

Introduction

Alexithymia is difficulty identifying emotions and finding words to describe them. Some studies attribute it to dissociation (inability to perceive emotions; Cooper & Langton, 2006), where others show that it is due to suppression of emotions after they have been perceived (Levant, Allen & Lien, in press). The present study tests these two hypotheses using event-related brain potentials (ERP) measures.

The Present Study

The present study contained two parts. For the first part, participants completed an online questionnaire: the Toronto Alexithymia Scale (TAS-20). Followed Levant et al. (in press), individuals with scores less than or equal to 50 were placed in the non-alexithymic control group, and individuals with scores greater than or equal to 61 were placed in the alexithymic experimental group. We then invited the individuals from these two groups to come into the lab to participate in the ERP experiment.

ERP Methods

We used a cuing paradigm, with a cue display followed by a target display. The question is whether an irrelevant emotional face in the cue display will capture attention to its location and thereby affect processing of the subsequent target display.

Cue Display: Contained one emotional face (fearful or happy) and one neutral face or it contained two neutral faces, resulting in 3 cue types:

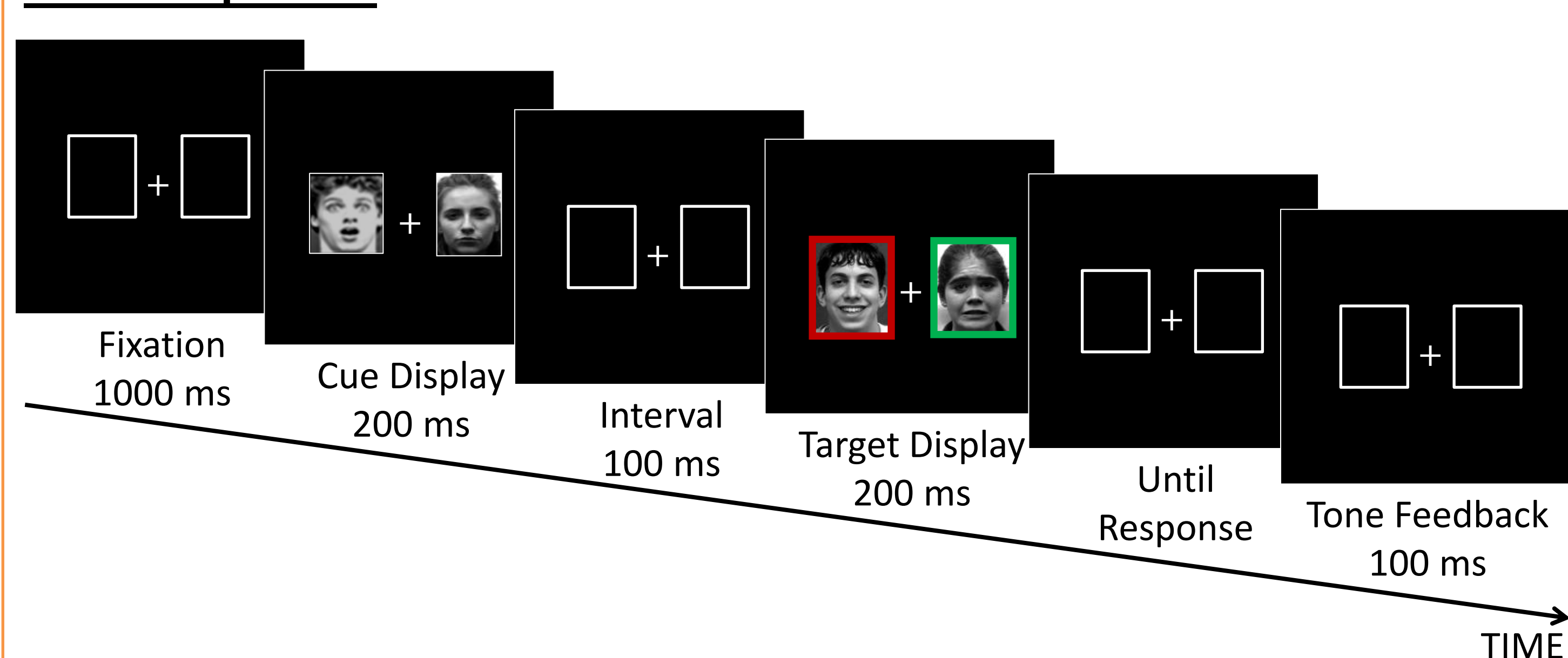
Fearful Cue: Fearful Face with Neutral Face

