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# Interoceptive awareness and yoga in eating disorders outpatients: a preliminary descriptive analysis.

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## Introduction

Eating Disorders (ED), such as anorexia, bulimia and binge eating, affect about 10% of young people (Treasure, 2020). They are characterized by a deviant relationship with food and body, resulting in pathological eating and weight control behaviors. Physiological and psycho-cognitive comorbidities are commonly associated with ED, including an interoceptive deficit (Demartini et al., 2021).

The interoception can be considered as the interpretation of internal and external stimuli producing an overall representation of the state of the body, linked to a cognitive and emotional context and including conscious and unconscious aspects (Figure 1, Bertson & Khalsa, 2021). The conscious aspect is the interoceptive awareness, it is the ability to identify, access, understand, and respond appropriately to the patterns of internal signals, such as digestive system, muscle tension, heart rate, etc. (Price & Hooven, 2018).

Interoceptive awareness (IA) can be improved with mind and body practices like meditation or yoga (Demartini et al., 2021). To our knowledge, the effect of yoga on IA has not been studied in ED patients.

The aim of this study is to assess the effect of yoga on interoceptive awareness and ED symptoms in a clinical sample. We hypothesize that yoga will improve interoceptive awareness and ED symptoms.

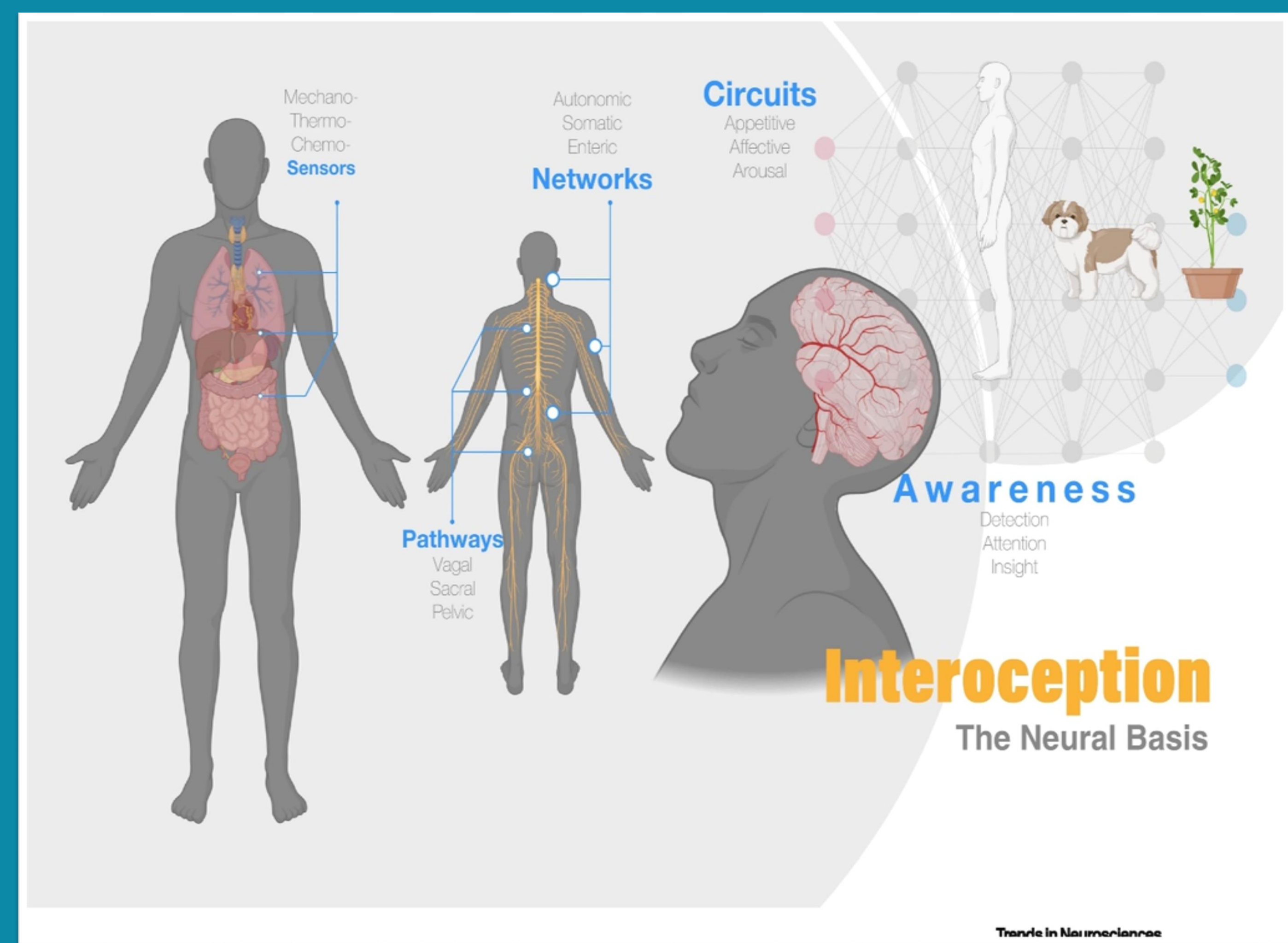
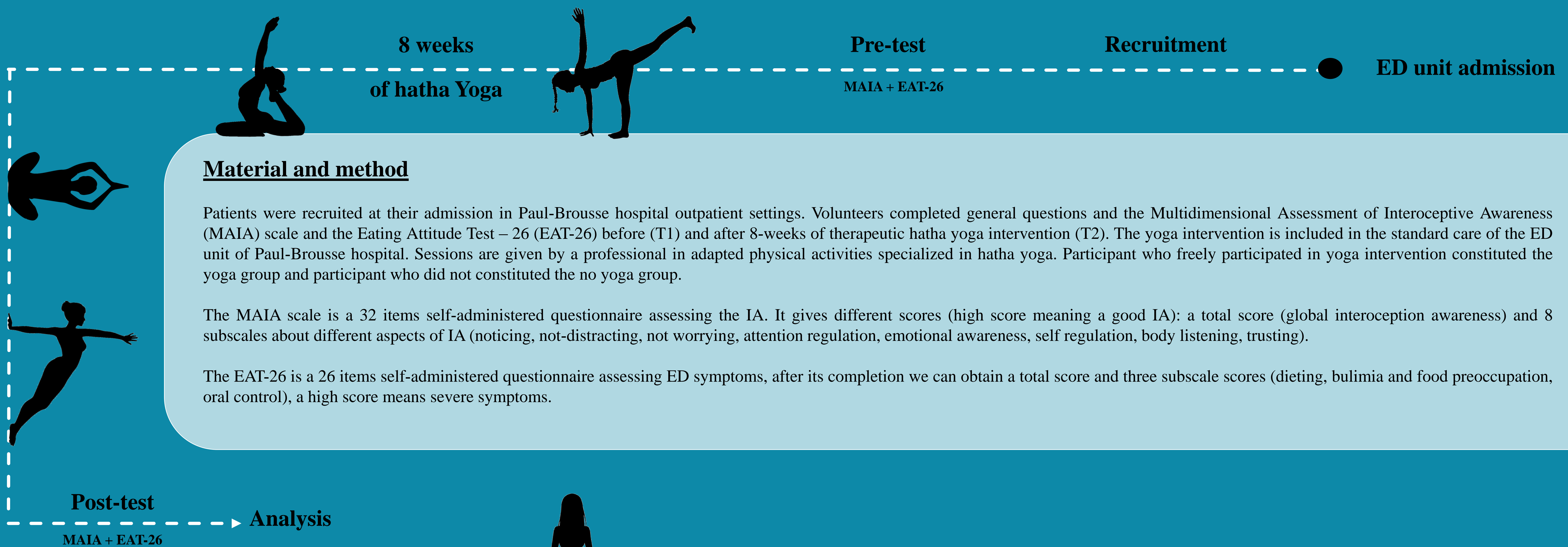


Figure 1. The Continuum of Interoception.

