



Dissociable Effects of Social Pressure on Frontal and Striatal-Mediated Classification Learning: Choking and Excelling Under Pressure

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Introduction

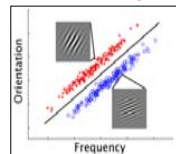
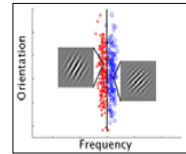
- Choking under pressure – abnormally poor performance when under pressure.
- **Distraction Theory:** Pressure decreases working memory (WM) and attention (Wine, 1971; Beilock et al, 2004).
- **Monitoring Theory:** Pressure increases WM and attention (Baumeister, 1984; Gray, 2004).

Category Learning

- Multiple neural systems mediate learning for different category structures (Maddox & Ashby, 2004).

Rule-Based

Information-Integration

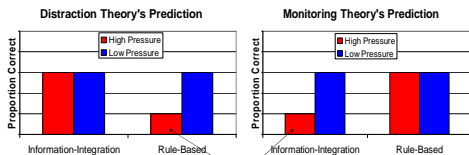


- Verbalizable
- Mediated by the prefrontal cortex
- Requires WM and attention

- Not Verbalizable
- Mediated by the striatum
- Does not require WM and attention

Hypotheses

Distraction and *Monitoring* theories make opposite predictions.



Choking

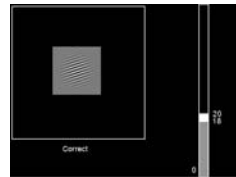
References

Baumeister, R. F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of Personality and Social Psychology*, 46, 610–620.
Beilock, S. L., Kulp, C. A., Holt, L. E., & Carr, T. H. (2004). More on the fragility of performance: Choking under pressure in mathematical problem solving. *Journal of Experimental Psychology: General*, 133(4), 584–600.

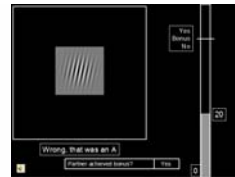
General Method

Low-Pressure Rule-based	High-Pressure Rule-Based
Low-Pressure Information-Integration	High-Pressure Information-Integration

Low Pressure



High Pressure

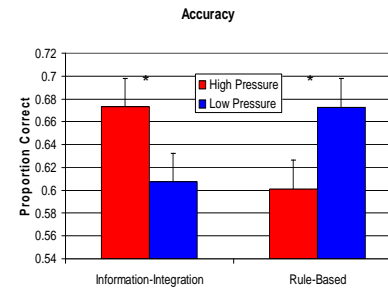


- Told to "do your best"

- Paired with a 'partner'
- Both reach criterion, both get \$6
- One fails neither get \$6
- Partner reached criterion

Results

Experiment 1 - Novices



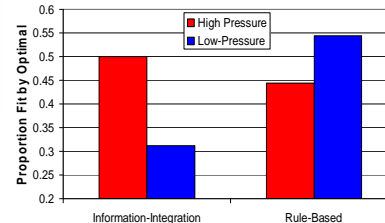
Excelling

Choking

- Novice rule-based subjects choked under pressure, while novice information-integration subjects excelled under pressure

Decision Bound Modeling

Proportion Best Fit by Optimal Model



- More *high pressure* information integration subjects were best fit by the optimal general linear classifier model.

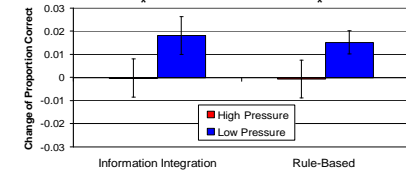
- More *low pressure* rule-based subjects were best fit by the optimal unidimensional rule model.

Results

Experiment 2- Experienced

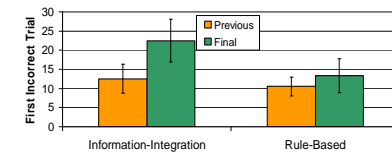
- Four sessions were performed identical to the low pressure condition in experiment 1.
- On the fifth session half received the pressure manipulation
- High Pressure subjects could earn a \$100 bonus for perfect performance on the final block.

Change in Proportion Correct After Pressure Manipulation



- Experienced information-integration subjects experience more severe declines in performance when under high pressure than rule-based subjects.

First Incorrect Trial on Final Block



- Experienced information-integration subjects perform better under pressure when given a criterion of 100% accuracy.

General Discussion

- In novices, rule-based subjects *choked* under pressure, and information-integration subjects *excelled* under pressure.
- In experienced subjects, high pressure caused performance decrements for both RB and II subjects, but appears to cause worse performance for RB subjects.
- Results suggest that pressure may have a more deleterious effect on frontal systems than on striatal systems which supports the Distraction Theory.