Happy Cue: Happy Face with Neutral Face

No Cue: Two Neutral Faces

Target Display: Contained one fearful face and one happy face, each surrounded by a box frame. One frame was red and one was green, randomly determined. Participants searched for a fearful face or a happy face (manipulated between blocks) and indicated the surrounding frame color by pressing the "1" key for red or the "5" key for green.

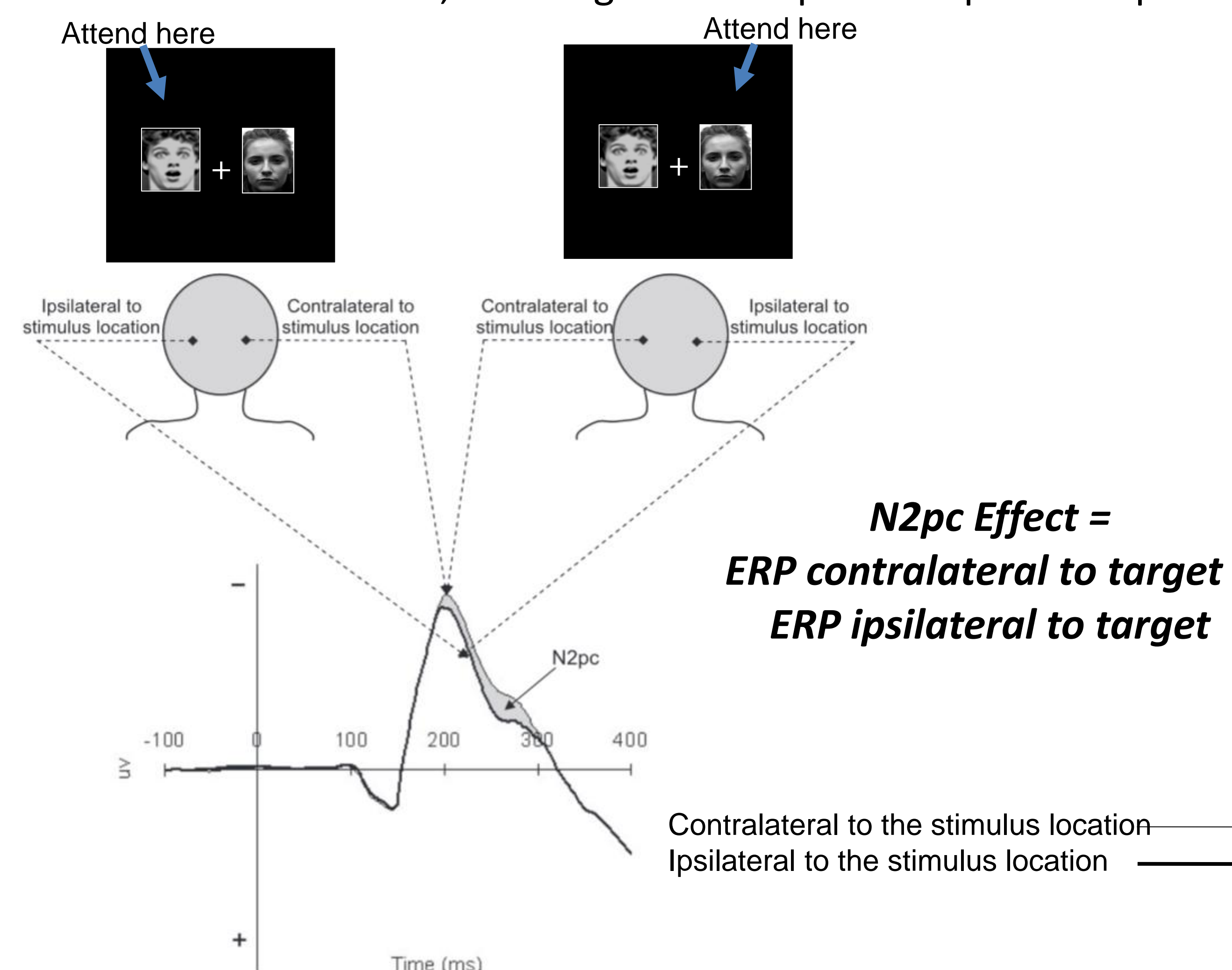
Event Sequence:



N2pc Effect vs. Pd Effect

We assessed the ability to perceive emotion using the N2pc effect and the ability to suppress emotion using the Pd effect (Sawaki & Luck, 2013).

N2pc Effect: The N2pc effect reflects lateralized allocation of spatial attention. When attention shifts to the left or right visual field, brain potentials are more **negative** in the contralateral hemisphere than the ipsilateral hemisphere. This lateral difference (*N2pc effect*), occurring 170-270 ms after stimulus onset, is strongest at occipital-temporal scalp sites.



Pd Effect: The Pd effect reflects active suppression of the distractor. It is a more **positive** potential in the contralateral hemisphere than in the ipsilateral hemisphere relative to the distractor position. This effect, occurring between 100-400 ms after stimulus onset (depending on stimuli and task), is strongest at occipital-temporal electrode sites. It has an opposite polarity to that of the N2pc effect and a slightly different localization.

EEG Data Analyses: N2pc effect was measured from 170-270 ms after cue onset and the Pd effect was measured from 270-370 ms after cue onset using the PO7 and PO8 electrode sites.

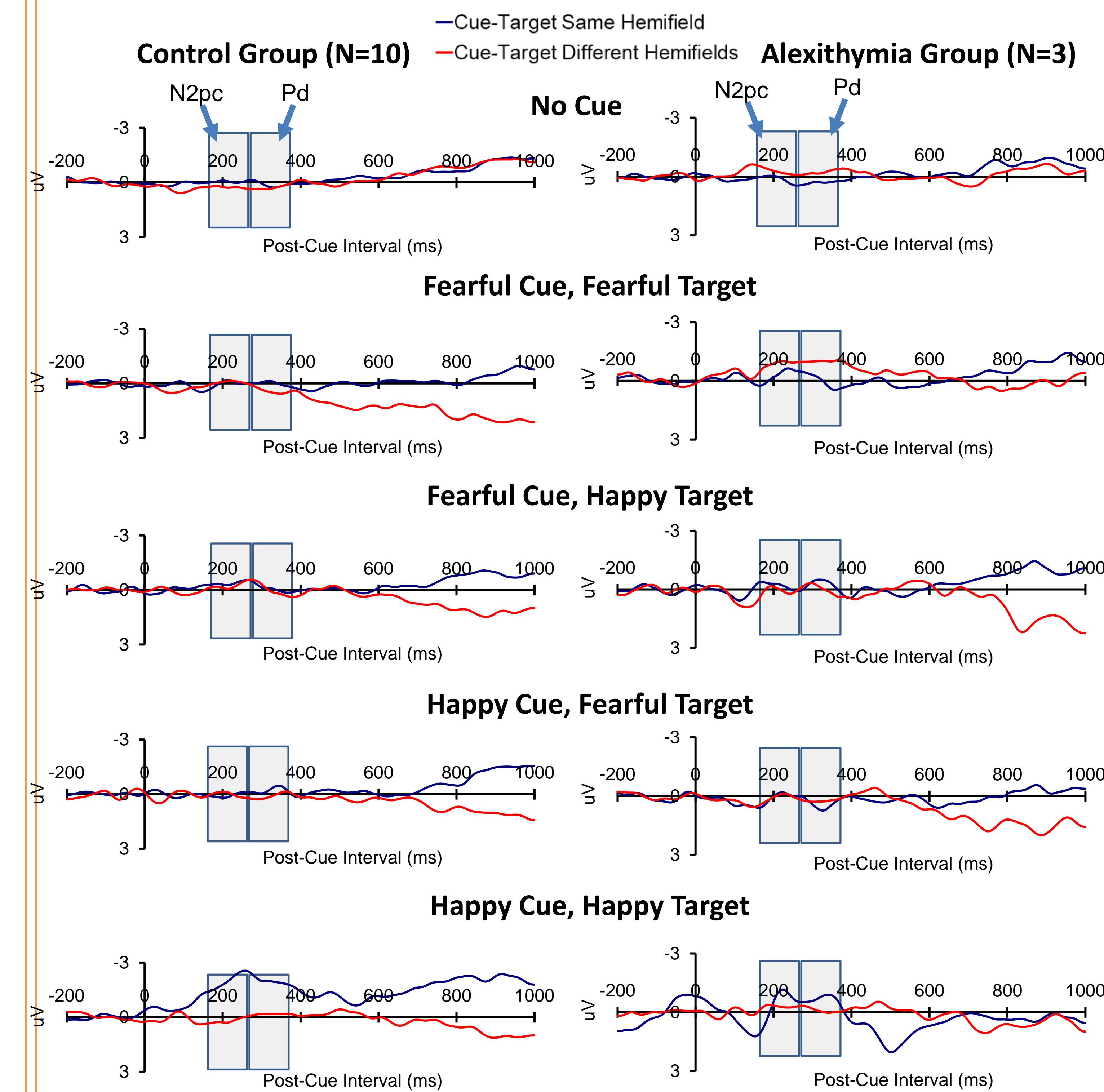
Predictions

The *dissociation view* predicts that an unusually **small** N2pc effect to the emotional cue for the alexithymic group relative to the control group. The *suppression view* predicts similar N2pc effects between groups but a **larger** Pd effect for emotional cues in the alexithymic group than the control group.

References:

Cooper R. M., & Langton, S. R. H. (2006). Attentional bias to angry faces using the dot-probe task? It depends when you look for it. *Behaviour Research and Therapy*, 44, 1321-1329.
