

Interoceptive training to reduce anxiety

Sarah N Garfinkel

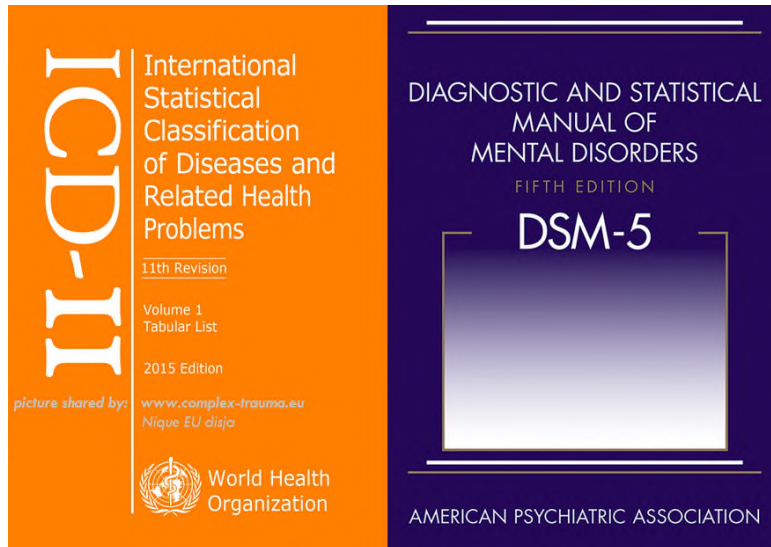
Psychiatry and Neuroscience
Institute of Cognitive Neuroscience
UCL

Outline

- Sensory alterations in Autism Spectrum Conditions (ASCs)
- Interoception
- Autism and interoception
- Interoceptive training for anxiety
- Final reflections

Sensory processing and ASC

- First accounts of ASC: Altered sensory perception as a characteristic feature (Kanner, 1943; Asperger, 1944)
- Renewed focus on the sensory aspects of Autism (DSM-V and ICD-11)



Hyper- or hyporeactivity to sensory input or unusual interests in sensory aspects of the environment

Hyper or hyporeactivity to sensory input or unusual interests in sensory aspects of the environment

Sounds



Temperature / pain



Texture



Lights / movement



Hyper-Hypo sensitivity: Complex

- Strong individual differences
- Developmental stage
- Hormonal changes
- Between modality differences
- Within modality differences
- Interaction with stress and the environment

 *Sensory profile for each individual*

The senses



Proprioception



Interoception



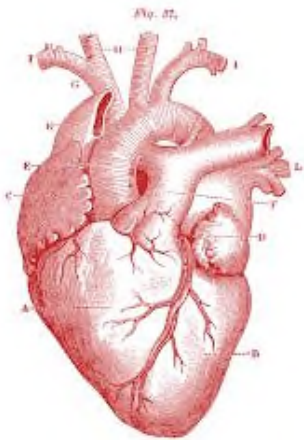
Interoception definition

Interoception is the body-to-brain axis of sensation concerning the state of the internal body and its visceral organs (Sherrington, 1948).

Interoception refers to the process by which the nervous system senses, interprets, and integrates signals originating from within the body, providing a moment-by-moment mapping of the body's internal landscape across conscious and unconscious levels (Khalsa et al., 2018).

Sensing the internal body

Test



Brain



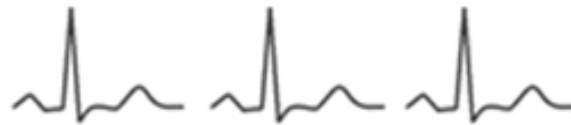
Ask



Insight



Measuring interoception: behavioural accuracy



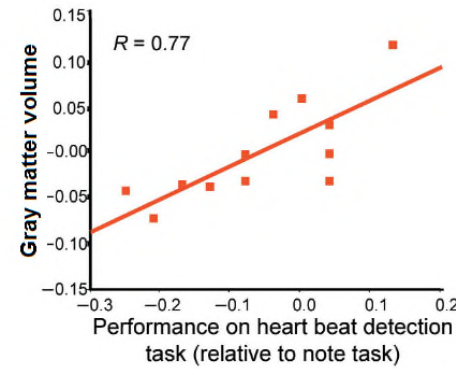
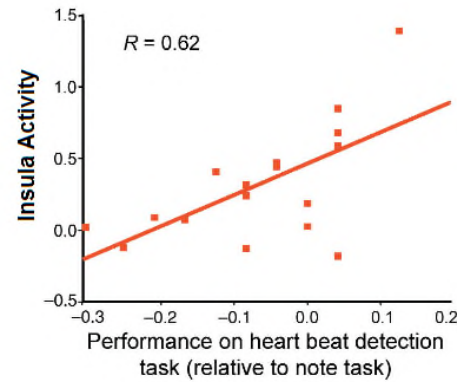
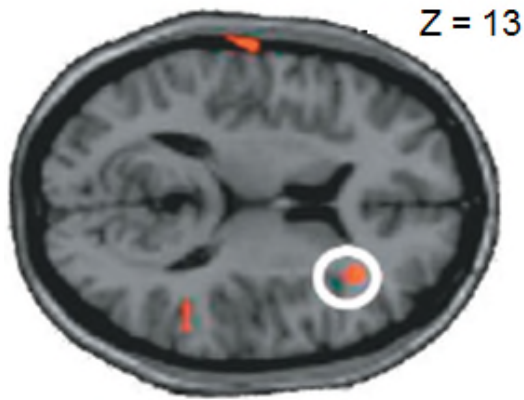
(Schandry 1981)

Heartbeat synchrony judgements



(Katkin et al., 1983; Whitehead et al., 1977)

Interoception: Neural overlap with emotion

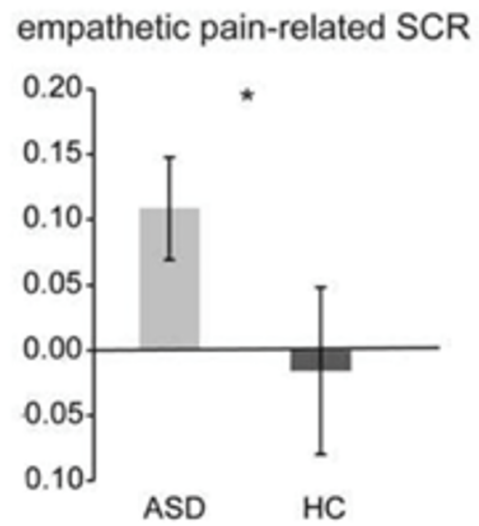


Critchley et al., (2004)

Bodily response



Gu et al., 2016



Autism and interoception

- Intuitive eating: knowing when hungry?
- Intuitive decision making
- Emotion processing and alexithymia
- Understanding the emotions of others
- Temperature
- Anxiety



Hypothesis 1

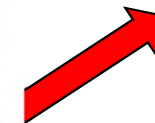
- 1a: Autistic individuals with have reduced interoceptive accuracy



Contents lists available at [ScienceDirect](#)

Biological Psychology

journal homepage: www.elsevier.com/locate/biopsycho



Behavioural accuracy



Knowing your own heart: Distinguishing interoceptive accuracy from interoceptive awareness



