

SiNAPSA Neuroscience Conference '15

Neuroeconomics

Neuroeconomics

“... a single unified discipline with the ultimate aim of providing single, general theory of human behavior” in which “economist and psychologists are providing rich conceptual tools for understanding and modelling behavior, while neurobiologists provide tools for the study of mechanisms.”

Glimcher & Rustichini, Science 2004

Neuroeconomics

Sergeja Slapničar, Grega Repovš

Neuroeconomics and management control

Sergeja Slapničar, Faculty of Economics, University of Ljubljana, Slovenia

Cognitive control and the path to better economic decision making

Grega Repovš, Department of Psychology, Faculty of Arts, University of Ljubljana, Slovenia

Dopamine and decision making

Robb Rutledge, Wellcome Trust Center for Neuroimaging at University College London, United Kingdom

EEG investigations on the management control problem

Philip Eskenazi, Rotterdam School of Management, Erasmus University, Rotterdam, The Netherlands

Neuroeconomics

Cognitive control and the path to better economic decision making

Grega Repovš

Department of Psychology, University of Ljubljana

Daniel Kahneman

Thinking fast and thinking slow

Daniel Kahneman
Thinking fast and thinking slow



Daniel Kahneman
Thinking fast and thinking slow



System 1

fast
automatic
frequent
emotional
stereotypic
subconscious

Daniel Kahneman
Thinking fast and thinking slow



System 1

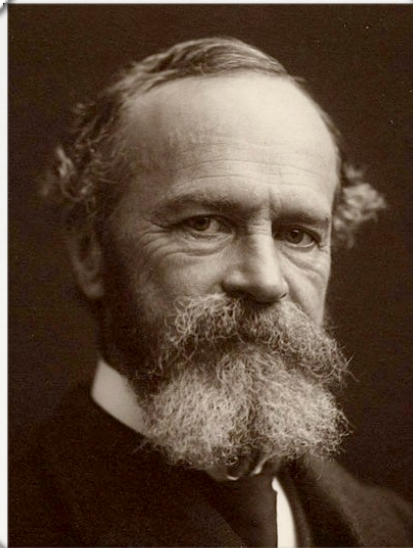
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System 2

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effortful
infrequent
logical
calculating
conscious

William James

The principles of psychology (1890)



“...wherever movement follows unhesitatingly and immediately the notion of it in the mind, we have ideo-motor action. We are then aware of nothing between the conception and the execution. In contrast, some acts require will, such that an additional conscious element in the shape of a fiat, mandate, or expressed consent is involved”

W. Schneider & R. M. Shiffrin

Controlled and automatic human information processing (1977)

W. Schneider & R. M. Shiffrin

Controlled and automatic human information processing (1977)



Automatic processing

activation of a learned sequence
without subject control
without stressing the system
without attentional demands

Controlled processing

activation of an *ad hoc* sequence
controlled by the subject
capacity limited
requires attention

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Thinking fast and thinking slow



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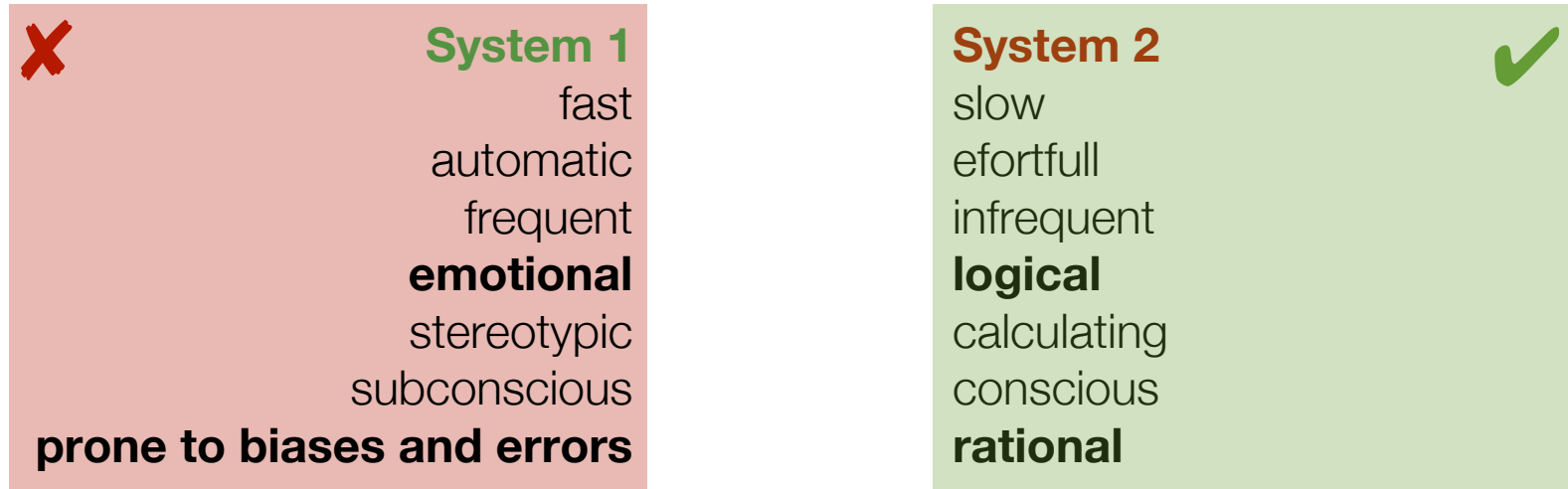
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Management control



assumption

*Management control can promote cognitive control / system 2 thinking
and lead to better (economic) decision making.*

assumption

Management control can promote cognitive control / system 2 thinking and lead to better (economic) decision making.

overview

do incentives improve cognitive control
mechanisms underlying different rewards
self-control vs. reframing
wrap-up

TASKS

Vigilance

The ability to continuously maintain attention.

Flanker task

The ability to inhibit distracting stimuli.

Emotional capture

The ability for emotional control.

CONDITIONS

Baseline

Perform the task with speed and accuracy.

“Competition”

Your results will be published and compared to others.

“Charity”

50¢ will be donated to charity for fast and correct responses.

