Attention Training Effects on Social Anxiety Symptoms and Neural Function

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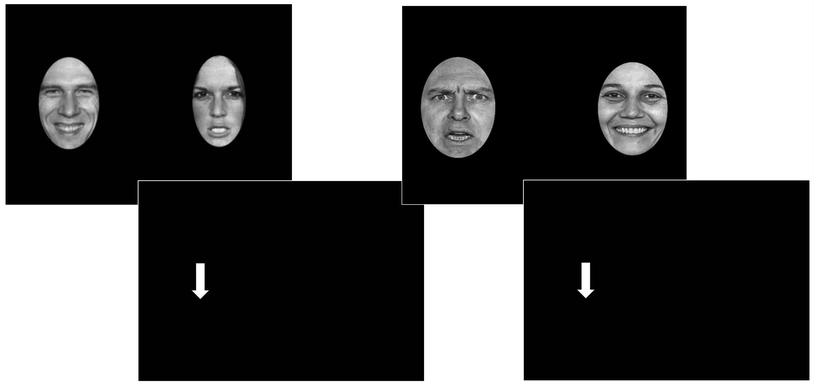
Background

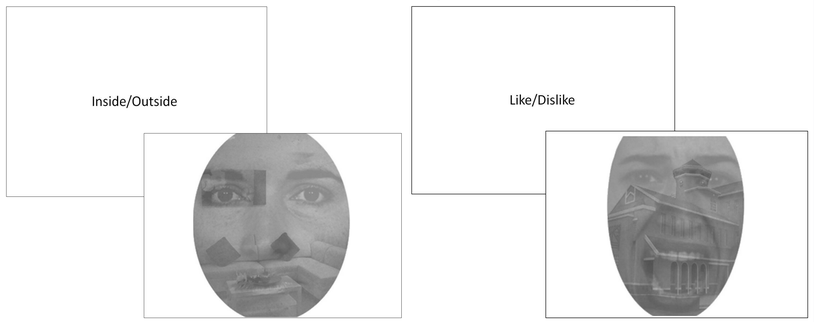
- Mixed evidence for attention training to reduce social anxiety
  - Decrease in symptom severity (Schmidt et al., 2009), physiological reactivity (Heeren et al., 2012), neural activation (Taylor et al., 2013), and attention bias toward social threat (Amir et al., 2009)
  - Negative findings demonstrated no impact of training (Carlbring et al., 2012; Julian et al., 2012)
- Specific mechanisms by which attention training can meaningfully impact SAD symptoms are unclear
- **Purpose:** Further investigate neural mechanisms underlying attention training in SAD using clinical assessments and fMRI

Method

- 41 (29 SAD, 12 HC); Age 18-45 (*M* = 25.4); 12 male, 29 female
- Attention Training: 4 sessions in laboratory (1 hour; 744 trials)
  - Modified dot-probe: no training (control task), attend positive, attend negative
  - Arrow replaces face to be trained toward on 80% of trials



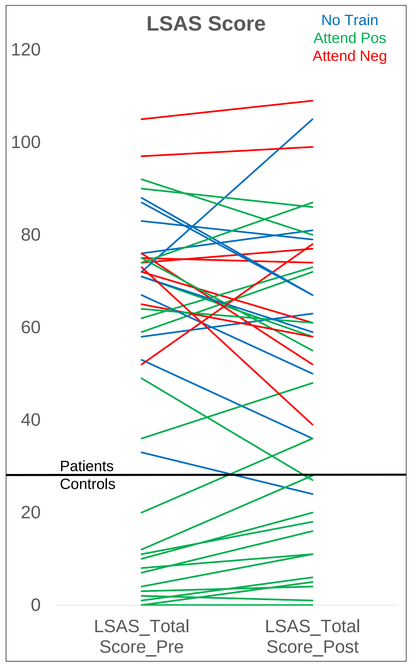
- Pre- and Post- Assessments
  - Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987)
  - fMRI scan to assess emotion processing, emotional appraisal, and attention modulation of emotion
    - Shifted-Attention Emotion Appraisal Task (SEAT; Anderson et al., 2003; Sripada et al., 2013)



