

# Individual and Contextual Influences on the Flexibility of Attention During Attention Bias Modification Training (ABMT) for Anxiety

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## Introduction

- Selective and exaggerated attention towards threat, termed threat bias (TB), has been identified as a core behavioral and neurocognitive mechanism in anxiety (Bar-Haim et al., 2007).
- TB is most commonly measured using the dot probe task in which threat and neutral cues compete for attention. Attention bias modification training (ABMT) systematically trains attention away from threat through a simple modification of the dot probe, and a growing body of research has examined it as a potentially powerful, cost-efficient, and easily accessible treatment for anxiety (Kazdin & Blase, 2011; Dennis & O'Toole, 2014).
- However, recent meta-analyses of ABMT efficacy have shown either null effects or documented small-medium effect sizes in TB and symptom reduction (Mogoşe et al., 2014). In addition, very few studies have shown that training-related changes in TB mediate ABMT efficacy (Heeren, Philippot, & Koster, 2015).
- Demonstration of ABMT efficacy and target engagement (mediation through hypothesized therapeutic mechanism, TB) has been complicated by a failure to consider individual differences in baseline TB and contextual stressors prior to training that may impact the flexibility of TB during training.
- In addition, static TB measures fail to quantify the flexibility of attention during training, measured as training gains or the rate at which TB is reduced over the course of ABMT. This flexibility may be the most direct measure of training efficacy.
- This study quantified training gains via decreases in reaction time to both training towards and away from threat in a large normative sample (N = 212).
- Baseline patterns of attention and TB reactivity were captured via the dot probe task upon arrival and following a stressor or control task
- Variability in training gains among individuals may help to isolate individual differences in attention to threat and the mechanisms by which ABMT works to systematically train attention away from threat.

## Hypotheses

- Baseline TB will influence training gains.
- Training gains will be sensitive to affective context.
- Do these effects depend on training type?

## Methods and Procedure

Participants were 212 adults (149 females), aged 18 - 39 (M = 20.12, SD = 3.43)

### Timeline



#### State Trait Anxiety Inventory (STAI)

	Min	Max	Mean (SD)
State	20	63	36.47(9.04)
Trait	22	74	42.28(10.30)

#### Positive and Negative Affect Schedule (PANAS)

	Min	Max	Mean (SD)
General PA	10	50	30.83(7.97)
General NA	11	37	17.69(5.01)
Today PA	10	50	27.13(8.47)
Today NA	10	28	15.24(3.99)

Three threat bias scores were generated at each bias assessment.

- Attention Bias** = M RT neutral probes - M RT threat probes. Positive scores indicate an attention bias towards threat.
- Vigilance** = M RT neutral probes in neutral-neutral pairs - M RT threat probes in threat-neutral pairs. Positive scores indicate vigilance toward threat.
- Disengagement** was calculated as M RT for neutral probes following threat-neutral pairs - M RT for neutral probes following neutral-neutral pairs. Positive scores indicate difficulty disengaging from threat.

EASY



DIFFICULT

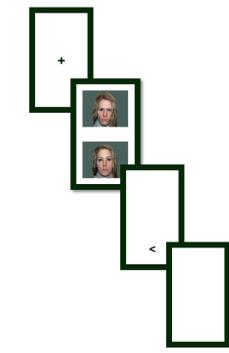


Figure 1. An example of a non-threat cued trial

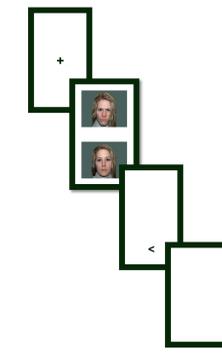


Figure 3. An example of an active ABMT trial

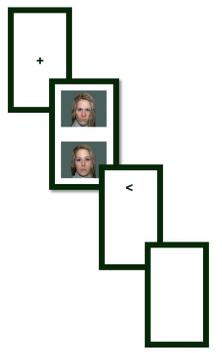


Figure 2. An example of a threat cued trial

## Quantifying Training Gains

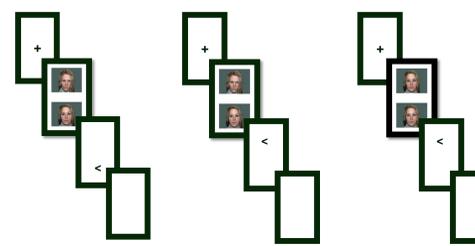
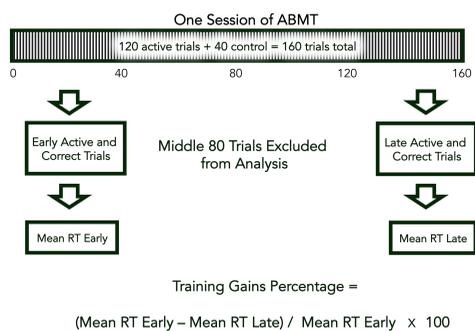


