ATTENTIONAL BIAS MODIFICATION TRAINING IMPACTS AUTONOMIC ACTIVITY: IMPLICATIONS FOR EMOTIONAL REGULATION ?

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INTRODUCTION

- A negativity bias, translated at the behavior level by a greater attentional allocation to negative stimuli, has been described in both healthy and clinical populations. It has also been linked to the onset and maintenance of affective disorders.
- Attention bias modification training (ABMT) aims to alter attentional deployment to emotionally salient stimuli.

The present study aims to **explore the effects of an ABMT at the physiological level.**

For this purpose, ABMT was carried out in a single session and using a double-blind randomized controlled trial design.

METHOD

134 participants

Trained group:
Induction of an attentional bias towards positive stimuli

Control group:
No modification of attention orientation

Stimuli: Three hundred pairs of pictures, associating a joyful facial expression with an angry or neutral one, selected from the *NimStim* image bank[1] and transformed with a morphing technique, were presented one at a time on the computer screen during a dot-probe task ; autonomic recordings had been carried out before, during and after the task.

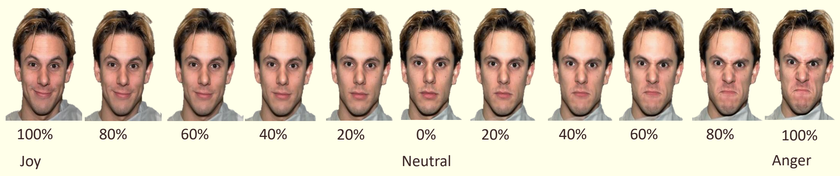

Figure 1: *Emotional facial expressions used as stimuli*

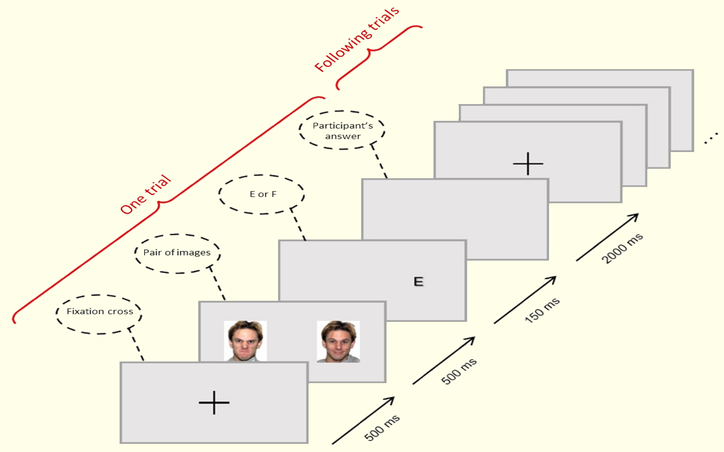

Figure 2: *Example of a dot-probe task trial*

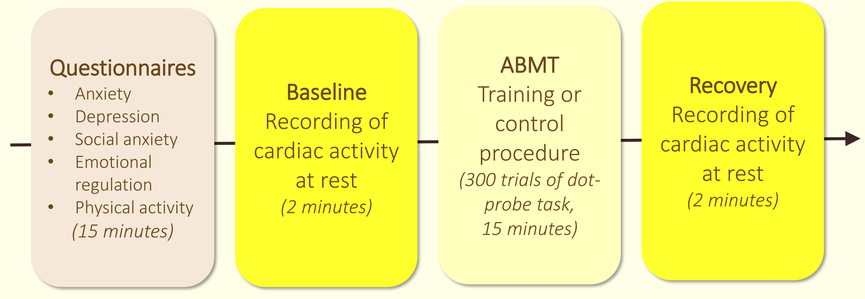

Figure 3: *Course of the experimental session*

Data analysis: Inter-group analyses of behavioral and autonomic differences were made using the Student's t test. The evolution of a group's discrimination's precision throughout the task was performed using a repeated measure ANOVA. Analysis of HRV reactivity was conducted by subtracting the data recorded at baseline to one recorded during recovery.

RESULTS

Behavioral results: Contrary to control participants (ps > 0.310), trained participants' performance improved throughout the task: starting from the 210th trial, their performance was significantly better than in the beginning (p < 0001; p = 0.006; = 0.038). Therefore, participants from the trained group significantly increased the attention orientation towards joyful facial expressions at the end of training, compared to the beginning, showing the training efficiency.

