



VNIVERSITAT
DE VALÈNCIA

TESIS DOCTORAL
**TOWARDS POSITIVE
BODY IMAGE:**
THE PROTECTIVE ROLE
OF BODY COMPASSION
AGAINST BODY SHAME
AND THE RISK OF
EATING DISORDERS

Presentada por:

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Dirigida por:

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Dra. Marta Miragall Montilla



VNIVERSITAT D VALÈNCIA

FACULTAT DE PSICOLOGÍA Y LOGOPEDIA

Programa de Doctorado: Investigación en Psicología 3133RD 99/2011

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Mayo, 2023

The completion of this Doctoral Thesis has been possible thanks to the following grants: Project PSI2017-85063-R ("AN-bodyment") funded by MCIN/AEI/10.13039/501100011033 and by ERDF A way of making Europe, and the grant PRE2018-084882 supported by MCIN/AEI/10.13039/501100011033 and by FSE Investing in your future.

*A mi madre y a mi abuela.
Дякую за вашу силу і безмежну відвагу.*

“I want to apologize to all the women I have called
beautiful
before I’ve called them intelligent or brave
I am sorry I made it sound as though
something as simple as what you’re born with
is all you have to be proud of
when you have broken mountains with your wit
from now on I will say things like
you are resilient, or you are extraordinary
not because I don’t think you’re beautiful
but because I need you to know
you are more than that”

— Rupi Kaur

ACKNOWLEDGEMENTS / AGRADECIMIENTOS

¿Cómo recoger mi gratitud en unas pocas palabras, cuando la gratitud ha sido uno de los motores principales de este trabajo?

Quiero comenzar agradeciendo a mis personas “brújula” durante esta trayectoria, mis directoras de tesis. Rosa, gracias por tu infinita sabiduría que me ha impulsado a crecer como investigadora y como persona; gracias por acogerme en tu extraordinaria familia de investigación dónde, por encima de todo, reina el apoyo incondicional. Marta, contigo aprendí a dar mis primeros pasos como investigadora en mi trabajo fin de máster; gracias por saber brindar sosiego y comprensión siempre que las haya necesitado. Gracias a ambas por supervisar, por confiar, por haberme enseñado tanto. Gracias por inspirarme. Gracias por ayudarme a construir un proyecto tan maravilloso.

También quería darle las gracias a Ausiàs, por abrirme las puertas del grupo y tener siempre a mano una palabra repleta de sabiduría. Gracias por ayudarme a iniciar este camino.

En esta etapa tuve la suerte de caminar acompañada de compañeras y compañeros *labpsíteros* maravillosos. En especial, quería agradecer a Lore, Alba, Jess, Maite, Tamara y Ro por vuestra bondad y enseñanzas, por las risas, por permitirme crecer a vuestro lado. Maja, gracias por las reflexiones con cada café compartido. María, gracias por la calma y los *mindful* abrazos. A todas y todos los y las *labpsíteros*, gracias por facilitar cada paso con vuestras palabras de ánimo, cariño, risas o consejos.

Gracias también a todas las participantes por poner vuestro granito de arena en cada estudio y darle sentido a este arduo trabajo; trabajo que tampoco sería posible sin la valiosa contribución de la Dra. Nuria López, Dra. Merce Jorquera y Dra. Maite Aranzazu. Gracias por abrirme las puertas de vuestras consultas y permitir aunar mi pasión por la investigación y la clínica. Gracias también a las personas que he acompañado en consulta, vuestra resiliencia siempre fue inspiradora.

Además, quiero dar las gracias a mis alumnas y alumnos: vuestra curiosidad me ha motivado a ser mejor docente. Thank you.

Дякую моїй родині за можливість вирости в розмаїтті двох культур, за сприяння стійкості, за те, що я можу пишатися своїм корінням. Мамо, це перш за все для тебе, дякую тобі за те, що ти дала мені можливість здійснити цю мрію. Dziękuję również mojej "nabytej" rodzinie. To szczęście mieć was.

Gracias también a mis amigas. En especial a mis personas *hogar* – Miriam, Natalia, Irene y Gemma - por creer en mí pase lo que pase, por cultivar la vulnerabilidad y, con ello, el coraje. Jorge, gracias por tu curiosidad. Rubén, gracias por tu alegría y las risas. Ahora y siempre, GRACIAS.

A todas las personas que me he cruzado en este camino, gracias por enseñarme, por verme crecer, por impulsarme a ser mejor.

And, lastly (but not *leastly*), me gustaría dar las gracias a mi compañero de vida por todo el apoyo, el amor y la paciencia durante estos años. Thank you for supporting me no matter what, thank you for standing by my side through the loss, the fear, and the grief. Thank you for -ALWAYS- making life easier, brighter, and full of adventure. I still cannot believe how lucky I am.

Gracias por tanto.

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This Doctoral Thesis is based on the following six studies:

- Burychka, D., Miragall, M., Lopez-Vilaplana, N., Borrego, A., Llorens, R., & Baños, R. M. (2023). Virtual Reality-based Assessment of the Underlying Mechanisms of Body Image Disturbance in Non-clinical and Eating Disorders Population. *Under review (Study 1)*
- Burychka, D., Miragall, M., Zapata, M., Álvarez-Borillo, J., & Baños, R. M. (2023). The Role of Affect on Body Image Disturbance in Adolescents with Eating Disorders: An Experimental Study Using a Virtual Reality Mood Induction Procedure. *Under review (Study 2)*
- Burychka, D., Miragall, M., & Baños, R. M. (2021). Towards a comprehensive understanding of body image: Integrating positive body image, embodiment and self-compassion. *Psychologica Belgica*, 61(1), 248. <https://doi.org/10.5334/pb.1057> **(Study 3)**
- Burychka, D., Miragall, M., & Baños, R. M. (2023). The underlying protective mechanisms of Self-compassion in Decreasing Body Shame and the Risk of Eating Disorders: A Path Analysis Model. *Under review (Study 4)*
- Burychka, D., Miragall, M., & Baños, R. M. (2023). The Role of Body Compassion in the Risk of Eating Disorders: Mediation Effects of Body Appreciation and Body Shame. *Accepted to be published in Psicothema. (Study 5)*
- Burychka, D., Miragall, M., & Baños, R. M. (2023). “Through Their Compassionate Gaze”: Protective Role of Body Compassion on Body Shame Induction in Young Adult Women. *Under review (Study 6)*

LIST OF ABBREVIATIONS²

| | |
|--------------|--------------------------------------|
| ED | Eating Disorders |
| AN | Anorexia Nervosa |
| BN | Bulimia Nervosa |
| BES | Binge Eating Scale |
| BI | Body Image |
| BID | Body Image Disturbance |
| APA | American Psychiatric Association |
| BMI | Body Mass Index |
| DTE | Developmental Theory of Embodiment |
| ARMS | Attuned Representation Model of Self |
| CFT-E | Compassion-focused Therapy for ED |
| BISS | Body Image Shame Scale |
| BCS | Body Compassion Scale |
| WHO | World Health Organization |

² Glossary of abbreviations used within the Chapter 1 and Chapter 8. Each of the articles incorporated in this dissertation features its own set of abbreviations, which are detailed within the respective manuscripts.