Figure 4. An example of an active ABMT trial training away from threat

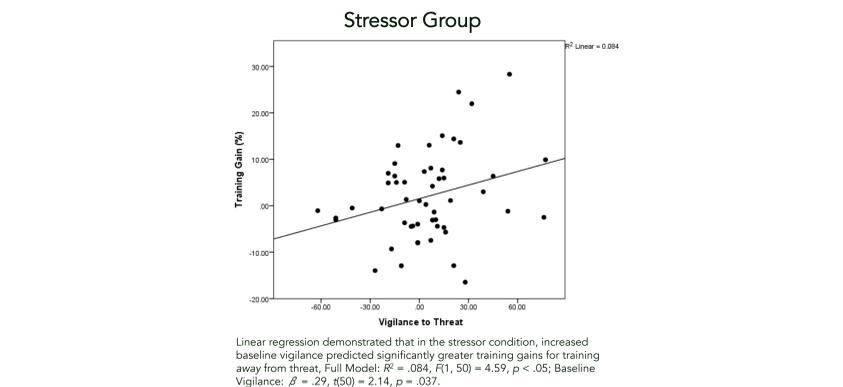
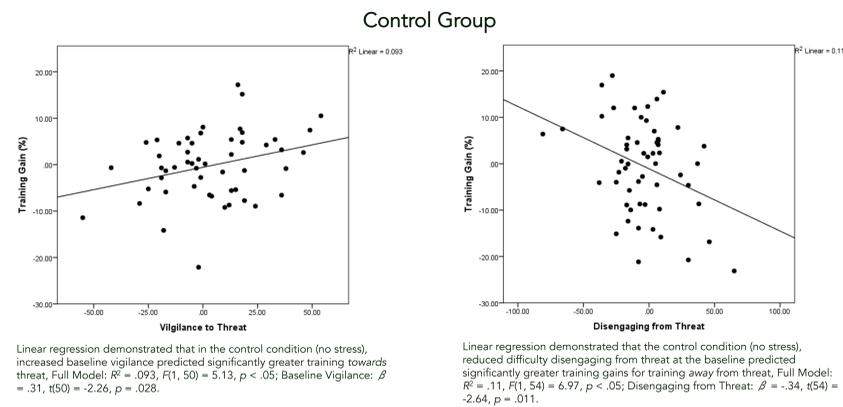
Figure 5. An example of an active ABMT trial training toward threat

Figure 6. An example of a control trial

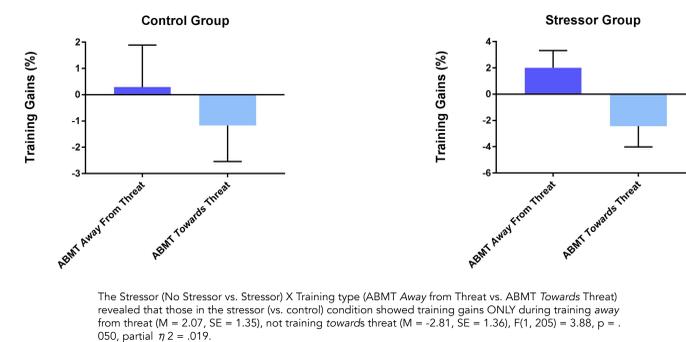
- Two types of active trials in which ABMT happens:
- Training Away from Threat:** neutral and threat were present and the probe follows the neutral face
  - Training Towards Threat:** neutral and threat were present and the probe follows the threat face

## Results

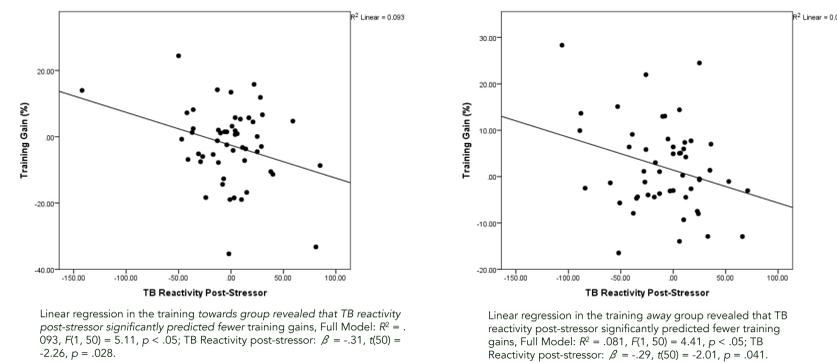
### 1. Baseline TB Predicted Training Gains



### 2. Stressor x Training Type Effects on Training Gains



### 3. Focus on Stressor



\*Note: TB reactivity post-stressor is the Dot Probe threat change score (Post-Stressor Bias Assessment Score - Baseline Bias Assessment Score)

## Discussion

- This study quantified training gains either towards or away from threat over a single, brief session of ABMT in a large normative sample following exposure to either a stressor or control condition.
- The results indicated that individual differences in baseline TB were associated training gains. In the control condition without stress, increased vigilance predicted greater training gains towards threat. On the other hand, reduced difficulty disengaging from threat predicted more training gains for training away from threat. When there was a stressor present, more baseline vigilance predicted greater training gains for training away, but higher TB reactivity post-stressor predicted reduced training gains in both ABMT training towards and away from threat.
- The current findings provide initial evidence that both baseline TB and TB reactivity to a stressor may play an important role in the flexibility of attention during training.
- Emphasis on such individual differences and methodological innovations can contribute to the long-term goal of developing more personalized approaches to remediating maladaptive neurocognitive processes in anxiety.

## References

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