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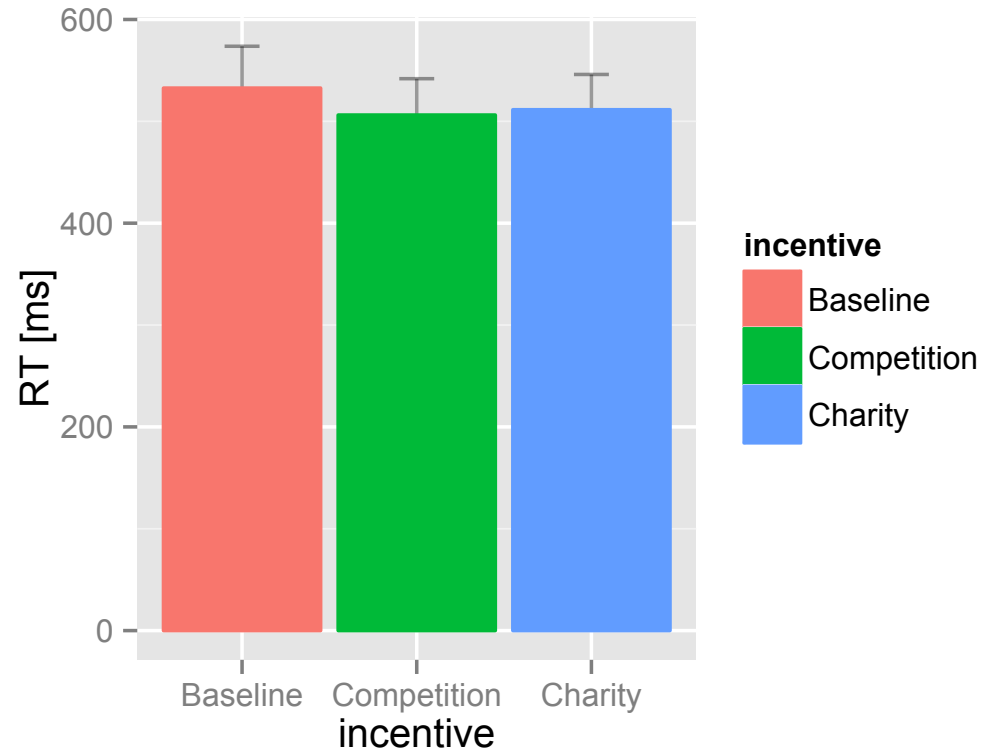
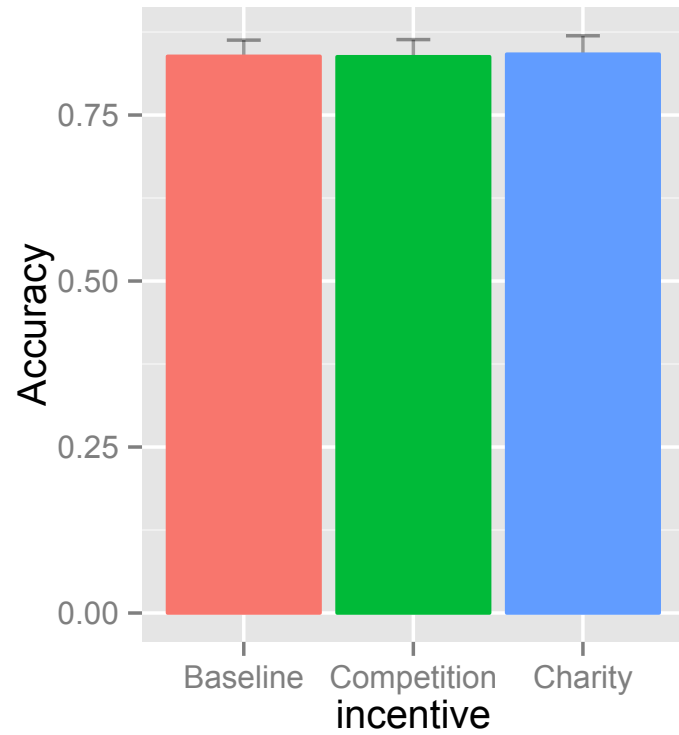
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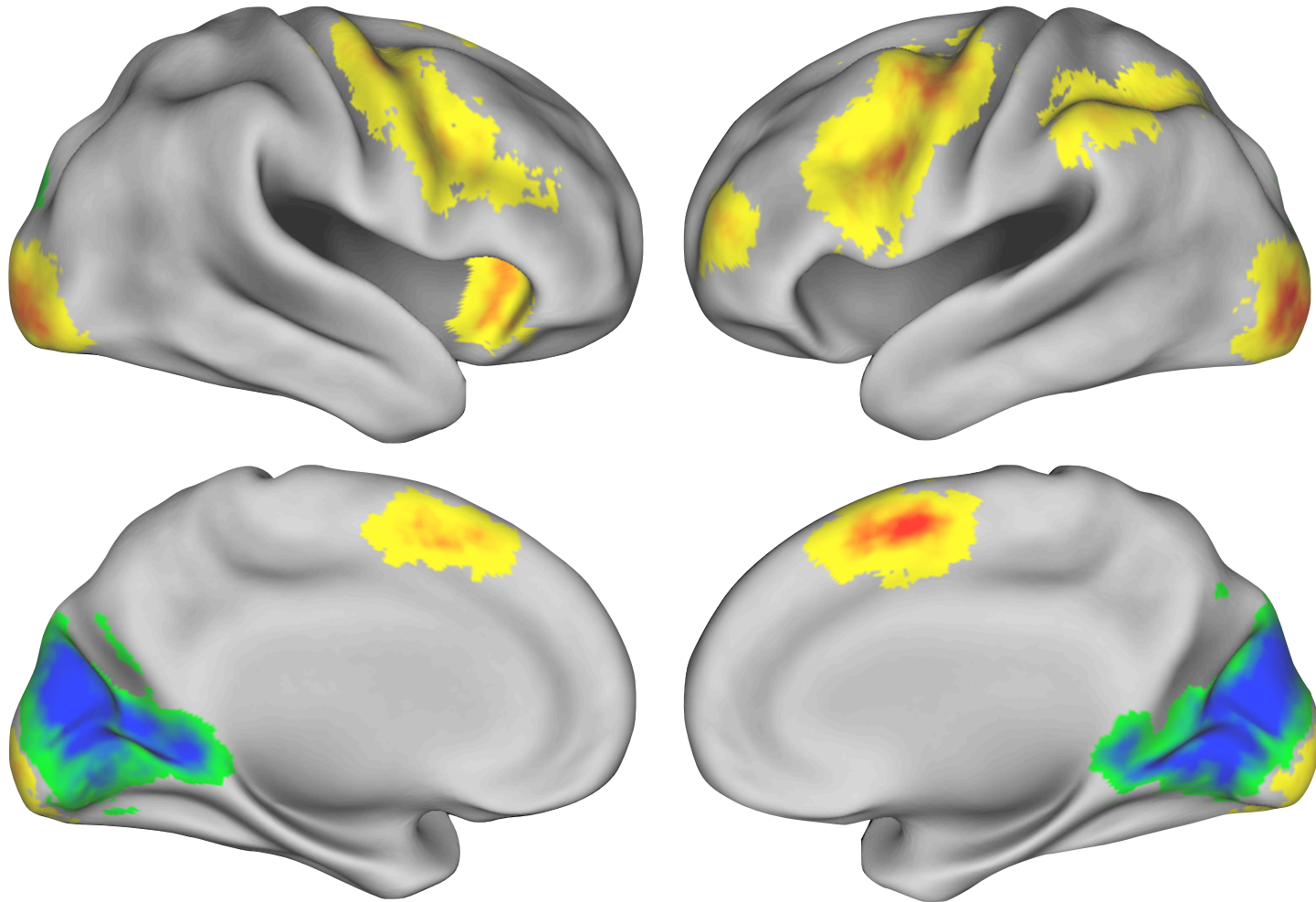


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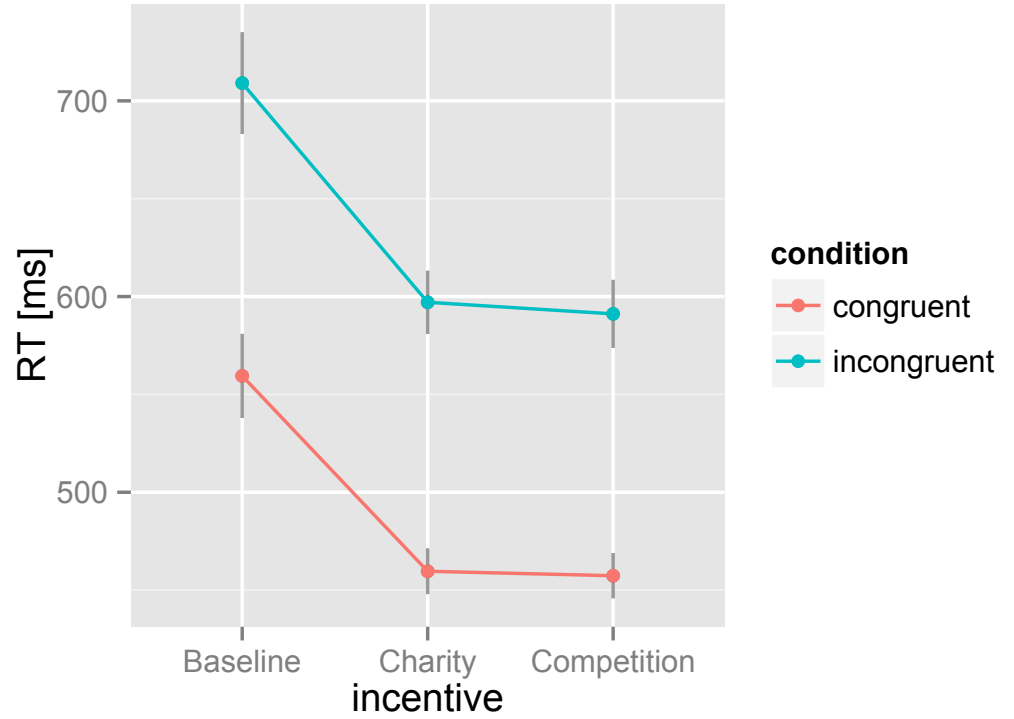
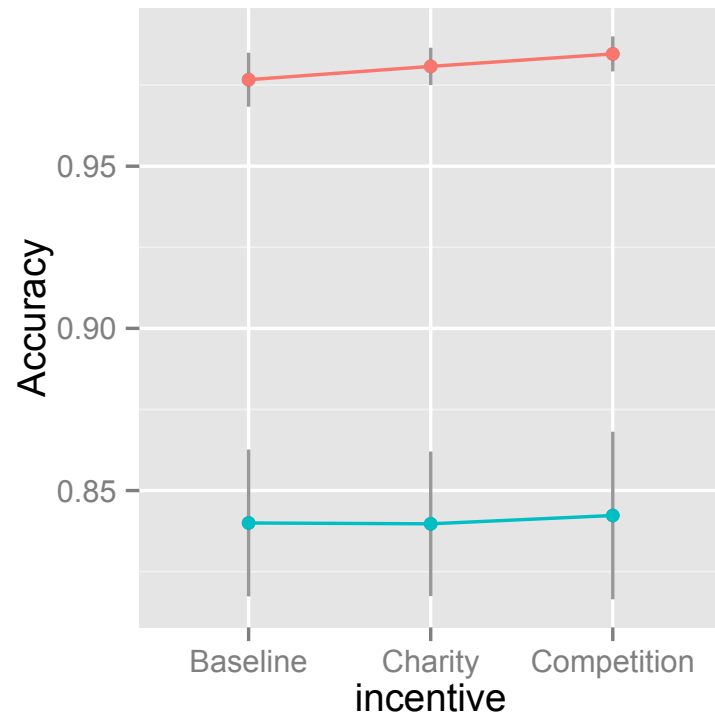


