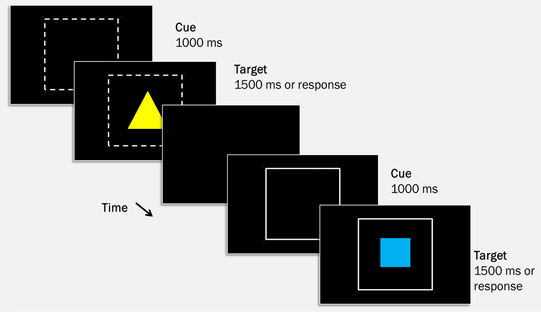
Stroop interference was eliminated when participants completed the task while standing.



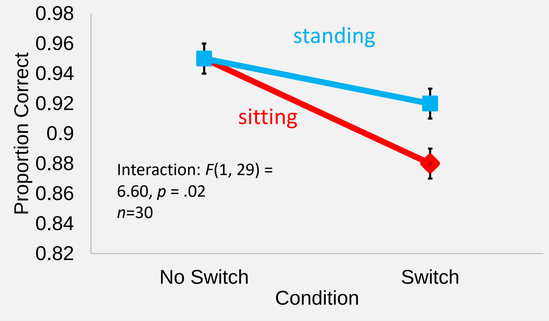
Experiment 2

Does standing affect task-switching performance?

- A square composed of either a solid or dashed line appeared, indicating to participants whether to respond to the shape or color of the upcoming target.
- Then a yellow or blue square or triangle appeared.
- Posture was counterbalanced and manipulated within participants.
- **Task:** Participants indicated "square" or "triangle" or "yellow" or "blue" using buttons.
- If the task in the previous trial was the same as the task in the current trial, it was a *no-switch* trial. If the tasks differed, it was a *switch* trial.



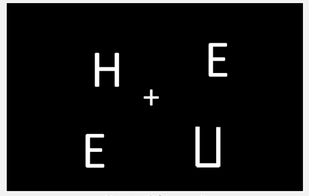
There was less of a reduction in accuracy in switch compared to no-switch trials in the standing posture compared to the sitting posture, indicating reduced switch cost when standing.



Experiment 3

Does standing affect visual search performance?

- A search display composed of 4 or 8 block letters appeared. There was one target (S or H) and either 3 or 7 distractors (E or U).
- Posture was counterbalanced and manipulated within participants.
- **Task:** Participants indicated "S" or "H" with buttons.



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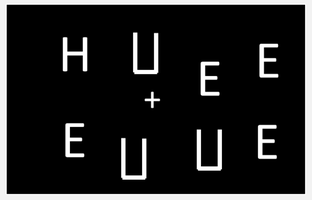

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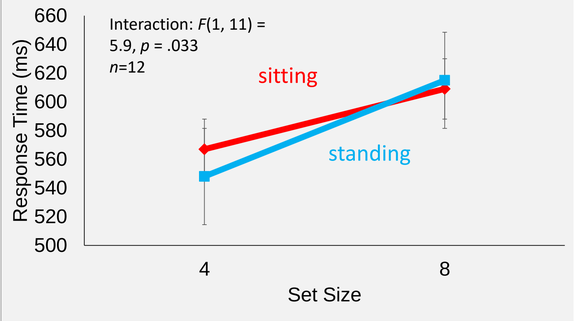
Visual search rate was slower when participants were standing compared to when they were sitting.



Conclusions

- Standing alters performance on tasks that require selectivity of attention.
- Specifically, Stroop interference and task-switching cost are reduced when standing. Visual search rate slows.
- These results are similar to findings related to changes in cognition in the near-hand space.[1,3] A similar mechanism may be involved.
- Perhaps the increased stress and load involved in standing is responsible for these changes.

References

1. Abrams, R. A., Davoli, C. C., Du, F., Knapp, W. H., & Paull, D. (2008). Altered vision near the hands. *Cognition*, *107*, 1035–47.
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4. Rosenbaum, D., Mama, Y., & Algom, D. (2017). Stand by your Stroop: Standing up enhances selective attention and cognitive control. *Psychological Science*, *28*, 1864-1867. doi:10.1177/0956797617721270