THE CROSSED-UNCROSSED DIFFERENCE IN NORMAL AND CALLOSOTOMIZED INDIVIDUALS

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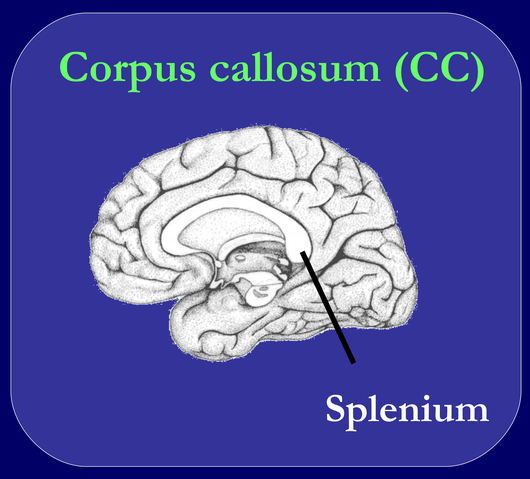
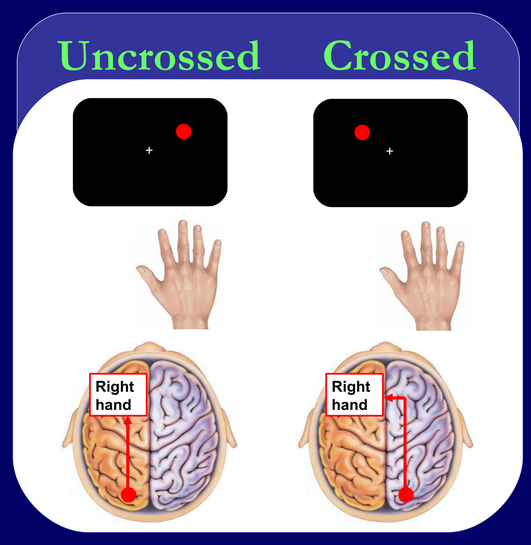
INTRODUCTION

The crossed-uncrossed difference (CUD) is the interaction of stimulus side and responding hand in simple reaction time (RT) tasks (Poffenberger, 1912). Traditionally, the CUD has been investigated with a paradigm requiring the detection of lateralized stimuli using unimanual responses. In such conditions, the CUD is approximately 3 ms in normal individuals and to up to 70 ms in split-brain (SB) individuals (e.g. Corballis, Hamm, & Barnett, 2002). The present study investigated whether a similar pattern is found with bimanual responses.

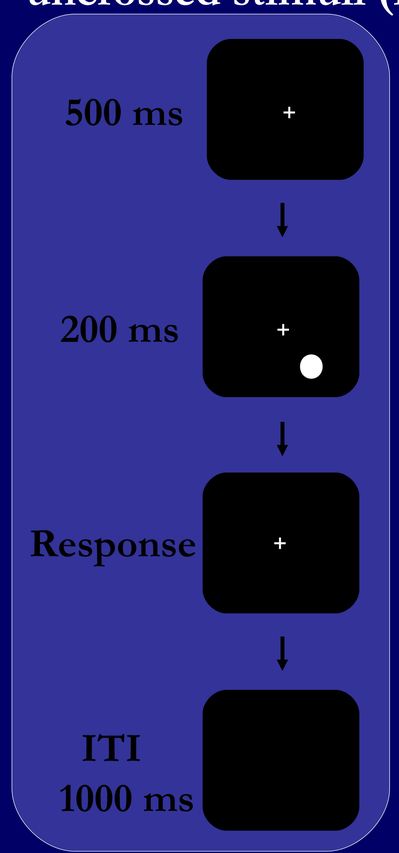




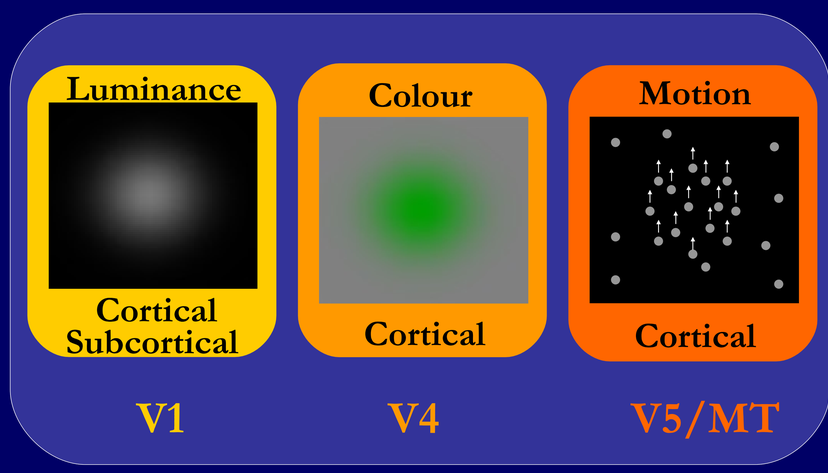
METHODS

❖ Ten normal individuals and 8 SB individuals (4 with a partial section— splenium preserved— and 4 with a total section) were tested.