"Interoception is a neural process that traverses sensors, pathways, networks, circuits, and awareness. Each component contributes to the next, although most processing of interoceptive signals occurs beyond the conscious awareness of the organism. Further, interoceptive awareness relies on circuit-based representations of the internal bodily self (e.g., 'my body': manikin at top right) and differs substantially from other circuit-based representations of other living objects (e.g., 'dog', 'plant' etc.)" (Bertson & Khalsa, 2021)



## Material and method

Patients were recruited at their admission in Paul-Brousse hospital outpatient settings. Volunteers completed general questions and the Multidimensional Assessment of Interoceptive Awareness (MAIA) scale and the Eating Attitude Test – 26 (EAT-26) before (T1) and after 8-weeks of therapeutic hatha yoga intervention (T2). The yoga intervention is included in the standard care of the ED unit of Paul-Brousse hospital. Sessions are given by a professional in adapted physical activities specialized in hatha yoga. Participant who freely participated in yoga intervention constituted the yoga group and participant who did not constituted the no yoga group.

The MAIA scale is a 32 items self-administered questionnaire assessing the IA. It gives different scores (high score meaning a good IA): a total score (global interoception awareness) and 8 subscales about different aspects of IA (noticing, not-distracting, not worrying, attention regulation, emotional awareness, self regulation, body listening, trusting).

The EAT-26 is a 26 items self-administered questionnaire assessing ED symptoms, after its completion we can obtain a total score and three subscale scores (dieting, bulimia and food preoccupation, oral control), a high score means severe symptoms.

