Preliminary findings from virtual reality and eye tracking-based training to modify body-related attentional bias in anorexia nervosa

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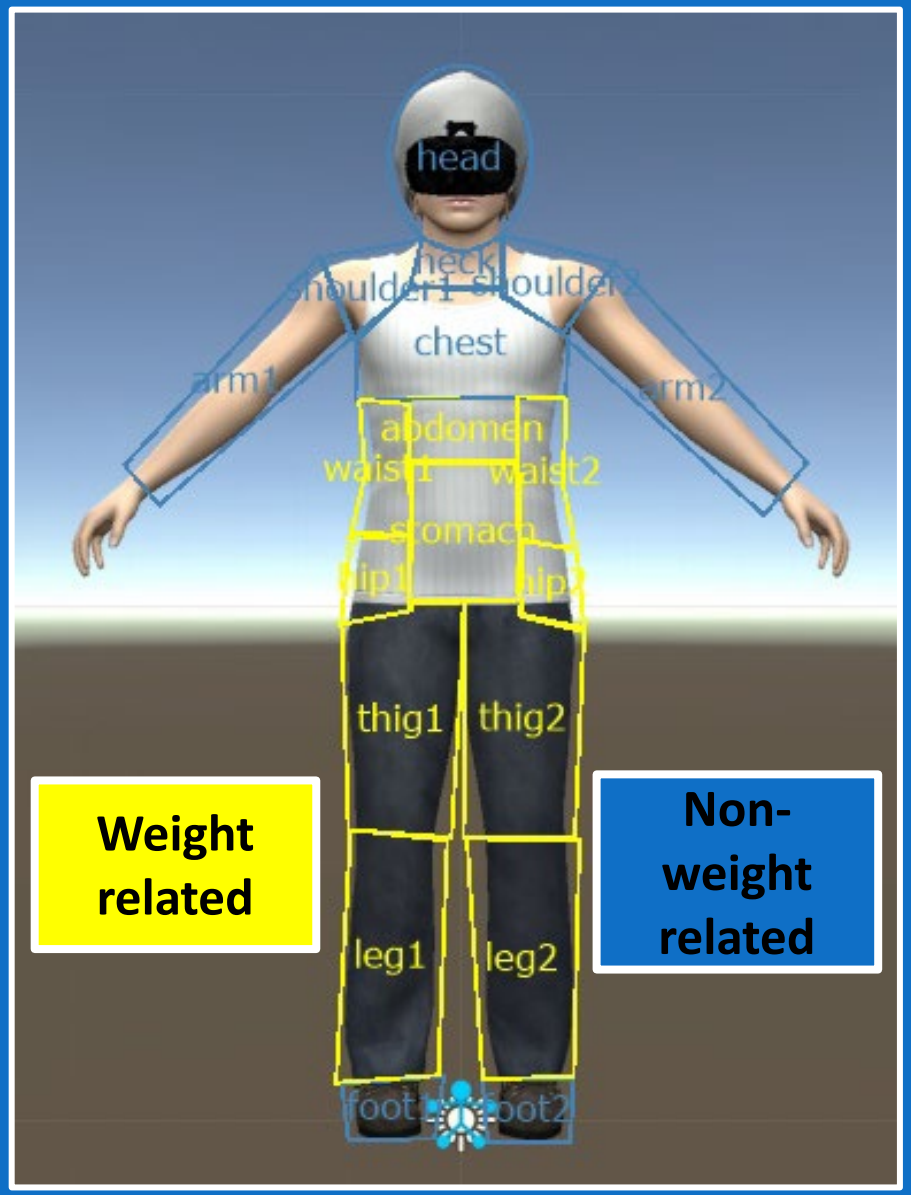
Patients with anorexia nervosa show dysfunctional body-related attentional bias



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

Body-related attentional bias

Association with higher levels of **body dissatisfaction**

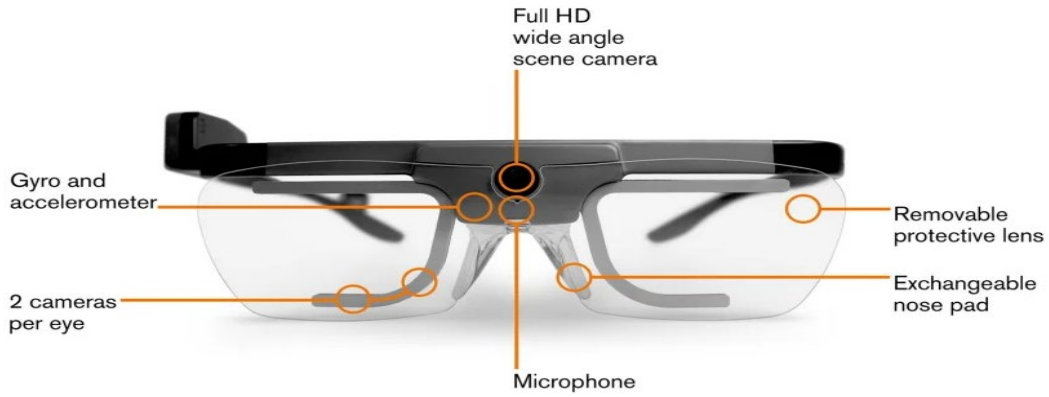
Interference with the effectiveness of the **body exposure-based treatments**

