# A single session of an attentional bias modification training based on virtual reality and eye-tracking to reduce attentional bias and body dissatisfaction in anorexia nervosa patients.

Ascione M.[1], Carulla-Roig M.[2], Miquel-Nabau H.[1], Meschberger-Annweiler F.A.[1], Serrano-Troncoso E.[2], Porras-Garcia B.[3],Ferrer-Garcia M.[1], Gutierrez-Maldonado J.[1]

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# **Introduction:** body-related attentional bias

Patients with Anorexia Nervosa show
dysfunctional body-related attentional bias

Association with
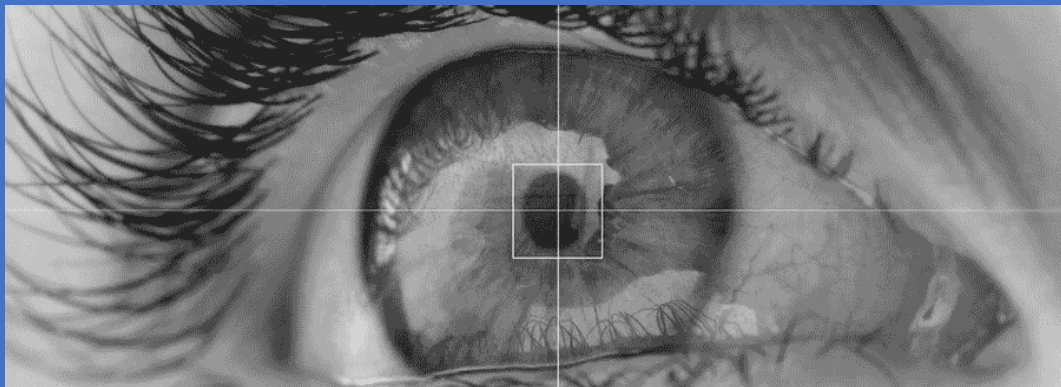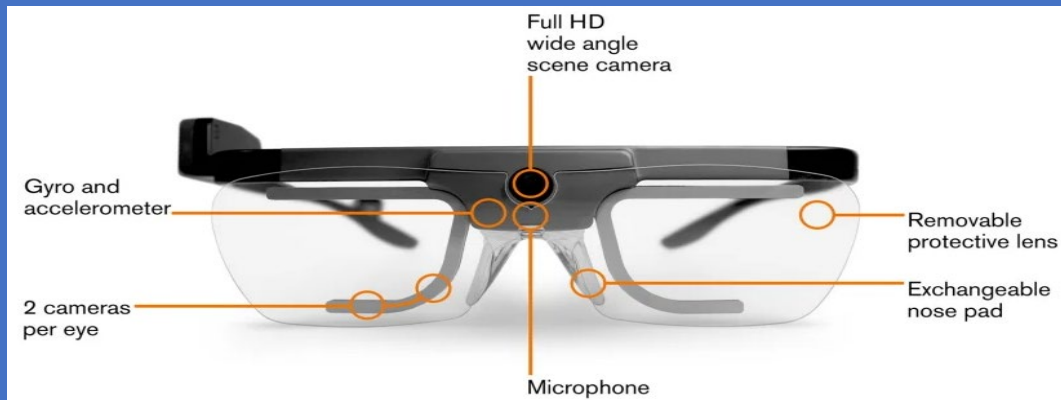higher levels of
body dissatisfaction

Interference with
the effectiveness of
body exposure-based treatments



**Attentional bias
modification training
can reduce
attentional biases**

# Introduction: attentional bias modification training (ABMT)

**Eye-tracking into Virtual reality**

# Study purpose

*To assess the usefulness of a single session of an innovative body-related attentional bias modification training based on VR and ET in AN patients.*

*Will the AMBT reduce body-related AB and BD levels?*

# Methodology

**Sample**

23 adolescent patients with AN diagnosis

| AGE<br>Mean (SD) | BMI<br>Mean (SD) |
|---|---|
| 15,30 (1,29) | 18,28 (1,62) |

