ELECTROPHYSIOLOGICAL MEASURES OF EMOTIONAL REACTIVITY AND EMOTION REGULATION IN PATIENTS & HEALTHY CONTROLS

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INTRODUCTION

The **late positive potential (LPP)** provides electrophysiological measures for emotional reactivity and emotion regulation[1]. While **reappraisal** of negative stimuli has been shown to reduce the LPP[2,3], **savoring** of positive stimuli for enhancing the LPP is a relatively new approach in emotion regulation research[4].
Objective: In this study, we investigated LPP-based measures of both emotional processes in a novel combination of up- and down-regulation. Our sample consists of a healthy control group and a group of patients with internalizing disorders enrolled in a larger research project dedicated to predicting (non-)response of cognitive behavioral psychotherapy.
This study addresses the following question:
Do LPP-based measures of emotional reactivity and emotion regulation differ between healthy control participants and patients with internalizing disorders?

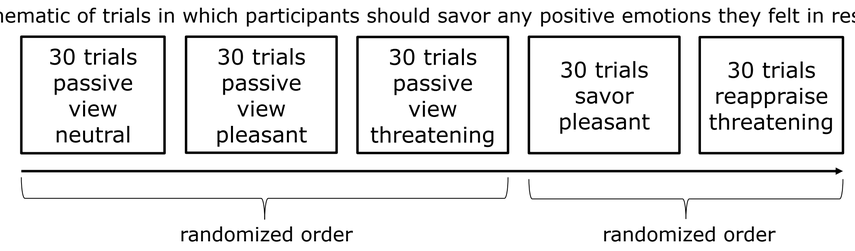
EXPERIMENTAL DESIGN

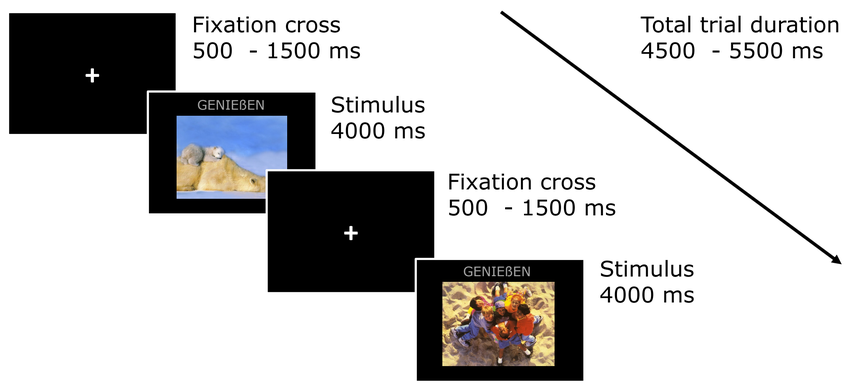
Emotion Regulation Paradigm

Participants were instructed to maintain, reduce, or enhance emotional responses using passive viewing, reappraisal or savoring. (Fig. 1).

- **Stimuli**: Neutral, threatening and pleasant pictures (IAPS)[5]

Fig. 1. Schematic of trials in which participants should savor any positive emotions they felt in response to the picture.





RESULTS

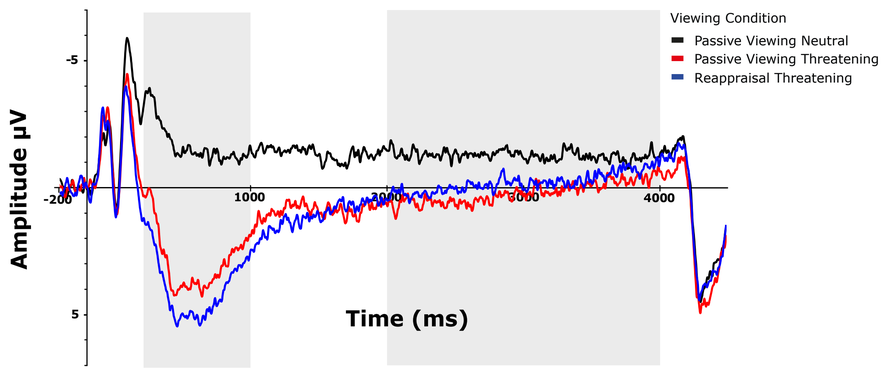
Sample

Healthy Control Group: n = 53 (M_{age} = 32.10, SD_{age} = 11.95, 18 = male, 35 = female)
Patient Group: n = 186 (M_{age} = 32.78, SD_{age} = 11.24, 74 = male, 100 = female, 2 = diverse gender, 10 = no gender information disclosed)