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Keisuke Suzuki^{b,c}, Hugo D. Critchley^{a,b}

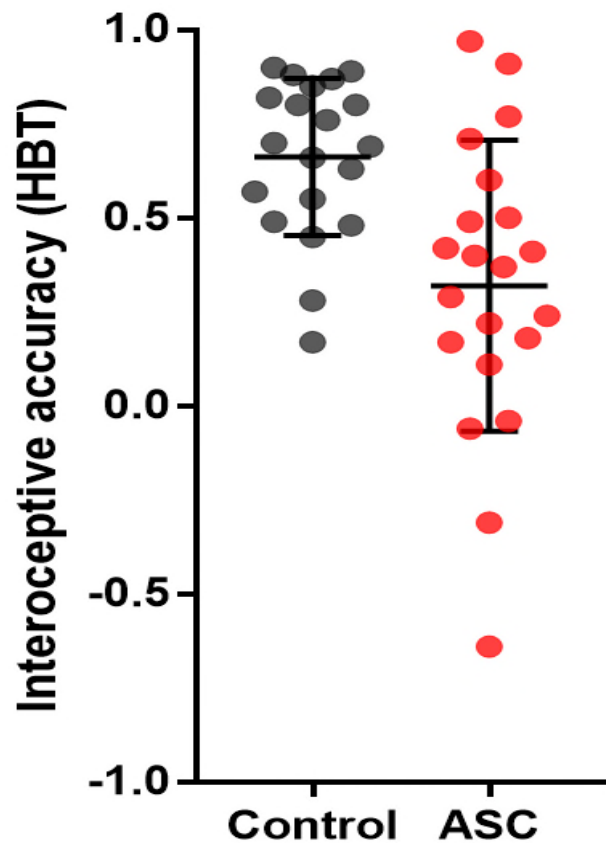
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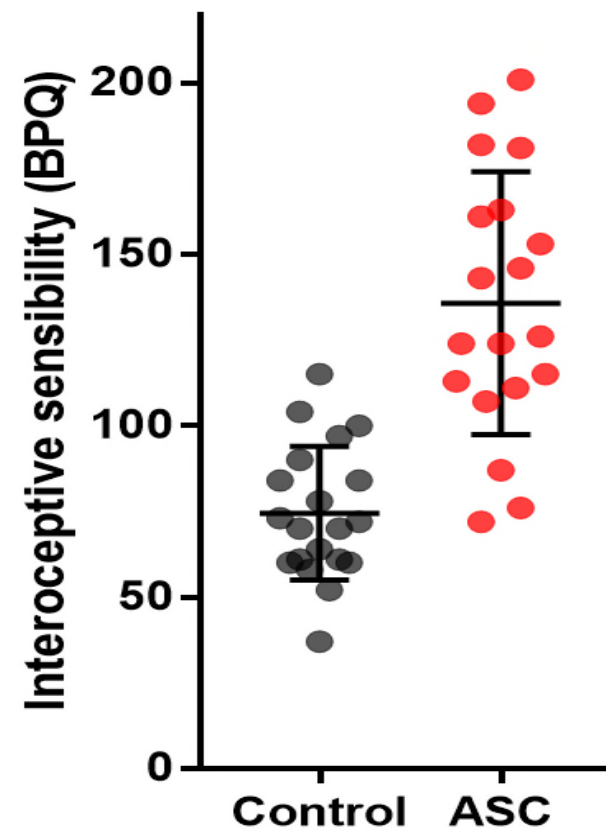
^c Department of Informatics, University of Sussex, UK

Self-report

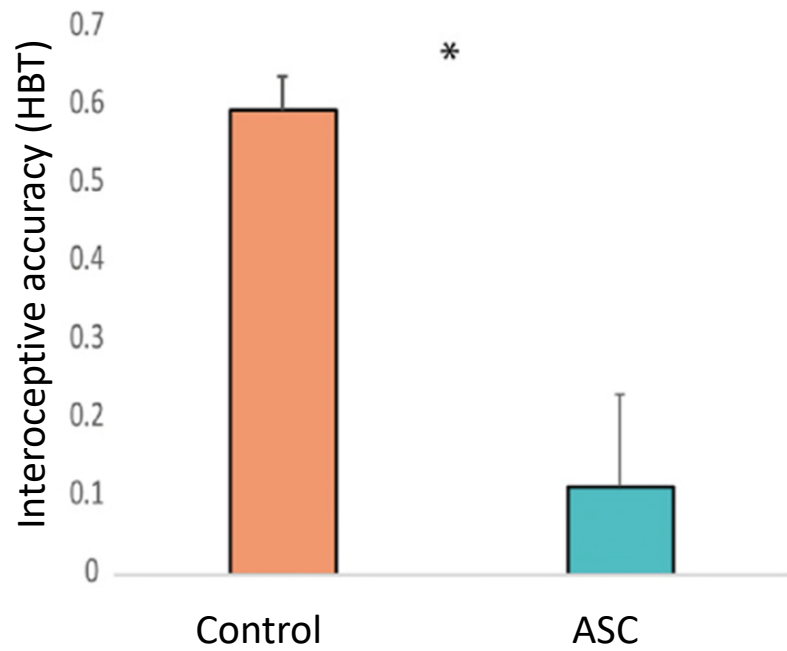
Interoceptive accuracy



Interoceptive self-report



75 Children and adolescents
aged 6-18



Palser et al., 2018

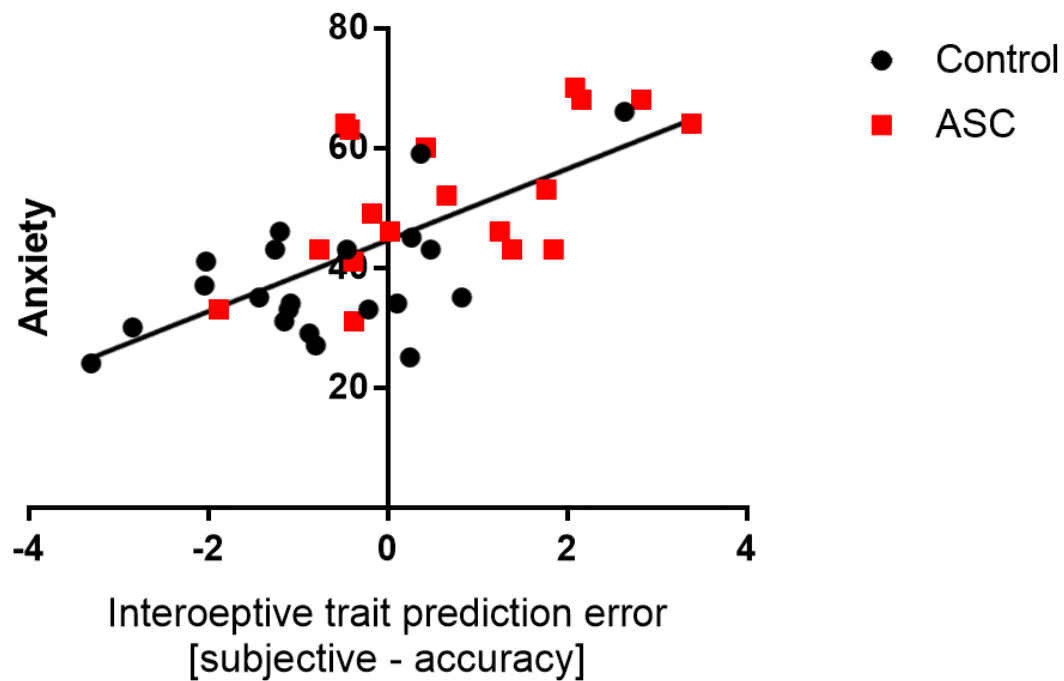
Autism and alexithymia

Alexithymia:

