

Is there Garner Interference in Manual Estimation?



1. BACKGROUND

1A. Perception-Action Model (PAM)

Goodale & Milner (1992) [1]

- Separate and parallel streams: **ventral** (“what”) and **dorsal** (“how”) [1]
- Different processing for different purposes of **visual perception** and **visuomotor actions**

1B. Garner's Speeded-Classification Task

Garner (1974) [2]

- Interaction between stimulus dimensions and perceptual information processing
- Baseline:** task-irrelevant dimension constant
- Filtering:** task-irrelevant dimension changes
- Garner Interference (GI)**

1C. Tasks & Design

Ganel & Goodale (2003) [3]

- Grasping** and **manual estimation** have similar task demands (comparable tasks)
- Irrelevant features cannot be ignored in **perception** ⇒ GI found in **perception**
- Irrelevant features can be ignored in **actions** ⇒ GI **not** found in **actions**
- Different processing in **perception** versus **action**

2. REPLICATION RESULTS

* p<0.05	, p<0.1	ns p>0.1	Reaction Time ms	Reaction Time ms	ManEst Time ms	Reaction Time ms	MGA Time ms		H ₁ BF>3	Weak H ₁ 1<BF<3	Weak H ₀ 0.3<BF<1	H ₀ BF<0.3	Reaction Time	Reaction Time	ManEst Time	Reaction Time	MGA Time
GI = Filtering - Baseline Mean ± SEM			Speeded-Classification	Manual Estimation		Grasping			GI = Filtering - Baseline Bayes Factors				Speeded-Classification	Manual Estimation		Grasping	
Ganel & Goodale 2003 [3]	P,GN=12 M N=8		23 ± 9	31 ± 13	48 ± 20	-1	-8		Ganel & Goodale 2003 [3]	P,GN=12 M N=8			2.69	1.94	1.97		
Ganel & Goodale 2014 [5]	N=40			22 ± 10		-2			Ganel & Goodale 2014 [5]	N=40				1.47			
Replication 2021	N=24		43 ± 12	6 ± 11	45 ± 22	-3.5 ± 4	-2.4 ± 6.5		Replication 2021	N=24			23.6	0.26	1.25	0.30	0.24
Replication 2022	N=24			8 ± 5	16 ± 9				Replication 2022	N=24				0.65	0.84		

• Two replications of [3,5] with improved design were performed

• Both Frequentist and Bayesian analyses show the same thing: **there is no clear evidence for Garner interference in manual estimation**

3. ALTERNATIVE EXPLANATION?

Classic

Reaction Time Difference [ms]

Narrow Wide

Button press = Decision

Long decision amplitude

Reaction Time Difference [ms]

Narrow Wide

Decision occurs in-flight

35 cm

Short decision amplitude

Reaction Time Difference [ms]

Narrow Wide

Decision occurs before start

5 cm

- Can decision amplitude affect GI?
- Distance between the start point and response buttons was changed [4]
- GI occurred when **fingers were on the response buttons at start**
- When the **start button was far from the response buttons**, no GI occurred
- Reduced distance from start:** GI re-appeared
- Crucially, **only speeded-classification** was tested

4. SET-UP

Transferring to Manual Estimation...