ERPs for Passive Viewing & Emotion Regulation

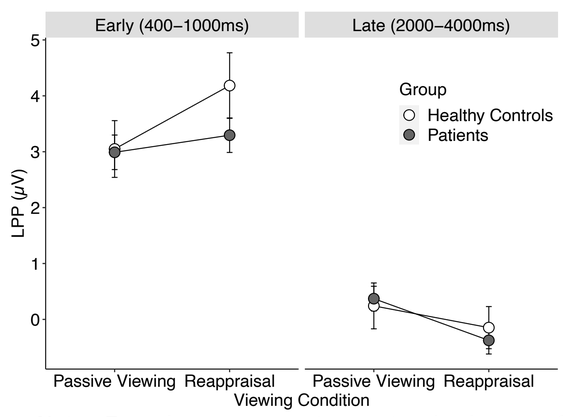
Based on prior research, four windows of interest were determined for which LPP scores were quantified by computing the average of the mean amplitudes at CPz, CP1 & CP2: 1.) 400 - 4000ms, 2.) 400 - 1000ms, 3.) 1000 - 2000ms, 4.) 2000 - 4000ms. Only regulation effects which are significant in at least one of the groups, are reported below. The respective time windows, for which group comparisons are plotted in the middle column, are marked grey.

Healthy Control Group
Passive Viewing Neutral, Passive Viewing/Reappraisal Threatening



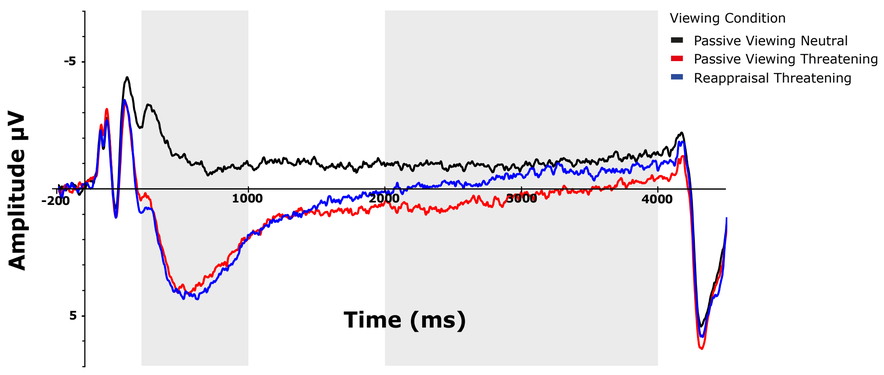
➢ Significant difference in LPP amplitudes under reappraisal instructions between 400 - 1000ms post stimulus (t(52) = 3.20, p = .002, two-tailed)

Group Comparisons
Early and Late LPPs for Threatening Pictures



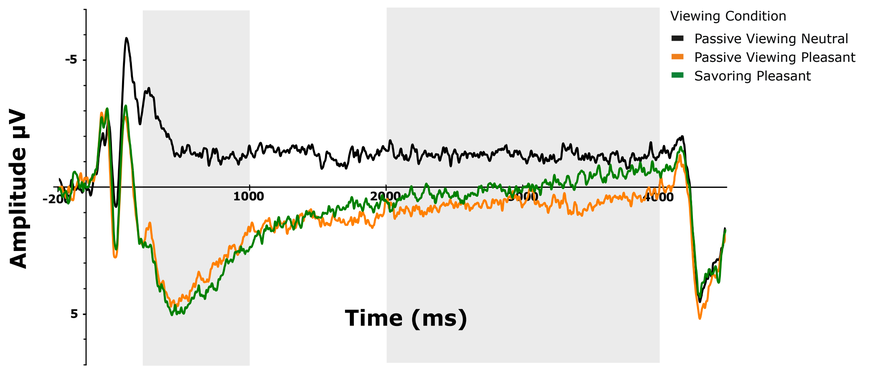
Note: Error bars represent one standard error of the mean amplitude in the respective condition.