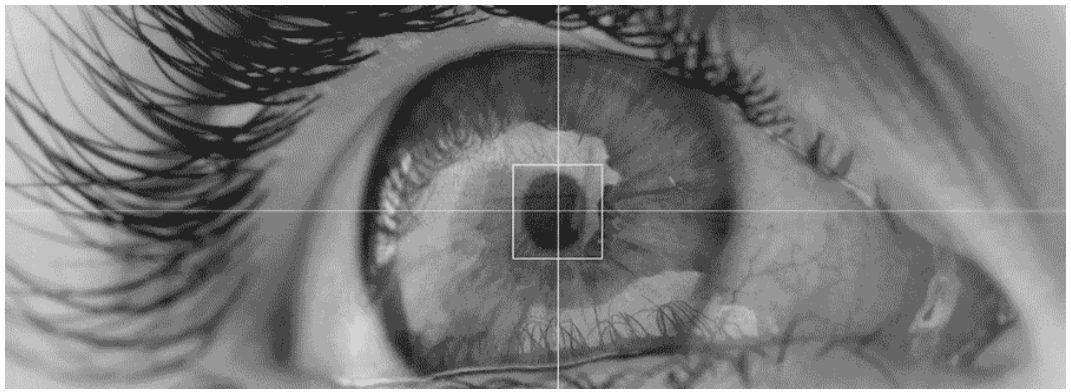
ATTENTIONAL BIAS MODIFICATION TRAINING

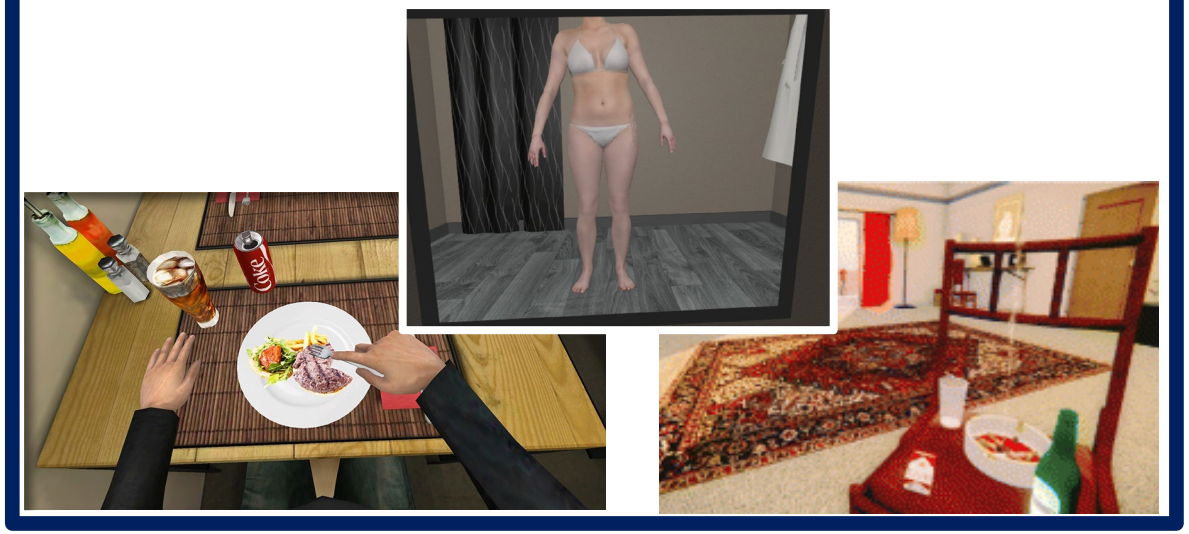
can reduce attentional biases

ATTENTIONAL BIAS MODIFICATION TRAINING - ABMT

Eye-tracking + Virtual reality







Study purpose

To assess the usefulness of a single session of a body-related attentional bias modification training based on virtual reality and eye-tracking in anorexia nervosa patients

Will the AMBT reduce body-related attentional bias and body dissatisfaction levels?

Methodology

Sample

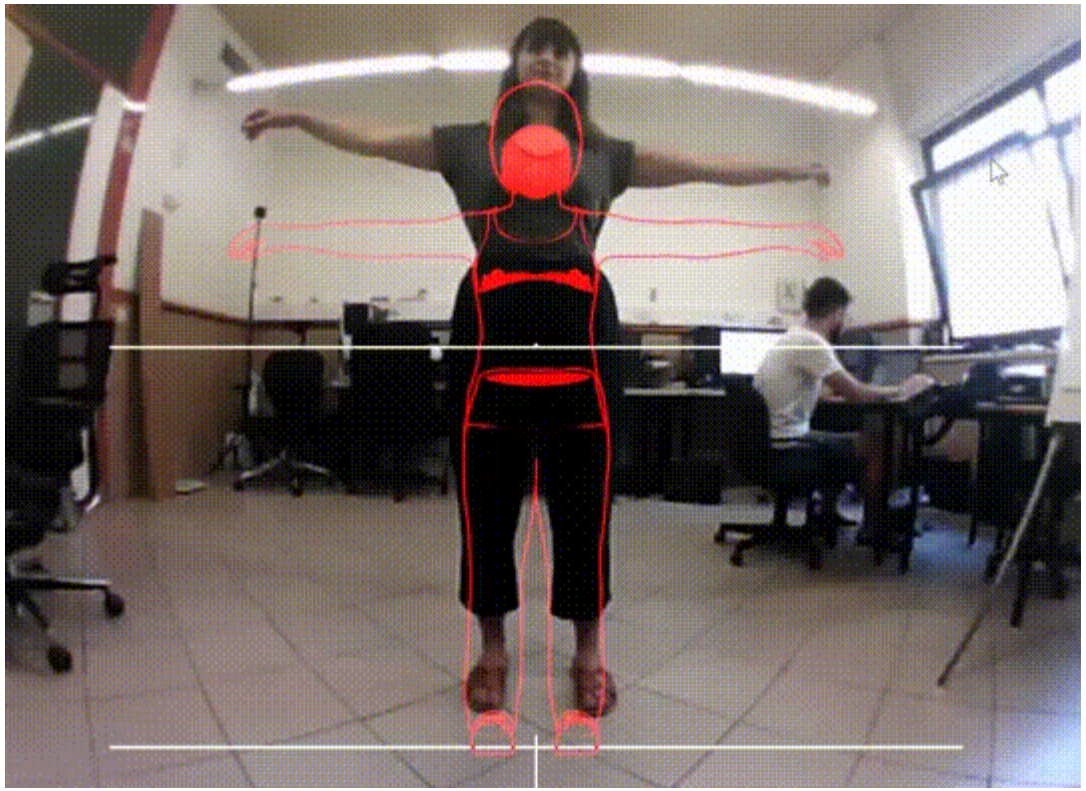
23 adolescent patients with anorexia nervosa diagnosis

AGE	BMI
Mean (SD)	Mean (SD)
15,30 (1,29)	18,28 (1,62)