❖ The CUD was computed by subtracting mean RTs for uncrossed stimuli (i.e., ipsilateral to the responding hand) from mean RTs for crossed stimuli (i.e., contralateral to the responding hand).



❖ Three types of stimulus onsets (luminance, color, & motion) were used to assess different cortical pathways.

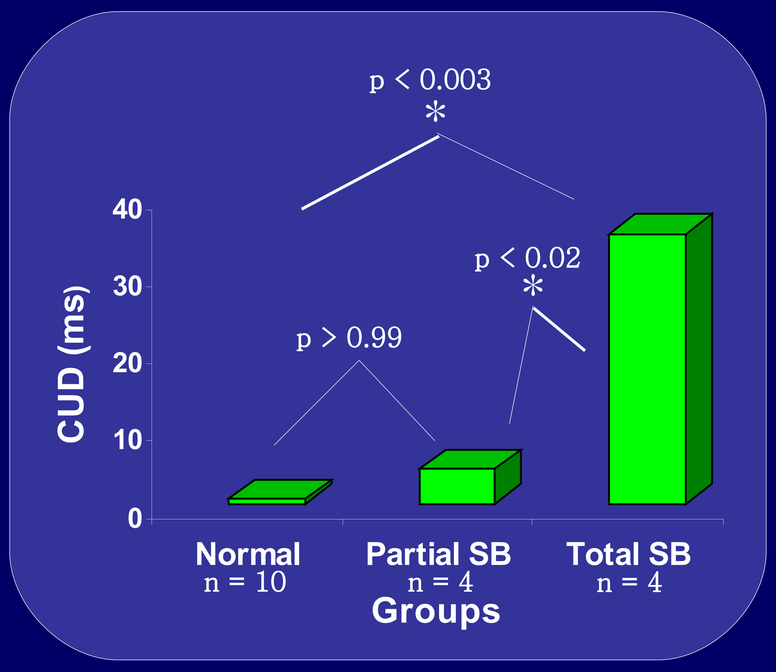


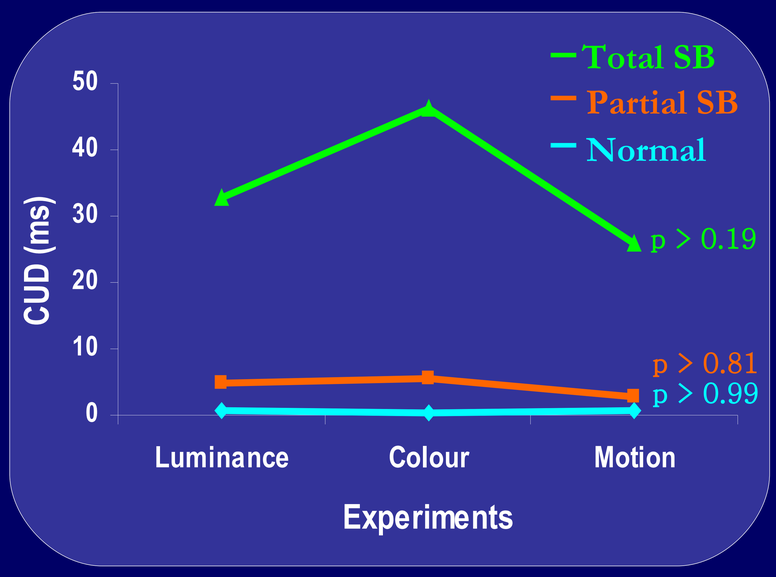
RESULTS

❖ The CUD of total SB individuals was larger than the CUD of partial SB and normal individuals.

❖ The CUD of partial SB individuals did not differ significantly from the CUD of normal individuals.

❖ The CUD varied differently as a function of groups and stimulus types ($p < 0.02$). This result seems to be mainly driven by a difference between the CUD elicited by colour stimuli as compared to luminance and motion stimuli in total SB individuals although it is not supported by a conservative statistical approach.





CONCLUSIONS

❖ Just as is found with unimanual responses (Clarke & Zaidel, 1989), the CUD recorded with bimanual responses increases from normal indivduals to total SB individuals.

❖ The CUD of total SB individuals is significantly larger than the CUD of partial SB individuals. Thus, the posterior portion of the corpus callosum, namely the splenium, contributes to the transfer of information underlying the CUD.

❖ Based on the means, manipulations of visual parameters seem to impact on the CUD of total SB individuals which suggests a sensory contribution to the CUD.

REFERENCES

Clarke, JM, & Zaidel, E (1989). *Brain*, 112, 849-870.

Corballis, MC, Hamm, JP, & Barnett, KJ (2002). *J Cogn Neurosci*, 14, 1151-1157.

Poffenberger, AT (1912). *Arch Psychol*, 23, 1-73.

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