Learning more when attending less: Poor attentional states enhance peripheral learning

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Introduction

Sustained attention enhances processing of task-relevant information [1]
- Important consequences for learning and memory [2-3]

Poor attentional control *can* boost learning under some conditions [4-7]
- Most research relies on **between-subjects** comparisons of attention
- Effects on learning of task-*irrelevant* information is largely unknown

Do participants with more attentional lapses learn more about task-irrelevant information?

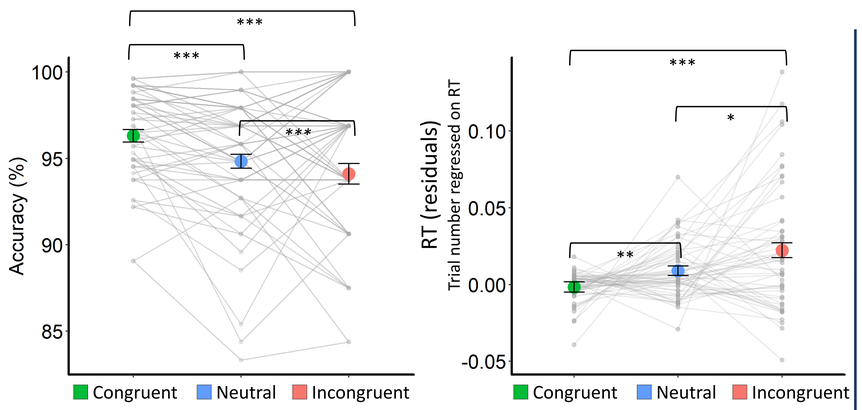
Between-subjects

Do participants with more attentional lapses learn more about the irrelevant information?

Within-subjects

Is more learning about irrelevant information exhibited during periods of attentional lapses?

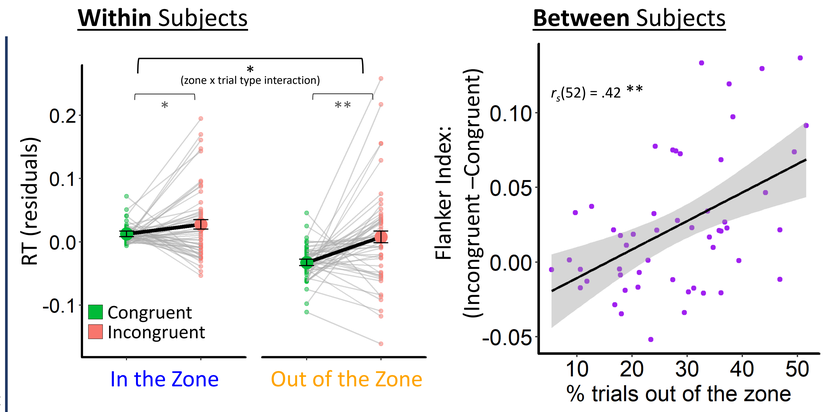
Participants show flanker sensitivity



*p < .05, **p < .01, ***p < .001

Participants are more *accurate* and *faster* on congruent trials

Attention lapses predict more sensitivity

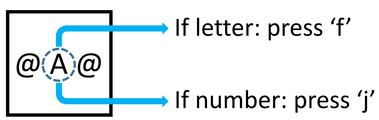


Larger RT differences when **out** of the zone

Zoning **out** more correlates with larger RT differences

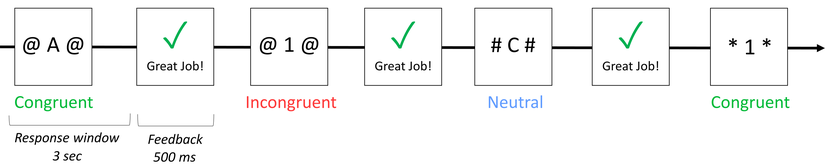
Correlated Flanker Task [8,9]

Participants indicate whether the central target, is a **letter** or **number**



*Instructed to **ignore** flankers*

n = 53
- *32 female*
- *mean age = 19yr*

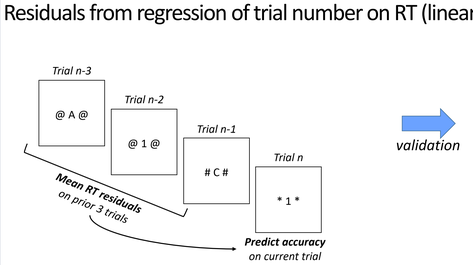


Target	Flanker		
	66.6% Congruent	8.3% Incongruent	25.0% Neutral
Letters	@	*	#
Numbers	*	@	#

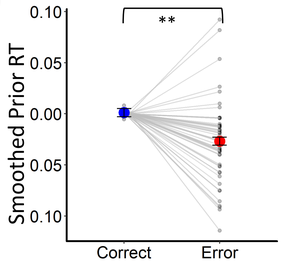
Operationalizing sustained attention via prior RT [2,10]

Prior RT = average of RT residuals^2 across 3 **prior** trials

Residuals from regression of trial number on RT (linear de-trend)

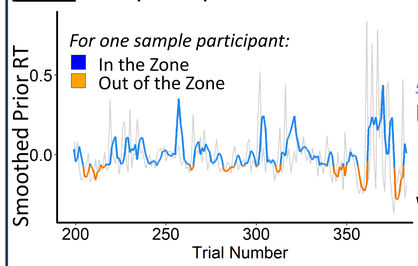


validation



Faster RTs precede errors
suggests lapses in attention (zoning out)

Out of the zone[10] when prior RT:
faster than participant mean **AND** more *deviant* than group average variability



Attention indices

Between participants: % of *neutral trials* **out** of the zone

Within participants: fluctuations in *prior RT* across time

Conclusions

Associations were learned
- Despite instructions & apparent irrelevance

Associations negatively correlated with sustained attention measures
- Between subjects: Participants who zoned out more often showed greater sensitivity to associations
- Within subjects: Greater sensitivity occurred on trials during periods where attention lapses

Attentional fluctuations modulate the ability to detect and utilize *task-irrelevant* information

Lapses in sustained attention linked to *greater learning* of irrelevant information!

References

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