

A COMPARISON OF EMOTION REGULATION STRATEGIES' EFFECTIVENESS UNDER COGNITIVE FATIGUE

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INTRODUCTION

Emotion regulation primarily refers to the process of cognitively controlling our emotions, the attention we give to emotions, and the way we interpret and experience emotions (Gross, 1998).

Various emotion regulation strategies have been explored and identified in the last few decades, and they were found to differ in their effectiveness in regulating emotions (Gross & John, 2003).

Emotion Regulation Strategies

Cognitive Reappraisal refers to a way in which individuals change how they think about a situation before emotions take place.

Distraction involves shifting focuses in order to deploy attention away from emotional stimuli.

Affect Labeling involves solely verbally labeling an emotional content of an external stimulus.

Possible explanations for differential effectiveness and success among emotion regulation strategies is that

- A) some strategies may require distinct amount of cognitive resource from others and
- B) individuals differ in their capacity to cognitively employ each emotion regulation process.

Research has shown that decreased cognitive resources weakened emotion regulation's effectiveness and that emotion regulation undermined performance on cognitive tasks (e.g., working memory span; Schmeichel, 2007).

Objectives:

To compare the effectiveness of cognitive reappraisal, distraction, and affect labeling under cognitive fatigue using **self-report negative emotions** and **skin conductance**.

SAMPLE



49 participant:
41 female (83.67%),
Education level:
28 Undergrad students (57.14%),
9 Graduate (18.37%), and
12 others (24.49%)

* Data from 3 individuals were excluded from the analysis due to non-responses of skin conductance that occurred during the experiment.