Procedure

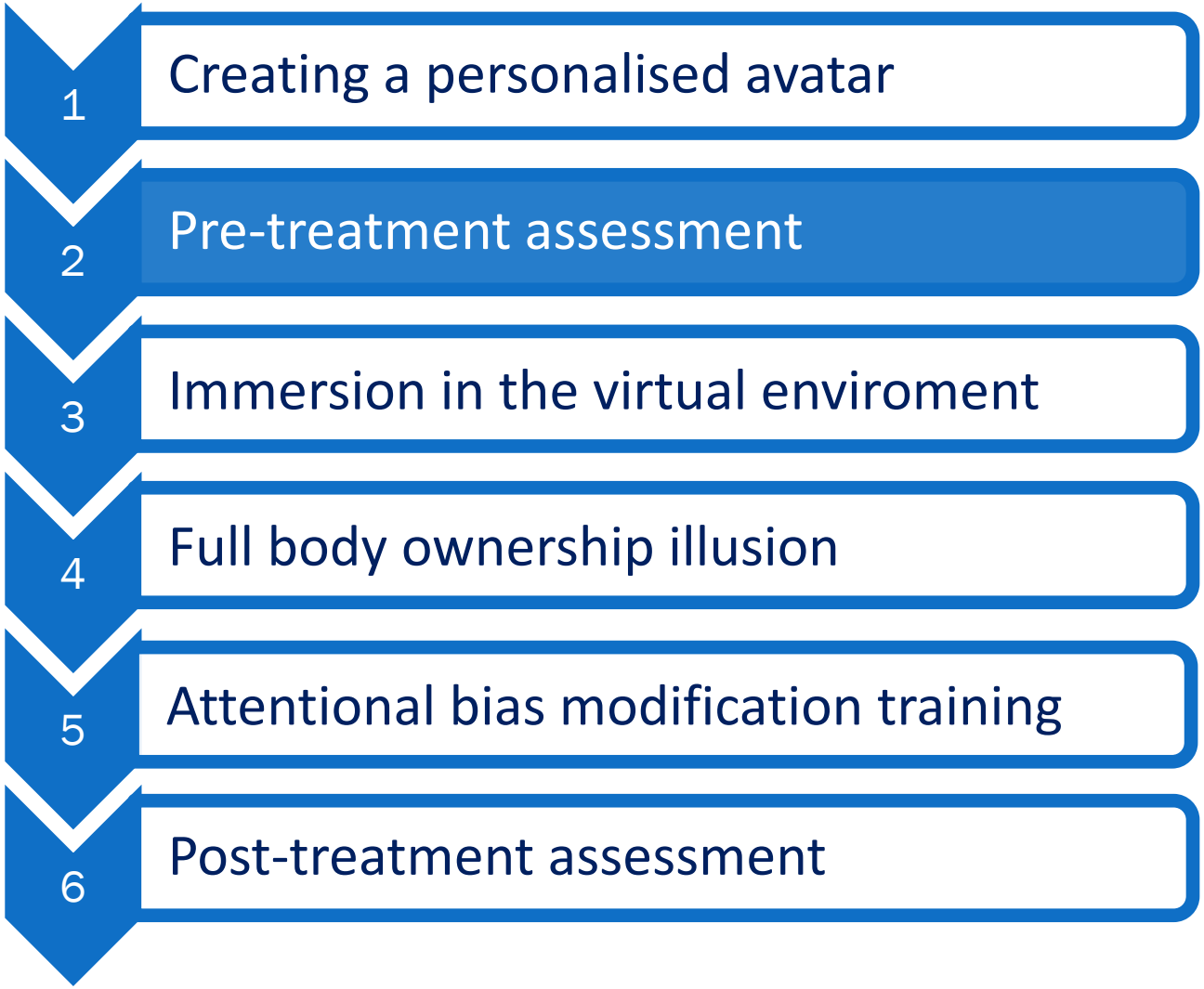
1. Creating a personalised avatar
2. Pre-treatment assessment
3. Immersion in the virtual enviroment
4. Full body ownership illusion
5. Attentional bias modification training
6. Post-treatment assessment

Creating a personalised avatar



The virtual avatar was created by taking a patient’s frontal photo which was manually overlapped on the silhouette of the virtual body by adapting the avatar’s body parts to the patient's silhouette.

Procedure


1
Creating a personalised avatar
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Pre-treatment assessment
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Immersion in the virtual enviroment
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Full body ownership illusion
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Attentional bias modification training
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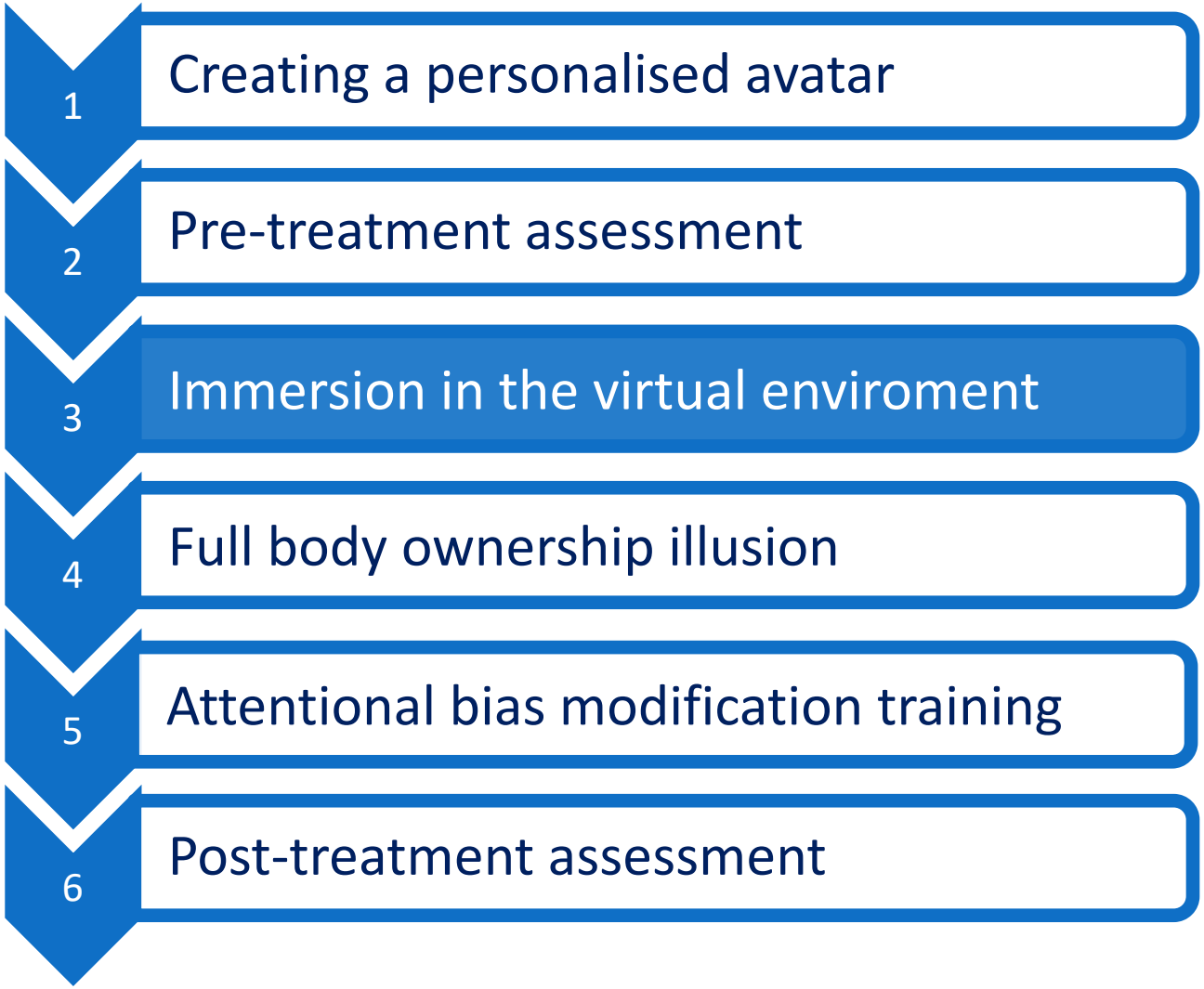
Post-treatment assessment

