

Introduction

This study focuses on the analysis of media representations of critical events in European history. One of the most traumatic events in recent history is the Holocaust. We have chosen it because of its absolute inhumanity recognized as a manifestation of mass violence. Social representations of the world history demonstrated the cross-cultural consensus and recognized the Holocaust as one of the most important events in world history. However, there is no data examining the psychophysiological impact of the Holocaust, whereas most of the experimental studies display acts of aggression in the movies and on TV in general. Watching historical documentaries containing real violence and feeling the anguish of the past events impact the emotional condition of individuals to a different extent. Sex-related reactions may further contribute differently to emotional processing of atrocities.

Subjects and Methods

38 healthy volunteers (21 women and 17 men) - first-year students aged 18 to 22 years participated in this study. We demonstrated them a video set comprised of 80 negative (from the Holocaust documentary "Night and Fog", France) and 80 unsensed images. We used the ERP with simple discrimination task in "oddball" paradigm in our study. The presentation time was 500 ms, the interval between the stimuli was 2.4 sec +/- 30%. The computer selected the image with a probability 50 to 50% (1:1). The time analysis of stimuli was 150 ms before the presentation of the images and 1000 ms after the beginning of the presentation. The total duration of the series was 6-7 min. We analysed average signal amplitude of ERPs in the time intervals 40-80, 80-120, 120-220, 220-300, 300-400 and 400-700 ms after the beginning of the exposure. Psychological testing was performed before and after the simultaneous EEG registration and the demonstration of the set of violent videos. We used the following tests: Syndrome of emotional burnout by V. Boyko, adapted for students, WAM (Well-being, Activity, Mood), State Anxiety Inventory by C. Spielberger and Y. Hanin, Internal Aggression Test by S. Dayhoff, and Aggression Test by A. Assinger (assessment of aggressiveness in relationships).

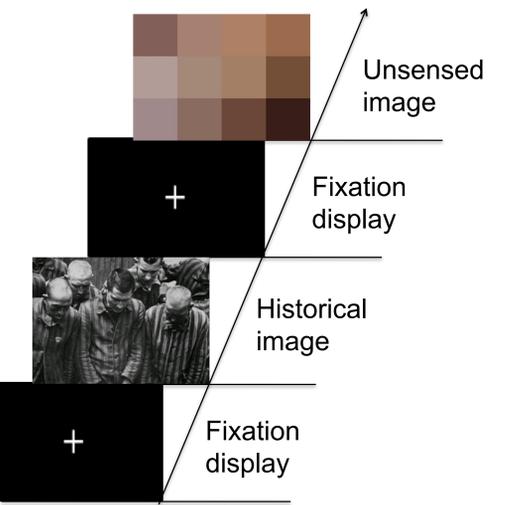


Fig. 1. The protocol of process of image presentation

The hypotheses

- Does the emotional stimuli exert gender dependent significant influence on psycho-physiological state of recipients (mood, well-being, activity, indicators of aggressiveness, eye tracker (pupil size))?
- How does the watching historical documentaries containing real violence impact the ERP modulations of individuals?

Study Aims

- to detect changes in psychological state as a result of looking at historical negative images;
- to identify patterns of ERP (N170, P300, N400) for negative historical images;
- to detect pupil reactions associated with looking at emotionally charged images

