THE ROLE OF THE CORPUS CALLOSUM IN THE REDUNDANCY GAIN EFFECT

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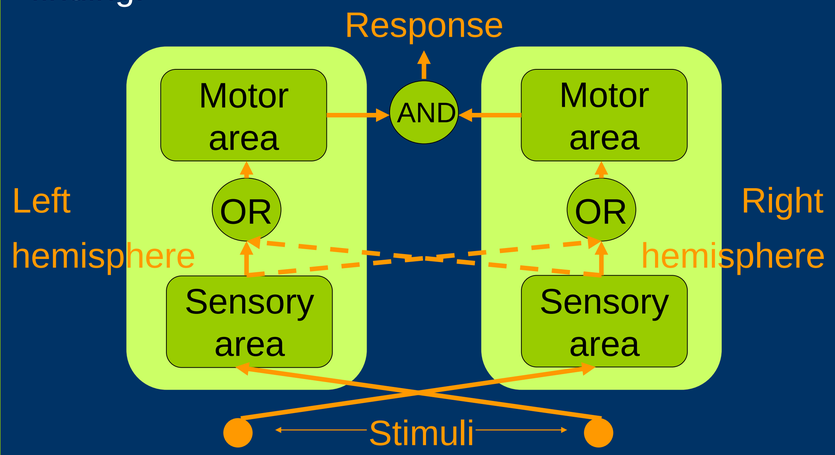
Introduction

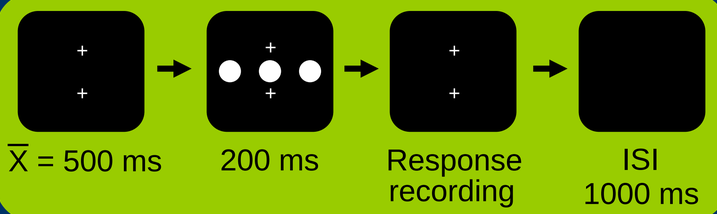
Redundancy gain (RG) occurs when reaction times (RTs) to multiple copies of the same stimulus are faster than RTs to a single stimulus, sometimes even faster than predicted by the independent-channels race model. One might think that the two hemispheres of a split-brain (SB) individual would behave more like independent channels than those of controls. However, an intriguing fact is that RG is larger in SB than in controls. Miller (2004) proposed the following coactivation model to explain this paradoxical finding.



According to such a model, the large RG for SB subjects results from slowing of responses to single stimuli as opposed to speeding up responses to redundant stimuli.

We tested this prediction by using a midline presentation as a baseline condition.

Method



- Subjects were instructed to respond as quickly as possible to the onset of a disk — 1 (single trials), 2, or 3 (redundant trials) disks were presented.
- There were three stimulus locations: left, midline, and right. All combinations (8) of stimulated locations were equally probable – including one condition with no stimuli (catch trials). They were intermixed and tested 60 times within a 480-trial session, preceded by 40 practice trials. All targets occupied 1.7° of visual angle. The peripheral disks appeared 6° to the left or right of the fixation point.
- Responses were bimanual.
- Trials with an eye movement were rejected.

Results

	Mean RTs (ms)	
Stimuli	**Normals (N=11)**	**Split (N=1)**
1	**353**	**561**
2	**331**	**497**
3	**318**	**456**
	p < .0001	

	Mean RTs (ms)	
Conditions	**Normals (N=11)**	**Split (N=1)**
(+,-,-)	**368**	**554**
(-,+,-)	**336**	**566**
(-,-,+)	**357**	**563**
(+,+,-)	**327**	**555**
(-,+,+)	**333**	**472**
(+,-,+)	**332**	**463**
(+,+,+)	**318**	**456**
	p < .0001	

Conclusion

- Normals were faster to detect a single-central stimulus compared to single peripheral ones, whereas the SB did not show such a benefit, as expected from Miller (2004), according to which RG results from an abnormal slowing of responses to single peripheral stimuli in SB.
- However, other evidence suggests perceptual problems for the SB for stimuli presented on the midline (e.g., St-Amour et al.,2004). Such problems could explain the SB performance without having to reject Miller's (2004) coactivation model.

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