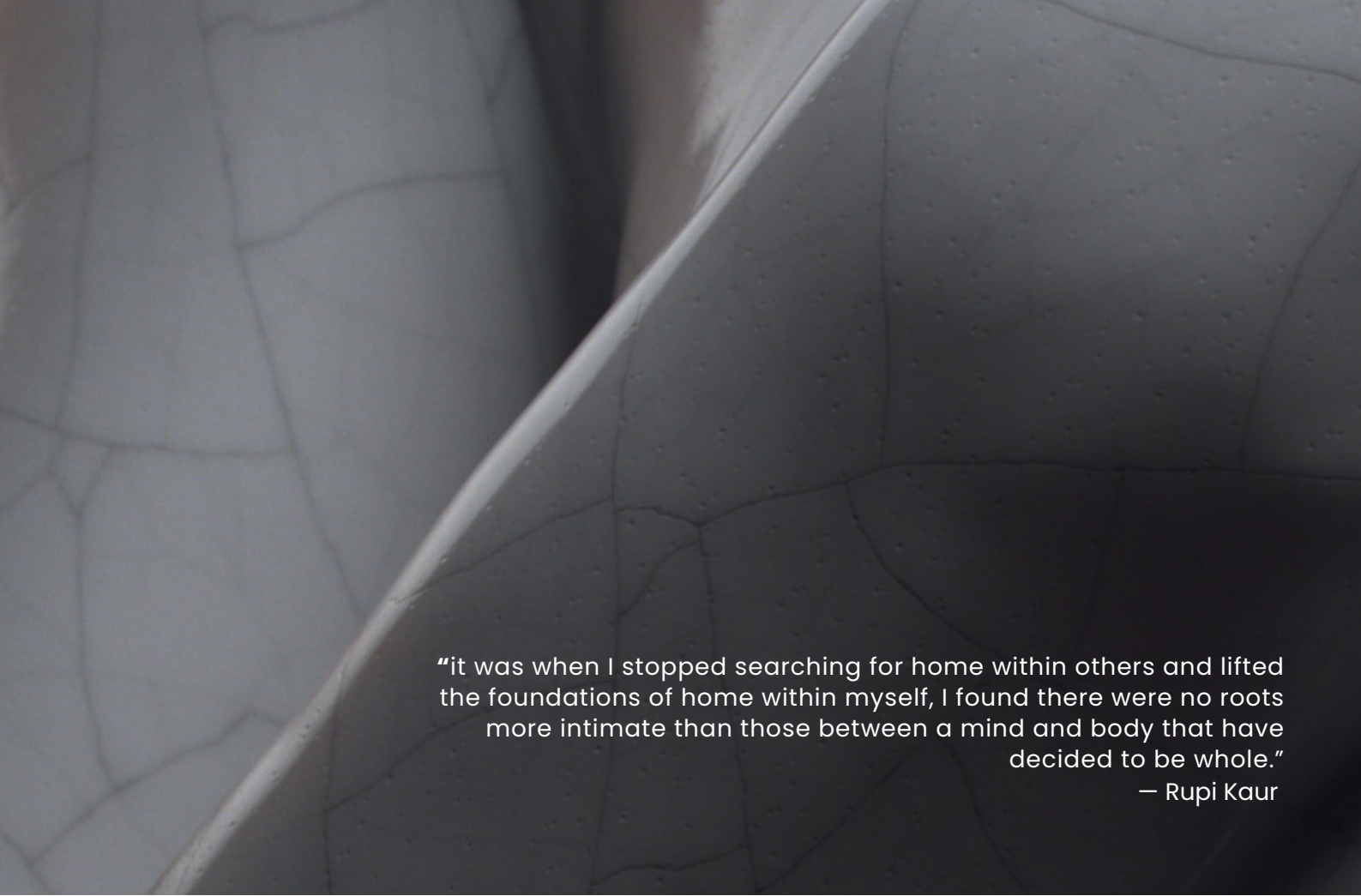
LIST OF ABBREVIATIONS in Spanish³

| | |
|---------------|---|
| IC | Imagen Corporal |
| TA | Trastorno(s) Alimentario(s) |
| RV | Realidad Virtual |
| BISS | Escala de la Vergüenza Corporal Hacia el Cuerpo |
| BCS | Escala de Compasión Hacia el Cuerpo |
| ICB | Insatisfacción Corporal Baja |
| ICA | Insatisfacción Corporal Alta |
| BSQ | Cuestionario de Forma Corporal |
| IMC | Índice de Masa Corporal |
| ANOVA | Análisis de la Varianza |
| ANCOVA | Análisis de la Covarianza |
| PIE | Inducción del Estado de Ánimo |
| AFC | Análisis Factorial Confirmatorio |
| CFI | Índice/índices de ajuste comparativo |
| SRMR | Media cuadrática normalizada |
| RMSEA | Error cuadrático medio de la aproximación |
| AFE | Análisis Factorial Exploratorio |

³ Glossary of abbreviations used within the Chapter 9.



Introduction



“it was when I stopped searching for home within others and lifted the foundations of home within myself, I found there were no roots more intimate than those between a mind and body that have decided to be whole.”

— Rupi Kaur

This PhD thesis examines the protective role of cultivating positive body image in mitigating body image disturbance and the risk of eating disorders in young adult women. It specifically examines how women's unique experiences of connecting with their bodies, shaped within a sociocultural context, can impact their body image and alter the risk of developing eating disorders.

Body image disturbance, characterized by alterations in the perceptual and/or affective dimension of body image, is widely established as a key risk factor in the onset and maintenance of eating disorders (Bruch, 1973; Glashouwer et al., 2019). Given the detrimental impact of body image disturbance on physical and mental health, especially for young adult women, it is crucial to further examine its underlying mechanisms in order to develop effective prevention and intervention programs (Menzel & Levine, 2011). Strongly influenced by sociocultural factors (Groesz et al., 2002), body image disturbance has been linked to the drive for thinness and negative affective states (McCabe et al., 2006). Hence, individuals may engage in social comparisons of their appearance to determine whether they meet established beauty standards. The pursuit of unrealistic thinness standards may frequently lead to adverse negative states such as body shame.

Body shame emerges when individuals perceive a discrepancy between the internalized standard of beauty and their perceived body shape and size (Duarte et al., 2015; Gilbert, 2003). Constantly monitoring one's body from an observer's perspective can lead not only to negative body evaluations but also to a sense of disconnection from one's body and an exclusive focus on physical appearance (Fredrickson & Roberts, 1997).

