



Negative Stereotypes Produce Better Performance in Frontal-Mediated Classification Learning

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Motivation

To reinterpret stereotype threat effects using the regulatory fit framework and to demonstrate benefits of fit in frontal-mediated classification learning but not in striatum-mediated learning

Stereotype Threat and Regulatory Fit

Stereotype Threat

Research documents the negative impact on performance given the activation of a negative stereotype

These performance decrements are known as stereotype threat effects (Steele & Aronson, 1995; Aronson, Lustina, Good, Keough, & Steele, 1999; Stone, Lynch, Sjomeling, & Darley, 1999)

For example, when an intellectual test was framed as diagnostic of ability, Black participants underperformed White participants but not when the test was framed as non-diagnostic or difficult for everyone (Steele & Aronson, 1995)

Regulatory Focus

A motivational mechanism that tunes sensitivity to gains and losses in the environment (Higgins, 1997)

- Promotion focus increases sensitivity to gains
- Prevention focus increases sensitivity to losses

Posited as a stereotype threat mechanism

A negative stereotype induces a prevention focus and a positive stereotype induces a promotion focus (Seibt & Förster, 2004)

Regulatory Fit

Need to account for match between focus and environment (Maddox, Markman, & Baldwin, 2007; Maddox, Baldwin, & Markman, 2006)

	Gains	Losses
Positive stereotype ("Promotion")	Match	Mismatch
Negative Stereotype ("Prevention")	Mismatch	Match

Only regulatory matches are assumed to increase dopamine release into frontal brain areas leading to increased cognitive flexibility

We predict that match groups will outperform mismatch groups on a category learning task that requires the participant test different explicit rules to correctly categorize stimuli. This task requires the use of the prefrontal cortex, the anterior cingulate cortex, and the head of the caudate nucleus, (e.g., Maddox & Ashby, 2004)

In contrast the match groups will do worse than mismatch groups on a category learning task using an information-integration category structure that requires the use of the striatum (e.g., Maddox & Ashby, 2004)

Experiments 1 & 2: Regulatory Fit Benefits Frontal-Mediated Learning

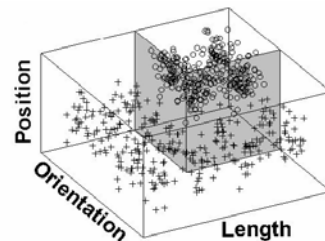
Frontal-mediated classification task

Requires participants test explicit verbal strategies to correctly classify stimuli, such as:

- Position: Left in Category A, Right in Category B
- Orientation: Steep in Category A, Shallow in Category B
- Length: Long in Category A, Short in Category B

Correct rule is conjunctive: If Long and Steep in Category A, otherwise Category B

- This rule can yield 100% accuracy on the task
- Any of the above unidimensional rules can yield 83% accuracy



Method:

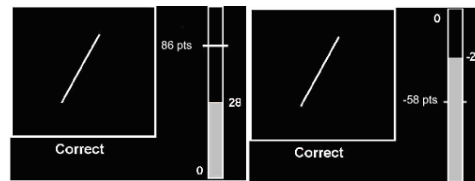
Experiments 1 and 2: 80 UT undergraduates paid \$8 participated in each

Stereotype threat manipulation:

- Experiment 1: Subjects told women are better at the task than men and tend to get more than 86 pts per block of trials
- Experiment 2: Subjects told men are better at the task than women and tend to get more than 86 pts per block of trials

Classification task reward structure:

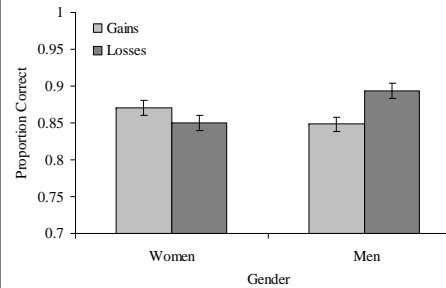
- Half gained points for correct responses
- Half lost points for correct responses



Classification task: completed 12 blocks of 48 trials each

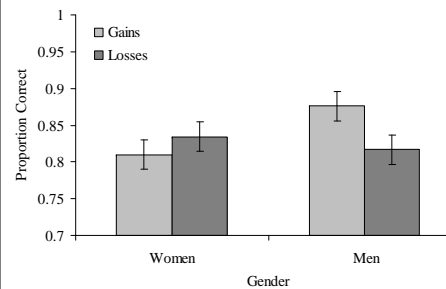
Experiment 1: Subjects told women are better

- Significant interaction of gender and reward structure
 - Men in losses > Men in gains in all 12 experimental blocks
 - Women in gains > Women in losses in 10 of 12 blocks



Experiment 2: Subjects told men are better

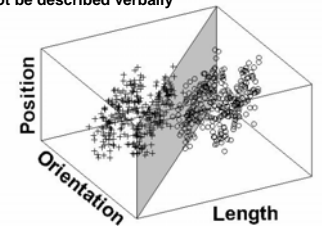
- Significant interaction of gender and reward structure
 - Men in gains > Men in losses in 11 of 12 blocks
 - Women in losses > Women in gains in 8 of 12 blocks



Experiment 3: Regulatory Fit Hurts Striatum-Mediated Learning

Striatum-mediated classification task

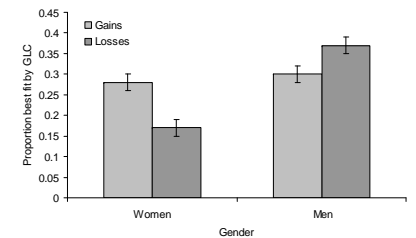
- Requires participants abandon explicit verbal strategies to correctly classify stimuli
 - The information-integration rule can yield 100% accuracy on the task but cannot be described verbally



Experiment 3: Subjects told men are better on task

Preliminary Results

- Significant interaction using decision-bound linear modeling
- Mismatch participants data better fit by general linear classifier (shown above) as compared to match participants



Concluding Remarks

We predicted and obtained a four-way interaction between stereotype, gender, reward structure, and task. Stereotype priming induces regulatory foci which interact with the task reward structure. As compared to a mismatch, a regulatory match produces better performance on a frontal-mediated task but worse performance on a striatum-mediated task.

References

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