Is Garner Interference valid evidence for the Perception-Action Model?

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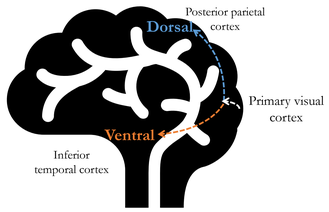
MODAL & AMODAL COGNITION

BACKGROUND

Perception-Action Model

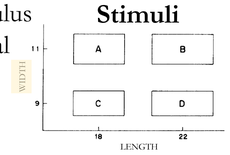
Goodale & Milner 1992 [1]

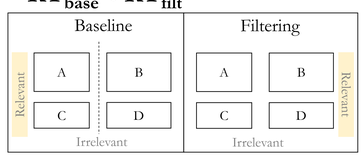


- Experiments on patients with brain damage
- Separate and parallel ventral ("what") and dorsal ("how") streams [1]
- Different processing for different purposes of visual perception and visuomotor actions

Garner's Speeded Classification

- Interaction between stimulus dimensions and perceptual information processing
- **Baseline:** task-irrelevant dimension constant
- **Filtering:** task-irrelevant dimension changes
- $RT_{base} < RT_{filt}$

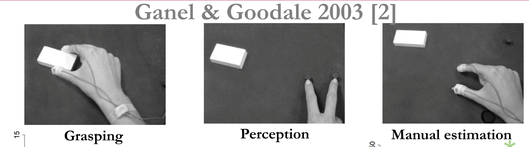




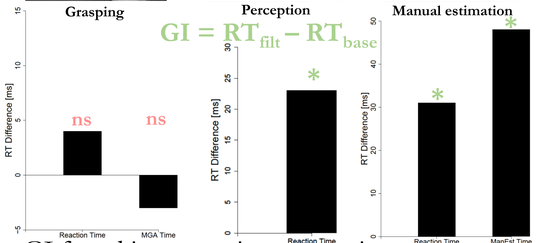
$RT_{base} < RT_{filt}$ Garner Interference (GI)

Tasks & Design

Ganel & Goodale 2003 [2]



$GI = RT_{filt} - RT_{base}$



- GI found in perception, **not** action
- Different processing in perception versus action

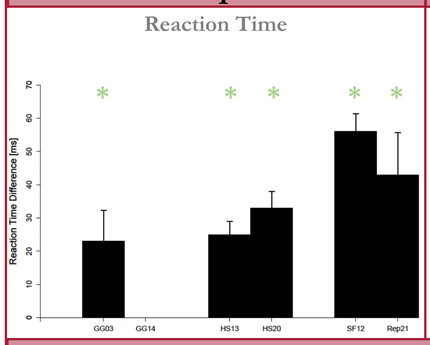
SUMMARY

* p<0.05	, p<0.1	ns p>0.1	Reaction Time ms	Reaction Time ms	ManEst Time ms	St. Dev. ManEst mm	Reaction Time ms	MGA Time ms	St. Dev. MGA mm
(Filtering - Baseline) Mean ± SEM			Perc	Manual Estimation			Grasping		
Ganel & Goodale 2003	GG03 [2]	P,G N=12 M N=8	23±9	31±13	48±20	0.64 ±0.20	4	-3	
Schum, Franz et al 2012	SF12 [3]	P,G N=20 M N=20	56±5	-7±18	-6±40		-3±8	-1±1.5	
Hesse & Schenk 2013	HS13 [4]	P N=24 G N=20	25±4				19±8	13±6.5	
Ganel & Goodale 2014	GG14 [5]	N=40		22±10		0.51 ±0.38			
Löhr-Limpens et al 2020	HS20 [6]	N=24 (5)	32±5				-0.6±1.5		0.64 ±0.15
Replication 2021	Rep21	N=24	43±12	7±11	45±22	-0.25 ±0.16	-0.01±7	-11.5±9	0.005 ±0.32