**Procedure**

1. creating the avatar shape
2. pre-assessment
3. full body ownership illusion into VR
4. attentional bias modification training into VR
5. post-assessment
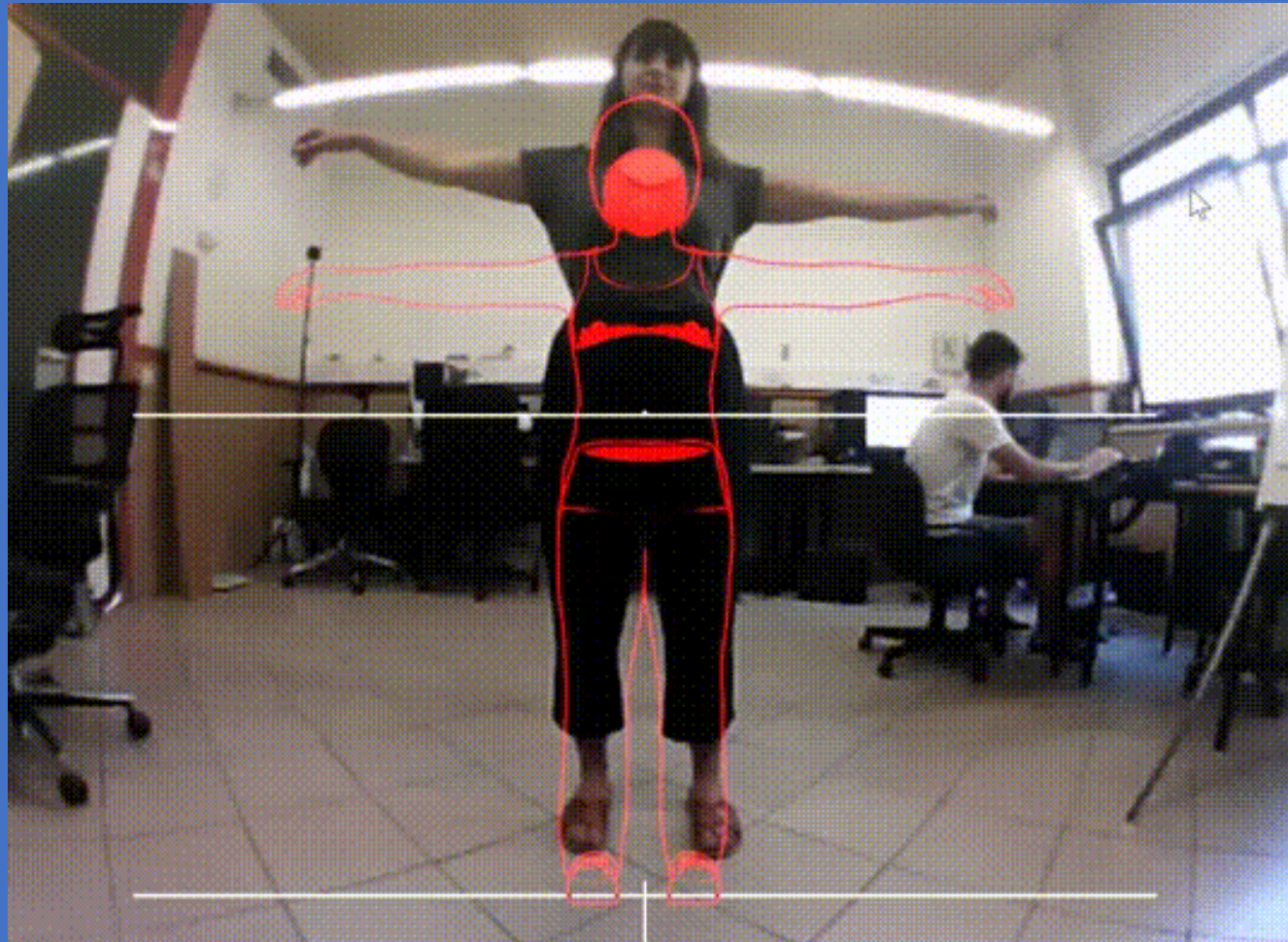
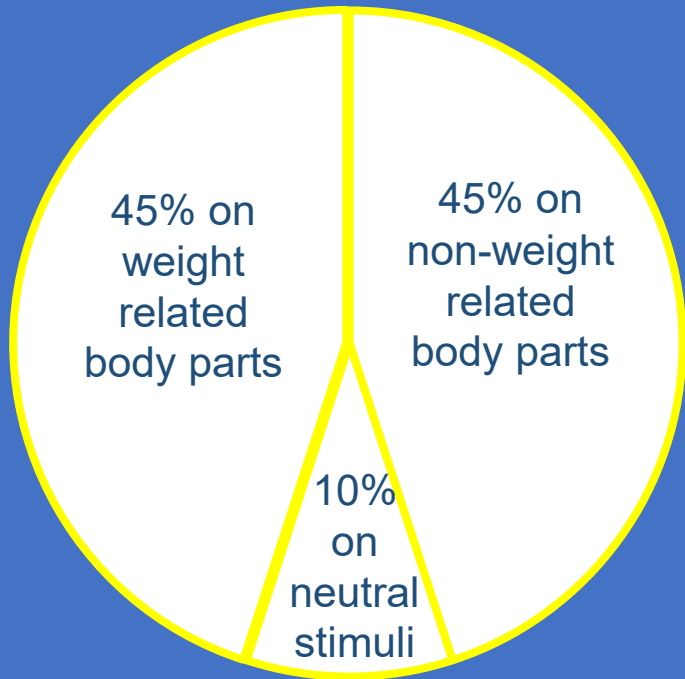# **Methodology:** personalised avatar