Given the limited effectiveness of current body image treatments

(e.g., Fairburn et al., 2003), it is essential to explore protective factors that could enhance their efficacy (Braun et al., 2016; Cook-Cottone, 2015). As a result, positive body image has gained attention as a construct that protects from body image-related threats and improves one's relationship with their body (Cook-Cottone, 2015). In relation to positive body image, self-compassion (Neff, 2003) - a kind and non-judgmental attitude towards oneself - is suggested as a protective factor able to contribute to the positive body image by helping in the adaptive regulation of emotional states (e.g., body shame) that may arise as a result of sociocultural challenges that women regularly confront (Turk & Waller, 2018).

Despite promising evidence, the role of these protective constructs (i.e., positive body image, self-compassion) requires further clarification, looking into their relationships and potential mechanisms of action. The emerging construct of body compassion - as a way to specifically direct self-compassionate attitudes towards one's body and accept its shortcomings - may be a promising approach to effectively combat body image disturbance and foster a healthy body image (Altman et al., 2017, 2020; Oliveira et al., 2018). Consequently, the findings from this research could have direct and specific implications for both research, prevention, and early intervention in addressing body image disturbance among young women.

Hence, this thesis aims (1) to further explore the role of body image disturbance and its underlying mechanisms (i.e., cognitive bias associated with "thin-fat" categorical boundary, depressive symptomatology, positive and negative affect) in eating disorders symptomatology, in both non-clinical and clinical eating disorder populations; (2) to analyze the protective influence of compassion in reducing the adverse consequences of body objectification (i.e., body shame and risk of developing eating disorders) while promoting positive

body image dimensions (i.e., body appreciation); and (3) to examine the effectiveness of a body compassion intervention in addressing both positive and negative dimensions of body image (i.e., body shame, body trust, body satisfaction) in women at risk of developing eating disorders.

Thus, the main aim of this dissertation is to meet these requirements and contribute to the improvement of the current prevention and treatment approaches for body image disturbance and eating disorders. In order to achieve it, six research studies will be conducted. The background literature will first be presented, emphasizing the need to develop more effective prevention and intervention programs by examining: (1) the construct of body image disturbance and its role in the risk and maintenance of eating disorders; (2) the risk factors of body image disturbance outlined from cognitive-behavioral models and highlighting the sociocultural elements; (3) the protective role of positive body image; (4) the significance of fostering positive body connection; and, lastly, (5) the protective influence of compassion (both self-compassion and body compassion) on the risk of developing eating disorders.

Next, chapters 2, 3, 4, 5, 6, and 7 comprise six research studies in “article format” as they have been submitted to or published in scientific journals indexed in the Journal Citation Report (JCR) of the Web of Science (WOS) platform. Out of the six already submitted articles, two of the articles have already been published and four are currently under review. Each of these chapters follows the structure of the research article containing an abstract, theoretical framework, specific goals and hypothesis, methodology, results, and discussion.

More specifically, Chapter 2 presents a quasi-experimental study – titled ***“Virtual Reality-based Assessment of the Underlying Mechanisms of Body Image Disturbance in Non-clinical and Eating***

Disorders Population”–, and Chapter 3 includes an experimental study – titled ***“The Role of Affect on Body Image Disturbance in Adolescents with Eating Disorders: An Experimental Study Using a Virtual Reality Mood Induction Procedure”***–, that explore the cognitive and affective factors (i.e., a cognitive bias associated with the “thin-fat” categorical boundary, the positive and negative affect, or the depressive symptomatology) contributing to the onset and maintenance of body image disturbance (i.e., perceptual and affective dimensions of body image). To do so, virtual reality software will be used in adolescent and young adult women, from clinical and non-clinical population.

Chapter 4 – titled ***“Towards a comprehensive understanding of body image: Integrating positive body image, embodiment, and self-compassion”***–, contains a review of the scientific literature to obtain a holistic understanding of the construct of body image. Specifically, the literature review examines the construct of positive and negative body image, the experience of disconnection from one’s body, body shame, and lastly, compassion as the way to foster a positive body image and decrease the risk of developing an eating disorder. This review helped to identify the gaps in knowledge regarding fostering compassion toward one’s body, which are addressed in the next three chapters.

Chapter 5– titled ***“The underlying protective mechanisms of Self-compassion in Decreasing Body Shame and the Risk of Eating Disorders: A Path Analysis Model”***–, and Chapter 6 – titled ***“The Role of Body Compassion in the Risk of Eating Disorders: Mediation Effects of Body Appreciation and Body Shame”***–, contain two cross-sectional studies, in which the Spanish validation of two instruments that are central to the research objectives of this dissertation are presented: the Body Image Shame Scale (BISS; Duarte et al., 2015) and the Body Compassion Scale (BCS; Altman et al., 2020). Furthermore, structural equation modeling is used to explore the potential underlying

mechanisms of compassion as a means of fostering a positive connection with one's body. Specifically, these studies examine the effect of self-compassion and body compassion on several dimensions of positive (i.e., body trust, body appreciation) and negative body image (i.e., body shame), as well as the risk of eating disorders.

Chapter 7 – titled “*Through Their Compassionate Gaze’: Protective Role of Body Compassion on Body Shame Induction in Young Adult Women*”–, contains an experimental research study based on the results obtained from the above-mentioned research studies. This article analyzes the effect of a brief body compassionate micro-intervention to buffer induced body shame and regulate its effects on positive affect and BI-related variables (i.e., body satisfaction, body trust) in young adult women.

Lastly, chapter 8 contains a **general discussion** that aims to provide a comprehensive summary of the main conclusions from the six studies in this research. It also covers the strengths and limitations of the current dissertation, as well as the future directions of the research on the protective role of compassion in the field of body image and eating disorders. Additionally, an attempt is made to establish how the findings can be transferred into clinical practice.

The present dissertation uses diverse cross-sectional, quasi-experimental, and experimental designs to explore the perceptual and affective components of body image disturbance, integrates the novel frameworks of positive body image and positive embodiment, and proposes body compassion as a potential construct to be considered in the assessment and treatment of eating disorders. The findings derived from this research offer new insights into the field of body image that may have potential applications in the prevention and early intervention of eating disorders.

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The body is a vehicle of being in the world, and having a body is, for a living creature, to be involved in a definite environment, to identify oneself with certain projects, and to be continually committed to them.

- M. Merleau-Ponty (1962, p. 82)

CHAPTER 1. Background



1. THE NEED FOR RESEARCHING NEW PREVENTION AND INTERVENTION STRATEGIES FOR EATING DISORDERS

Over the past decades, the prevalence of eating disorders (EDs) has been progressively increasing (Treasure et al., 2020). Despite variations in prevalence rates due to the assessment methods, applied criteria, or the studied populations, we can sustain that the prevalence may have raised globally by approximately 25% (Mitchison et al., 2020; Treasure et al., 2020). In Europe, anorexia nervosa (AN) lifetime prevalence is considered to range from 1% to 4%, and for bulimia nervosa (BN), it may range from 1% to 2% (Keski-Rahkonen & Mustelin, 2016), being these rates higher for women (Qian et al., 2022). This circumstance coincides with the promotion of more restrictive thin-body ideals (Stice et al., 1994; Swami, 2015) and the increased sensitivity to receive negative evaluation from others (Cardi et al., 2014; Ferreira et al., 2013).