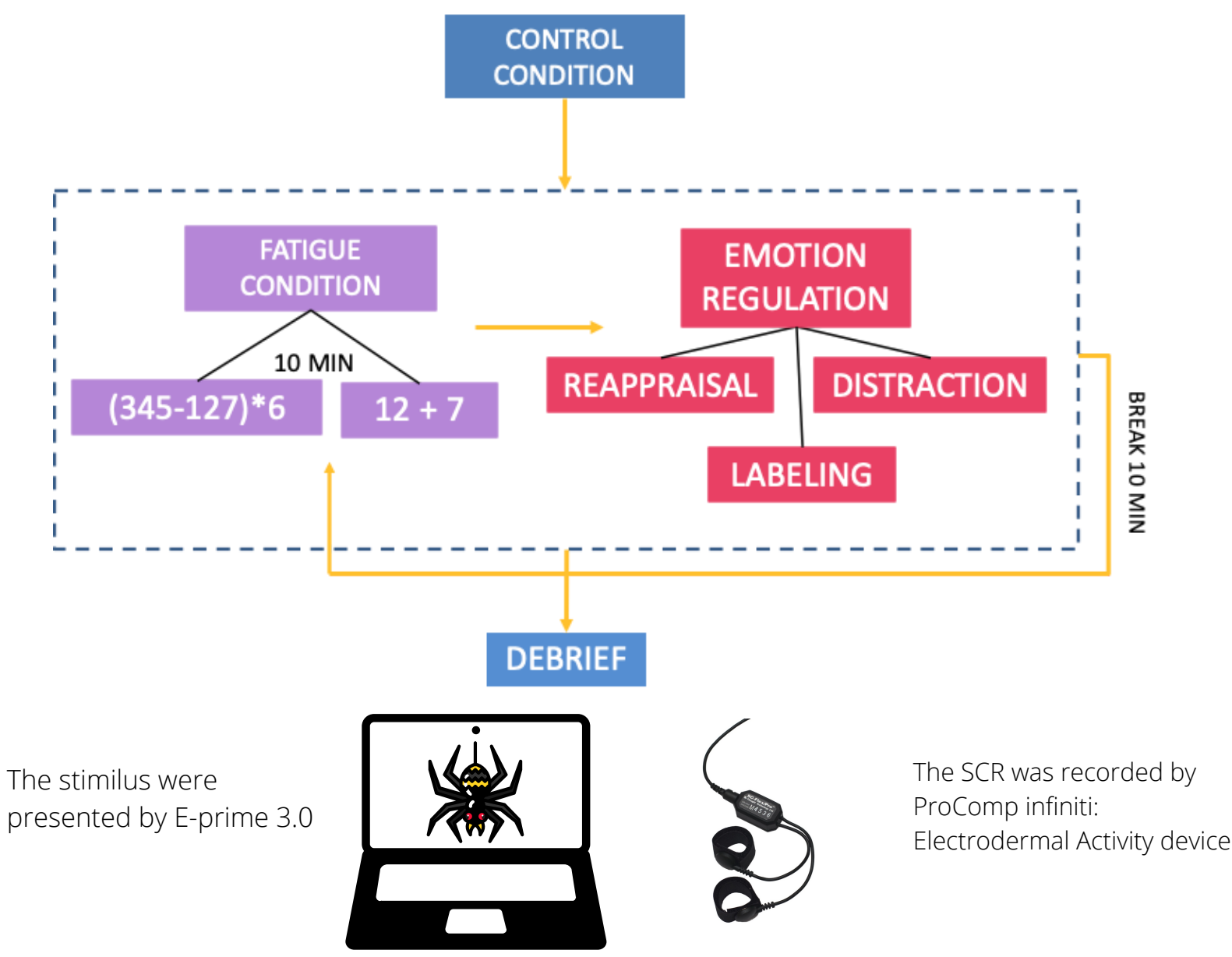
Measures

- Self-report Negative Emotion**
Likert scale (1 low to 7 high intensity)
- Skin Conductance (EDA)**
measured by ProComp Infiniti Device

Materials

- Cognitive Fatigue Tasks.** Series of mental calculations including additions, subtractions, multiplications, and division which consists of 1-3 digit numbers and three levels of calculation, for instance, $(345 - 127) \times 6$.
- Emotion Stimuli.** 40 images from the International Affective Picture System (IAPS; Lang et al., 2008)
- Emotion Regulation Tasks.** These tasks required individuals to regulate their emotions that were elicited from the IAPS pictures.

Procedure



An incomplete randomized block design for a 3 (strategies) by 2 (fatigue) within-subject conditions was employed in order to reduce the length of the experimental session and kept the participants engaged. In this design, one participant was randomly assigned into 4 of 6 conditions

Data Analysis

Linear mixed-effect models were designed to predict each of the outcome variables: **self-report negative emotions** and **sum of SCR phasic amplitude**.

RESULTS

Comparisons of Emotion Regulation Strategies against Control Group

- All six experimental conditions were significantly lower than the negative baseline-control. ($M_{exp} = 2.19 - 3.34$ vs. $M_{neg-base} = 4.14$). While the sum of amplitudes, only reappraisal in non-fatigue condition ($M = 1.50$, $SD = 0.33$) showed the result lower than the negative baseline control ($M = 1.53$, $SD = 0.32$). See table below.

Condition	Strategies	Self-Report (n = 46)	Sum of Amplitude (n = 45)
Control	Control	4.14 ± 0.18	1.53 ± 0.32
Fatigue	Reappraisal	2.60 ± 1.17	1.54 ± 0.38
Fatigue	Distraction	2.69 ± 1.34	1.72 ± 0.56
Fatigue	Labeling	3.19 ± 1.29	1.92 ± 0.70
Non-fatigue	Reappraisal	2.19 ± 0.90	1.50 ± 0.33
Non-fatigue	Distraction	2.53 ± 1.14	1.64 ± 0.46
Non-fatigue	Labeling	3.34 ± 1.29	1.77 ± 0.60