Results

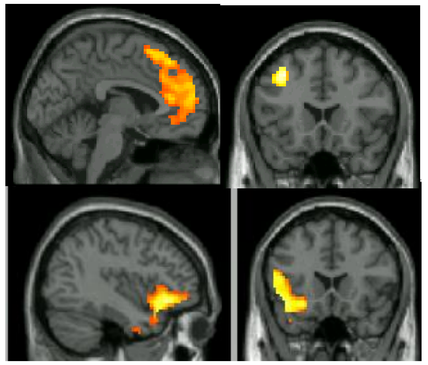
– SAD Symptoms

- No effect of Time ($p > .05$)
- No effect of Training ($p > .05$)
- No Training X Time interaction ($p > .05$)
- Main effect of Group
  - $F(1,39) = 125$, $p < .05$
- Group X Time Interaction
  - $F(1,39) = 5.5$, $p < .05$

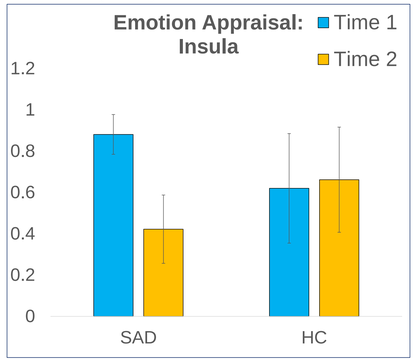


– Brain Activation

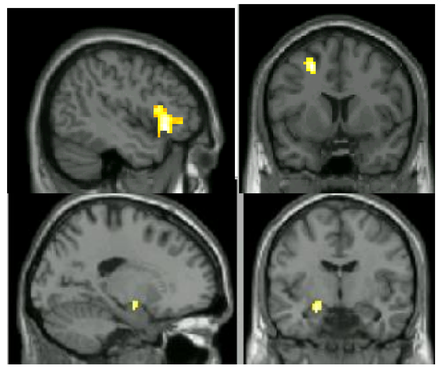
- Emotion Appraisal ($p < .001$, uncorr)



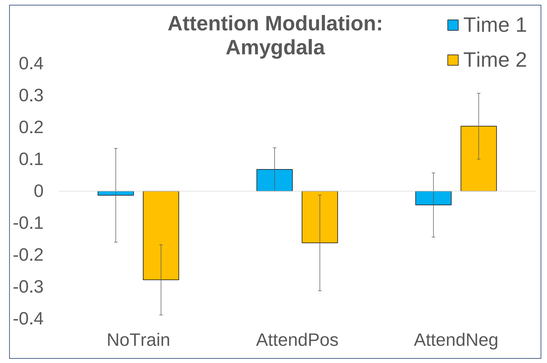
- Main effects of Group and Time
  - ACC, Insula (*p*s < .05)
  - SAD > HC; Time 1 > Time 2
- Group X Time Interaction : Insula
  - $F(1,39) = 4.1$, $p < .05$



- Attention Modulation ($p < .001$, uncorr)



- Main effects of Group and Time
  - Amygdala, Insula (*p*s < .05)
  - SAD > HC; Time 1 > Time 2
- Time X Training Interaction: Amygdala
  - $F(2,26) = 3.2$, $p = .05$



Summary

- SEAT activated expected ROIs involved in salience processing, emotion modulation, and attention control
  - Greater activation in salience processing brain regions in SAD compared to HC
  - Decrease over time in activation in salience processing regions in both SAD and HC
- Emotion Appraisal: Insula hyperactivity in SAD decreased over time; remained stable in HC
- Attention Modulation: Amygdala activation decreased over time in no train and attend pos.; increased over time in attend neg.
- However, no changes in symptoms associated with attention training
- Clinical significance and impact of computerized attention training approaches remains unclear
- Future studies should focus on individual differences, training optimization approaches, and alternative mechanisms

Acknowledgments

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