Procedure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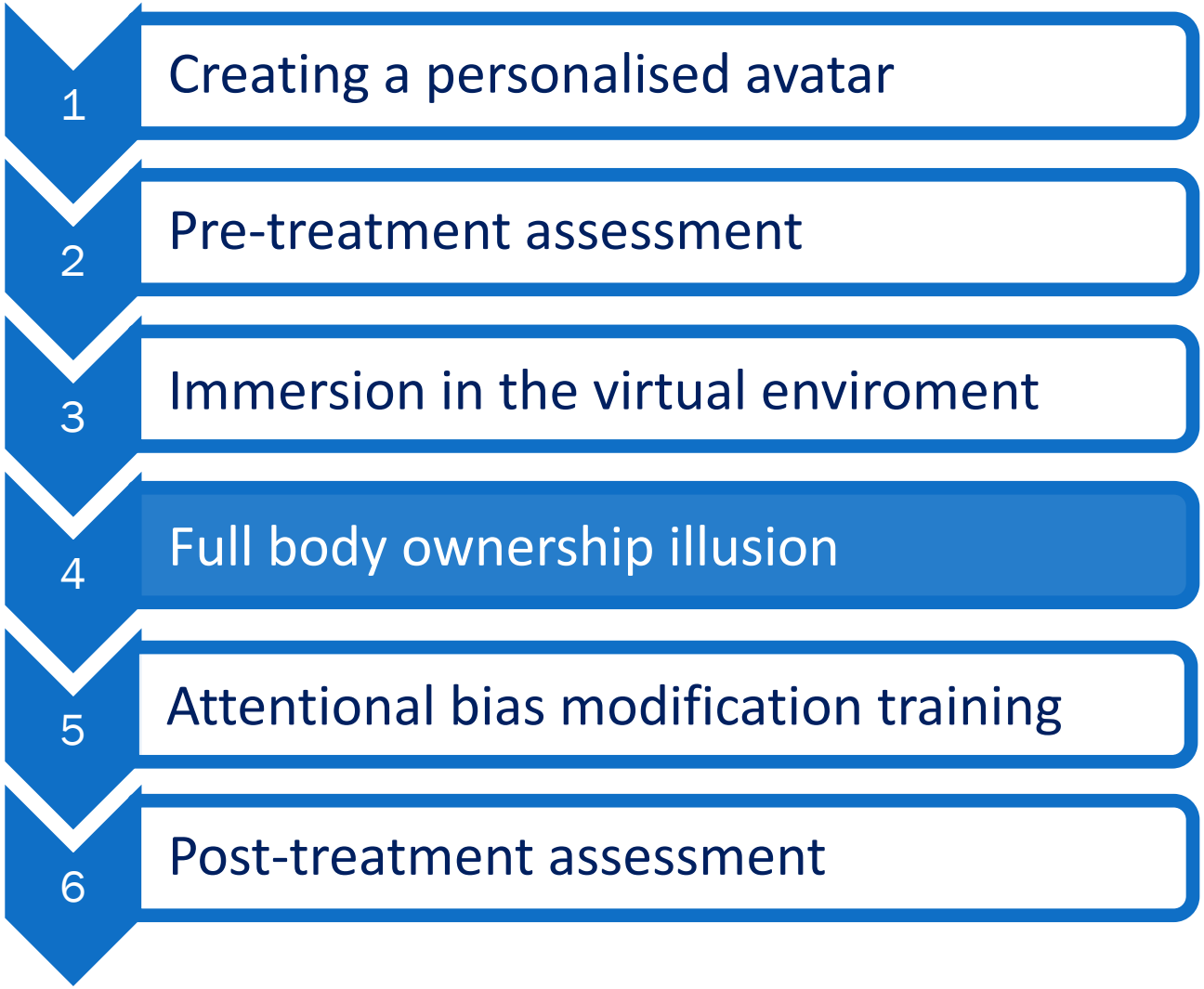
Virtual reality enviroment

Full Body Motion Tracking

Procedure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Full body ownership illusion

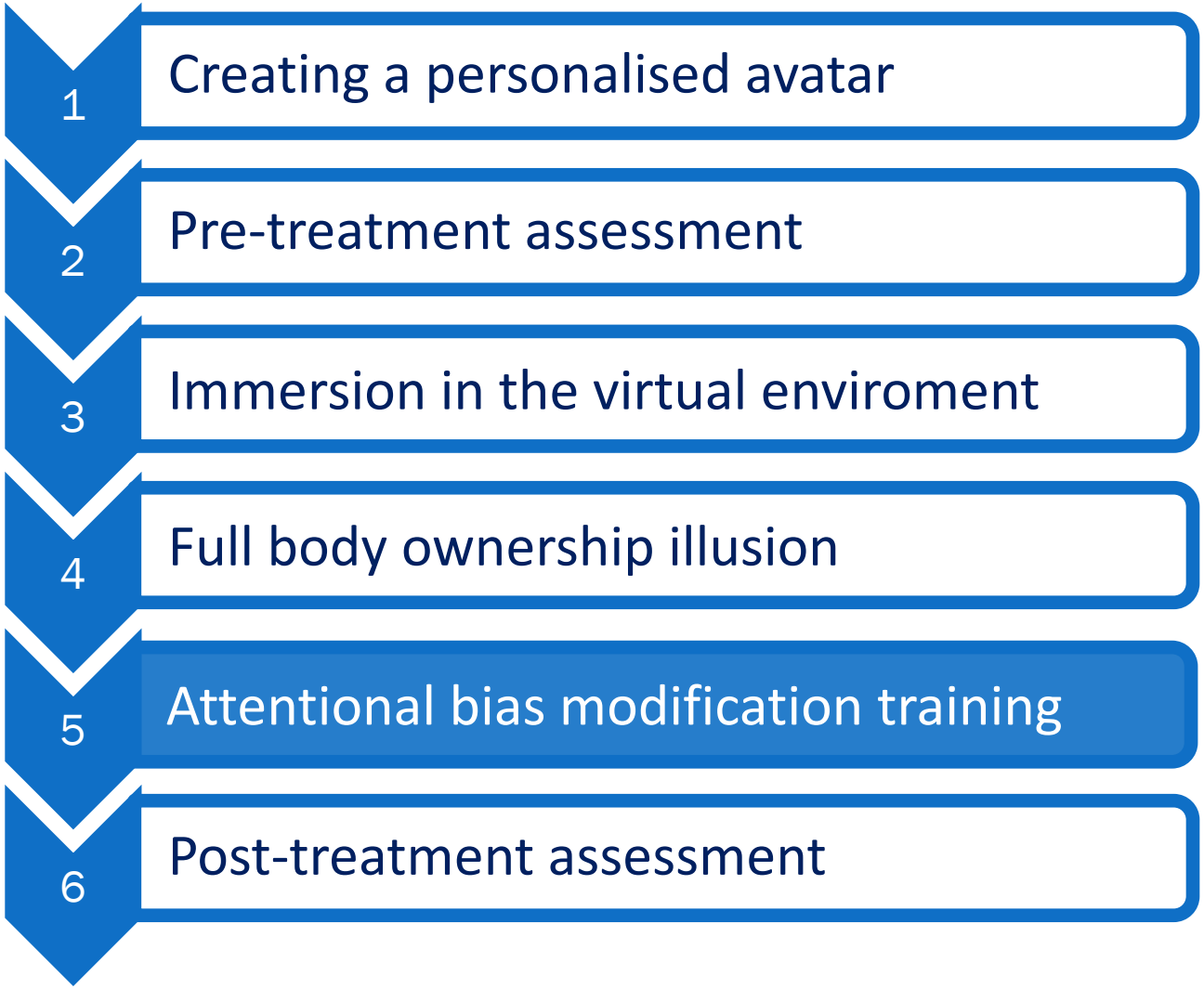
VISUO-MOTOR STIMULATION PROCEDURE

synchronizing the movements of the participant with the movements of the avatar using motion capture sensors placed on the hands and feet → *participants could see how the virtual body was doing the same movements as the real body.*

