THE UNIVERSITY OF TEXAS AT AUSTIN

Regulatory Focus and Executive Functions

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Introduction

- Executive function (EF) encompasses cognitive processes that allow flexible and adaptive behavior in the face of novel or changing situations.
- The Wisconsin Card Sorting Task (WCST) is the gold standard measure of EF in neuropsychological assessment. [1]
- In category learning and choice tasks, a regulatory fit has been shown to increase cognitive flexibility and exploratory response strategies.[2,3]
- A regulatory fit occurs when one's regulatory focus (i.e. long-term goal) matches the reward structure of the task (i.e. short term goal).
- Relevant to clinical assessment because many neuropsychological tasks require flexible cognitive processing. [4]

Situational Focus

Reward Structure	Promotion	Prevention
Gains	Fit	Mismatch
Losses	Mismatch	Fit

WCST Hypothesis

Situational Focus

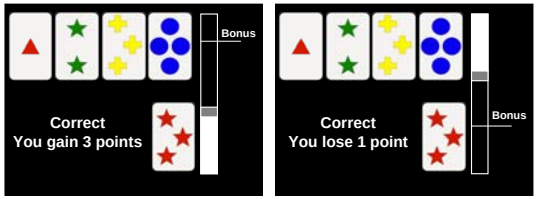
Reward Structure	Promotion	Prevention
Gains	Better set shifting	Worse set shifting
Losses	Worse set shifting	Better set shifting

WCST + Regulatory Focus

- WCST incorporated with Regulatory Focus framework
- Subjects sort cards on three dimensions, with one dimension relevant at a time, while the other two are irrelevant
- Relevant dimension changes after 10 correct responses (color → form → number)

Situational Focus	
Promotion	**Prevention**
Earn raffle entry into drawing for $50	*Keep* raffle entry into drawing for $50

Task Reward Structure	
Gains	**Losses**
+3 for correct response +1 for incorrect	-1 for correct response -3 for incorrect



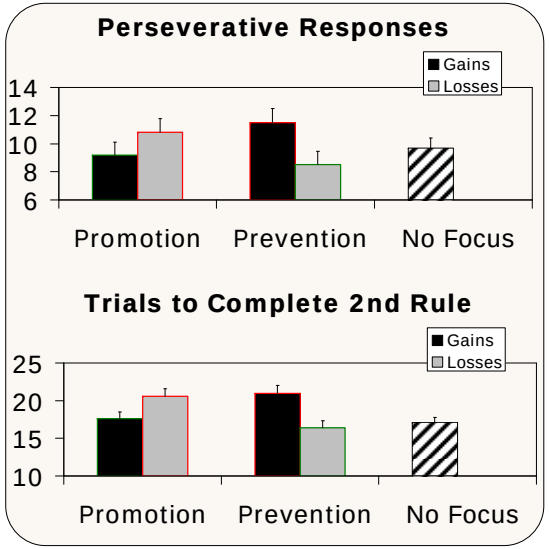
- Bonus criterion set to 80% of difference between minimum and maximum possible points

Participants

- 299 members of the University of Texas community, with 56, 62, 59, 54 and 68 in the promotion-gains, promotion-losses, prevention-gains, prevention-losses and control conditions, respectively.

Performance Measures

- A *perseveration* is a response to the previously relevant rule
- Trials to learn the 2nd rule (after completing the 1st rule) is a measure of set shifting in the WCST
- Interaction of Situational Focus and Task Reward Structure such that the participants in a **Regulatory Fit** (Promotion-Gains and Prevention-Losses) perseverate less and learned the 2nd rule faster than those in a **Regulatory Mismatch** (Promotion-Losses and Prevention-Gains)



- **Those in a Regulatory Fit performed better than those in a Regulatory Mismatch in the WCST, a set shifting task that requires cognitive flexibility**

"Clinical Diagnosis"

- A "control" group with no Situational Focus nor Task Reward Structure was compared to the four experimental conditions
- Performance below 1.1 standard deviation from the mean of the "control" group was considered to be "clinically impaired", as often computed for the WCST[1]

Condition	Perseverative Responses	Trials to Second Category
Promotion-Gain (Fit)	11.1%	16.7%
Prevention-Loss (Fit)	10.2%	12.2%
Promotion-Loss (Mismatch)	20.7%	25.9%
Prevention-Gain (Mismatch)	25.9%	20.7%
Fit (Overall)	**10.7%**	**14.6%**
Mismatch (Overall)	**23.3%**	**23.3%**

Discussion

- Motivational differences might differentiate two examinees, not EF abilities, with one being classified as normal and one as impaired
- Implications for neuropsychiatric treatment. E.g., . If a neuropsychiatric disorder is characterized by a chronic prevention focus then home environment could be modified to emphasize loss minimization, or the person's global incentive structure could be modified to introduce situational promotion foci.
- Different neural circuits may regulate EF performance on the same task, depending on Regulatory Fit or Mismatch. Thus, it may be possible to develop therapies or interventions (behavioral or pharmacological) to emphasize brain functioning mediated within a normal neural pathway over one that is dysfunctional[5]

References

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