Levant, R. F., Allen, P. A., & Lien, M.-C. (in press). Alexithymia in men: How and when do emotional processing deficiencies occur? *Psychology of Men & Masculinity*.
Sawaki, R., & Luck, S. J. (2013). Active suppression after involuntary capture of attention. *Psychonomic Bulletin & Review*, 20, 296-301.
Silberman, E. K., & Weingartner, H. (1986). Hemispheric lateralization of functions related to emotion. *Brain Cognition*, 5, 322-353.

Results and Discussion



For the N2pc effect (170-270 ms), no effects involving group was significant, $F_s(1,11) \leq 1.89$, suggesting that both groups perceived emotions to a similar degree. The N2pc effect was numerically larger, albeit not significantly, for the fearful face cue and fearful face target in the alexithymia group ($-0.640 \mu V$) than the control group ($-0.073 \mu V$).

The Pd effect (270-370 ms) was larger and positive for the left fearful face cue ($2.310 \mu V$) than the left happy face cue ($1.742 \mu V$), $F(1,11)=5.01$, $p < .05$. This finding is consistent with previous studies showing that right hemisphere is specialized for processing negative emotions (Silberman & Weingartner, 1986). The Pd effect for the left emotional cue was numerically larger, albeit not significant, for the alexithymia group ($2.692 \mu V$ and $2.444 \mu V$ for fearful and happy face cues, respectively) than the control group ($1.929 \mu V$ and $1.039 \mu V$), $F_s < 1.0$. These findings tentatively suggest that the alexithymia individuals were more likely to actively suppress the emotional face cues, especially the fearful face.

While we are still collecting data, the present results so far tentatively favor the suppression view; that is, the disruption in emotional processing for alexithymia individuals is not due to their inability to process emotion but rather to their unusually strong suppression of perceived emotions.