VISUO-TACTILE STIMULATION PROCEDURE

synchronizing the participant's visual and tactile stimulation using a tactile controller → *participants could see how their virtual body was touched by a virtual controller on the same areas of the real body touched by a real controller.*

Procedure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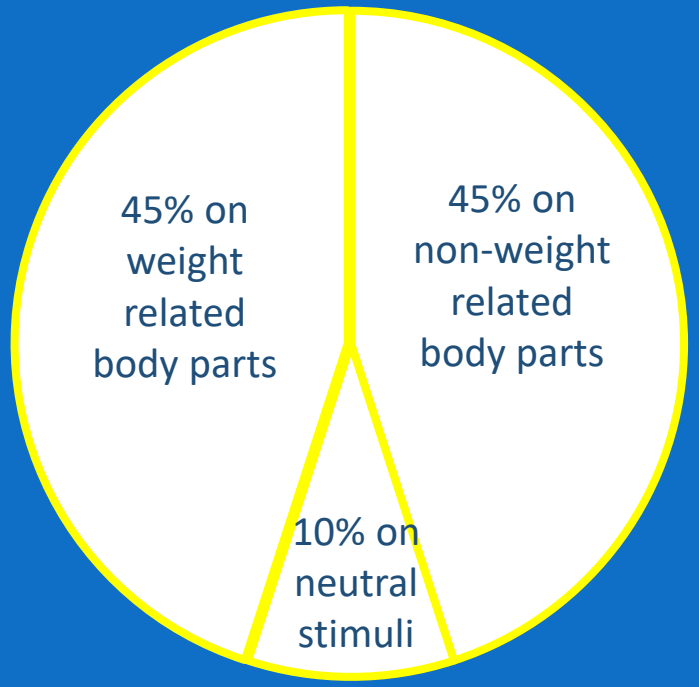
Attentional bias modification training

The attentional bias modification training goal was to balance the attention between weight and non-weight-related body parts

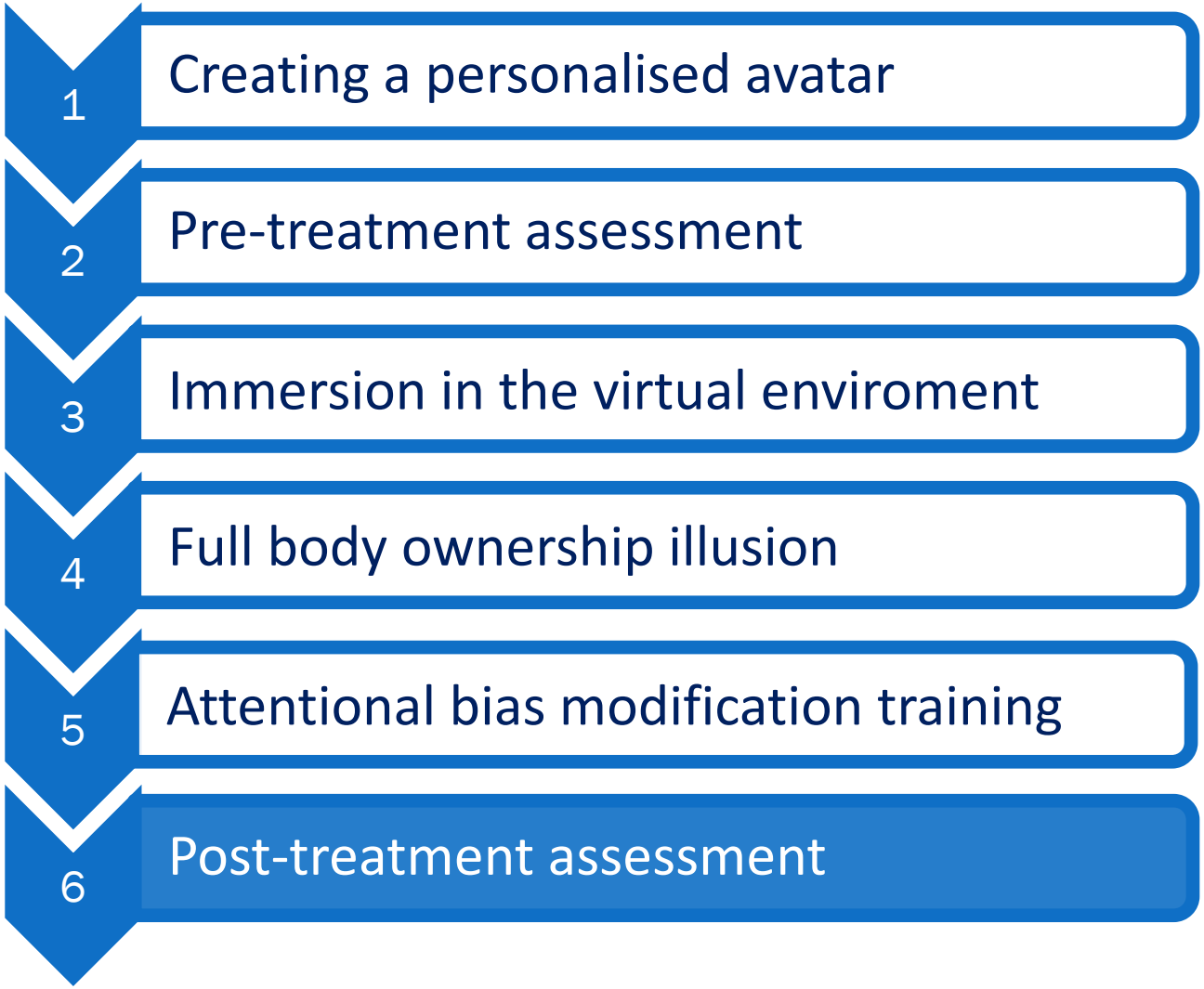


150 figures divided into two blocks of 75 figure
10-15 minutes task

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

Patients were asked to be staring for 4 seconds at the figures that appeared on a specific body part of the avatar, while it was progressively illuminated until the end of the 4 seconds, and then to move on to the next figure presentation.