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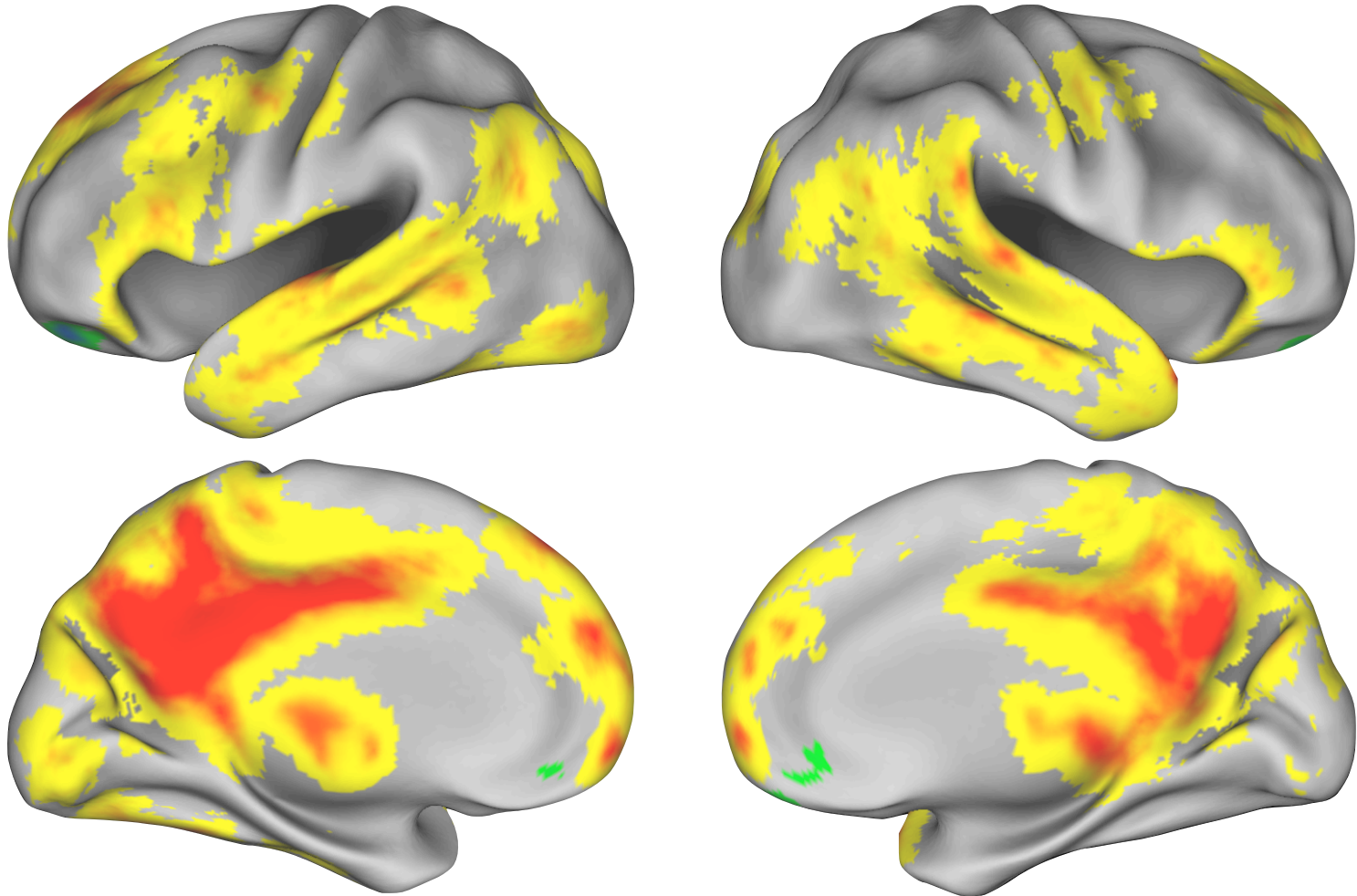


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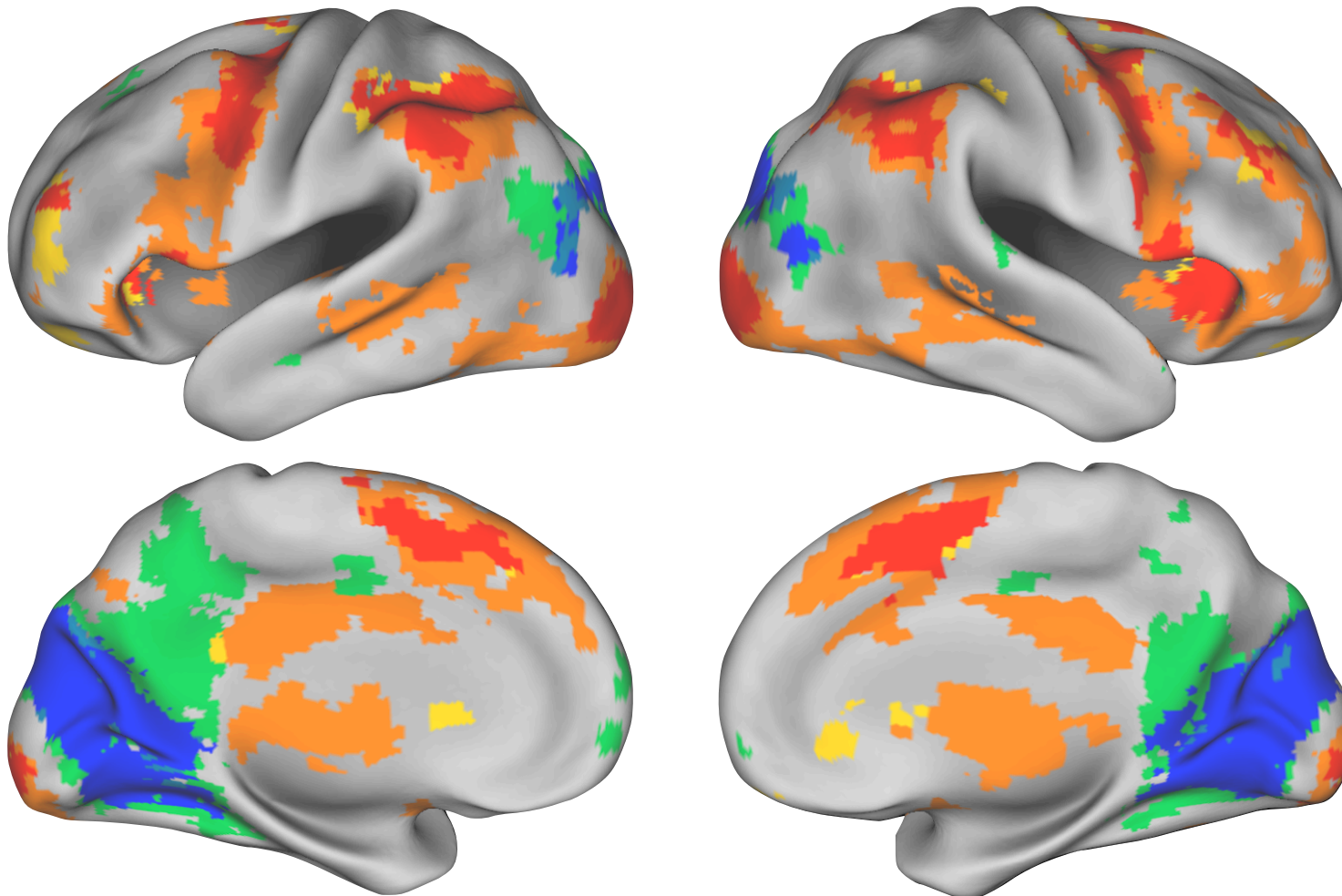
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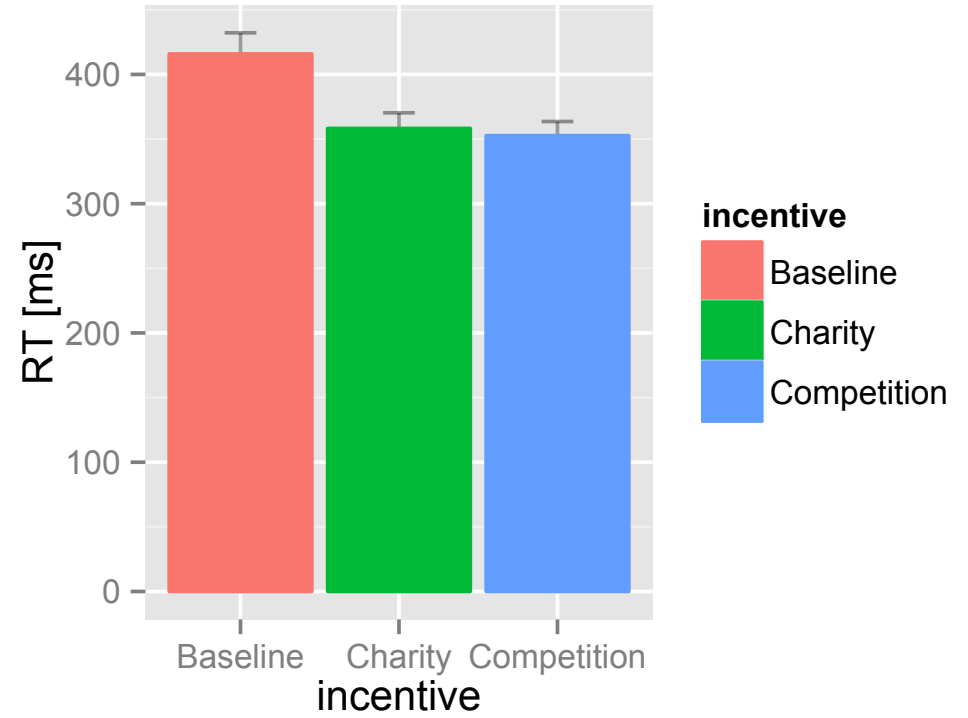
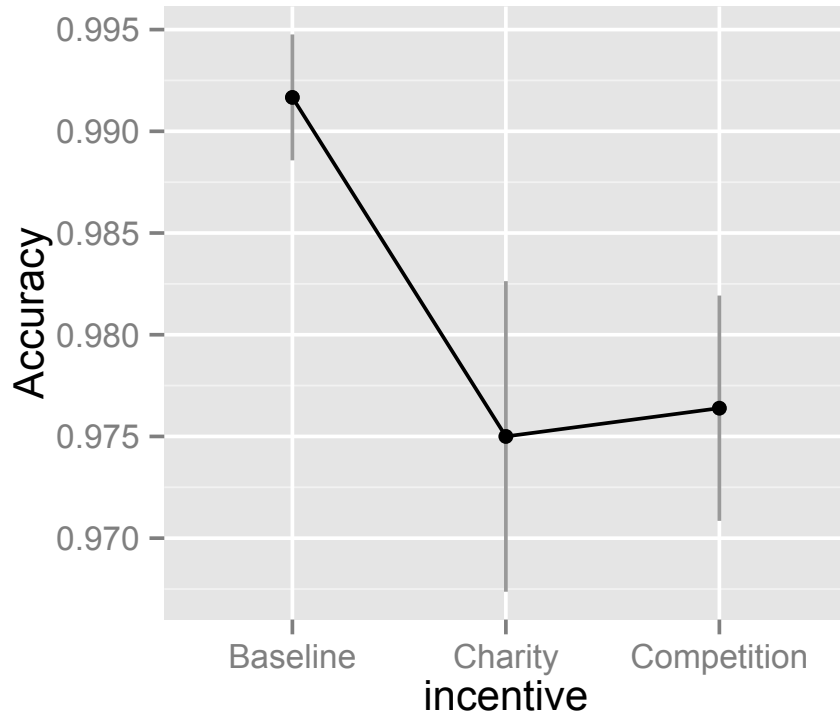