While EDs most commonly emerge during adolescence (Wade et al., 2015) or young adulthood (Brown, et al., 2020; Christian et al., 2020), the impact of risk factors on the onset of EDs may start sooner, and its influence increases during puberty (Barakat et al., 2023; Herle et al., 2020). Adolescence has been defined as a critical developmental period comprising physical, psychological, or social changes that may lead to an increase in body image (BI) concerns (Voelker et al., 2015).

Despite the growing research on ED risk (Currin et al., 2005), existing treatments - primarily based on the cognitive-behavioral approaches (Fairburn et al., 2015) -, have demonstrated mixed efficacy (Murray et al., 2019; Watson & Bulik, 2013), poor long-term recovery (Espie & Eisler, 2015; Kotilahti et al., 2020) and high relapse rates (Berends et al., 2018). Additionally, high rates of individuals with EDs do not undergo treatment (Hamilton et al., 2022; Kazdin, 2017) or receive it years after the onset of their EDs symptoms (Ivancic et al., 2021). A recent systematic review shows that the average time between the establishment of ED symptomatology and the first visit to a therapist is 2.5 years for AN and 6 years

for BN (Austin et al., 2021).

This data highlights the need for more effective ED prevention programs, focused on early screening and intervention (Hart et al., 2011; Kazdin, 2017). However, to do so, further research on the risk and maintenance factors of EDs (e.g., thin-ideal internalization, negative affect) is needed (D'Adamo et al., 2022; Stice et al., 2021). Moreover, there is an imperative need to examine the protective factors to increase the effectiveness of the prevention and early intervention programs of EDs in the prevention and intervention (e.g., self-compassion) (Braun et al., 2016; Levine & Smolak, 2016; Piran, 2015). Specifically, the scope of future research should aim to (a) explain the risk factors involved in the onset and maintenance of body image disturbance (BID) and EDs; (b) further understand the barriers and facilitators of treatment-seeking behaviors; and, lastly, (c) explore ways to improve the dissemination of the evidence-based treatments (e.g., Jacobi et al., 2004; Junne et al., 2019; Nechita et al., 2021; van den Berg et al., 2019). Furthermore, additional research focusing on a high-risk cohort, such as adolescents and young adults, is needed to identify the potential obstacles to accessing evidence-based care (Koreshe et al., 2023). The next sections of this chapter will focus on describing these requirements and delineating the need for comprehensive, targeted approaches that account for these risk factors, barriers, and facilitators.

In this context, it is especially important to analyze the BID, which has been identified as a key factor in the onset and maintenance of EDs (Bruch, 1973; Glashouwer et al., 2019; Stice et al., 2021) and a predictor of relapse or treatment outcomes (Junné et al., 2019; Lee et al., 2018). The development of a negative BI or BID may begin in childhood and early adolescence and range in a continuum from mild dissatisfaction to strong disturbance (Cash, 2002). In the next section, the characteristics and underlying mechanisms associated with BID will be explained.

1.1. Body image disturbance: the main feature and risk factor in eating disorders

Over three decades ago, Rodin et al. (1984) introduced the term "normative discontent" to describe the widespread dissatisfaction that women experience regarding their body shape and weight, suggesting that this is the norm rather than an exception. Since then, research has intensified, focusing on normative discontent and other ED risk factors in order to develop more effective prevention and intervention programs (Tantleff-Dunn et al., 2011).

EDs are severe psychiatric problems characterized by disordered eating or weight-control behaviors resulting in physical and psychological impairment (American Psychiatric Association [APA], 2013). Although these diagnoses are defined by distinctive features, they are all characterized by the common factor of dysfunctional bodily experiences related to body shape or weight (i.e., body image disturbance; Stice, 2002).

Although not all individuals with negative body evaluation will develop EDs, BI concerns have been associated with unhealthy lifestyles (e.g., dieting or restrictive eating), depression, or low self-esteem (Dahlenburg et al., 2020). Negative BI-associated thoughts or feelings may also influence relationships with others and affect social functioning (Hosseini & Padhy, 2019). Consequently, further study of these maladaptive body-related experiences is significant.

BI is a complex, multidimensional construct that encompasses various aspects of one's relationship with their body shape and weight, comprising cognitions, affect, and behaviors (Muth & Cash, 1997). Cash and Deagle (1997) posited that BI comprises two main dimensions: (a) the perceptual dimensions, which refers to the accuracy of an individual estimation of body size and weight, and (b) the affective dimension (also known as affective-cognitive-attitudinal dimension) which encompasses individual's evaluations, thoughts, attitudes, and emotions related to the appearance. The negative BI or BID involves alterations of

one or both of the BI dimensions (perceptual and affective). The BID has been identified as a key factor in the onset and maintenance of EDs (Bruch, 1973; Glashouwer et al., 2019; Stice et al., 2021) and a predictor of relapse or treatment outcomes (Junne et al., 2019; Lee et al., 2018).

The affective BID comprises evaluative thoughts and beliefs about one's body (e.g., body shame, body dissatisfaction) (Cash & Brown, 1987). Body dissatisfaction, the most studied factor of affective BID, arises from the discrepancy between the perception of one's body weight and shape (i.e., perceived body) and the expectance on how one wants the body to be (i.e., ideal body) (Wade et al., 2009). In fact, individuals at risk of developing EDs often show preferences for a thin-ideal body (e.g., Luo et al., 2020; Woud et al., 2011).

The perceptual dimension of BID involves distortions in the estimation of body size or weight (i.e., body size overestimation or underestimation; Cash & Deagle, 1997; Gardner & Brown, 2014; Keizer et al., 2014). Recent neuroscientific evidence suggests that these perceptual disturbances in EDs may have a multisensory origin (Badoud & Tsakiris, 2017; Brockmeyer et al., 2018; Guardia et al., 2012) with impairments in different sensory domains (i.e., tactile perception, proprioception, and interoception). Body size overestimation (i.e., perceiving one's body as bigger than it objectively is) (Cash & Deagle, 1997) has been associated with the drive for thinness (i.e., the pursuit of a thin ideal) or depressive symptoms (McCabe et al., 2006; Taylor & Cooper, 1992), leading to increased body dissatisfaction (Woud et al., 2011). Evidence also suggests that body size overestimation may be a consequence of affective BID (i.e., body satisfaction) (Gardner & Bokenkamp, 1996; Mölbert et al., 2018; Smeets et al., 1997). However, the relationship between both dimensions of BID and the comprehension of these dimensions independently remains unclear, posing challenges in the development of specific prevention and treatment programs for EDs.

