EXAMINING THE TEST-RETEST RELIABILITY OF REWARD-MODULATED ATTENTIONAL BIASES

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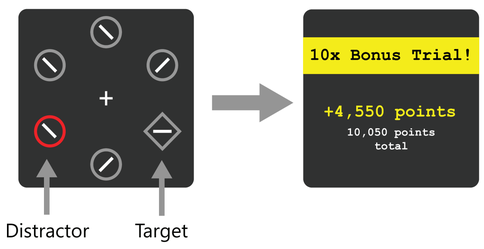
BACKGROUND

- Previous studies have shown that stimuli associated with **high-value rewards** capture attention **more often** than stimuli associated with **low-value rewards**, even when attending to the reward-associated stimuli is counterproductive[1,2,3].
- This effect has been labelled *Value-Modulated Attentional Capture* (VMAC).



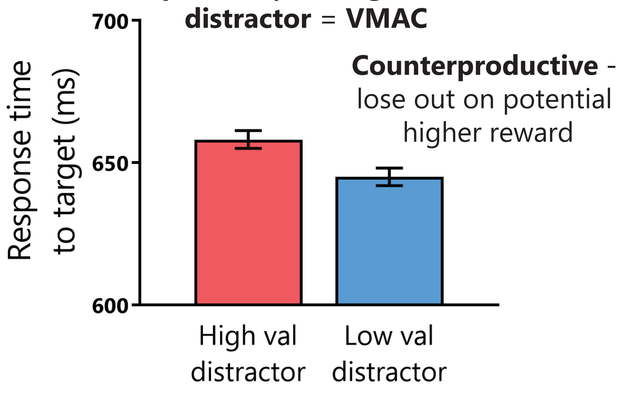
Faster response to target = More points ($$$)

High value distractor = 10x Bonus!

Low value distractor = No bonus

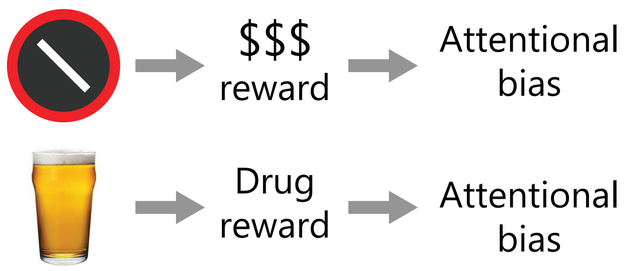
(colour reward assignment counterbalanced)

Participants **slower** to respond to the target because **attention captured** by the **high value distractor** = **VMAC**

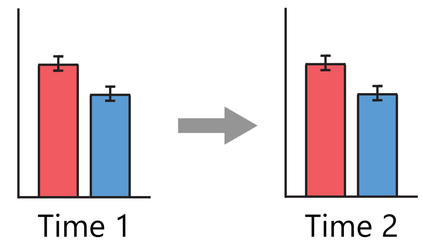


Counterproductive - lose out on potential higher reward

- **Maladaptive attentional biases** and **dysfunctional reward-learning processes** have been indicated in a number of mental and physical health problems (e.g., addiction, schizophrenia, depression, impulsivity)
- There has been considerable interest in determining whether VMAC is related to these phenomena[1,4,5,6]. **Does VMAC index trait sensitivity to the effects of reward on attention?**
- In order to be a meaningful index of reward-sensitivity, VMAC must be **stable across time** (i.e., it must have high **test-retest reliability**)



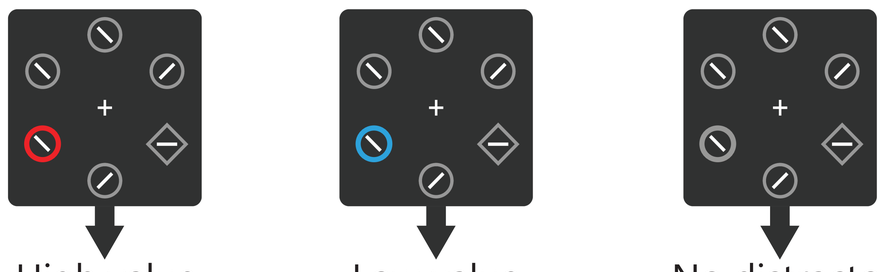
Does VMAC index general sensitivity to effect of reward on attention?



