

The effect of arousal on regulation of negative emotions using cognitive reappraisal: an ERP study

Michelle E. Sanchez and Sandra J.E. Langeslag
University of Missouri – St. Louis

UMSL

Introduction

- Emotion regulation = use of behavioral or cognitive strategies to generate new emotions or to increase or decrease intensity of current emotions [1]
- Emotion intensity (arousal) may affect emotion regulation
- The late positive potential (LPP) amplitude is an objective measure of regulation success [2]
- Research question: how does arousal affect reappraisal success of up-regulation and down-regulation of negative emotions?
- Hypothesis 1: hard to down-regulate weak emotions (floor effect) and to up-regulate intense emotions (ceiling effect) [3, 4]
- Hypothesis 2: reappraisal is not effective for down-regulating intense emotions [5]

Methods

- 20 participants (20-39 yrs, 9 men)
- Unpleasant and neutral IAPS pictures
- Valence, arousal, and difficulty ratings at the end of block (Fig. 1)
- 32-channel EEG registration (Biosemi)
- LPP amplitude (300-400 ms, 400-700 ms, 700-1000 ms) at Fz, Cz, Pz

Seven Conditions

- 1 High arousal + Down regulation
- 2 High arousal + Up regulation
- 3 High arousal + View
- 4 Low arousal + Down regulation
- 5 Low arousal + Up regulation
- 6 Low arousal + View
- 7 Neutral + View

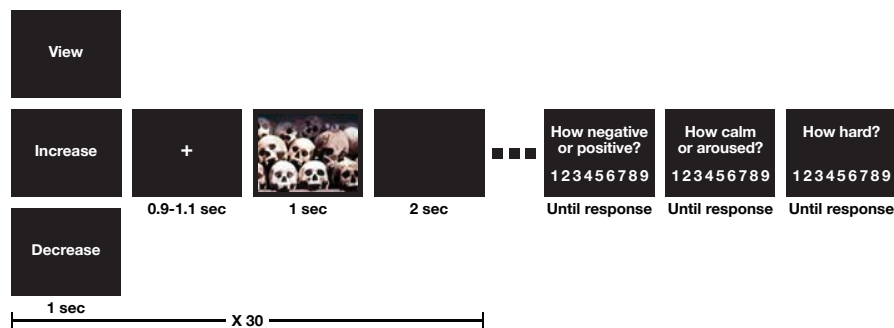


Fig. 1: Block overview

Results

- Valence ratings: up-regulation < view < down-regulation
- Arousal and difficulty ratings: no significant effects
- LPP 300-400 ms: view < up-regulation and down-regulation at Pz (Fig. 2)
- LPP 400-700 ms: view < up-regulation at Pz, for low arousing unpleasant pictures (Fig. 2)
- LPP 700-1000 ms: no significant effects
- Up-regulation effect at Pz was positively correlated with up-regulation effect in arousal ratings, for high arousing unpleasant pictures (Fig. 3)

Discussion

- Reappraisal modulated subjective valence in the direction of the regulatory goal irrespective of intensity
- Expected LPP enhancement for up-regulation, longer duration for weak (300-700 ms) than intense (300-400 ms) negative emotions
- Participants seemed less successful at up-regulating intense than weak emotions (ceiling effect)
- This ceiling effect may result from individual differences in up-regulation success of intense negative emotions
- Unexpected enhanced LPP for down-regulation (300-400 ms) [cf. 3, 4, 6]
- Possibly due to blocked design, strategy selection, or order effects
- Floor and ceiling effects probably not the cause of the absence of a decreased LPP with down-regulation in previous studies [cf. 3, 4, 6]
- Future research: explore how arousal affects reappraisal success of up/down-regulation of positive emotions

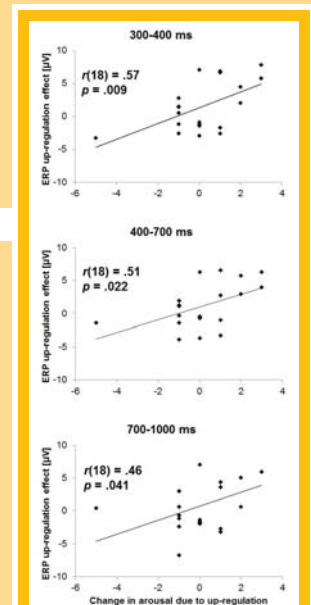


Fig. 3: Correlations between up-regulation at Pz and up-regulation in arousal ratings for high-arousing stimuli

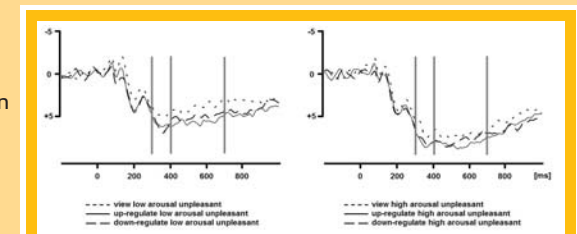


Fig. 2: Event-related potentials (ERPs) at Pz