- Difficulty identifying feelings
- Difficulty detecting feelings
- External orientated thinking

Anxiety: Interoceptive error

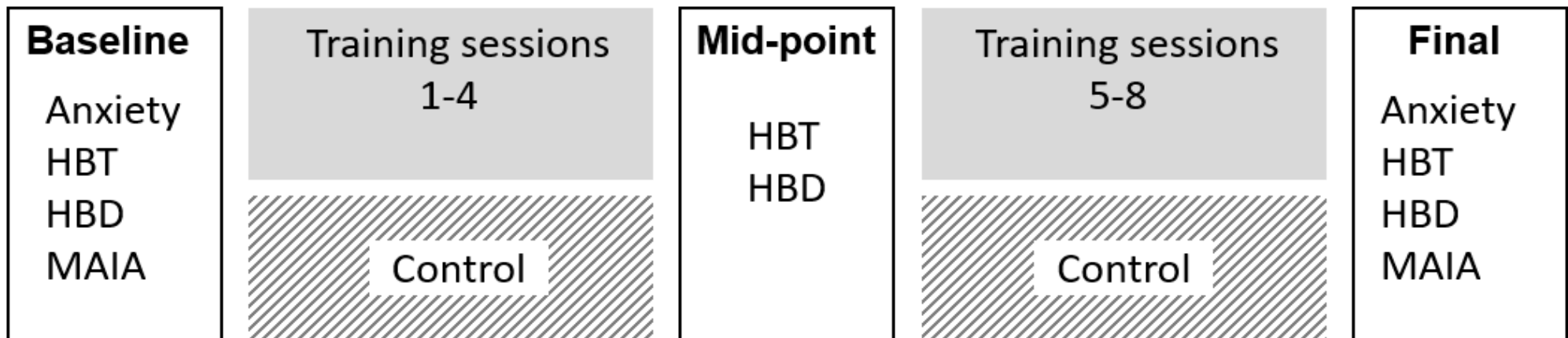
Hypothesis



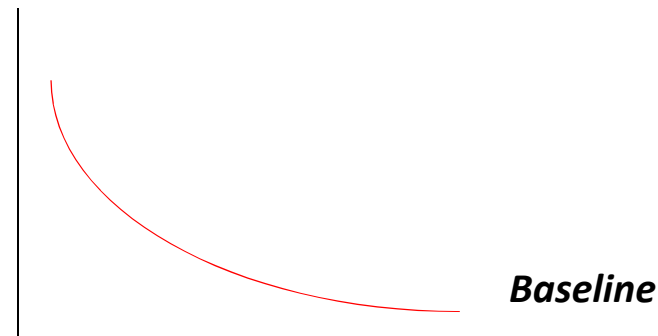
- Increasing interoceptive accuracy should reduce anxiety

Training protocol

Training (N=30) Control (N=20)