PHOTO OF THE PARTICIPANT

**Methodology:** virtual reality enviroment

# Methodology: full body ownership illusion



VISUO-MOTOR STIMULATION PROCEDURE

VISUO-TACTILE STIMULATION PROCEDURE

# Methodology: attentional bias modification training



45% on weight related body parts

45% on non-weight related body parts

10% on neutral stimuli

*The task is based on a virtual reality adaptation of the attentional bias induction procedure proposed by Smeets et al. 2011*

# Methodology: pre-post measures

Body dissatisfaction
(BIAS-BD; Gardner et al., 2009)
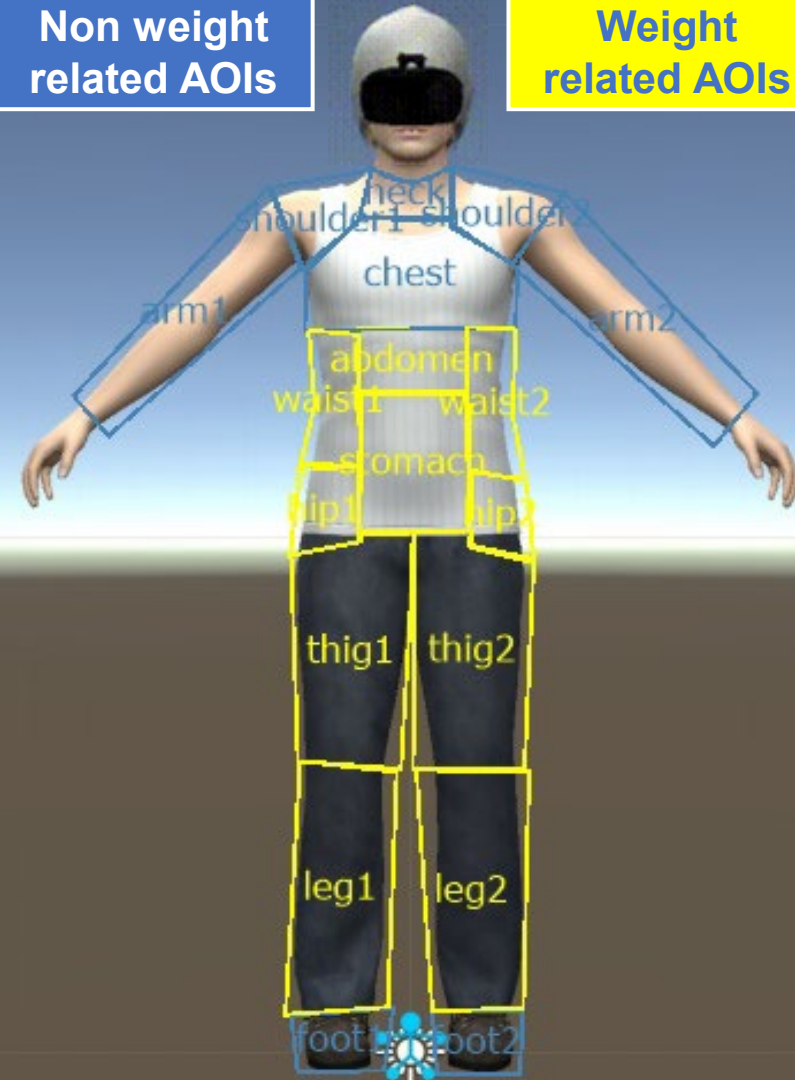
Body-related attentional bias