## Results

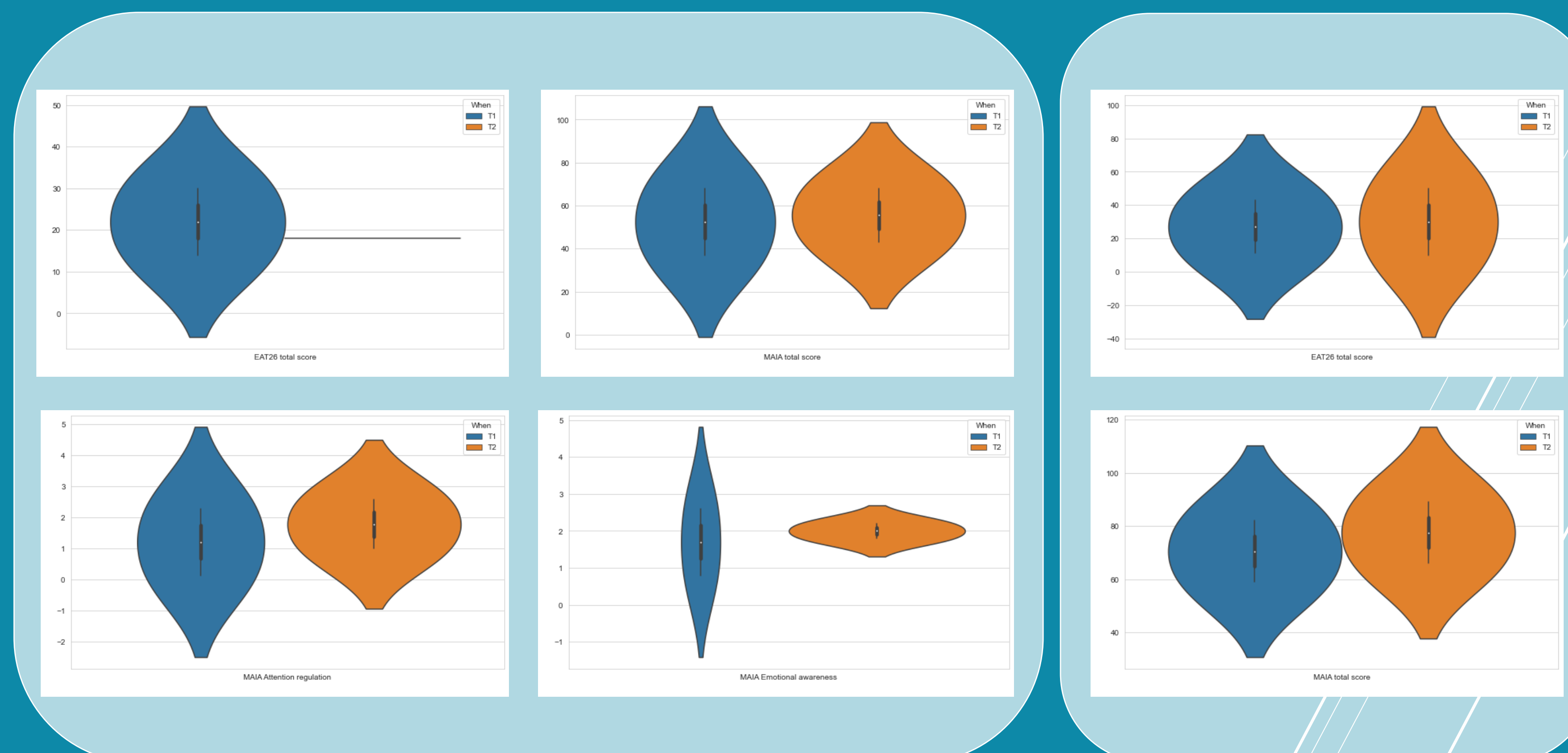
Currently, four participants have completed the protocol, two in the yoga group and two in the no yoga group. The yoga group mean age was 53,5 (±2,12) years, the mean body mass index was 17,71 (±0,92) kg/m<sup>2</sup> and they were suffering of restrictive anorexia. The no yoga group mean age was 28,5 (±0,70) years, the mean body mass index was 18,79 (±0,02) kg/m<sup>2</sup> and they were suffering of restrictive anorexia.

A descriptive analysis showed that the total MAIA score improved after the 8 weeks of yoga for the yoga group (T1= 52,5/160 ±26; T2= 55,5/160 ±17) and for the no yoga group (T1= 70,5/160 ±41; T2= 77,5/160 ±16). For the yoga group, scores in the subscale of emotional awareness (T1= 1,7/5 ±0,5; T2= 2,5/5/160 ±0,28) and in the subscale of attention regulation (T1= 1,21/5 ±0,1; T2= 1,78/5, ±1,11) seemed to be an important part of this improvement. For the no yoga group no particular subscale increase seemed to explain the improvement.

In addition, the EAT-26 total score showed a diminution for the yoga group (T1= 22/78 ±21; T2= 18/78 ±0) and an increase for the no yoga group (T1= 27/78 ±7,7; T2= 30/78 ±28,2). No particular subscales seemed to explain these modifications.

### Yoga Group (n = 2)

### No yoga Group (n = 2)



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## Discussion and conclusion

The MAIA score increase should demonstrate a positive effect of yoga on IA. The improvement in the emotional awareness and the attention regulation subscales should indicate that yoga can specifically target these IA dimensions. However, concerning emotional awareness and attention regulation subscales, our sample showed lower means (1,7/5 and 1,21/5) compared to other adult ED sample in the literature (2,96/5 and 2,28/5) which could be a bias linked to the small size of the sample (Brown & al., 2017).

The EAT-26 decrease is in accordance with the literature and should reveal an improvement of ED symptoms after yoga therapeutic intervention (Borden & Cook-Cottone, 2020).

The sample size was small and additional data are needed for inferential analysis. Nevertheless this first descriptive analysis suggest a positive effect of yoga on IA for ED outpatients

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