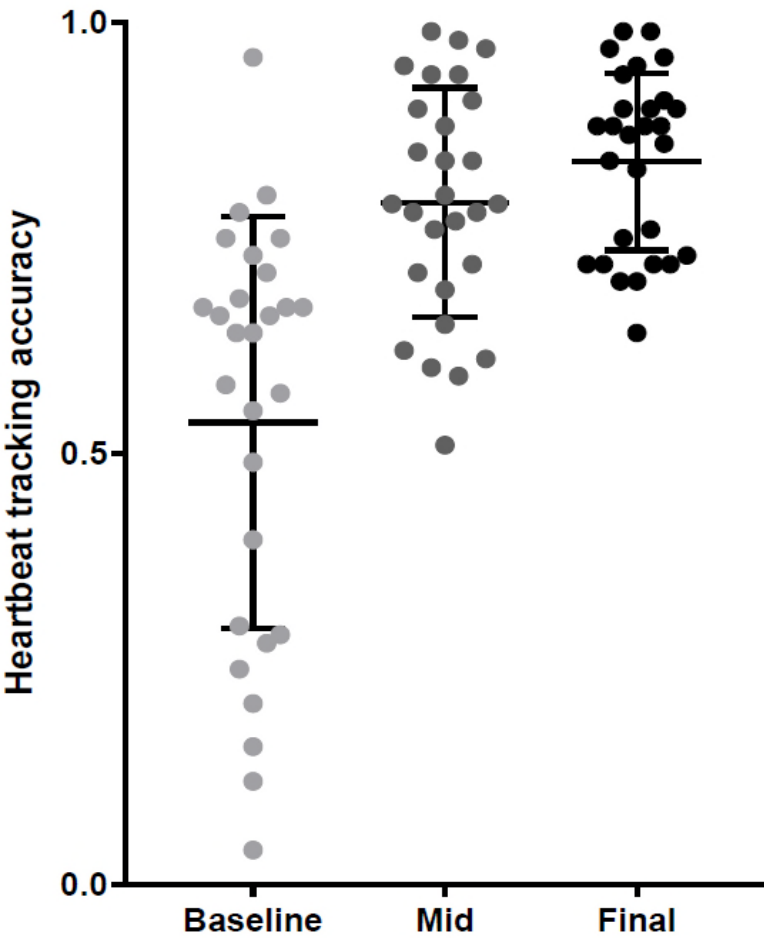


Feedback

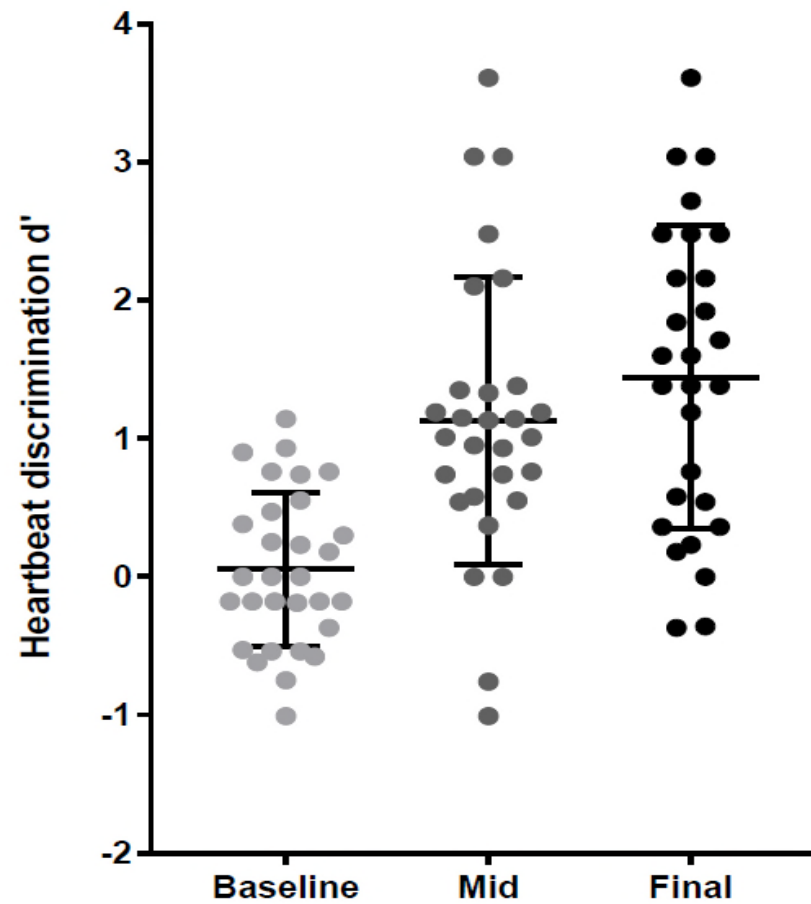


Interoceptive training

Heartbeat tracking

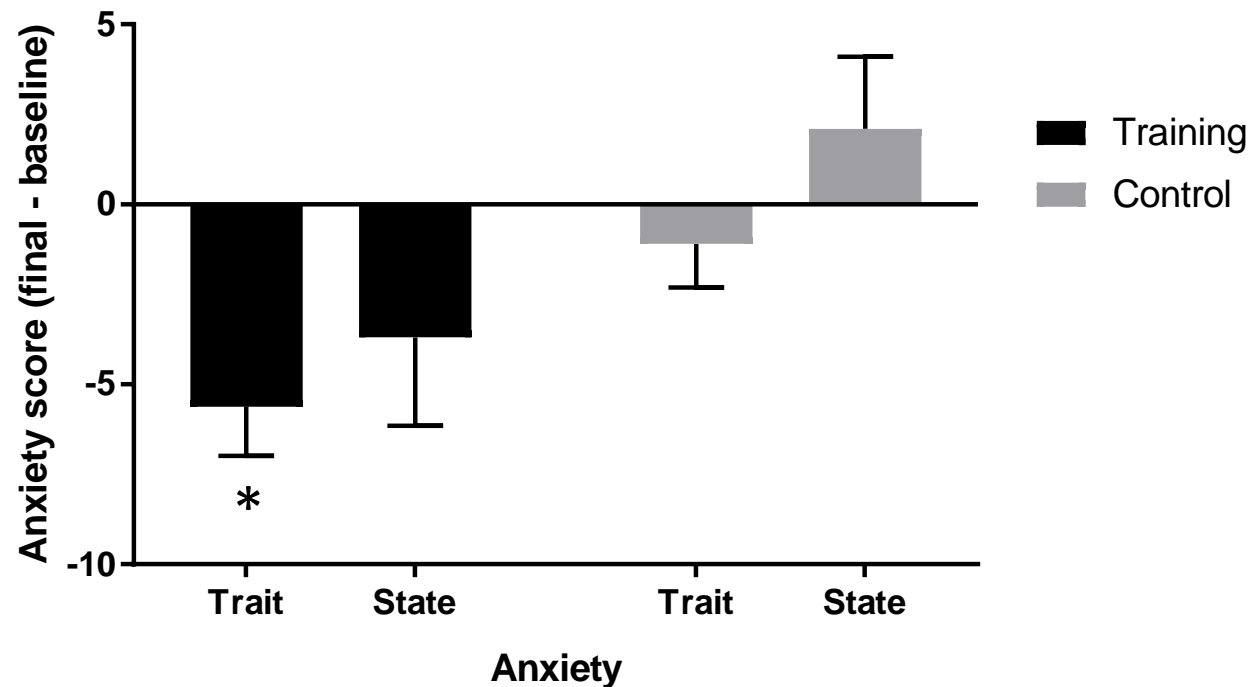


Heartbeat discrimination



Under review

Interoceptive training: Anxiety



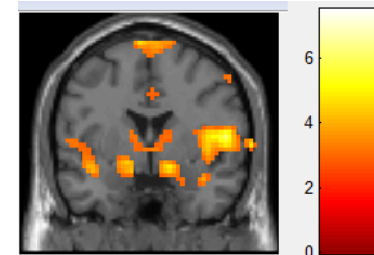
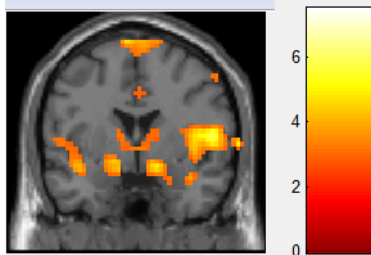
Reduction in state anxiety was related to interoceptive improvement across both the tracking ($r=-0.34$, $p=0.02$) and discrimination ($r=-0.32$, $p=0.03$) tasks.

Elevations in both the '**not worrying**' and '**attention regulation**' subscales significantly predicted reductions in trait anxiety ($r=-0.34$, $p=0.2$; $r=-0.34$, $p=0.02$).

Under review

Clinical Trial: Autism (N=120)