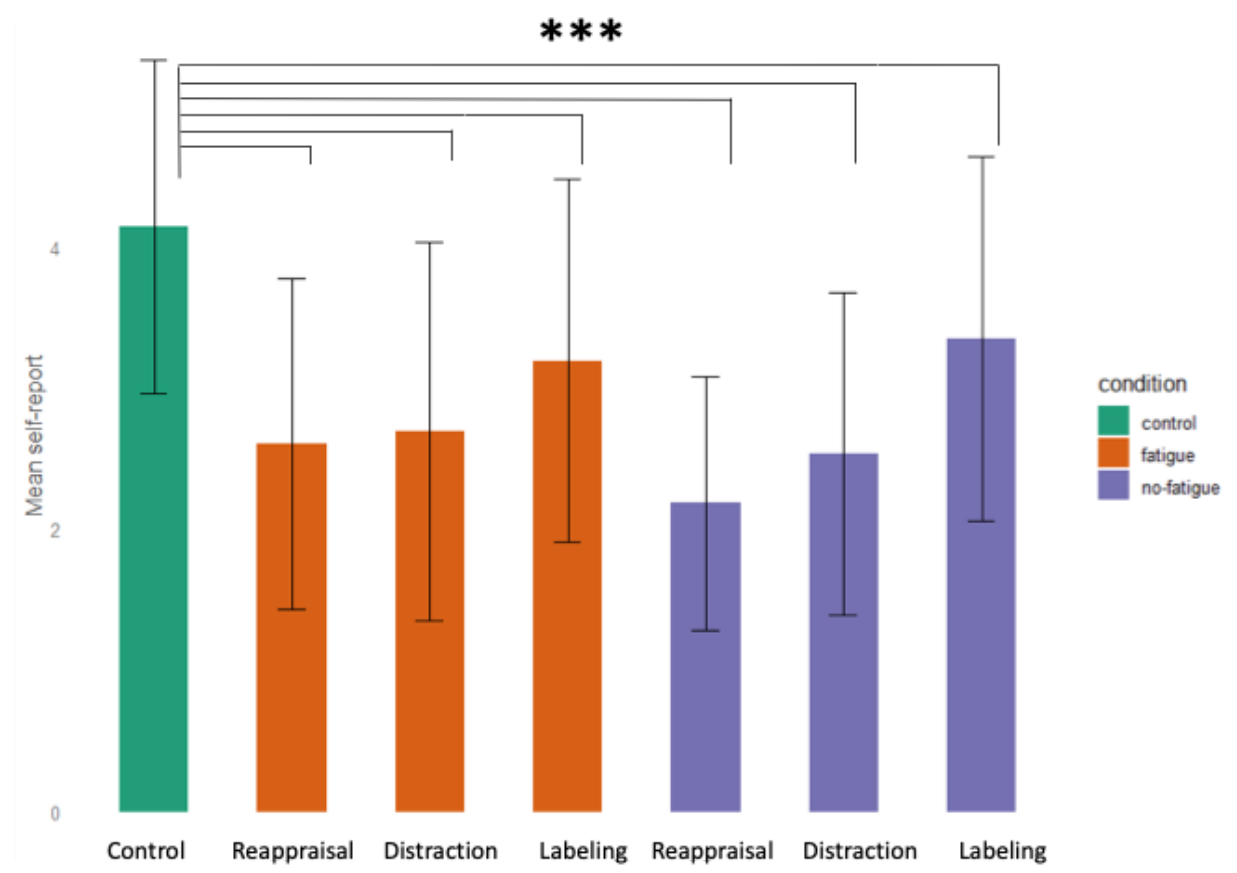
Comparisons of Emotion Regulation Strategies and Fatigue Conditions

Self-reported Negative Emotions.