The design and promotion of effective interventions in the field of BI begin with the use of well-designed, standardized tools (i.e., reliable, valid, and sensitive

to changes measure) (Cash, 2002). The affective dimension of BID is typically assessed through self-reports, such as clinical interviews and standardized questionnaires (Fairburn & Beglin, 1994; Hosseini & Padhy, 2019), which can be influenced by social desirability (Wade et al., 2009). Implicit measures, which are less susceptible to response bias (Vartanian et al., 2004), have been recommended to complement the traditionally used measures, particularly among individuals who may deny the severity of their disorder (Vitousek et al., 1998). The perceptual BID has been traditionally assessed with marking procedures, figural drawing scales, or video distortion (Askevold, 1975; Gardner & Moncrieff, 1988; Shafran & Fairburn, 2002). However, these methods have been shown to have questionable reliability and convergent validity (Gardner, 2011; Gleghorn et al., 1987).

Even though these assessment instruments have improved in the last decades (Cash & Pruzinsky, 2002), further research is necessary to overcome all the methodological issues. For instance, while some researchers suggest that BI may be stable and consistent over time, others have defended that it is malleable and can be influenced by various social, cultural, and individual factors, leading to fluctuations and changes throughout the lifespan (Cash, 2002; Tiggemann, 2004). The cognitive-behavioral model posits that specific situational factors can activate schema-driven cognitive processing regarding one's own body, resulting in mood and BI-related evaluation changes (Melnik et al., 2004). Consequently, the evaluation of the accuracy of the perceived body size (i.e., greater body size estimation) or the degree of satisfaction with one's body (i.e., larger disturbance between perceived and ideal body size) may be dependent on BI-related stimuli derived from individual's sociocultural context (Williamson, 1990). Moreover, assessments were typically administered by phone or email in order to capture the variability in the BID (e.g., Colautti et al., 2011; Rudiger et al., 2007), complicating the measurement of all the situational variables that contribute to BID fluctuations. As a result, the situational or emotional mechanisms (Cash, 2002) that influence these changes are still not well understood. To achieve

clinical benefits, further studies are needed to identify and measure the specific BID-related risk factors (Colautti et al., 2011; Melnyk et al., 2004) and examine how these contextual specificities are manifested among different populations with EDs (Cash & Deagle, 1997; Fuller-Tyszkiewicz, 2019; Stice, 2002).

Given the importance of studying the risk factors associated with BID, it is especially important to know the main theoretical approach explaining the etiology of BID.

1.2. The etiology of body image disturbance

Over the past decades, there has been increasing interest in developing and testing comprehensive models of risk factors for BID. The etiology and maintenance of BID are multi-factorial, and it has been contextualized through the biopsychosocial model (Cash & Deagle, 1997; Culbert et al., 2015). This framework incorporates findings from feminist psychology (e.g., body objectification), developmental psychology (e.g., the critical role of puberty or early adulthood in ED development), or social learning processes (e.g., appearance-related teasing) (Fairburn et al., 2008; Fredrickson & Roberts, 1997; Stice et al., 1996; Levine & Smolak, 1992). As a result, this model encompasses the interaction of biological factors (e.g., genetic and physical influences), individual psychological factors (e.g., low self-esteem or perfectionism), and sociocultural factors (e.g., peer influence, cultural and societal norms).

These factors can be classified into (a) predisposing factors, which would encompass biological, psychological, and sociocultural factors, (b) trigger factors such as negative comments about one's weight or traumatic experiences leading to the onset of EDs, and (c) perpetuating factors that contribute to the maintenance of the BID and EDs (e.g., praising one's weight loss) (Bratland-Sanda & Sundgot-Borgen, 2013).

While biological and physical factors (e.g., body mass index [BMI]) may directly lead to EDs (Paxton et al., 2006; Wertheim et al., 2004), the majority of BI-related concerns arise as a result of psychological or sociocultural factors (e.g., body size or shape do not align with culturally established standards; Wertheim et al., 2004). Psychological factors emphasize the role of personality and cognitive aspects such as perfectionism, body objectification, or the internalization of thin ideals (Fredrickson & Roberts, 1997; Tiggemann & Williams, 2012; Wertheim et al., 2012). In contrast, sociocultural factors encompass cultural norms, interpersonal and communicative processes, as well as additional social influences such as media, parents, and peers, all of which may contribute to the development of EDs (Piran, 2015; Wertheim & Paxton, 2012). For example, young adult women may be more susceptible to engaging in social comparison, which can result in body dissatisfaction and increase their risk of developing EDs (Galmiche et al., 2019; Pinkasavage et al. 2015).

In the next subsection, we review several theoretical models that emphasize the sociocultural and emotional aspects of EDs. Each of these models contributes to the understanding of the mechanisms that play a role in the development and maintenance of EDs. To find effective strategies that address both risk protective factors in the ED field, we must first comprehend how sociocultural and emotional variables may interact and influence the BID.

1.3. Theoretical models of eating disorders

1.3.1. Theories emphasizing the sociocultural factors

As outlined above, the development and maintenance of EDs can be conceptualized as multi-factorial. The current treatments for EDs are primarily based on cognitive-behavioral approaches (Fairburn et al., 2015); however, the design of the prevention programs also incorporate the sociocultural influence component as significant risk and maintenance factors of BID (e.g., media

pressure to reach the thin ideal) (Culbert et al., 2015; Piran & Levine, 1999).

Regarding sociocultural factors, thin-ideal internalization has been identified as a crucial risk factor that plays a significant role in the onset and maintenance of BID and, consequently, in EDs (Schaefer et al., 2020; Stice, 2002). Moreover, thin-ideal internalization has been found to persist after the recovery and predict the risk of future relapses (Bardone-Cone et al., 2010). Although normative discontent (Rodin et al., 1984) is a widespread phenomenon in the Western context, body-related dissatisfaction due to failing to achieve a socially acceptable body size and weight may not necessarily lead to an increased risk of EDs. Thus, some researchers began examining the impact of specific risk factors involved in the internalization of unrealistic standards of thinness (Stice, 2002; Culbert et al., 2015).

According to van den Berg et al. (2002), the process of thin-ideal internalization involves accepting “thinness” as a socially valuable attribute, and subsequently, engaging in actions to achieve this thin standard. So far, the influence of the thin ideal internalization on the development of BID and EDs has been explained through several theories: the *Social Comparison Theory* (Festinger, 1954; Heinberg & Thompson, 1992), the *Tripartite Model of Influence* (Thompson et al., 1999) and *Dual-Pathway Model* (Stice, 2001) and, lastly, the *Objectification Theory* (Fredrickson & Roberts, 1997). In the following points, the main characteristics of each theory will be described:

- *The Social Comparison Theory* (Festinger, 1954) is one of the earliest theoretical frameworks contributing to our understanding of BID development. According to Festinger (1954), individuals tend to compare their characteristics to other people to obtain an accurate evaluation of their self-worth. These evaluations may be either upward (comparison to individuals who may attain better characteristics than oneself) or downward (comparison to individuals who may attain worse characteristics than oneself).