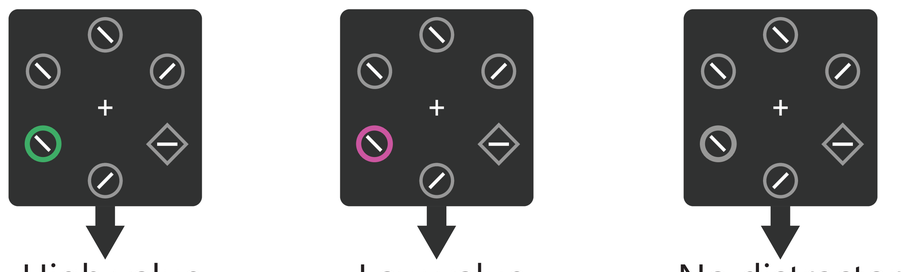
If VMAC indexes trait sensitivity to reward, it must be stable across measurement points

METHOD

SESSION 1



SESSION 2



- Participants instructed about colour-reward contingencies
- Total trials = 288

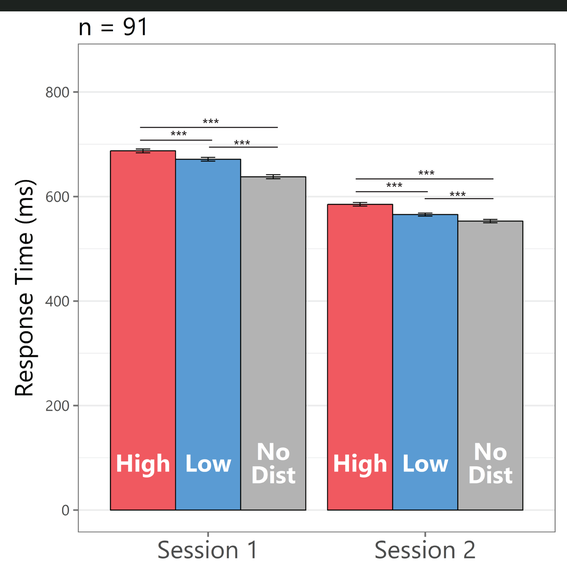
Experiment 1:
- n = 91 first-year psychology students
- Session 1 and 2 separated by 7 days

Experiment 2:
- n = 307 volunteers through Amazon Mechanical Turk
- Session 1 and 2 separated by 3-7 days