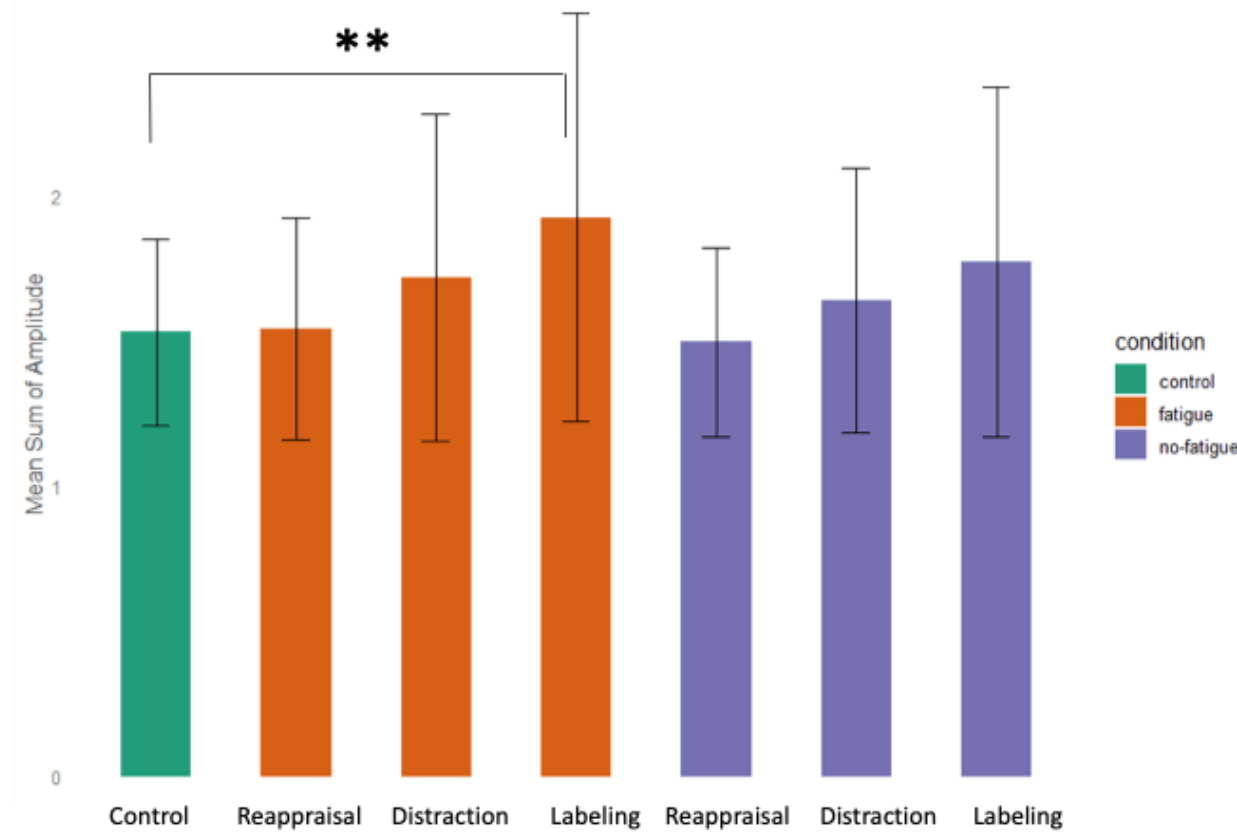
- The results revealed that the difference between the fatigue and non-fatigue conditions was not significant ($b = -0.36$, $p = .106$).
- For the main effect, affect labeling was significantly higher than reappraisal ($b = 0.70$, $p < 0.001$) while distraction was not significantly different from reappraisal ($b = 0.22$, $p = 0.304$).
- The interaction between regulation strategies and cognitive fatigue was not significant.

Sum of Amplitudes.

- Consistent with the self-report emotions, the effect of cognitive fatigue was not significant for the sum of amplitudes ($b = -0.01$, $p = 0.915$).
- Affect labeling showed significant different to reappraisal ($b = 0.09$, $p < 0.05$) while distraction showed no significant difference ($b = 0.03$, $p = 0.395$).
- There was no significant interaction between the fixed factors.



Self-report Negative Emotion



Sum of Amplitude (µS)

** = $p < 0.01$, *** = $p < 0.001$

DISCUSSIONS

Effects of cognitive fatigue on Emotion Regulation

- From the results, we could not demonstrate the effect of cognitive fatigue, this might due to:
- Emotion regulations were not affected by cognitive fatigue.
 - Participants were not cognitively fatigue.
 - Participants were cognitively fatigue in both condition.

Effectiveness of Emotion Regulation on Negative Emotions

- Reappraisal is a promising strategy regardless of one's cognitive resource.
- There is only small difference between reappraisal and distraction.
- Affect labeling did not show to be effective as expected.

Measurement of Emotions

- Results showed inconsistency between self-report negative emotion and skin conductance response in the control group.
- This could due to the Carry-over effect of physiological response of the participants.

CONCLUSION

Emotion regulation is a fundamental ability to adapt individual's behavior to different situations. Different emotion regulation strategies have been explored in many domains such as clinical, psychology mental health, neuroscience, etc. The present study provided a consistent conclusion with previous works which showed that reappraisal worked better than distraction and affect labeling. On the other hand, we could not demonstrate any difference in emotional responses when comparing the cognitive fatigue conditions, suggesting that the three strategies may very sensitive to the decrease cognitive resources

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