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The ability for emotional control.

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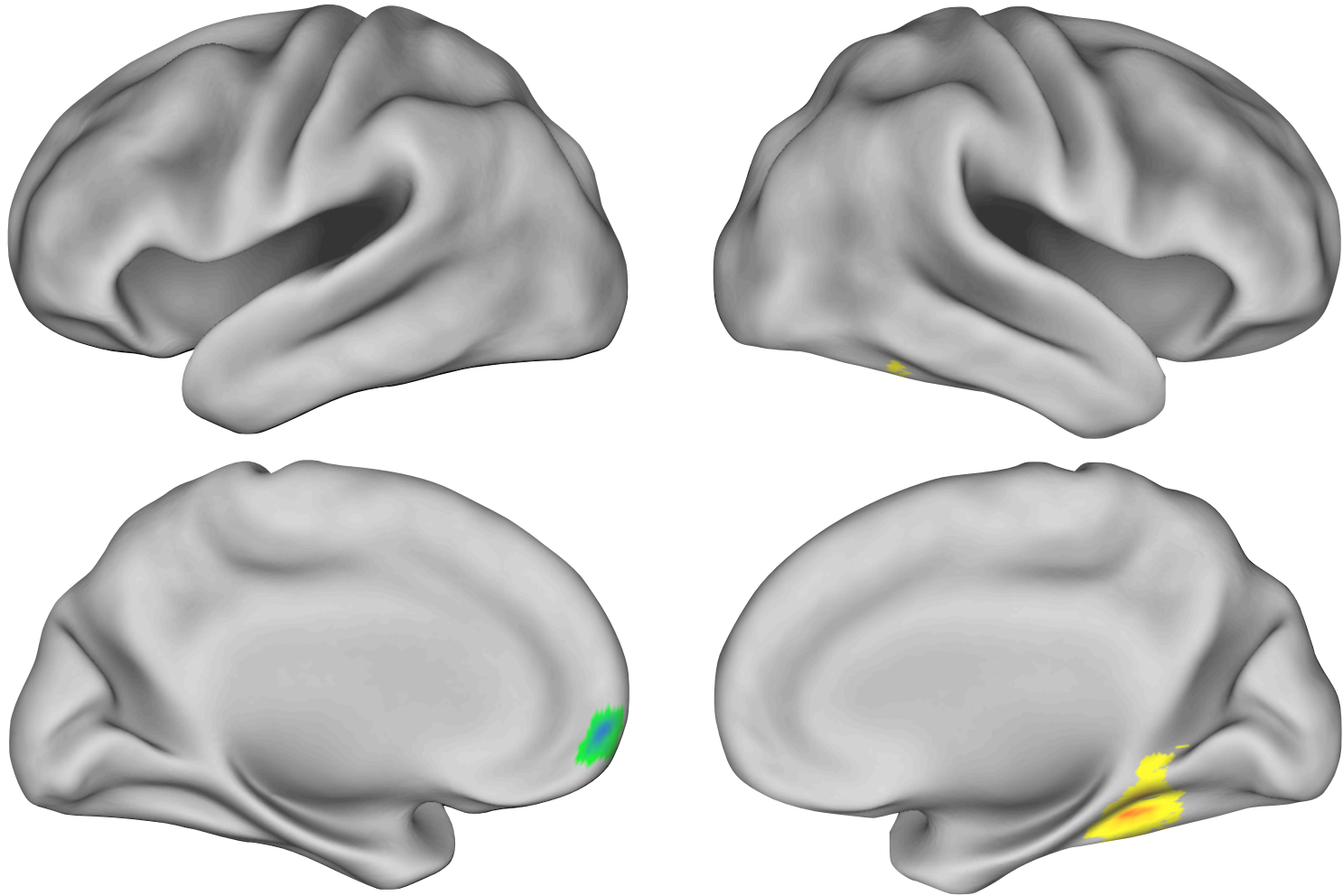


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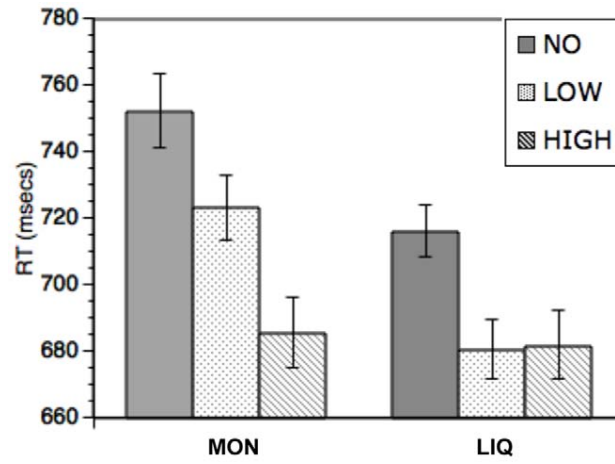
Do incentives improve cognitive control?

incentives increase general and specific cognitive control



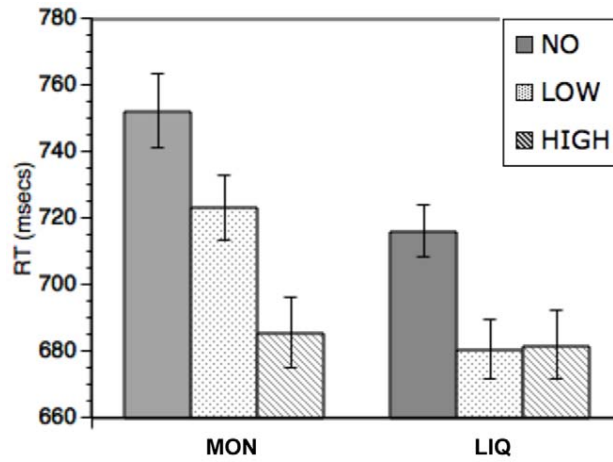






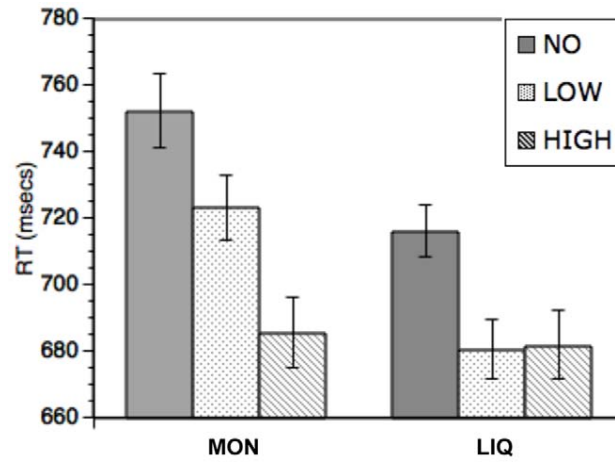


CCN
cognitive control
network





CCN
cognitive control
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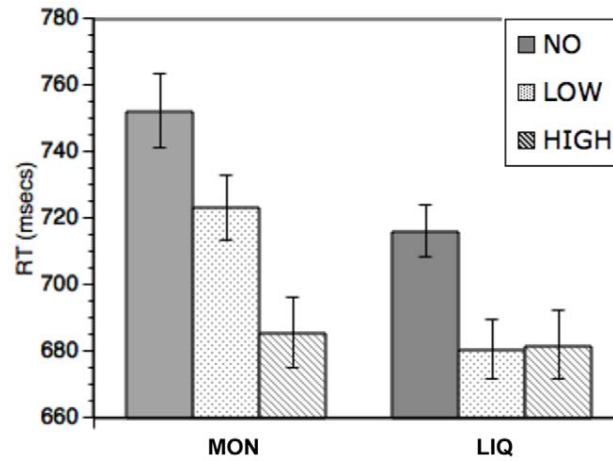