Procedure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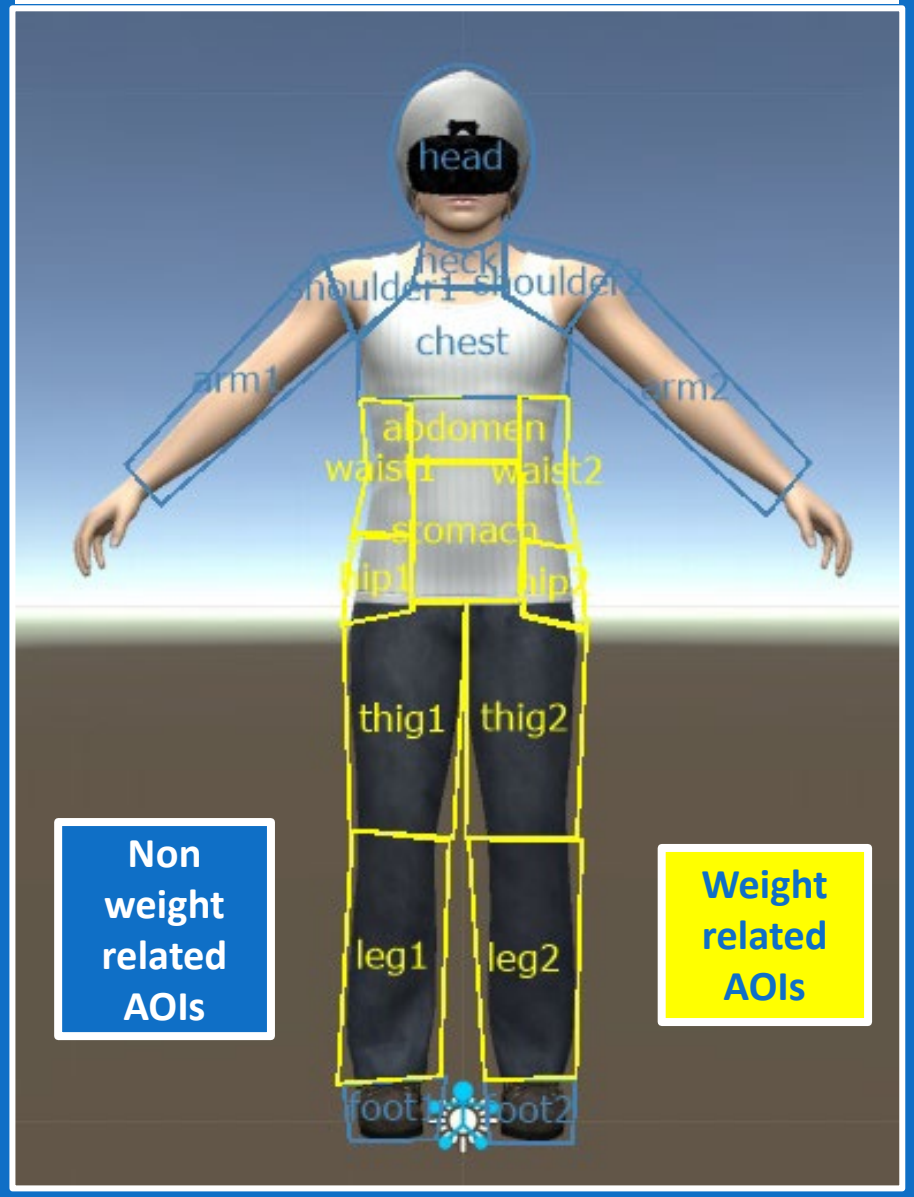
PRE-POST MEASURES

Areas Of Interest*



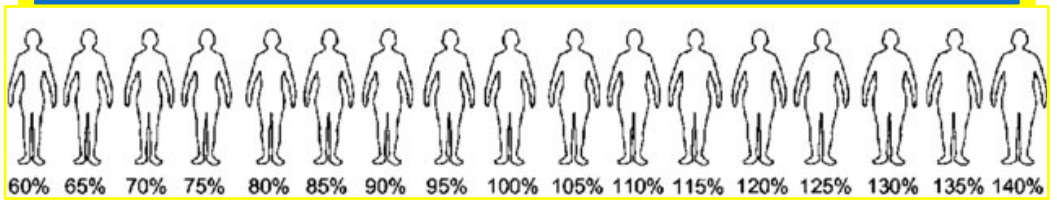
Non weight related AOIs

Weight related AOIs

1

Body dissatisfaction

Body Image Assessment Scale-Body Dimensions; Gardner et al., 2009



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Body-related attentional bias

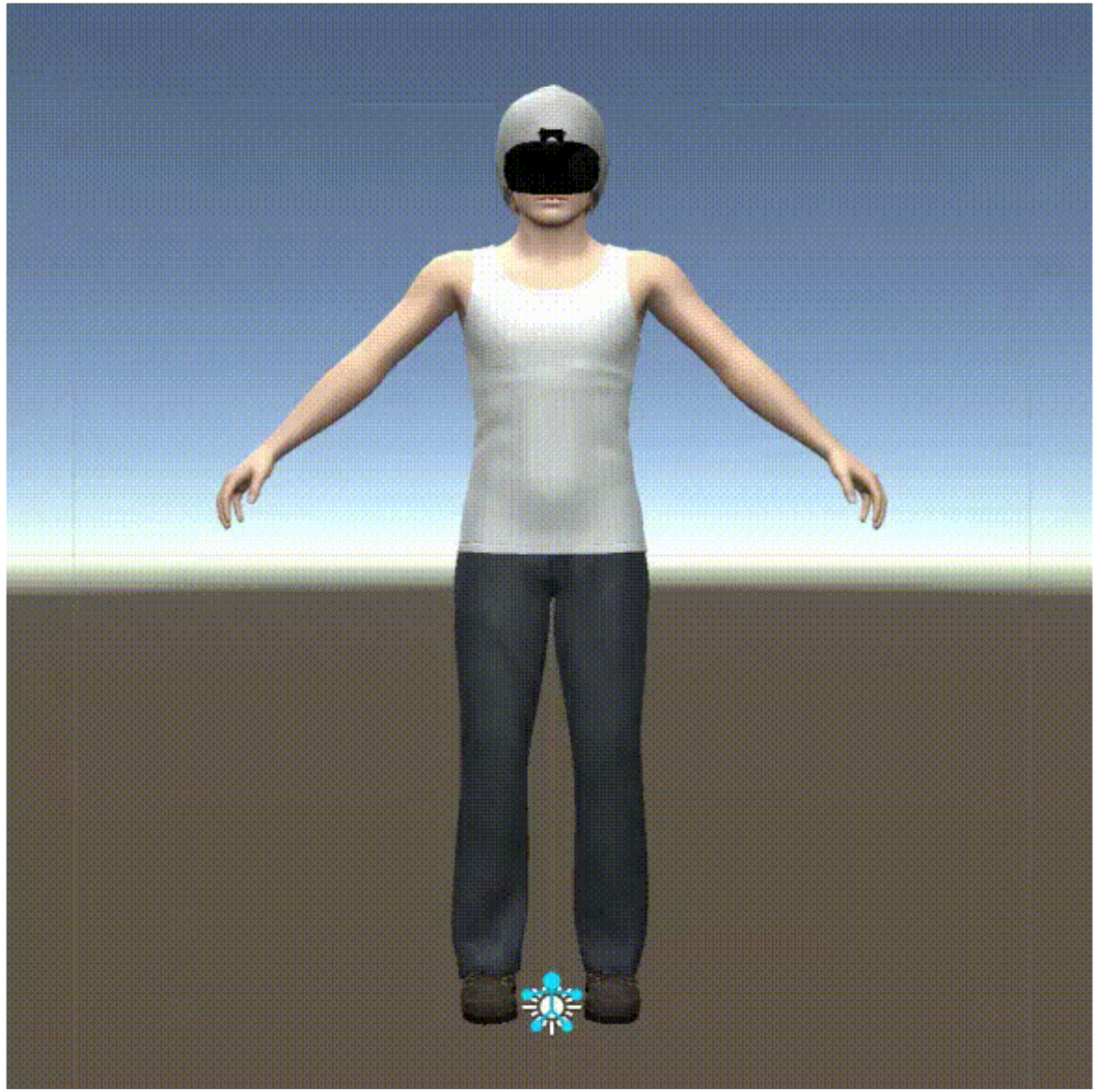
Visual fixation

- Complete fixation time
- Fixations number

An involuntary act of maintaining the gaze on a specific location, at least, for 100- 200 ms.