Interoceptive training



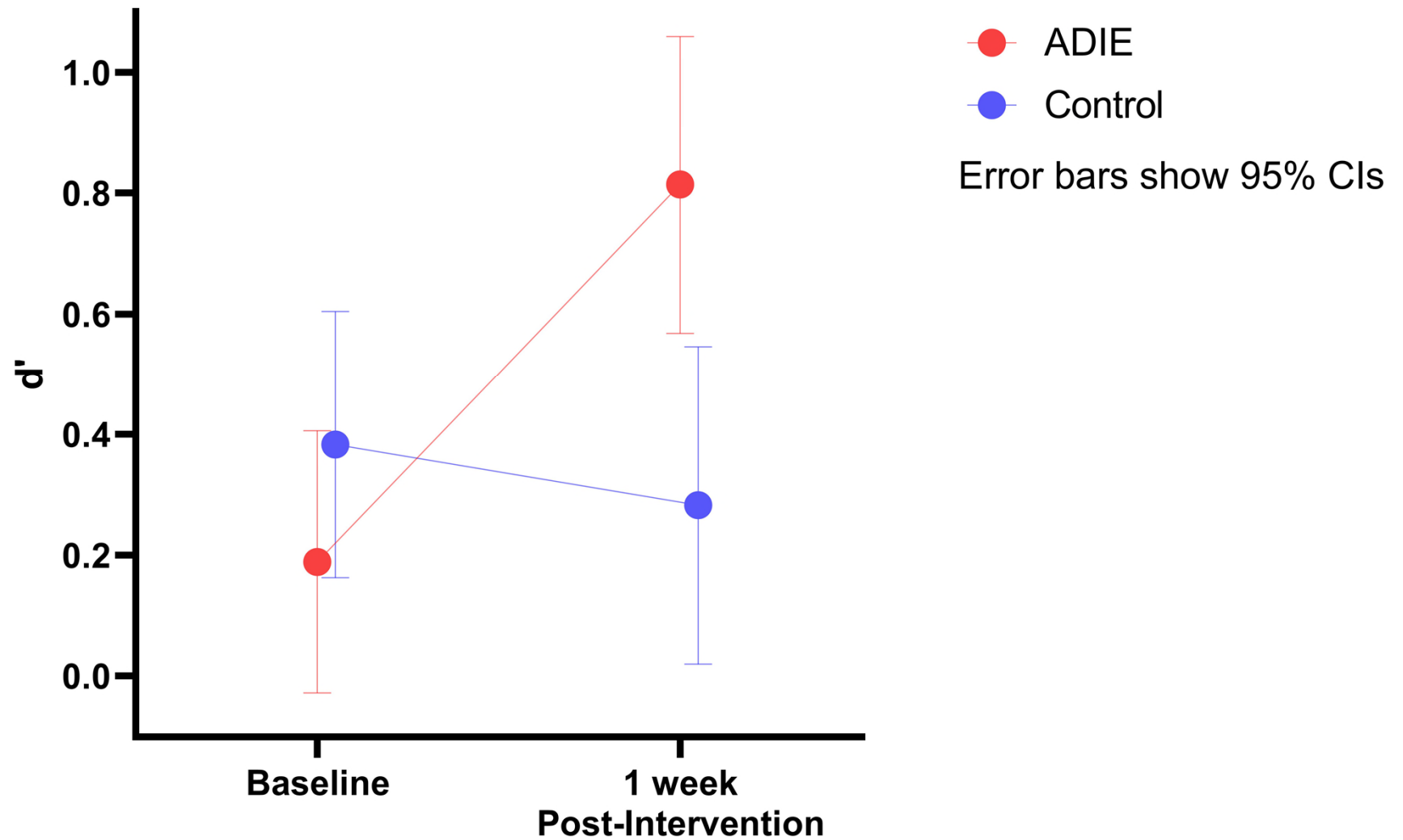
Δ Anxiety
Δ Emotion

Exteroceptive training

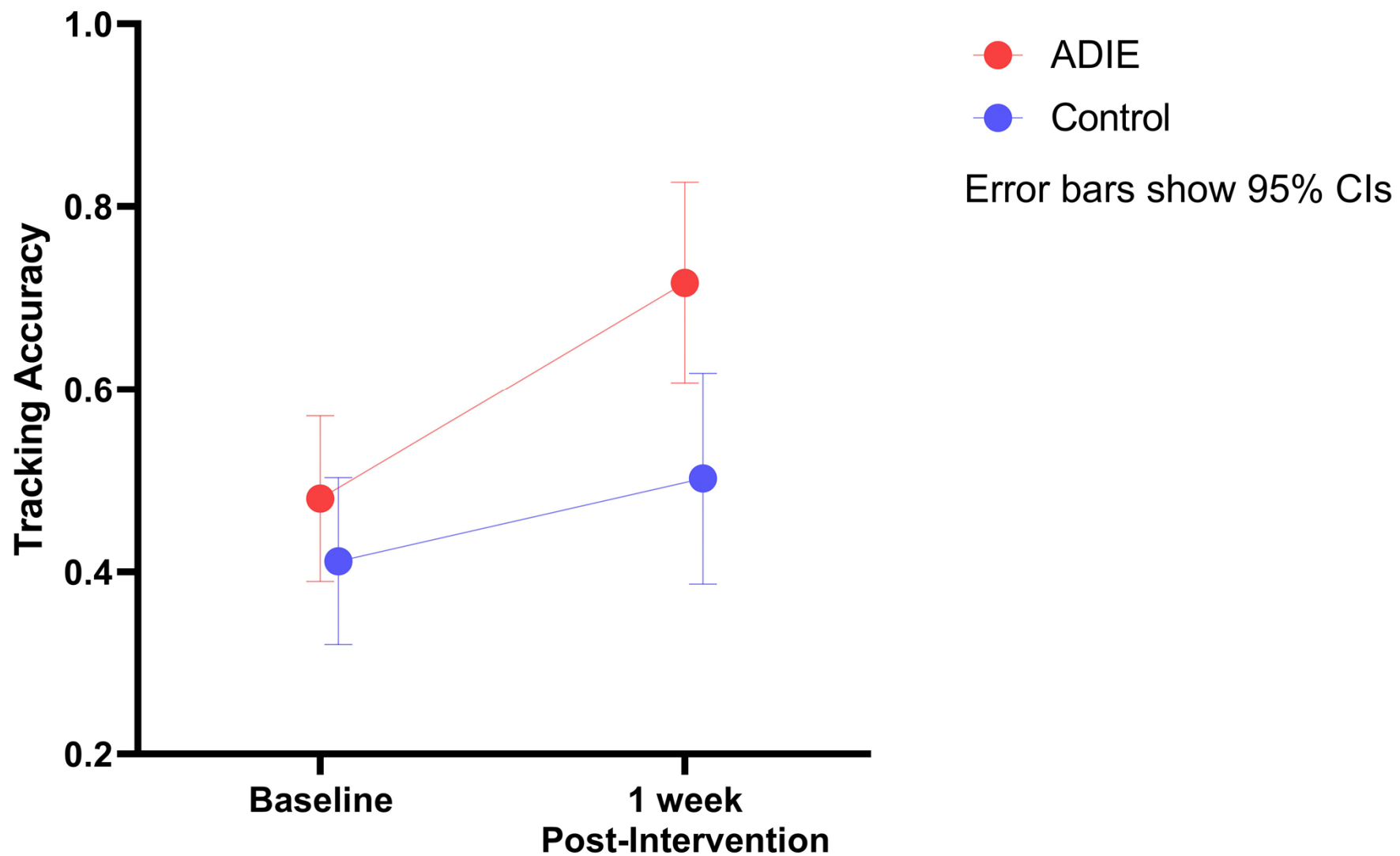


Δ Anxiety
Δ Emotion