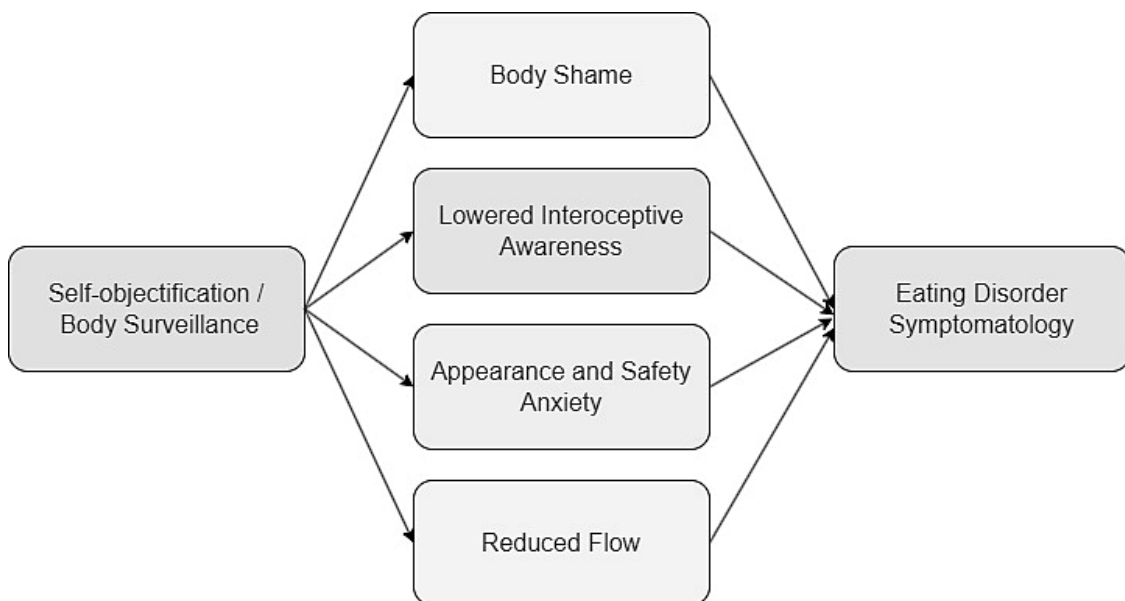
Heinberg and Thompson (1992) extended the social comparison theory onto explaining the tendency to evaluate and compare one's body to others (i.e., appearance comparison). The upward social comparison of one's appearance, therefore, will lead to negative BI-related consequences (e.g., body dissatisfaction).

- The *Sociocultural Theory* (i.e., *Tripartite Influence Model*; Thompson et al., 1999) suggested that women are exposed to these beauty standards through various sources, including peers, family members, and the media (social, internet, television, etc.), and may embrace these ideals for themselves (Groesz et al., 2002; Thompson et al., 1999). Thus, the constant exposure to the unrealistic body shapes promoted by Western society will trigger frequent upward appearance comparisons leading to feelings of insecurity and dissatisfaction. As societal pressure often results in judgment toward individuals who do not conform to cultural standards (Ferreira et al., 2013), individuals may engage in disordered eating behaviors as a means to attain the desired appearance (Marks et al., 2020; Rodgers & DuBois, 2016; Thompson et al., 1999).
- The *Objectification Theory* (Fredrickson & Roberts, 1997) further explained the impact of the internalization of societal messages on the tendency to focus on one's appearance (instead of one's internal states or body functions). As a consequence of frequently engaging in appearance comparison behaviors, women may begin viewing themselves from an observer/third-person perspective. McKinley and Hyde (1996) were the first to describe the tendency to see one's body as an object to be evaluated by others. This experience of objectified body consciousness comprises three components: body surveillance (i.e., perception, affect, and cognitive aspects regarding one's appearance); body shame or the internalization of the

sociocultural body ideal; and, lastly, appearance control beliefs (i.e., the belief that, with enough effort, one can attain the body ideal). Hence, the constant monitoring and evaluation of one's appearance may result in several negative psychological effects. These consequences include feelings of body shame, appearance and safety anxiety, concerns for personal safety, difficulty concentrating and achieving "flow" states, and reduced awareness of bodily signals such as hunger and satiety (see Figure 1). According to the authors, these effects may lead to the development of psychological disorders. When attempting to reach the societal standard of thinness, the body may be perceived as an obstacle, an object distinct from the self (i.e., body uncanny) that needs to be corrected matching the internalized body ideals, frequently resulting in disordered eating behaviors (Calogero, 2012; Fredrickson & Roberts, 1997; Svenaeus, 2013).

Figure 1

Objectification Theory Model based on the theory of Fredrickson & Roberts (1997)



- The *Dual-Pathway Model* (Stice, 2001) explores the consequences (e.g., dieting, body dissatisfaction) of the thin ideal internalization and the societal pressure to attain appearance standards. However, in contrast to the previously described models, Stice (2001) along with Fredrickson and Roberts (i.e., the *Objectification theory*; 1997) specifically address the role of negative affect.

Thus, while over the last decades, most theoretical models have primarily conceptualized EDs by their behavioral (e.g., restrictive eating, binge episodes, body monitoring) or cognitive characteristics (e.g., overvaluation of shape), Stice's *Dual-Pathway Model* (2001) specifically emphasizes the role of negative affect – resulting from thin-ideal internalization and societal pressure to attain appearance standards – as a significant risk factor in the development and maintenance of EDs. Similarly, the *Objectification Theory* (Fredrickson & Roberts, 1997) highlights the impact of focusing on one's appearance from a third-person perspective on negative emotional states (i.e., increased body shame).

1.3.2. Theories emphasizing emotional factors

In addition to established ED-related factors (i.e., body dissatisfaction, thin-ideal internalization), impaired emotional processing, and regulation have been identified as transdiagnostic traits associated with ED symptoms in both clinical and non-clinical populations (Prefit et al., 2019; Thompson, 2019). Emotional regulation involves the ability to identify, adjust and use specific strategies in response to emotional states (Gross, 2015).

Affect regulation models of EDs (Hawkins & Clement, 1984; Wonderlich et al., 2014) propose that disordered eating helps to regulate negative emotional states. These authors argue that instead of accepting and dealing with emotions in an adaptive way to modulate mood, individuals with EDs often engage in behaviors such as binge eating or purging that provide immediate but temporary,

short-term relief (i.e., reducing their awareness of the aversive mood) (De Young & Anderson, 2010; Polivy & Herman, 2002).