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

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

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

Results: complete fixation time - CFT

Statistically significant reduction in CFT on the W-AOIs

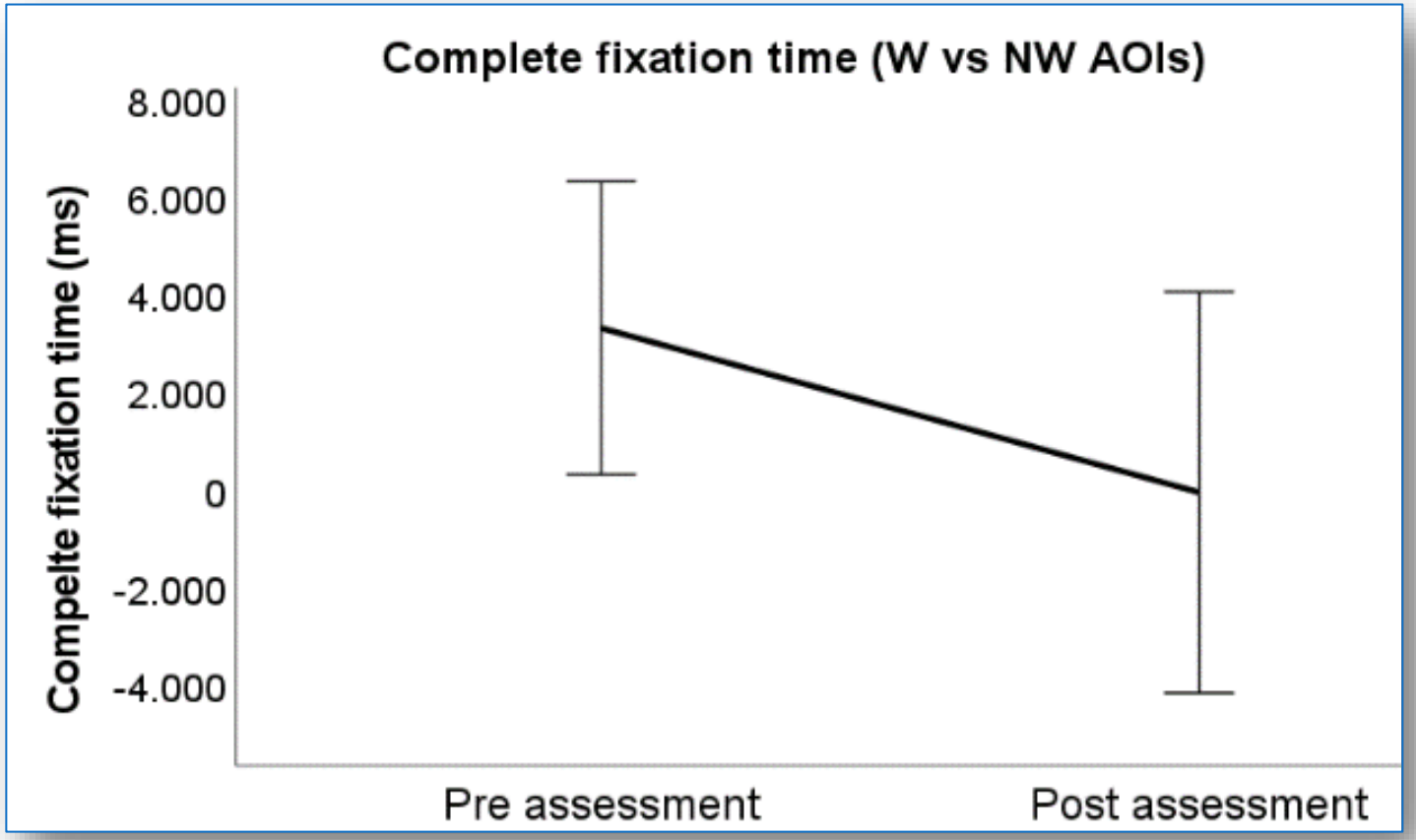
[t(16) = 1.8, p = .040]

positive scores	**negative scores**	**close to 0 score**
more attention at weight-related body parts	more attention at no weight-related body parts	balanced attention between weight and non-weight related body parts

Patients showed at baseline a ***longer CFT on weight-related body parts***

PRESENCE OF BODY-RELATED ATTENTIONAL BIAS

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



Results: fixations number - FN

No statistically significant reduction in FN on the W-AOIs

positive scores	negative scores	close to 0 score
more attention at weight-related body parts	more attention at no weight-related body parts	balanced attention between weight and non-weight related body parts

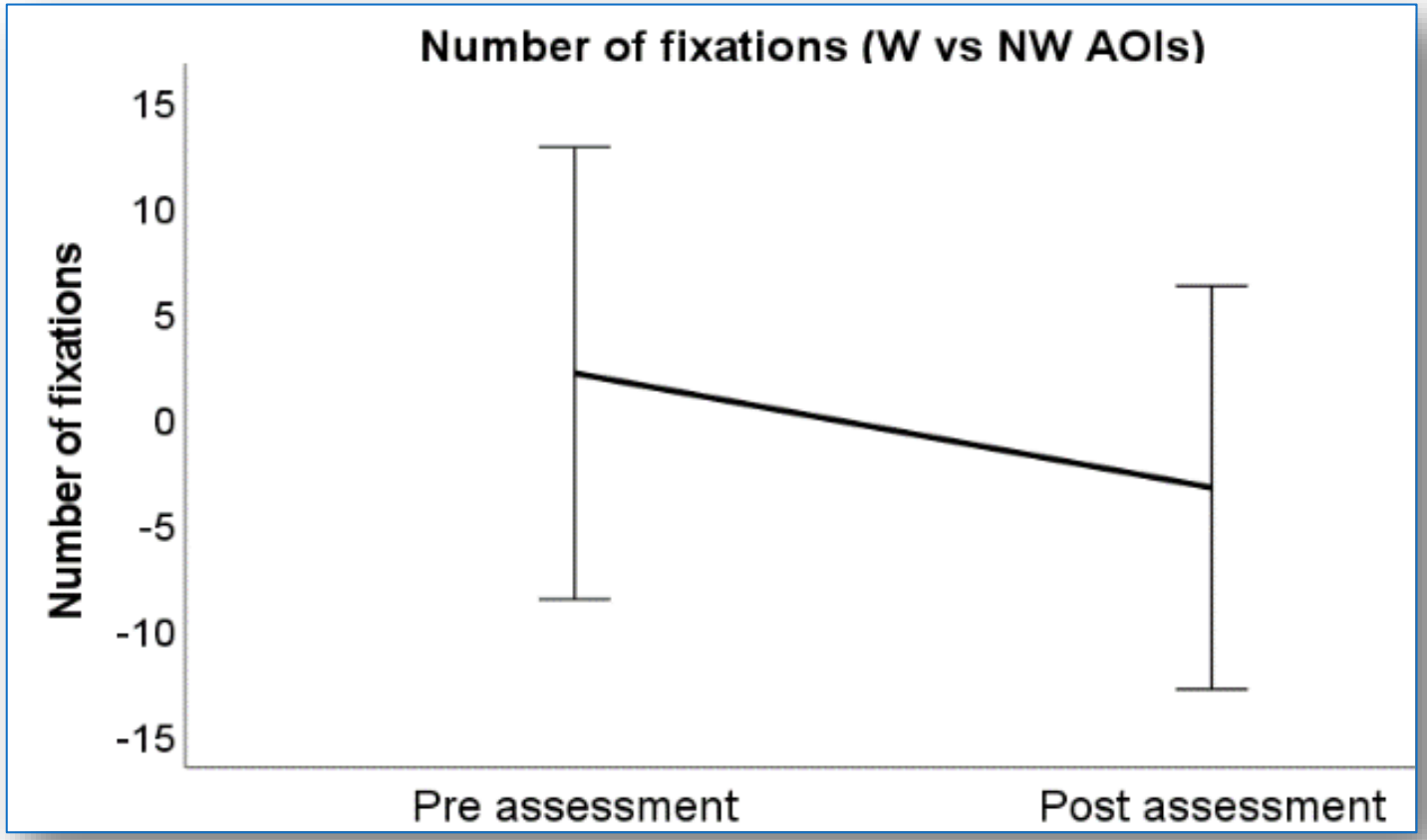
Patients showed at baseline a ***balanced FN*** between weight and non-weight-related body parts