Reward
Reward processing
network



CCN
cognitive control
network

*sustained CCN
activation*



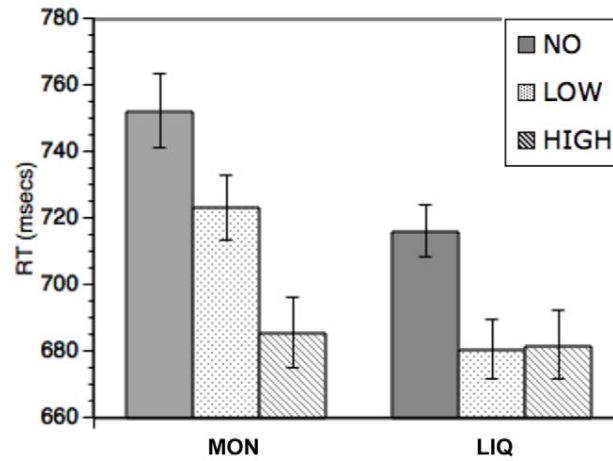
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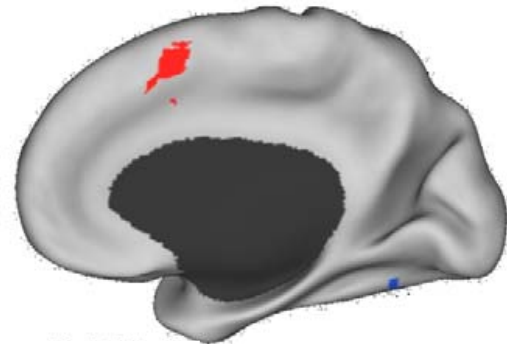
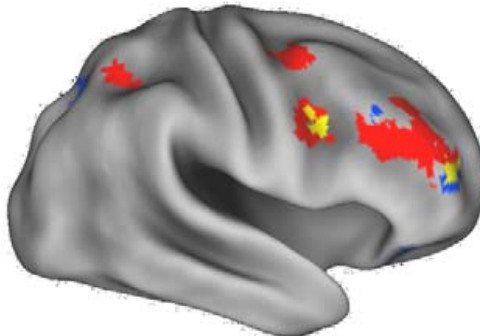
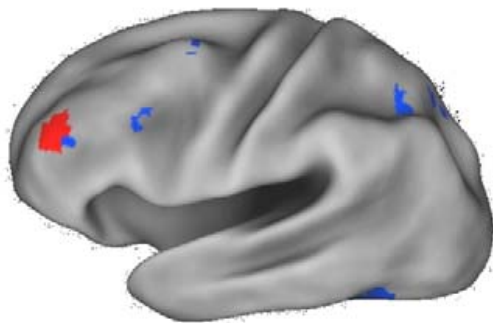
*transient CCN
activation*



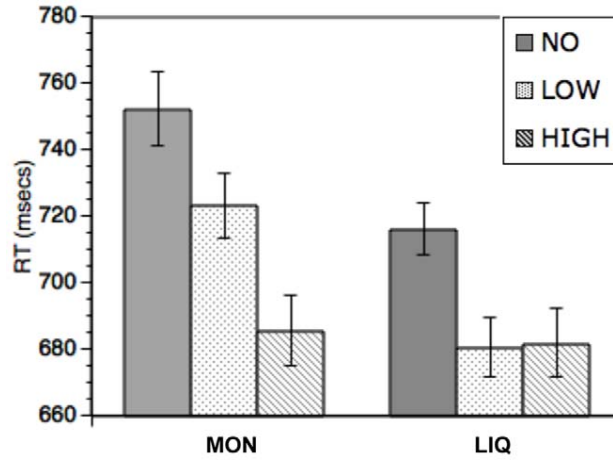
CCN

cognitive control
network

*sustained CCN
activation*



■ sustained money ■ transient liquid ■ overlap



Reward

Reward processing
network

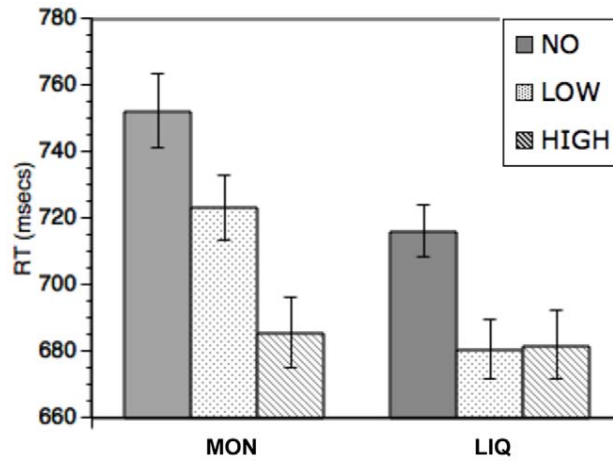
*transient CCN
activation*



CCN

cognitive control
network

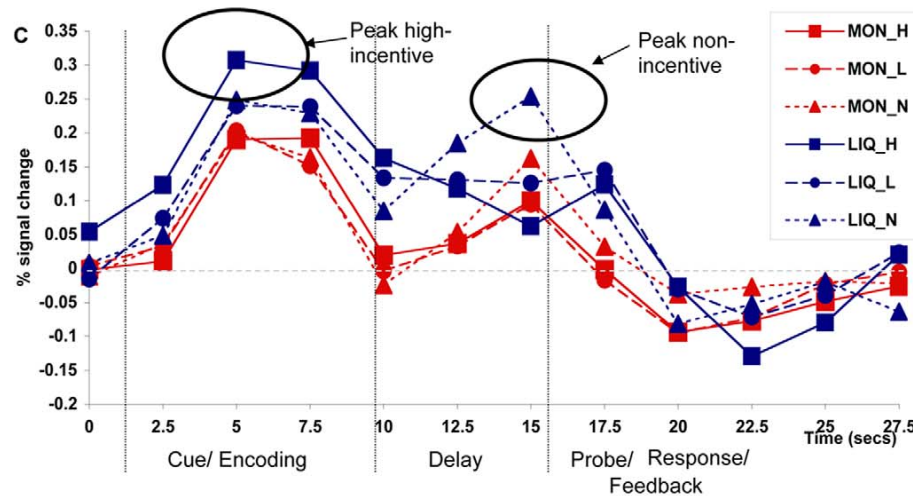
*sustained CCN
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Reward

Reward processing
network

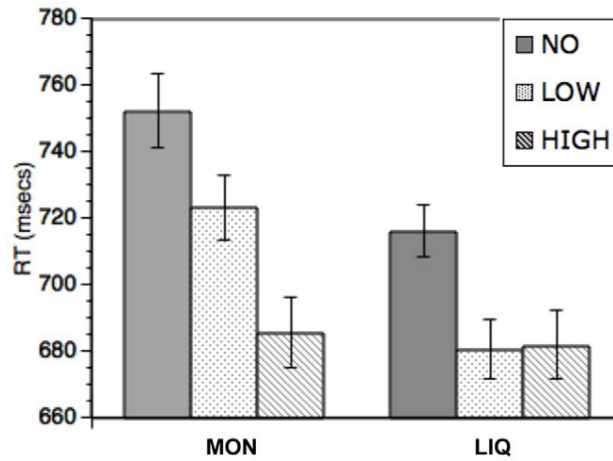
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activation*