Complete fixation time

Fixations number



**Areas Of Interest***

**Non weight related AOIs**

**Weight related AOIs**

* Physical Appearance State and Trait Anxiety Scale (PASTAS; Thompson, 1999

# **Methodology:** body-related attentional bias assessment

# Descriptive and Analytic results

| | Pre-Assessment Time | Post-Assessment Time | Paired sample t-test | | Effect size |
|---|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | t | p | Cohen's d* |
| **Complete Fixation Time** | 3269.88 (5837.05) | -94.88 (7988.81) | 1.863 | *.040 | .452 |
| **Number of Fixations** | 2.00 (20.80) | -3.41 (18.56) | .835 | .208 | .203 |
| **Body Dissatisfaction** | 42.83 (26.14) | 33.26 (32.14) | 1.880 | *.037 | .392 |

Significant differences. *$p < .05$; Cohen's *d* effect sizes: small (≥0.20), medium (≥0.50), and large (≥0.80).

# Results: complete fixation time

**positive outcome**
more attention at weight-related body parts

**negative outcome**
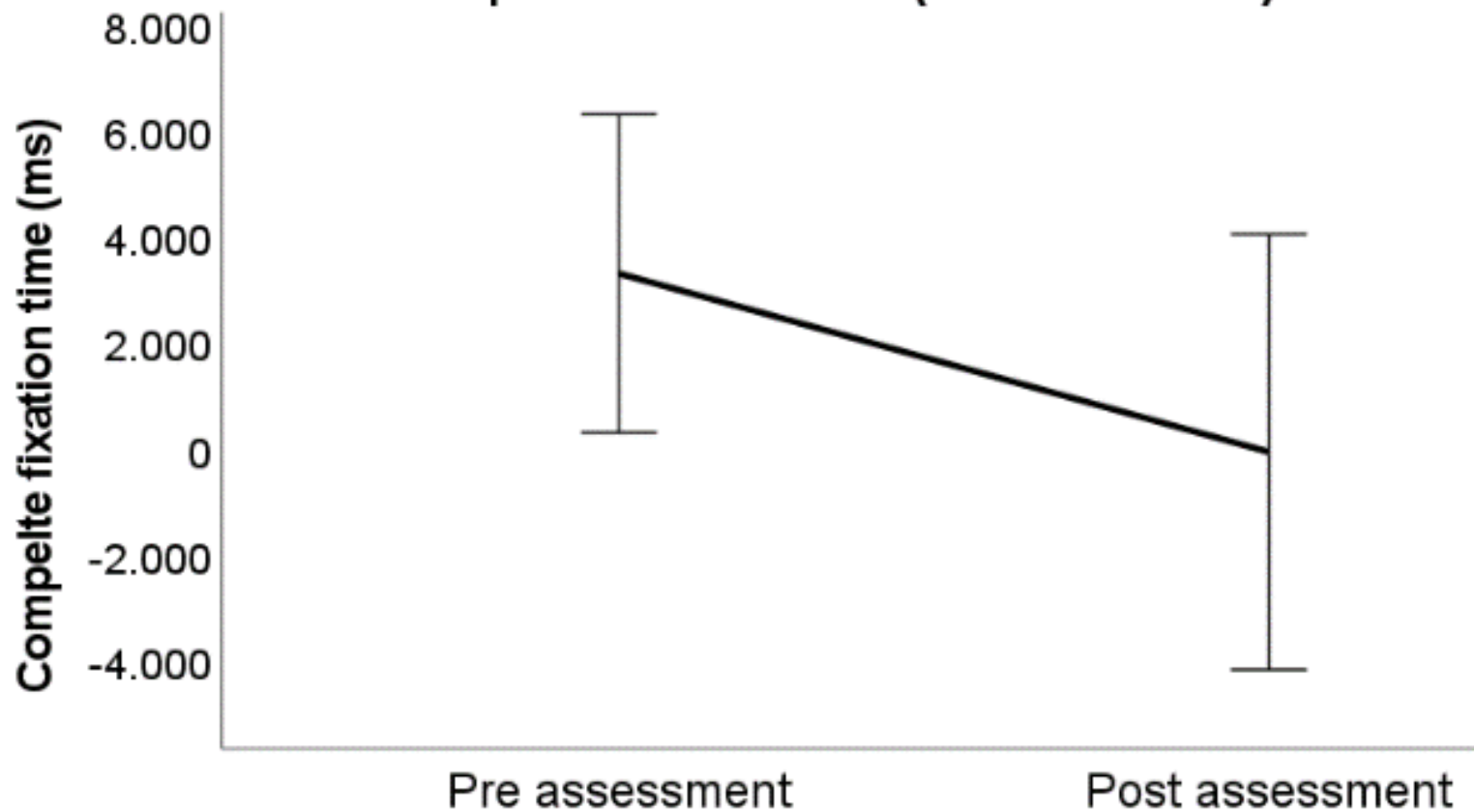more attention at no weight-related body parts

**close to 0 outcome**
balanced attention between weight-related and non-weight-related body parts

**Statistically significant reduction in CFT on the W-AOIs**
[t(16) = 1.8, p = .040]



Complete fixation time (W vs NW AOIs)

The ABMT restored balanced attention between weight-related body areas and non-weight-related body areas reducing the time the patients spent looking at weight-related body parts.