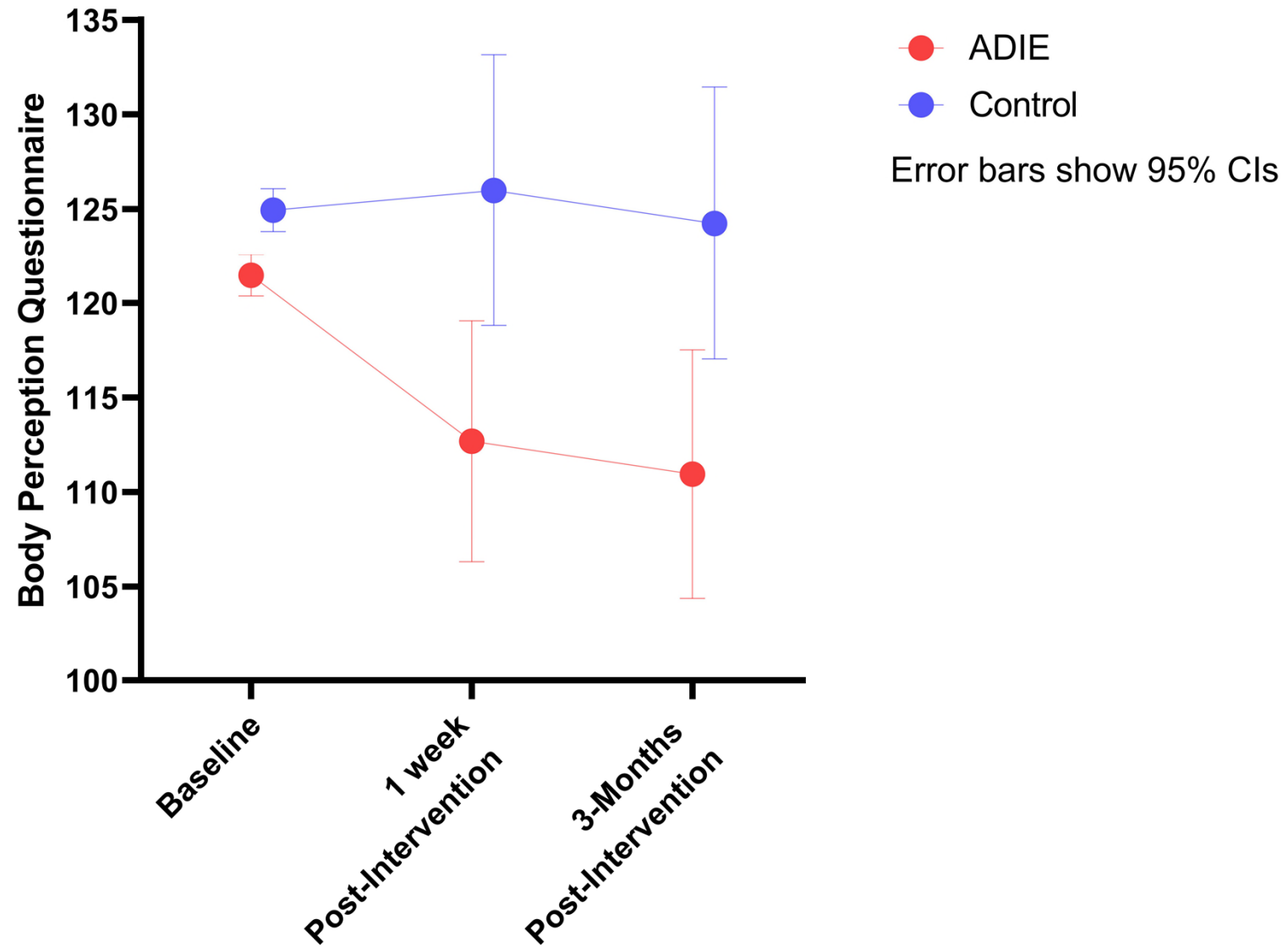
Predictive Margins for Interoceptive Accuracy (Discrimination)



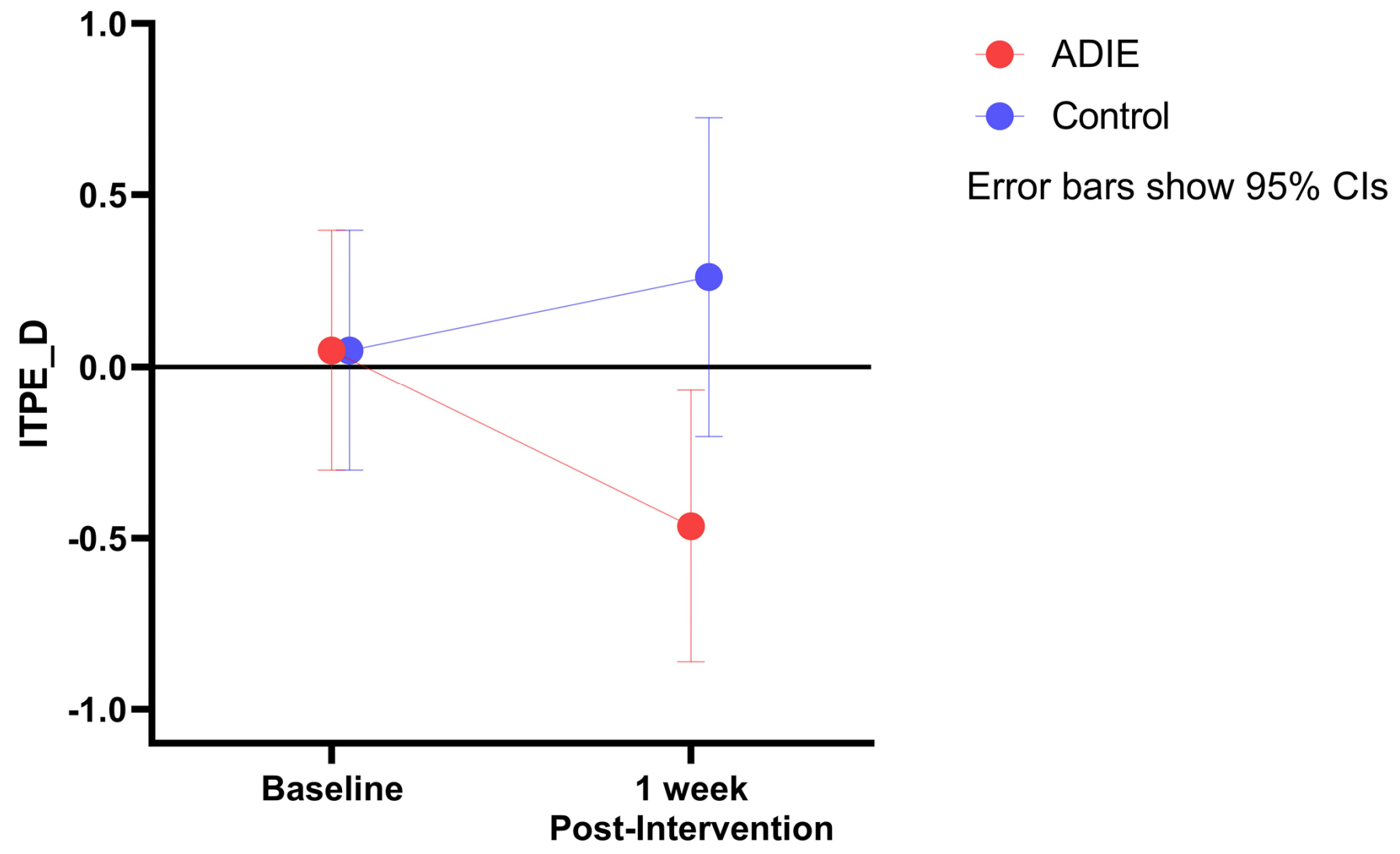
Predictive Margins for Interoceptive Accuracy (Tracking)