CCN
cognitive control
network

*sustained CCN
activation*

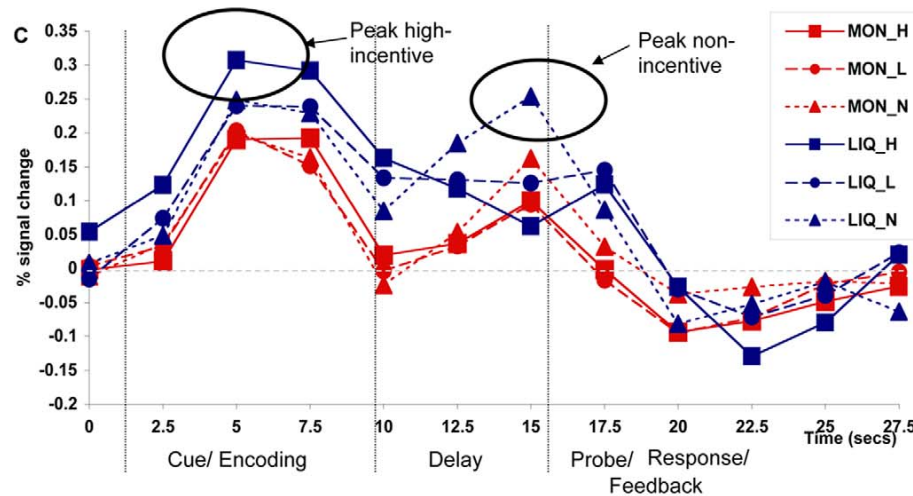


shift to proactive
cognitive control



Reward
Reward processing
network

*transient CCN
activation*

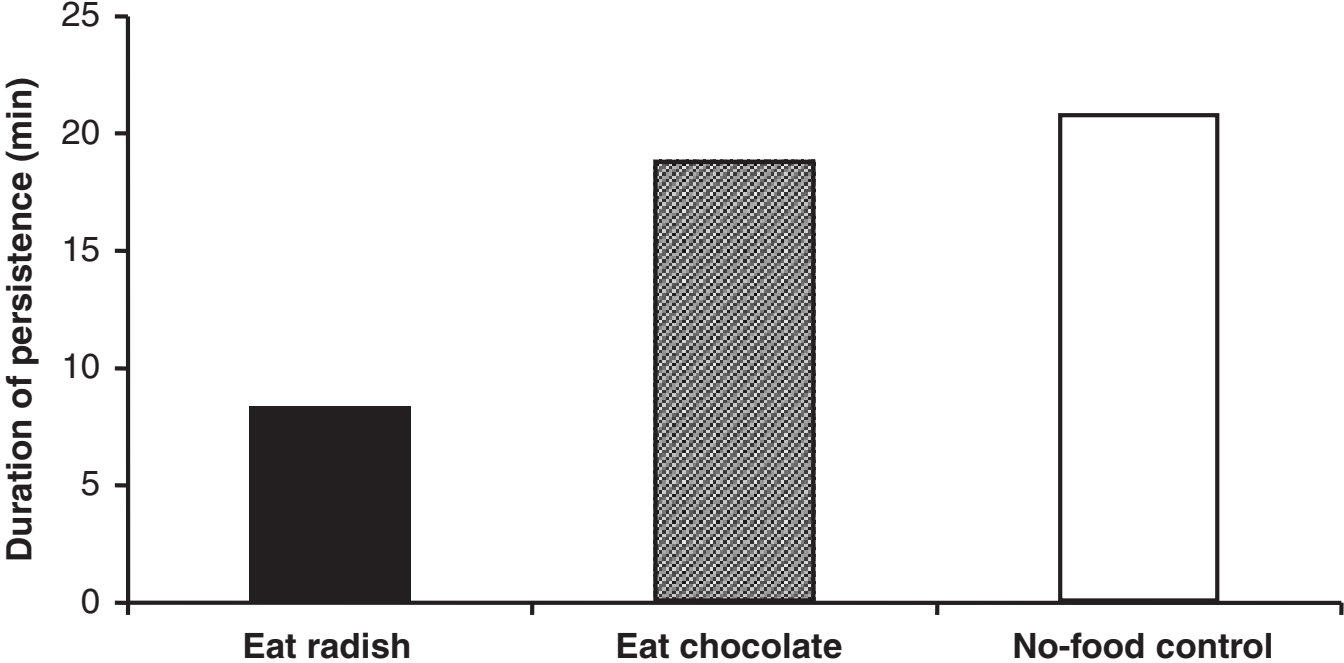


Mechanism underlying primary and secondary reward

Primary rewards are automatic, do not require maintenance of reward value / attention.

Self-control is “expensive”

Self-control is “expensive”



\$40 now or \$100 in 6 months

hidden-zero frame

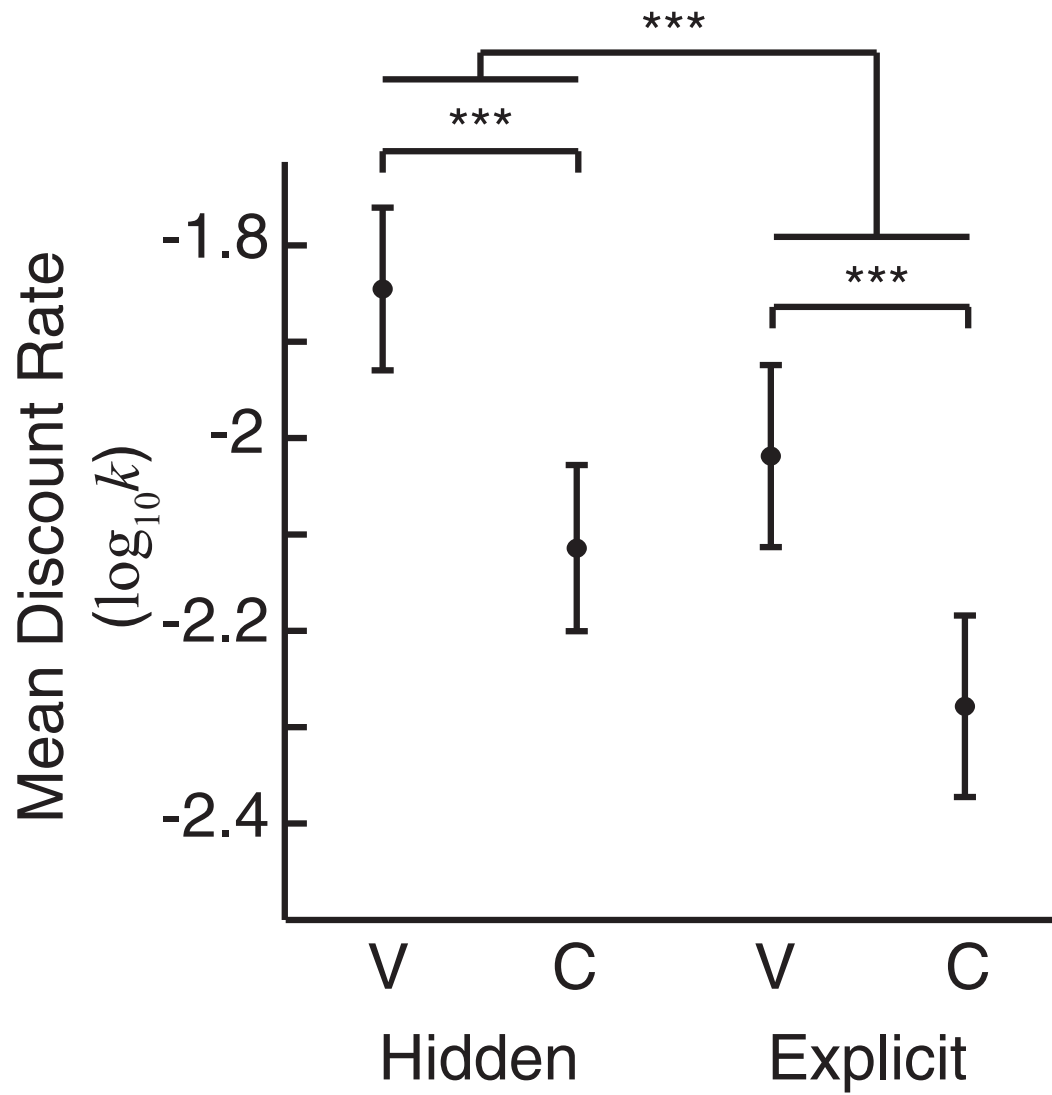
\$40 now or \$100 in 6 months

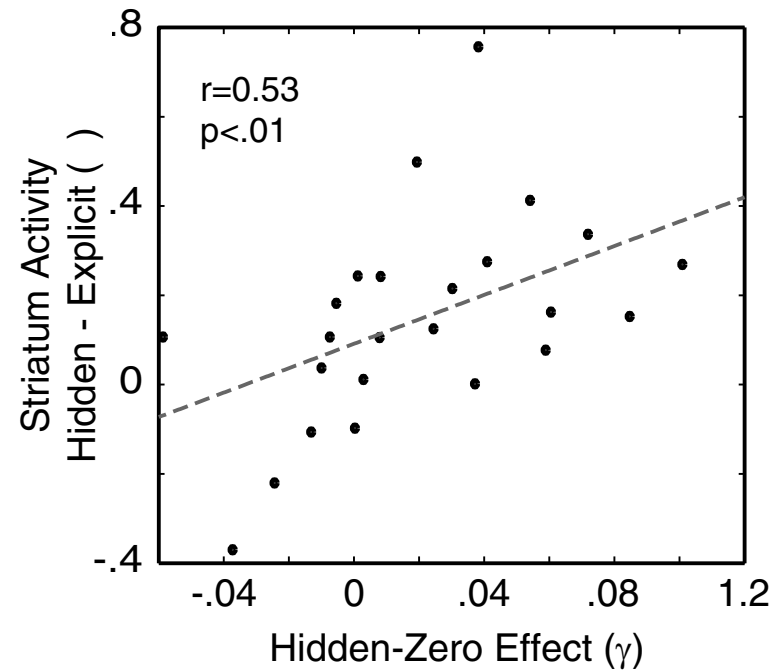
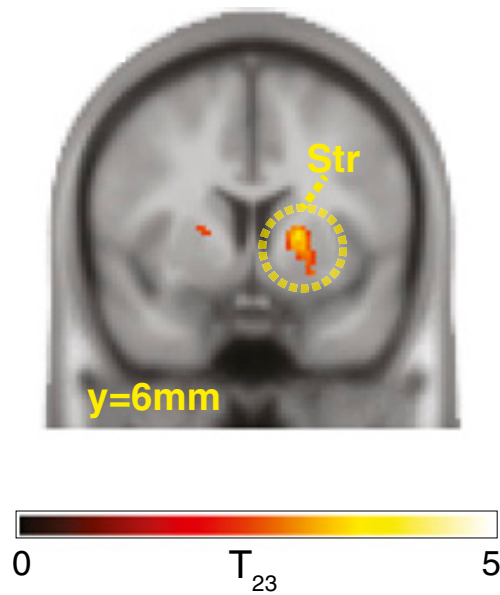
hidden-zero frame