Results

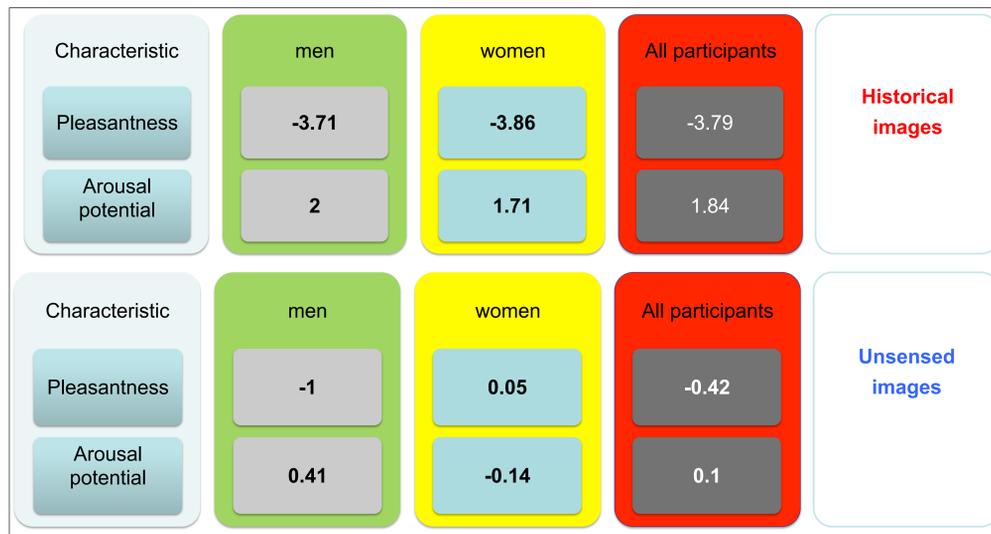


Fig.2. Mean ratings of stimuli. Scales: -5 to +5, no difference between groups

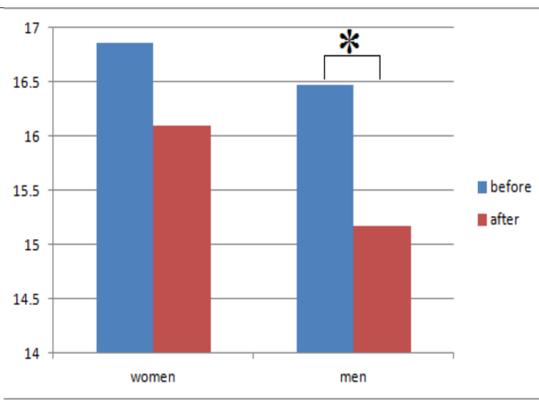


Fig. 3. Before-after differences in affective state (internal aggression - anger), (* p < 0.05)