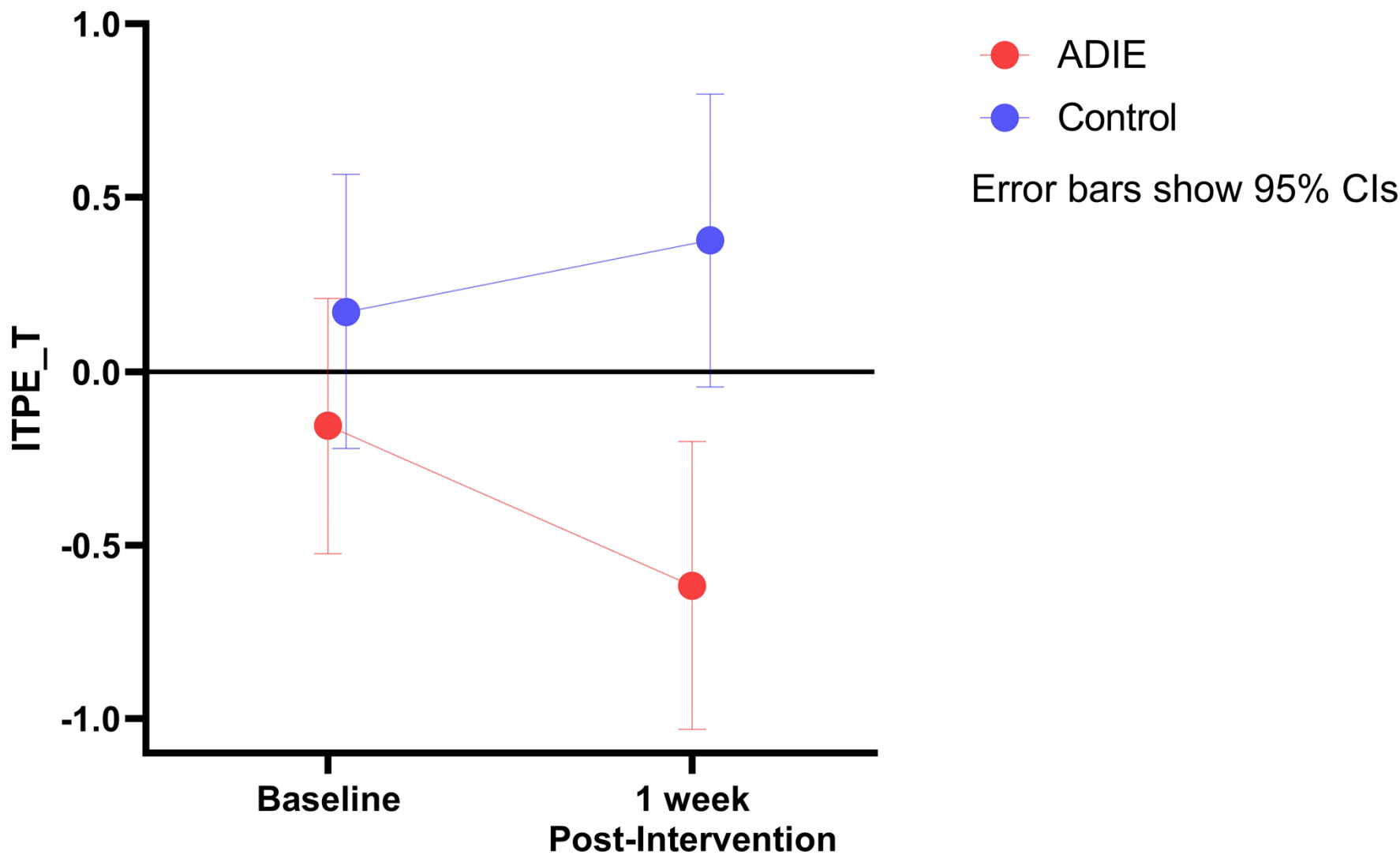
Predictive Margins for Interoceptive Sensitivity



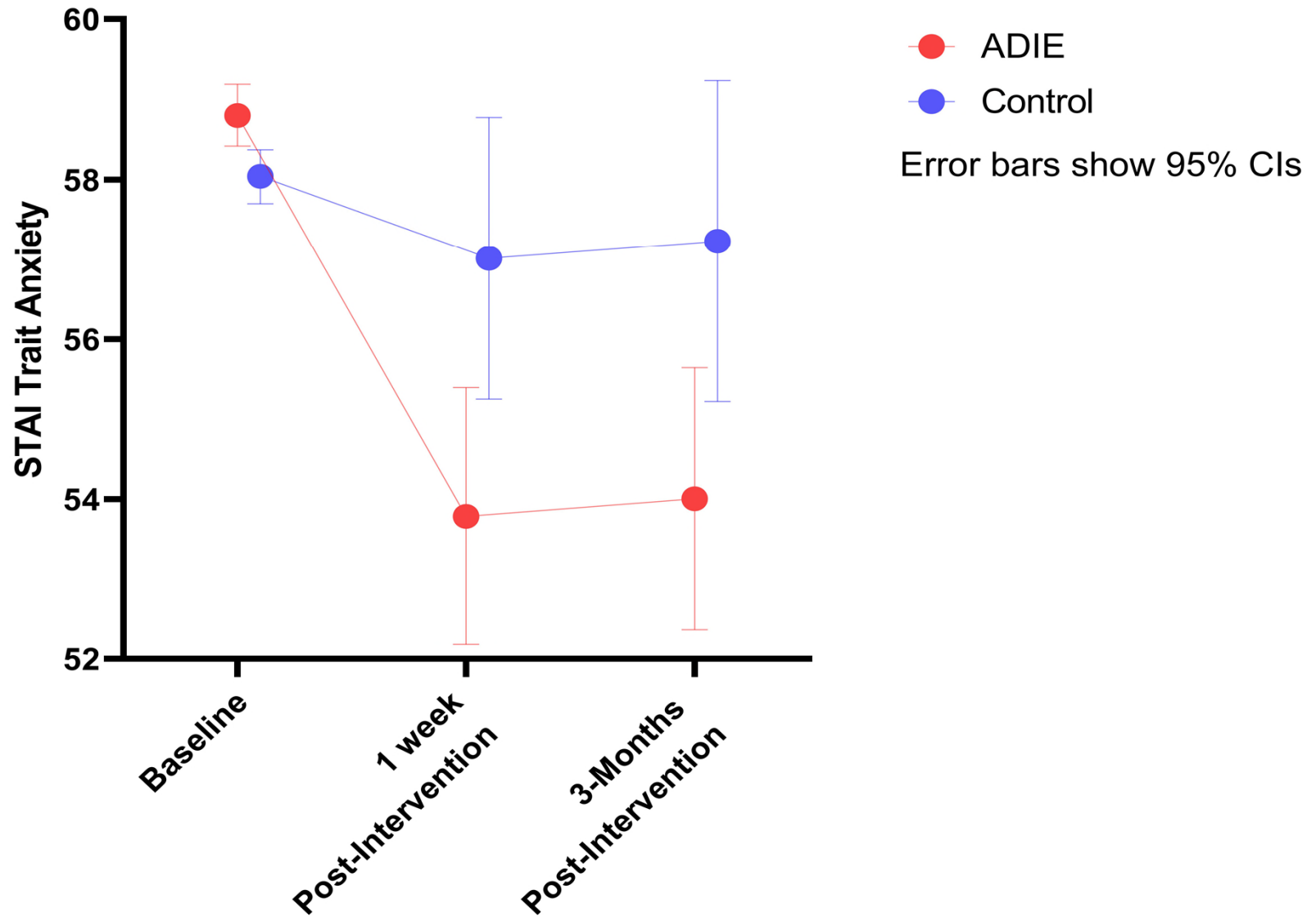
Predictive Margins for Interoceptive Trait Prediction Error (Discrimination)