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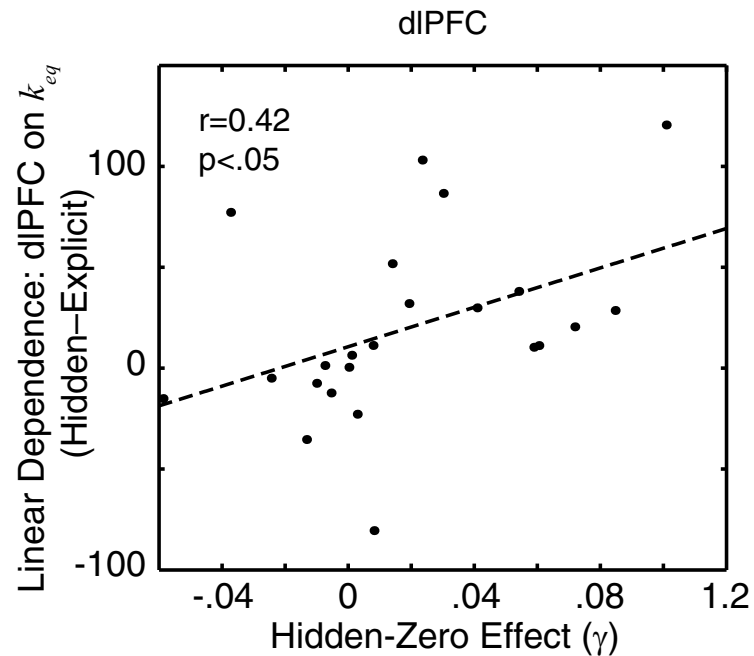
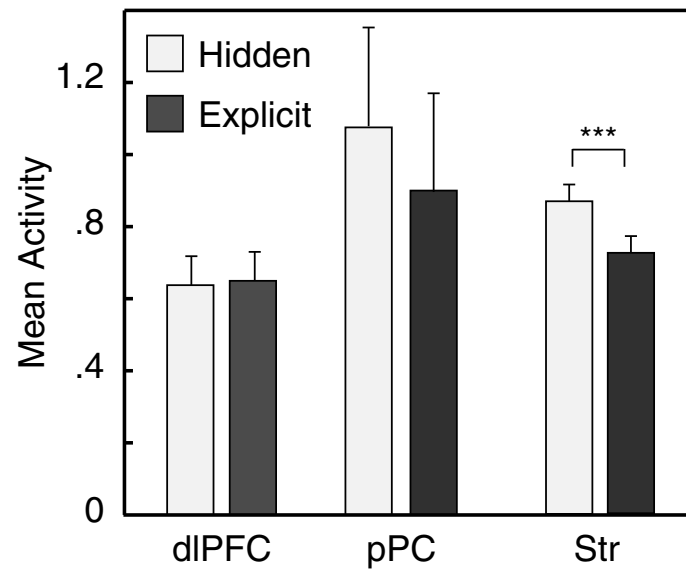
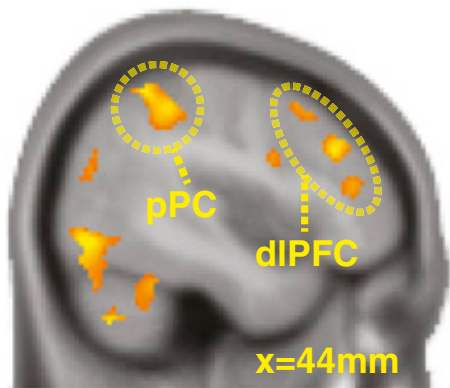
explicit-zero frame

\$40 now and 0\$ in 6 months
or 0\$ now and \$100 in 6 months





Hidden-zero activates reward system more,
the difference in activation predicts framing effect size.



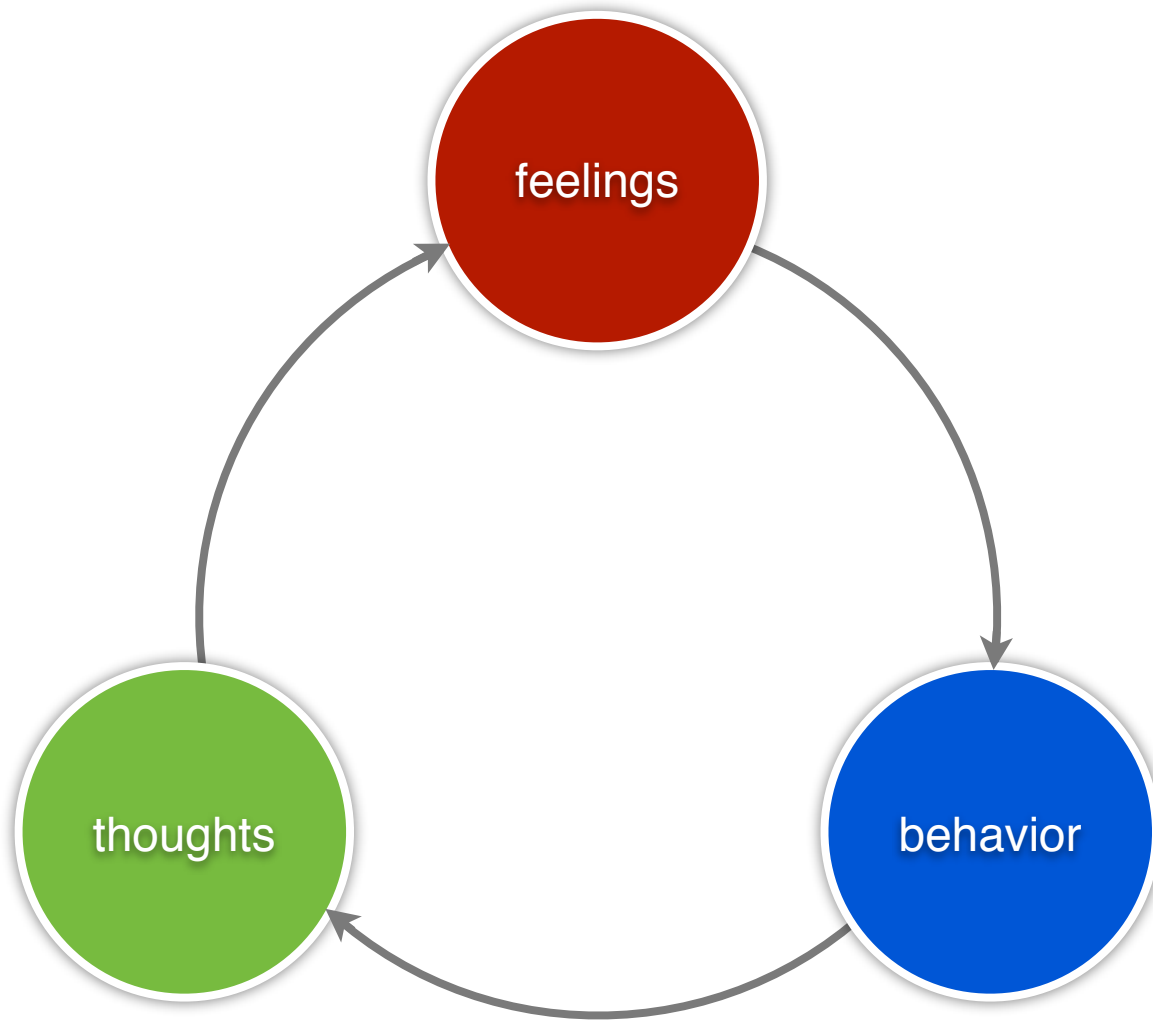
Choice framing does not affect DLPFC and PPC mean activity.
It affects the increase in DLPFC activity for larger, later reward.