Object

Start

End

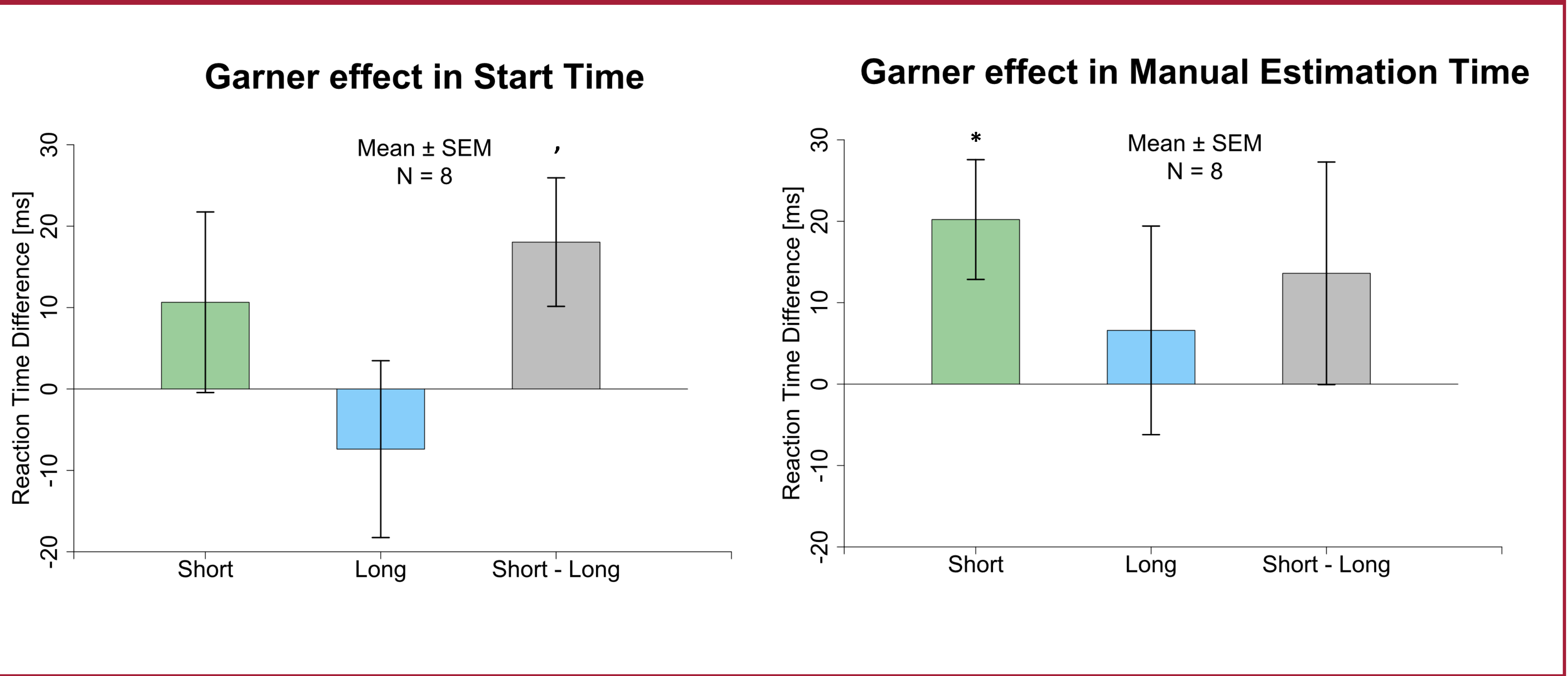
7 cm

30 cm

Short amplitude

Long amplitude

5. PRELIMINARY RESULTS



6. DISCUSSION

- Evidence supporting PAM: GI present in **perceptual** tasks but absent in **action** tasks
- We show lack of evidence for this dissociation regarding **manual estimation**
- Decision amplitude can account for GI in **speeded-classification** [4]
- We tested this hypothesis for **manual estimation**
- GI eliminated in a **long decision amplitude**
- GI seems present in a **short decision amplitude**
- Outlook: confirmatory study investigating decision amplitude and GI in **manual estimation** and **grasping**
- Inferring processing differences (PAM) from Garner interference seems problematic

7. REFERENCES

1. Goodale, M. A., & Milner, A. D. (1992). Separate visual pathways for perception and action. *Trends in neurosciences*, 15(1), 20-25.

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3. Ganel, T., & Goodale, M. A. (2003). Visual control of action but not perception requires analytical processing of object shape. *Nature*, 426(6967), 664-667.

4. Hesse, C., & Schenk, T. (2013). Findings from the Garner-paradigm do not support the “how” versus “what” distinction in the visual brain. *Behavioral brain research*, 239, 164-171.

5. Ganel, T., & Goodale, M. A. (2014). Variability-based Garner interference for perceptual estimations but not for grasping. *Experimental brain research*, 232(6), 1751-1758.

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