

Stereotype threat and working memory resource depletion effect

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Background

- Working memory resources can be depleted during a learning task (Chen, Castro-Alonso, Paas, & Sweller, 2018; Leahy, & Sweller, 2019).
- In previous experiments, we failed to replicate
 - transcription task (Vié et al., 2021)
 - dictation task (Brellier & Tricot, 2021).
- Cognitive load theory does not take social factors into account (Pennington et al., 2016)
- Stereotype threat is a typical cognitive load effect in social psychology
 - What is the effect of stereotype threat over time?
 - What role in resource depletion?

Hypotheses

$$\begin{array}{c} \text{Resources} \\ \text{to process threat} \end{array} + \begin{array}{c} \text{Resources} \\ \text{to perform task} \end{array} = \text{High cognitive load}$$

$$\begin{array}{c} \text{Resources} \\ \text{to process threat} \end{array} + \begin{array}{c} \text{Resources} \\ \text{to perform task} \end{array} = \text{Low cognitive load}$$



Method

- Replication of Chen et al.'s (2018) protocol
- Mental math calculations task
 - 4 sheets of 24 calculations each
 - 20 minutes.
- Measures
 - evolution of performance over the task
 - performance at a working memory posttest,
 - perceived difficulty, perceived fatigue, etc.

Method



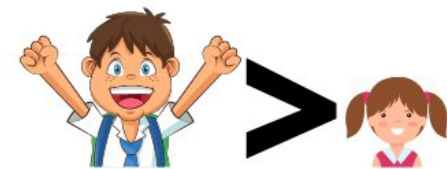
non-threatening



threatening



threatening with threat reactivation



- Participants
 - 179 grade 6 students.
 - randomly assigned

Method

- Procedure

- (5') a reminder of the calculation rules to perform the task,

- (20') the main mental calculation task (depletion task)

- (10') a working memory post-test: calculations and recall questions related to the results of these calculations

- (5') subjective questionnaire

Results

- the number of errors increases between the first and second calculation sheets ($t(150) = -6.518, p < .001$).
- the number of calculations not performed increases between the second fourth calculation steps ($t(150) = -2.298, p = .023$)
- a threat effect
 - Girls omitted more calculations ($F(1,149) = 8.74, p = .004$);
 - Girls made more errors ($F(1,150) = 11.41, p < .001$).
 - Girls reported more anxiety ($F(1,150) = 5.76, p = .018$),
 - Girls perceived greater difficulty ($F(1,144) = 8.089, p = .006$).
 - Girls less likely to repeat the $F(1,150) = 5.26, p = .023$).

Discussion

- Partial resource depletion effect
- Partial stereotype threat effect
- No effect of maintaining threat
- Limitations: the way we reactivated threat may have been irrelevant