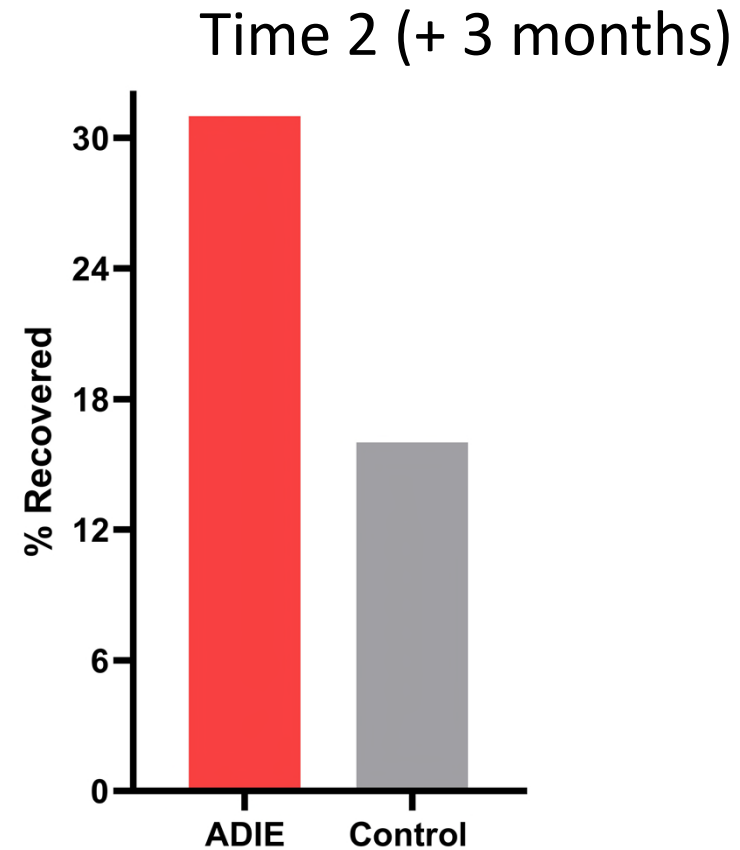
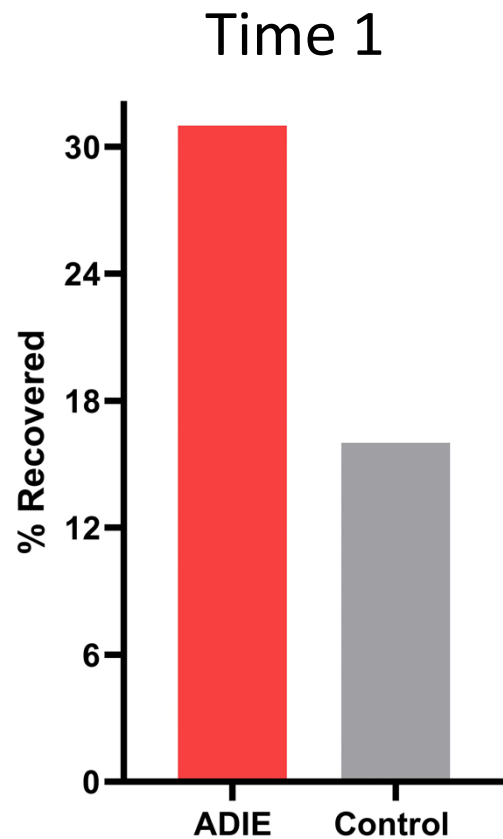
Predictive Margins for Interoceptive Trait Prediction Error (Tracking)



Predictive Margins for Primary Outcome



Recovered: Anxiety



* 6-point drop in trait anxiety and an STAI-T score below 55

Reactions and thoughts

>> So much more to understand, we are not there yet

Reactions to the ADIE Study

struggles to manage sensory overload, saying the world sometimes feels “intense, loud, fast, painful”, which she said contributes to feelings of stress and anxiety. Focusing on her heart and breathing is something she has learned to do naturally as a coping strategy and she enjoyed the training. “It was good to tune in and focus on my heartbeat,” she said. “No matter how busy outside or inside is, I can still focus on that.”



The screenshot shows a Twitter thread. At the top is a link to a Guardian article titled "Autistic people listen to their hearts to test anti-anxiety therapy". Below the link is a tweet from user @cassolotl, who has a profile picture of a person with glasses and a rainbow flag. The tweet says "THIS MAKES SO MUCH SENSE OMG. Next time I am feeling anxious I'm going to find my pulse." and is dated 5:01 pm - 14 Dec 2018. It has 6 likes and 2 replies. Below the tweet is a reply from user @cheaprhye, who has a profile picture of a person with glasses and a rainbow flag. The reply says "I do that! I often stim by putting my hand over my heart" and is dated 14 Dec 2018. It has 1 like. Below the reply is another tweet from @cassolotl saying "Ohhh that's lovely!". The bottom of the screenshot shows the Twitter logo.

The Guardian
Autistic people listen to their hearts to test anti-anxiety therapy
Trial seeks further proof that tuning into our internal organs' activity can reduce anxiety
theguardian.com

2 3 12

Cas 🌱 🍌 🐶 🏳️‍🌈 🏳️‍♂️
@cassolotl [Follow](#)

THIS MAKES SO MUCH SENSE OMG.

Next time I am feeling anxious I'm going to find my pulse.

5:01 pm - 14 Dec 2018

6 Likes

2 6

[Tweet your reply](#)

This Tweet is unavailable

1 more reply

Rebel scum 🌱 @cheaprhye · 14 Dec 2018
Replying to @cassolotl
I do that! I often stim by putting my hand over my heart

1

Cas 🌱 🍌 🐶 🏳️‍🌈 🏳️‍♂️ @cassolotl · 14 Dec 2018
Ohhh that's lovely!

Reduction of sensory overload

As the inner channel gets clearer, the outer channel gets more quiet

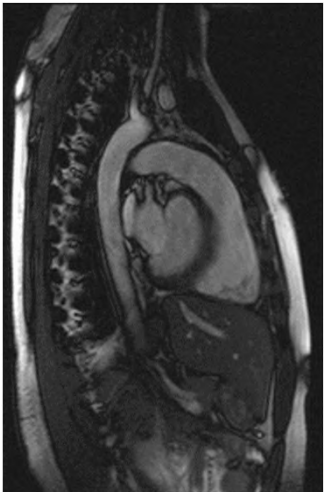
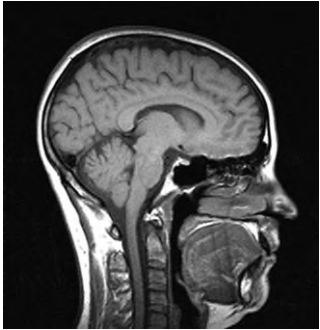
Not worrying and enhanced regulation

When I notice the impacts of anxiety on my body I am more aware of them and am able to reassure myself that it is just a physical reaction. I am better at taking deep breaths and trying to slow my breathing and heart rate down, rather than letting it spiral.

Generalized bodily awareness

I believe it has increased my awareness of hunger and as a result I remember to eat/drink/go to the toilet

Conclusions



- Interoception is the sensing of internal bodily sensations
- Interoception can influence emotion and interoceptive error is related to anxiety
- Interoceptive accuracy is reduced in some autistic individuals
- Interoceptive training: could help with anxiety
- More research is needed

Thank you



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