RESULTS

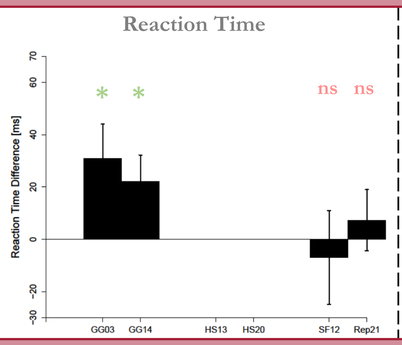
Perception

Reaction Time

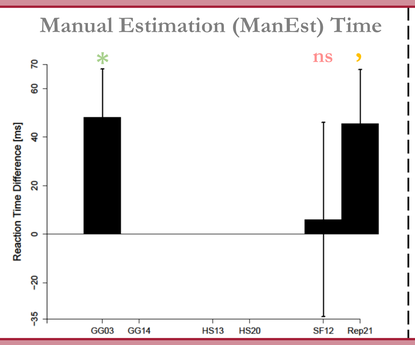


Manual Estimation

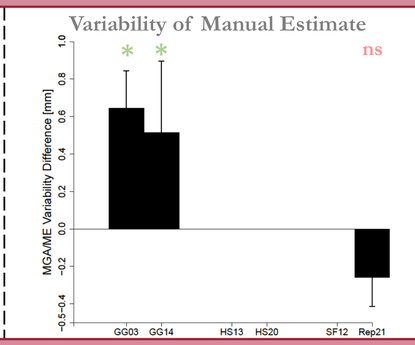
Reaction Time



Manual Estimation (ManEst) Time

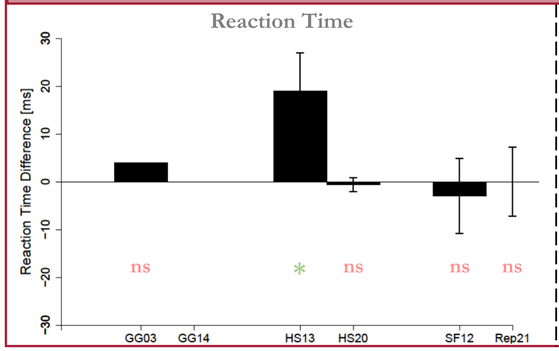


Variability of Manual Estimate

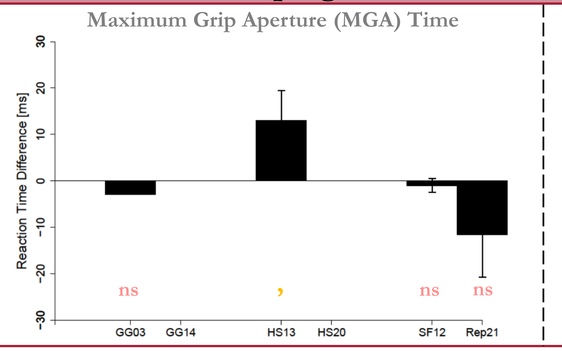


Grasping

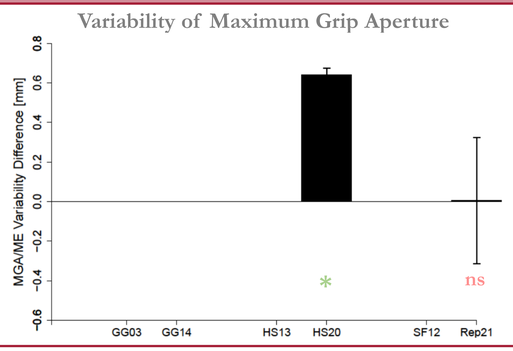
Reaction Time



Maximum Grip Aperture (MGA) Time

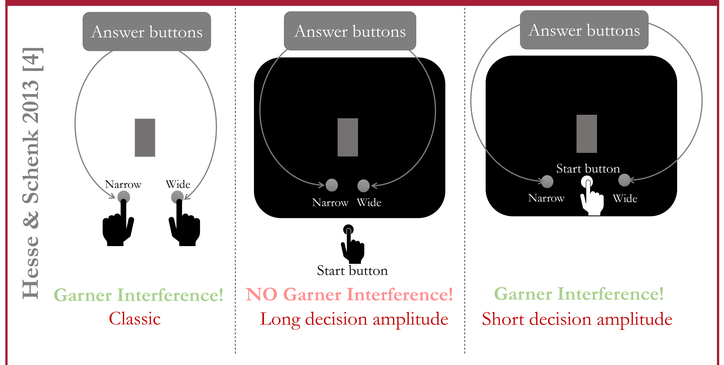


Variability of Maximum Grip Aperture



DISCUSSION

Hesse & Schenk 2013 [4]



- GI found in perceptual but not grasping task
- GI is proposed to depend on the temporal profile of the RT [4]
- ManEst time includes decision time so GI is expected
- GI found in ManEst time but not ManEst RT
- Some inconsistencies of GI and PAM resolved, some remain

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