# Results: fixations number

**positive outcome**
more attention at weight-related body parts

**negative outcome**
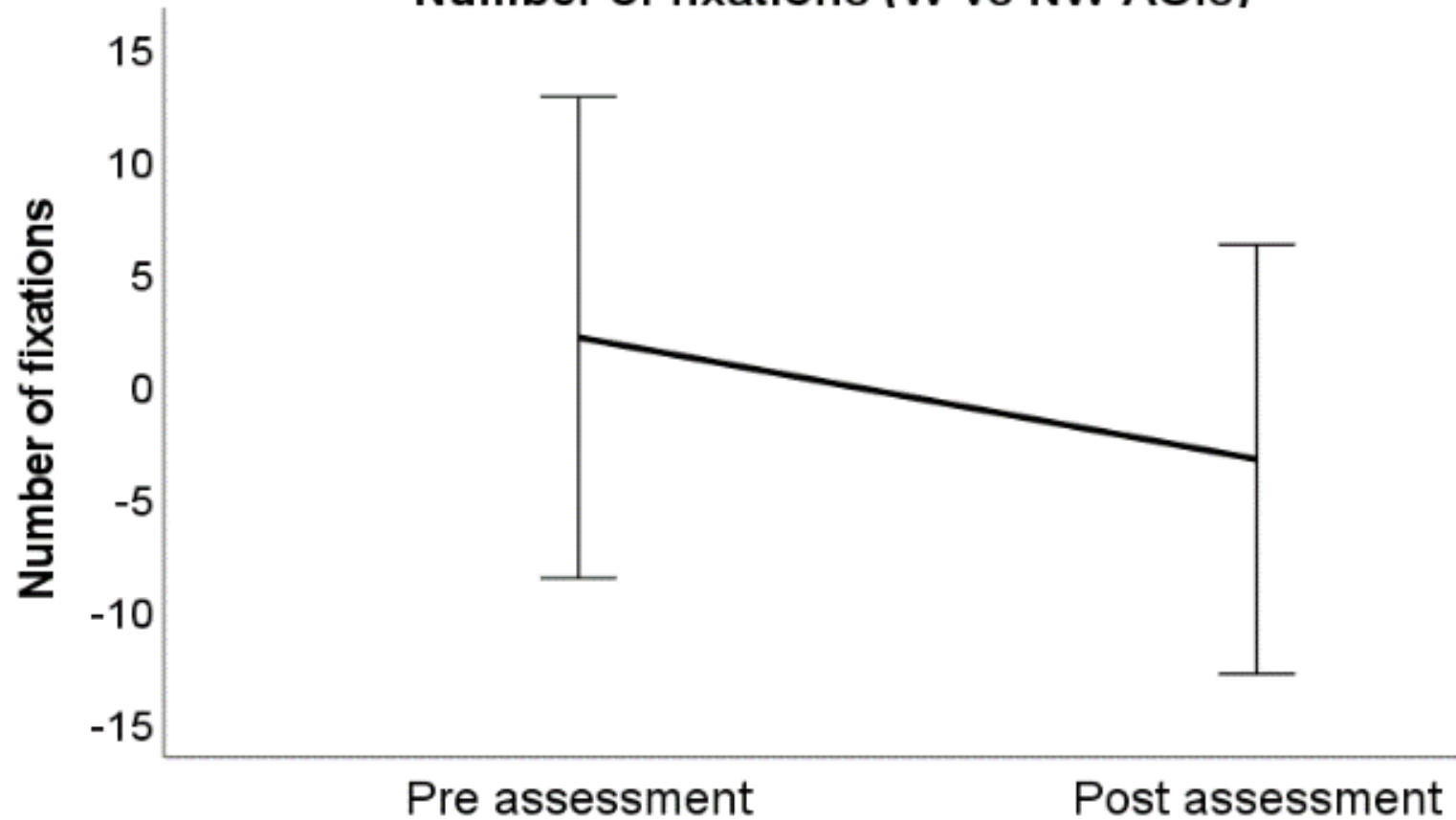more attention at no weight-related body parts