Recent studies utilizing network analysis to examine specific aspects of negative affect have identified guilt related to eating and shame as particularly relevant to EDs (Wong et al., 2021). In the field of psychopathology, shame is strongly associated with EDs, considered both a consequence and a risk factor for ED development (Duarte & Pinto-Gouveia, 2016; Nechita et al., 2021; O’Loughlen et al., 2022) that may pose an obstacle in therapeutic interventions. Numerous studies have found that shame is a primary reason that patients may avoid disclosing information during therapy sessions (Hook & Andrews, 2005; Swan & Andrews, 2003).

Shame is a complex, self-conscious construct characterized by a combination of negative emotions, thoughts, and behaviors (Gilbert & Miles, 2002; Tangney et al., 1996). It can be conceptualized as having two dimensions: internal and external shame. External shame usually arises in interpersonal situations and relates to the fear and negative beliefs about being negatively perceived by others (e.g., unattractive) (Matos et al., 2012). Originally described by Kaufman (1989) and Nathanson (1994), internal (or internalized) shame involves the negative assessment of the self as flawed, inferior, or unattractive. Internal shame has been associated with self-criticism (i.e., the act of evaluating and judging oneself) and self-hatred (i.e., feelings of self-disgust and intense dislike) (Gilbert & Miles, 2002).

In the field of EDs, body shame – specifically directed towards one’s BI – has been linked to ED symptoms (McKinley & Hyde, 1996). In this regard, Kaufman (1989) was the first to refer to EDs as “disorders of shame”. In the context of the *Objectification Theory* (Fredrickson & Roberts, 1997), body shame arises when the individual, who constantly compares their appearance, fails to meet the internalized or culturally promoted thin ideal. This negative perception of one’s body image as inferior, unattractive, or undesirable (e.g., Gilbert & Miles, 2002; Duarte et al., 2015) has been identified as a crucial factor in the development and

maintenance of BID and altered eating patterns in both clinical (Blythin et al., 2018; Pinto-Gouveia et al., 2014) and non-clinical samples (Ferreira et al., 2013; Gee & Troop, 2003). In clinical populations, experiences of shame may trigger attempts at control to hide perceived inadequacy from others (e.g., concealment or avoidance) (Ali et al., 2017; Gilbert & Miles, 2002), to adhere to restrictive eating or compensatory actions as a way to regulate these distressful emotional states (Kelly et al., 2013; Troop & Redshaw, 2012) or to avoid disclosure in treatment (Ali et al., 2017; Swan & Andrews, 2003), and consequently, perpetuating a cycle of increased body shame (Stormer & Thompson, 1996).

Although recent research has increased attention to emotional disturbances in EDs, the emotional states and underlying emotion regulation processes remain poorly understood, both in terms of their impact on the onset and maintenance of BID and the persistence of EDs. Hence, considering the presence of mood symptoms and negative affect as risk factors of BID and EDs, it is crucial to further explore their role in understanding BID. For instance, a reduction in shame in the early stages of treatment may lead to faster improvements in ED symptoms (Tangney & Dearing, 2002). Therefore, it is imperative to understand the process of emotion regulation and negative affect to foster effective ED prevention and intervention strategies targeting emotional-related processes (Peñate et al., 2020; Tiggerman & Miller, 2010).

Hence, it is crucial to look for complementary approaches aimed at assessing and intervening in the underlying sociocultural factors and emotion regulation processes of EDs. In this regard, positive body image is a relatively new approach in the field of EDs aimed at approaching the study of BID from a holistic framework.

2. POSITIVE BODY IMAGE: a complementary approach in the field of eating disorders

From the earlier sections, it is clear that, until recently, research and clinical practice in the field of BI and EDs has largely focused on addressing negative BI aspects (Bucchianeri & Neumark-Sztainer, 2014; Williams et al., 2004). These efforts have been useful in recognizing the risk factors and consequences of negative BI (Williams et al., 2004; Wood-Barcalow et al., 2010). However, the outcomes of the well-established interventions focused on the negative BI (i.e., changing one's dysfunctional thoughts, feelings, and behaviors contributing to BID) had reached at most a “neutral” BI at the end of the treatment (Tylka & Wood-Barcalow, 2015), leading to future relapses (Bardone-Cone et al., 2010). Thus, this approach of “damage repair” has neglected the promotion of healthy and optimal functioning (Fredrickson & Losada, 2005; Seligman & Csikszentmihalyi, 2000).

The *salutogenic* approach of positive psychology emphasizes the importance of focusing on the patient's strengths, well-being, and positive mental states as a way to enhance the effectiveness of current interventions (Fredrickson, 2001; Seligman & Csikszentmihalyi, 2000). In the field of BI, the salutogenic approach advocated studying how individuals develop a healthy relationship with their bodies by focusing on protective factors (Cook-Cottone, 2015). Protective factors, as defined by Rutter (1985), will modify, decrease, or adjust a person's response to some environmental threats that may predispose the individual to maladaptive consequences. Thus, BI-related protective factors may mitigate the likelihood of ED development and maintenance through several mechanisms (Crago et al., 2001; Striegel-Moore & Cachelin, 1999): (a) directly decreasing the negative effects of negative BI (e.g., lesser body size overestimation); (b) preventing the onset of risk factors for developing EDs (e.g., resistance to internalize the thin body ideals); (c) disrupting the mediational relationship through which a risk factors acts on developing EDs (e.g., higher body functionality appreciation) or by (d) interacting with a risk factor to

decrease/interrupt its detrimental effects on developing EDs (e.g., body appreciation).

In order to promote protective BI-related factors, research, and therapeutic practice in the field of BI have made an important shift from a primary focus on negative BI to a consideration of positive BI dimensions (Halliwell, 2015; Tylka & Wood-Barcalow, 2015). This shift began with the conceptualization of positive BI as a separate construct from negative BI (Menzel & Levine, 2011; Tylka & Wood-Barcalow, 2015). However, although negative and positive BI has been proven to be distinct constructs (Menzel & Levine, 2011; Tylka & Wood-Barcalow, 2015), some of their dimensions have a strong inverse relationship, suggesting that improvements in one may have an impact on the other (Linardon et al., 2022; Tylka & Wood-Barcalow, 2015). As a result, negative aspects of BI, such as dissatisfaction, can coexist with positive BI (Halliwell, 2013). The consideration of protective BI-related factors may, therefore, complement the research on negative BI (Tylka, 2012), promoting positive BI dimensions in the field of EDs (e.g., Striegel-Moore & Cachelin, 1999; Tylka, 2012).

Positive BI encompasses a loving and respectful attitude toward one's body, appreciating its uniqueness and functionality, and emphasizing one's body's assets rather than dwelling on its imperfections (Webb et al., 2015; Wood-Barcalow et al., 2010). Menzel and Levine (2011) identified three central components of positive BI: (a) appreciation of the body's appearance and function, (b) awareness of and attentiveness to the body's experiences and needs, and (c) positive cognitive style for processing body-related messages in a self-protective way.