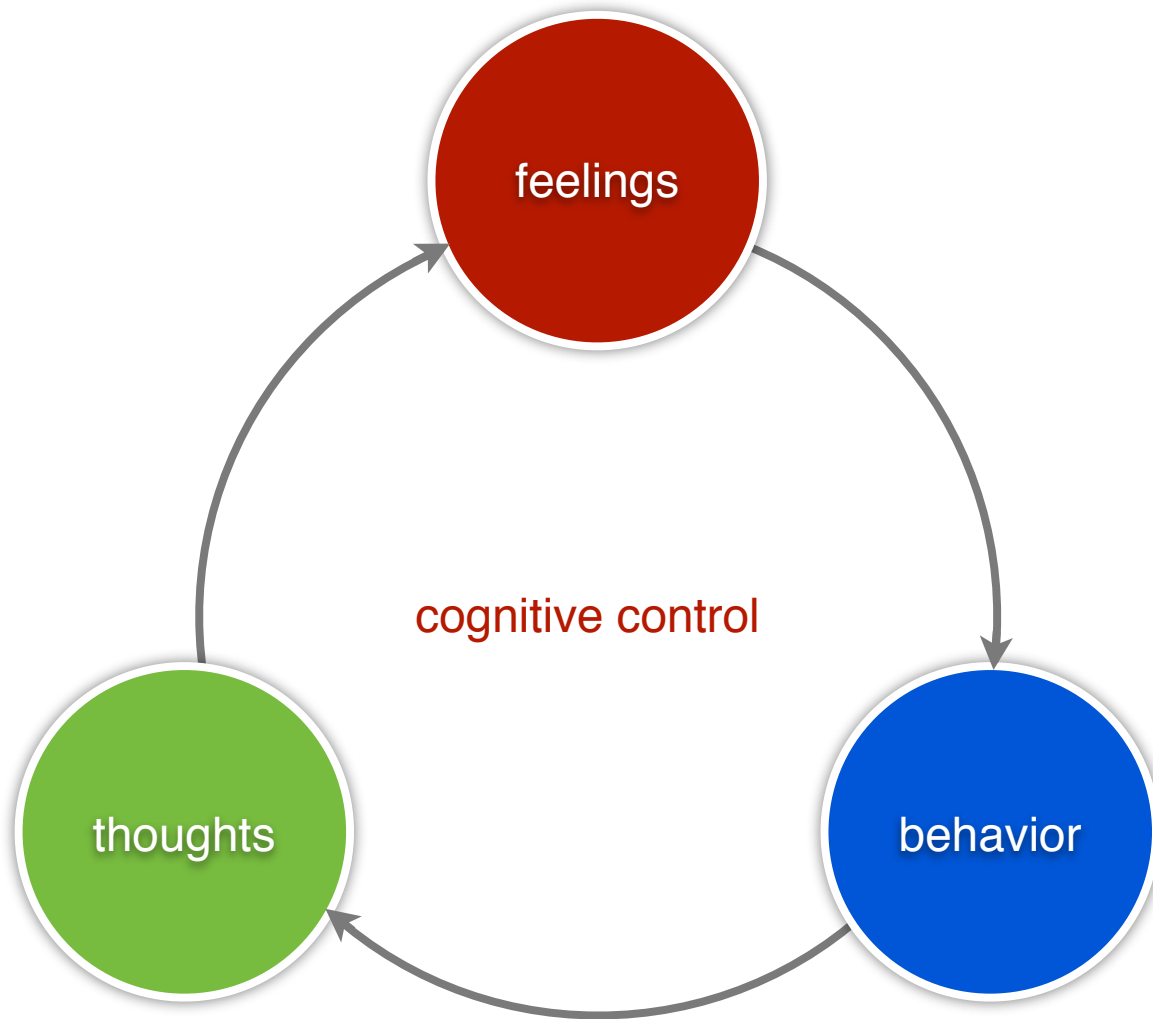
Self-control vs. reframing

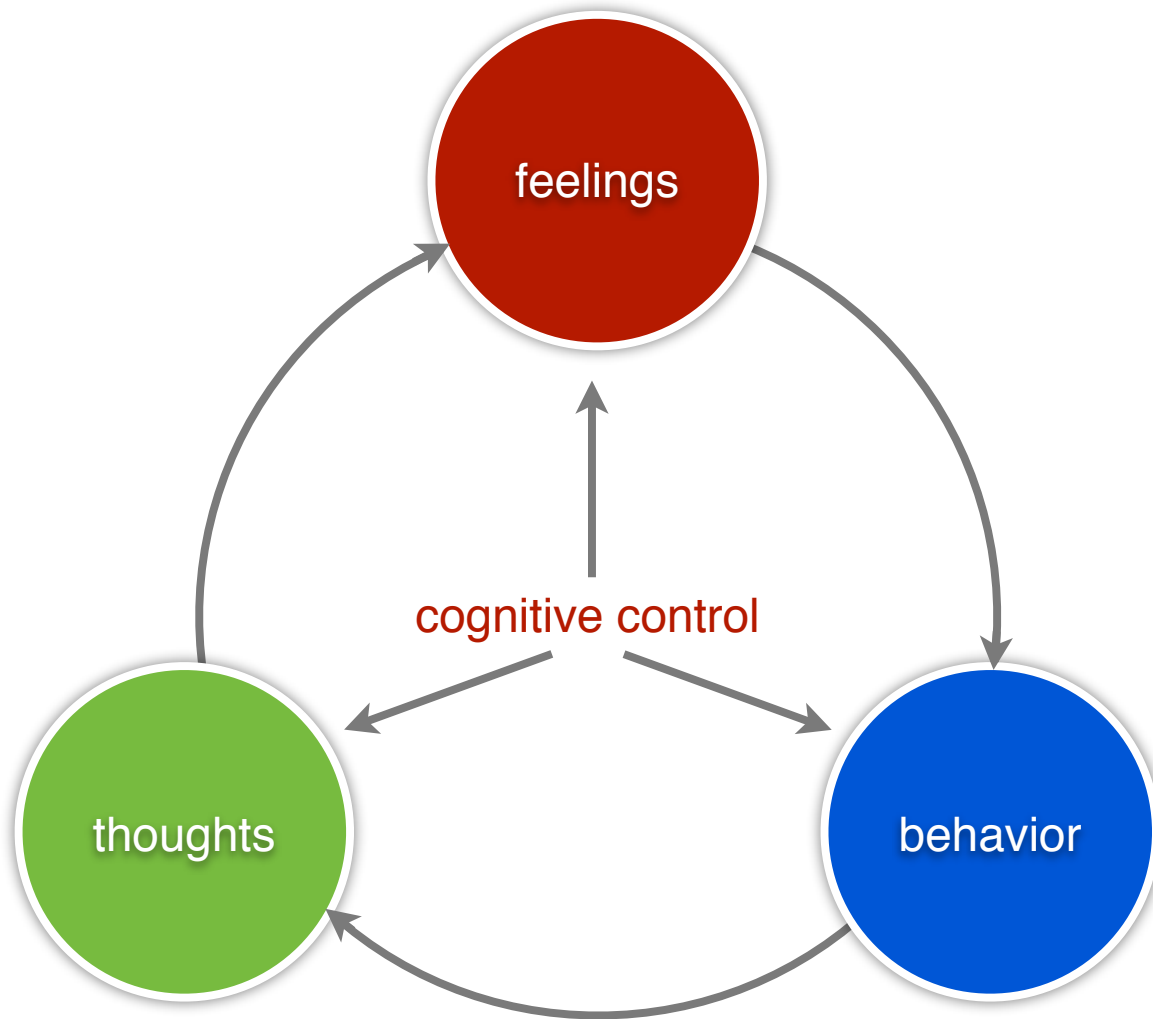
Reframing enables choice value adjustments,
it promotes better choices without resource depleting willfull self-control.

Question

Are existing management control strategies smart?







Daniel Kahneman
Thinking fast and thinking slow



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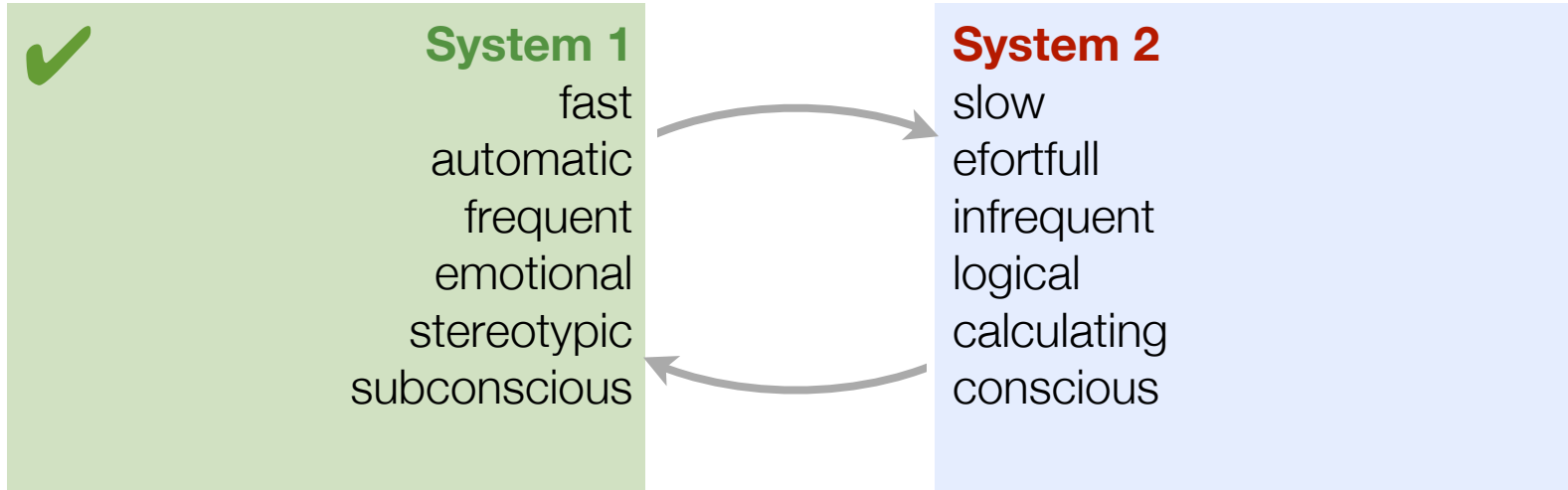
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