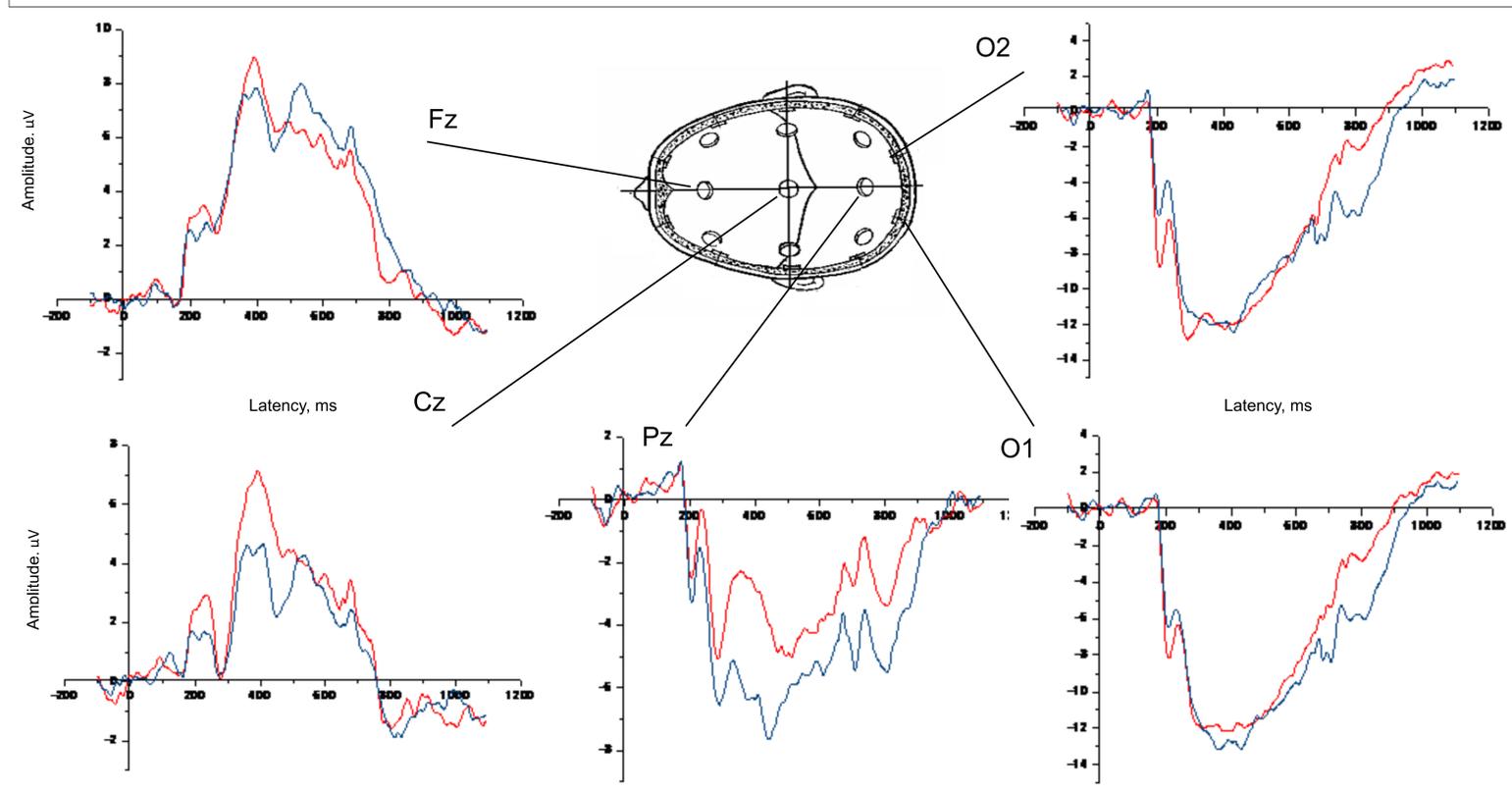


Fig. 4. ERPs to the historical images. Sex-related differences in the reactions. Grand averaged waveform for the ERP to negative (holocost) images. Blue solid lines = men (n=17); Red lines = women (n=21).

Volunteers regarded the historical images we offered them as unpleasant and activating. The historical photos caused the same emotions and attract the same level of attention in both sexes (P300 and LPP in the occipital regions). In female participants, the historical images required more efforts to process the information presented in the pictures and to establish the semantic content in comparison to male participants (N400 in frontal and central areas). In the latter, the ERP amplitude in the central parietal zone reflected a higher activity of polymodal projection zones and a higher level of association in comparison to female participants. As indicated by the size of pupils, associated with attention and cognitive effort, female participants were far more affected by emotional images than male participants. Bigger concurrent pupil dilation to the negative stimuli indicated more attention and semantic integration than to the neutral images in both male and female participants.

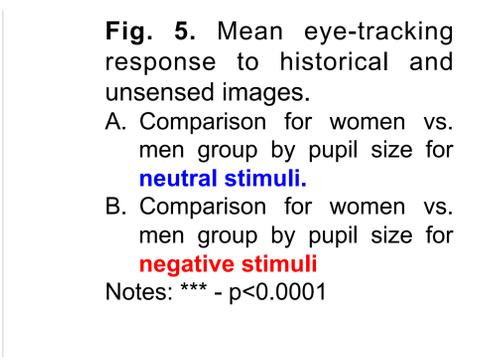
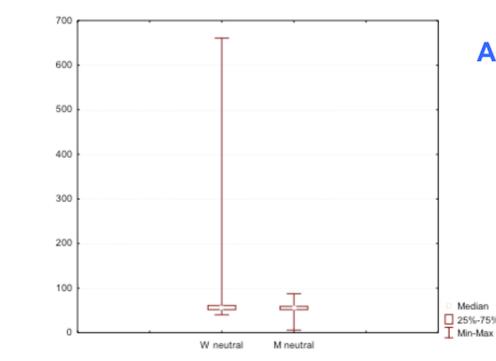


Fig. 5. Mean eye-tracking response to historical and unsensed images. A. Comparison for women vs. men group by pupil size for neutral stimuli. B. Comparison for women vs. men group by pupil size for negative stimuli. Notes: *** - p<0.0001

Conclusion

Our results suggest that historical violence exert significant influence on the psychological condition of the participants. Men and women use different cognitive strategies to perceive negative information. The general trends indicate that negative images cause more significant emotional impact on women than on men.