ABSENCE OF

BODY-RELATED ATTENTIONAL BIAS

The balanced attention between weight and non-weight-related body areas reported at baseline was maintained after the training.

The ABMT did not affect the FN because there was no bias to be corrected.

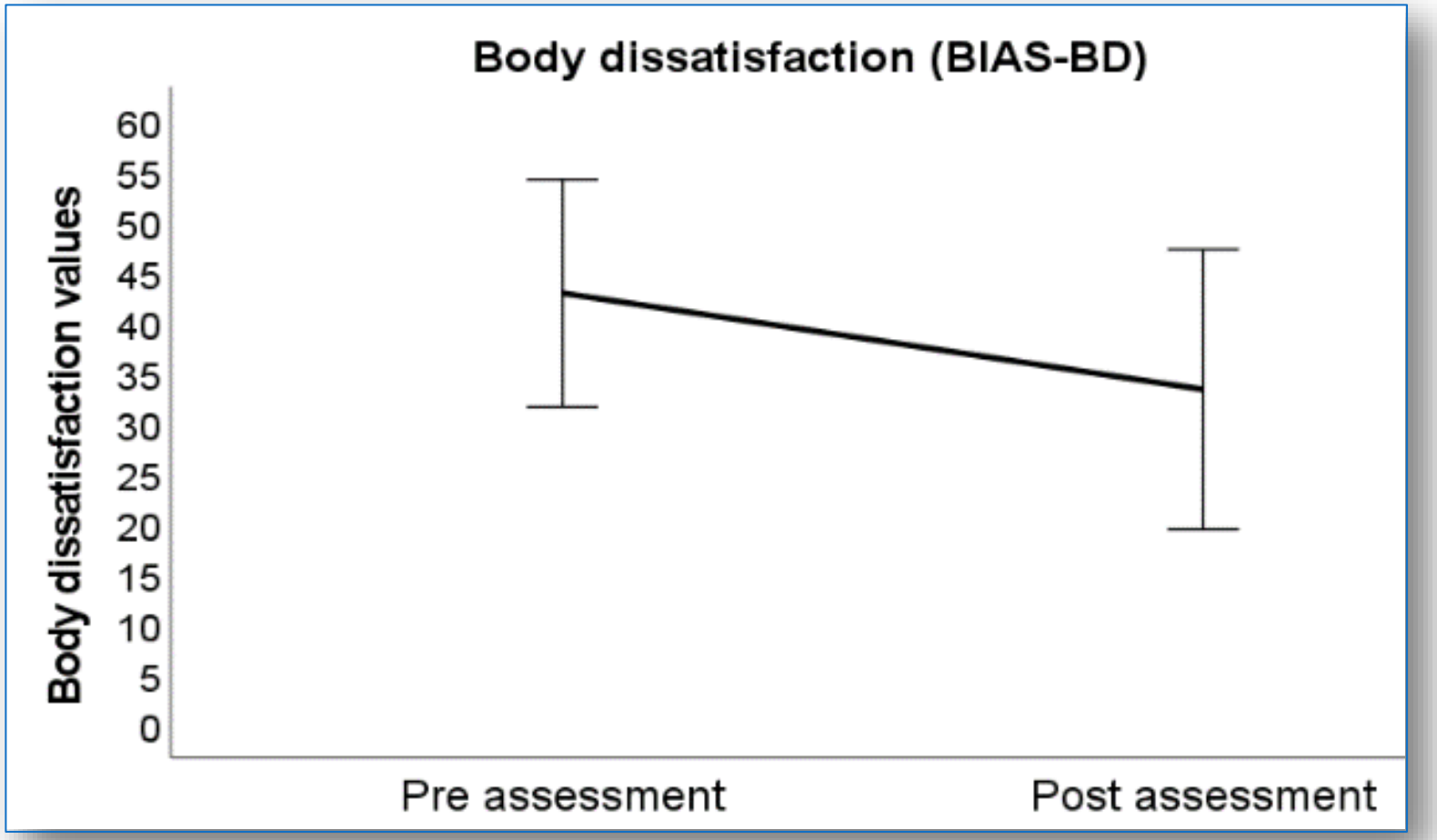


Results: body dissatisfaction

Statistically significant reduction in body dissatisfaction

[t(22) = 1.88, p = .037]

After the ABMT, body dissatisfaction levels decreased.



Discussion

Complete fixation time

Indicator of the level of interest and the complexity of content

⇩

Patients may have at baseline longer CFT on weight-related body parts because these could have greater emotional relevance and complexity and could therefore be associated with deeper processing of information.

Number of fixations

Indicator of the semantic importance

⇩

Patients may have at baseline a distributed FN between weight and non-weight-related body parts because both belong to the semantic category of the body that is clinically significant for patients with anorexia nervosa.

⇩

The change in CFT may be the result of learning to control the attention to body parts **or** the effect of a change in the emotional and cognitive relevance of non-weight-related body areas, **or** the latter could be the consequence of the former.

Innovations

ABMT goal:
to direct attention to both negative and positive/neutral stimuli

Traditional ABMTs divert attention away from disorder-related stimuli

Measures of gaze behaviour with good psychometric properties

Visual Fixation:
CFT & FN

ABMT based on a virtual representation of the patient's real body in a highly ecological situation

Future research

Stand-alone or combined treatment?

Preventive function?

Conclusions

VR-ET based ABMT

⇩

new effective clinical intervention
for anorexia nervosa patients

⇩

body-related attentional bias
&
body dissatisfaction

Thank you!

Contacts

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