Autonomic results: A larger variation of HF-HRV peaks between the baseline and recovery periods was observed in the trained group compared to the control group (p = 0,007; d = -0,430) *(Figure 4A).* A smaller variation of LF-HRV peaks between the periods for trained participants was also observed (p = 0,026; d = 0,341) *(Figure 4B).*

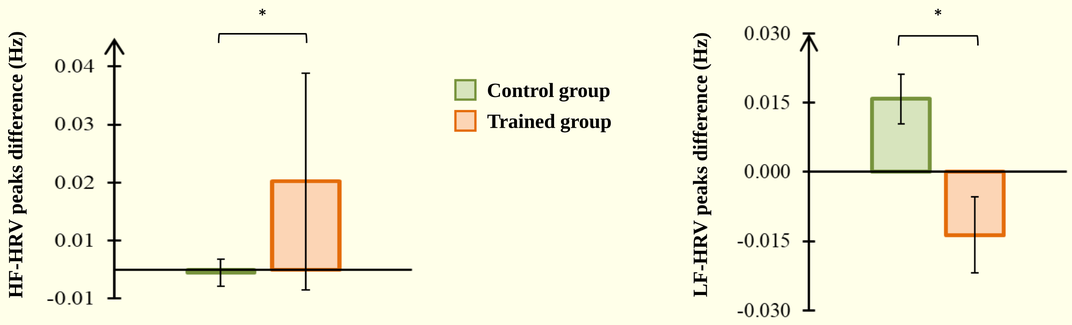

Figure 4: *Difference of HF-HRV peaks between periods depending on the group (A). Difference of LF-HRV peaks between periods depending on the group (B).*
*Error bars represent the confidence intervals at 95%. * represents a p < 0.05 .*

HF-HRV peaks being exclusively modulated by the parasympathetic nervous system, whereas LF-HRV peaks being regulated by both branches of the autonomic nervous system, these results indicate an increase of parasympathetic influence after the procedure in the trained group

Correlation results: In the trained group, LF-HRV peaks difference was found to be significantly correlated to the participants' score in the positive refocalisation sub-scale of the Cognitive Emotional Regulation Questionnaire (CERQ) (r = -0,277 ; p = 0,025) *(Figure 5).* LF-HRV peaks variation after the training is less important for trained participants who tend to positively refocus when faced with a stressful event in their daily life.

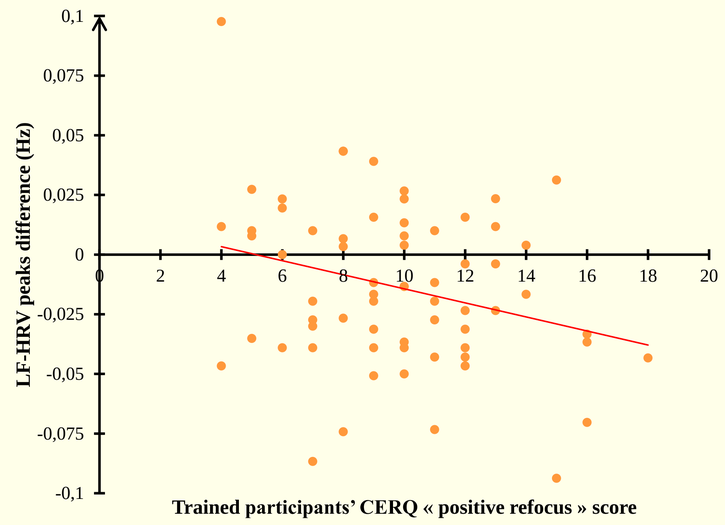

Figure 5: *Correlation between LF-HRV peaks difference and trained participants' CERQ "positive refocus" sub-scale score*

DISCUSSION

- An ABMT using a dot-probe task is efficient to induce an attentional orientation towards positive stimuli, after 210 trials.
- At the autonomic level, an increased parasympathetic influence following the task was observed in trained participants. As increased parasympathetic influence has been linked to increased emotional regulation abilities (Boschloo et al., 2011), this result suggests that this training could lead to better emotional regulation.
- Autonomic variations following the training seem to be influenced by psychometric factors, including emotional regulations strategies.

Considering that attentional biases contribute to the onset and maintenance of various psychopathological disorders, the ABMT could potentially be used to increase emotional regulation abilities in clinical populations, which could lead to the decrease of various symptoms.

References:
[1]Tottenham, N., Tanaka, J. W., Leon, A. C., McCarry, T., Nurse, M., Hare, T. A., Marcus, D. J., Westerlund, A., Casey, B., & Nelson, C. (2009). The NimStim set of facial expressions : Judgments from untrained research participants. Psychiatry Research, 168(3), 242-249. 10.1016/j.psychres.2008.05.0066
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