Patient Group
Passive Viewing Neutral, Passive Viewing/Reappraisal Threatening



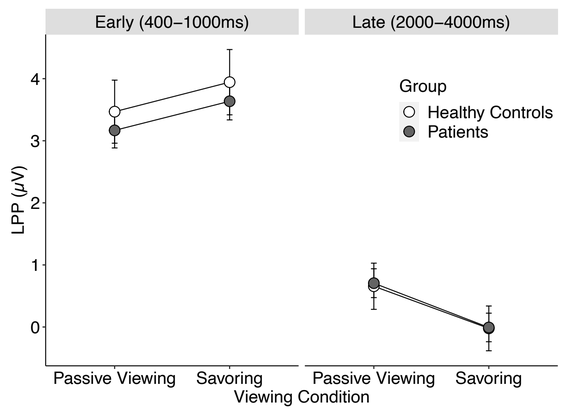
➢ Significant difference in LPP amplitudes under reappraisal instructions between 2000 - 4000ms post stimulus (t(185) = 2.98, p = .003, one-tailed)

Healthy Control Group
Passive Viewing Neutral, Passive Viewing/Savoring Pleasant



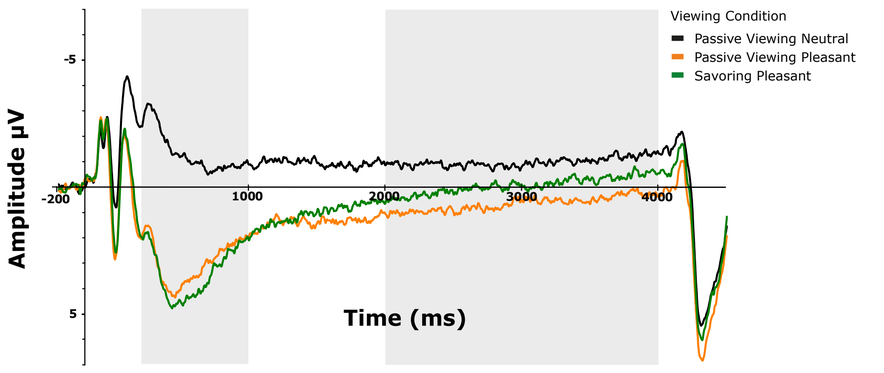
None of the regulation effects differed significantly between the patient and the healthy control group.

Group Comparisons
Early and Late LPPs for Pleasant Pictures



Note: Error bars represent one standard error of the mean amplitude in the respective condition.

Patient Group
Passive Viewing Neutral, Passive Viewing/Savoring Pleasant



➢ Significant differences in LPP amplitudes under savoring instructions between 400 - 1000ms (t(185) = 2.08, p = .039, two-tailed) and between 2000 - 4000ms post stimulus (t(185) = -2.90, p = .004, two-tailed)

DISCUSSION

In line with previous findings, LPP amplitudes were significantly reduced in the reappraisal condition compared to the passive viewing condition for the late LPP component. Probably due to the comparatively small healthy control sample, this effect was only significant in the larger patient sample.
Contrary to one previous finding, LPP amplitudes were also significantly reduced – and not enhanced - in the savoring condition compared to the passive viewing condition for the late LPP component. This effect was also only significant in the patient sample.
This unexpected finding may be indicative of systematic differences between regulation strategies depending on their mode of application (i.e., more spontaneously, as in previous trial-by-trial designs, or in a more sustained fashion, as in our blocked design).

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