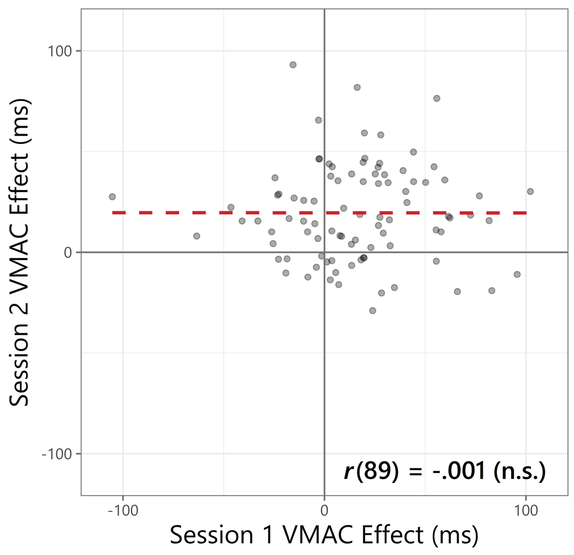
RESULTS

EXPERIMENT 1

n = 91



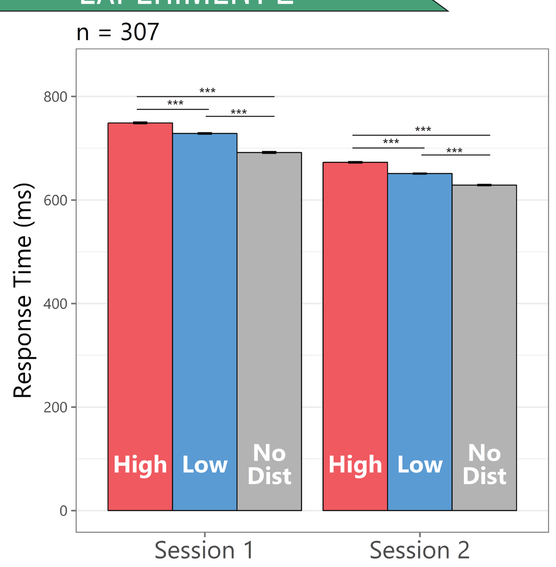
Trial Type: $F(1,90) = 65.6$, $p < .001$, $\eta_G^2 = .009$
Session: $F(1,90) = 431.2$, $p < .001$, $\eta_G^2 = .243$
Trial Type × Session: $F(1,90) = .64$, n. s.



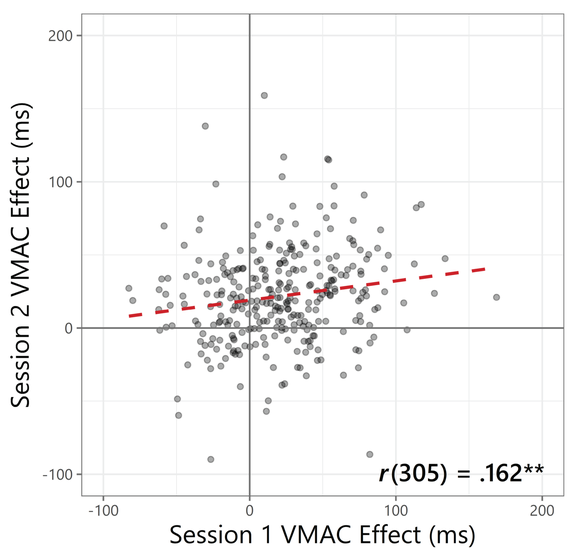
Error bars show within-subjects SEM
** $p < .01$, *** $p < .001$

EXPERIMENT 2

n = 307



Trial Type: $F(1,306) = 171.9$, $p < .001$, $\eta_G^2 = .009$
Session: $F(1,306) = 557.3$, $p < .001$, $\eta_G^2 = .109$
Trial Type × Session: $F(1,306) = .27$, n. s.



Error bars show within-subjects SEM
** $p < .01$, *** $p < .001$

VMAC effect was found across both sessions in Exp 1 and 2
- **Slower** responses to the target when search display contained a **high-value distractor** versus a **low-value distractor**

VMAC effect (RT on High value trials - RT on Low value trials) **had low test-retest reliability**
- **Non-significant** or **small correlations** between session 1 and 2

Physical salience effect (RT on Low value trials - RT on No Distractor trials) **more reliable**
Expt 1: $r(89) = .3422$*** Expt 2: $r(305) = 0.256$***

CONCLUSION

- **On average**, VMAC is consistent across time
- However, at the individual level, the magnitude of VMAC at Time 1 is **not strongly correlated** with VMAC at Time 2
  - **VMAC has low test-retest reliability**
- This suggests that VMAC is a **poor index of stable individual differences** (e.g., trait reward-sensitivity, impulsivity, susceptibility to addiction, etc.)
- Does not rule out the possibility that VMAC indexes **state individual differences**
- This finding adds to a body of literature demonstrating **low-reliability of implicit measures**[7]

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