**close to 0 outcome**
balanced attention between weight-related and non-weight-related body parts

**No statistically significant reduction in NF on the W-AOIs**
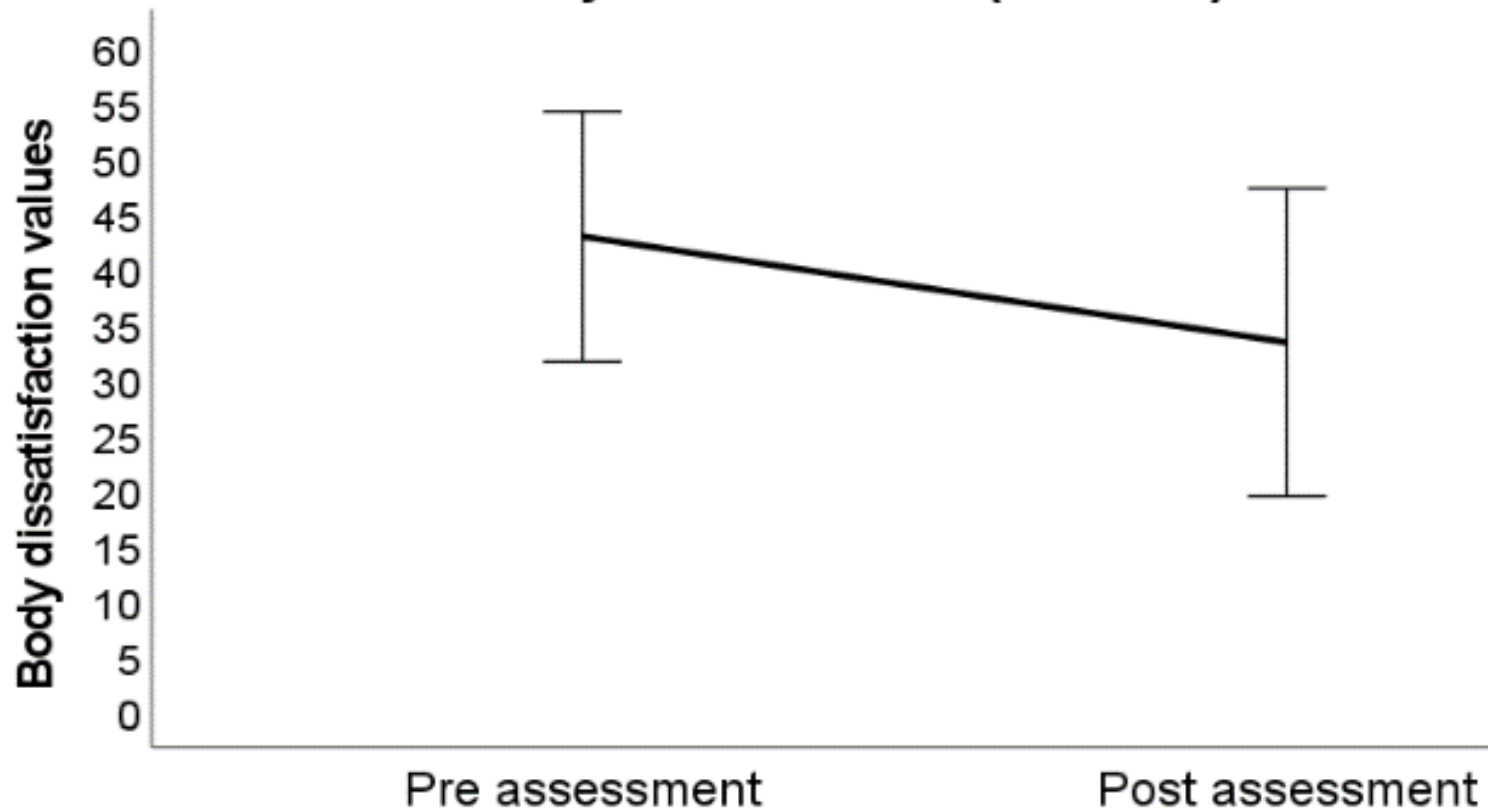[t(16) = .83, p = .208.]



Number of fixations (W vs NW AOIs)

The ABMT change the AB from weight-related to non-weight-related body parts.

# Results: body dissatisfaction

Statistically significant reduction
in body dissatisfaction
[t(22) = 1.88, p = .037]

After the ABMT, the BD levels decreased



Body dissatisfaction (BIAS-BD)

# Discussion

Our results are in line with previous studies.

Patients with anorexia nervosa show a tendency to focus more on weight-related body parts than on other body areas

Porras-Garcia et al., 2021; Bauer et al., 2017; Tuschen-Caffier et al., 2015; George et al., 2011; Mountford, 2006; Jansen et al., 2005

Inducing attentional bias towards negative and positive appearance-related stimuli increases the attentional bias for the respective target stimuli in healthy women

Smith & Rieger, 2009

Inducing attentional bias for self-defined unattractive body parts or negative shape and weight-related words increase body dissatisfaction levels in healthy women

Smith & Riger, 2006, 2009; Smeets et al., 2011

# Discussion: innovations

The ABMT goal was to balance attention by directing it to both negative and positive/neutral stimuli

Measures of gaze behaviour with good psychometric properties were used to assess attentional bias

It is the first ABMT based on a virtual representation of the patient's real body in a highly ecological situation
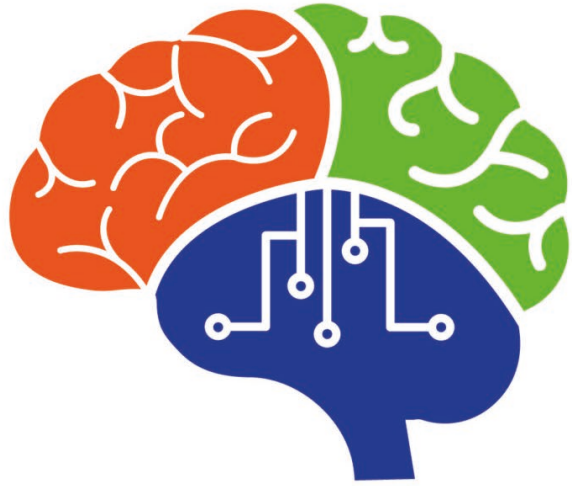
Stand-alone or combined treatment?

Preventive function?

# Conclusions

VR and ET-based ABMT
has the potential to become
a new effective clinical intervention
for the treatment of
body-related AB and body dissatisfaction
in anorexia nervosa patients

# *Thank you!*

**Contacts**
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# Eye tracking data transformation

**1**
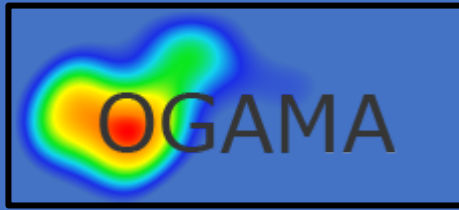


Open Gaze and Mouse Analyzer software

| Eye tracking raw data | → | Suitable quantitative data |

**2**

Weight AOIs – No Weight AOIs

Example→ fixation points:

25 (W-AOIs) – 10 (NW-AOIs) = 15

Positive outcome

↓

looking more at the weight-related body parts

Negative outcome

↓

looking more at the no-weight-related body parts