Positive BI can protect against the onset of EDs (Linardon, 2021) by directly or indirectly influencing negative BI (e.g., Gillen, 2015; Iannantuono & Tylka, 2012; Swami et al., 2018; Tylka & Kroon Van Diest, 2013; Wood-Barcalow et al., 2010). Existing empirical evidence corroborates the protective role of positive BI on the promotion of more adaptive coping strategies when facing BI-related threats (e.g.,

self-compassion; critical approach to unrealistic beauty standards) (Albertson et al., 2015; Avalos et al., 2005; Swami et al., 2008; Williams et al., 2004), a healthier relationship with one's own body (Cook-Cottone, 2015; Wood-Barcalow et al., 2010; Tylka & Kroon Van Diest, 2013), and higher general well-being (e.g., positive affect, optimism) (Gillen, 2015). Investigating positive BI could not only promote a more holistic conceptualization of BI (Avalos et al., 2005; Linardon, 2021) but also improve the efficacy and the lasting effects of clinical treatments and prevention (O'Dea & Abraham, 2000; Tylka & Wood-Barcalow, 2015).

In addition to positive body image, there is another approach aimed at analyzing the fact of how we experience properly living from one's body or being connected with our body, which is referred to as the experience of positive embodiment (vs. disembodiment). In the next section, we will explain the main feature of this approach, which is aimed at exploring to a greater extent the relationship with one's body.

3. BEYOND POSITIVE BODY IMAGE: a positive embodiment (vs. disembodiment) as a way of habiting the own body

According to Cook-Cottone (2015), having a positive BI may enhance “*flourishing*”, which refers to an individual's awareness and commitment to living an attuned life to both internal and external experiences. Despite including aspects of positive BI, recent research has primarily focused on the observable aspects of BI, with a relatively limited investigation into the psychological and affective experience of the body and its protective connection to an individual's fundamental self-representations (Piran, 2001). While the construct of BI can help to understand an individual's perception and feelings toward one's physical appearance, it does not fully capture the complexity of a person's relationship with their body (Tylka & Piran, 2019).

Recently, researchers have begun to show greater interest in the role of the body in terms of how embodied processes are related to both the origins and maintenance of EDs. From the sociocultural framework and the phenomenological theory, scholars stress the need to include the concept of “*the lived experience of the body from the inside*” (Gleeson & Frith, 2006; McBride & Kwee, 2018) to promote more effective prevention and intervention strategies. This construct, coined as “experience of embodiment”, captures the negative and positive ways of inhabiting the body (Fredrickson & Roberts, 1997; Piran, 2016). From the field of positive psychology, the experience of embodiment is “*the identification and attachment with the body; [embodiment] reflects body awareness (e.g., awareness of hunger and satiety cues) and responsiveness (e.g., eating in response to hunger cues and ceasing to eat in response to satiety cues)*” (Tylka, 2012). Thus, BI represents just one element within the broader notion of embodiment (Cash, 2002; Piran & Teall, 2012).

Positive BI and embodiment are multidimensional and may be influenced by interpersonal and intrapersonal factors, such as the social context, as well as mental and physical processes (Cash, 2012; Piran & Teall, 2012). In addition, it is important to recognize that both constructs may overlap and, as a result, their further differentiation, frequently remains unclear. Both constructs emphasize the need to promote a culture that rejects societal body ideals, which may be internalized and lead to disordered eating behaviors (Tylka & Wood-Barcalow, 2015). However, while the BI construct primarily involves an appearance-based process that cognitively assesses one’s body based on social norms and physical appearance; the experience of embodiment aims to explain the inner experience of living in the body (Piran et al., 2020; Piran & Teall, 2012). Thus, investigating the experience of the embodiment may enhance our comprehension of the psychological mechanisms involved in BID, and, consequently, the risk of EDs.

3.1. Embodiment as a significant contributor to positive body image

The experience of embodiment has been conceptualized as a continuum ranging from a state of body disconnection (i.e., disembodiment) to the state of body connection (i.e., positive embodiment) (Piran & Sigall, 2011). The ends of this continuum have been described from two theories: *The Developmental Theory of Embodiment (DTE)* (Piran & Teall, 2012) and the *Objectification Theory* (Fredrickson & Roberts, 1997) explained before.

In recent years, the DTE is gaining empirical support as a comprehensive paradigm that may help in understanding risk and protective factors in the BI field (Cook-Cottone, 2015; Piran, 2015, 2016). Particularly, the DTE focuses on the study of factors from the social, psychological, and physical environments that could increase BID or promote a healthy BI (Piran & Teall, 2012; Piran, 2015).

The factors implicated in the development of BID or positive BI have been referred to as *connective* or *disruptive*. The connective experiences include (a) body attunement to one's state, needs, and desires (e.g., body awareness); (b) feeling confident and assertive to fulfill these states, needs, and desires; (c) feeling connection and positive feelings regarding oneself and others; (d) active engagement in the world (Piran & Teall, 2012). On the other hand, the disruptive experiences may include (a) body dissatisfaction (e.g., Grabe et al., 2007), (b) self-objectification (Fredrickson & Roberts, 1997; Piran & Teall, 2012), (c) negative emotional states (i.e., body shame) (Breines et al., 2008; Quinn et al., 2006) or (d) external body orientation (i.e., focusing on one's appearance rather than internal states) (Ainley & Tsakiris, 2013; Fredrickson & Roberts, 1997).

The disruptive factors –breaking the connection with one's own body– may lead to negative BI (Roberts et al., 2018) and EDs (e.g., Moradi et al., 2005; Piran & Teall, 2012). Conversely, connective activities that foster body awareness and focus on internal bodily signals such as yoga may decrease self-objectification

and promote positive embodiment (e.g., Ariel-Donges et al., 2019; Cox & Tylka, 2020; Mahlo & Tiggemann, 2016; Piran & Neumark-Sztainer, 2020). Thus, taking into account the construct of embodiment as connective or disruptive experiences may shed light on the positive and negative BI from a holistic perspective (Piran, 2016). As a result, the positive embodiment will lead to the promotion of a positive BI experience (Menzel & Levine, 2011; Piran & Teall, 2012). However, some questions remain unclear: How do we actively promote a positive connection to one's own body? Which are the processes that protect against the disruption of the positive embodiment?

3.2. Promoting positive connection to one's own body: mindful self-care as a protective factor against disembodiment

Preliminary qualitative and quantitative evidence suggests that *mindful self-care* may contribute to the positive connection to one's body (i.e., positive embodiment) (Cook-Cottone & Guyker, 2018; Cook-Cottone et al., 2017; Piran, 2016). An extensive body of research supports the idea that engaging in active, daily activities that foster one's agency and connection to the body (e.g., developing mindful awareness, practicing exercise, or having an attitude of self-compassion or engaging in supportive relationships) can promote self-care (Cook-Cottone, 2015, 2016).

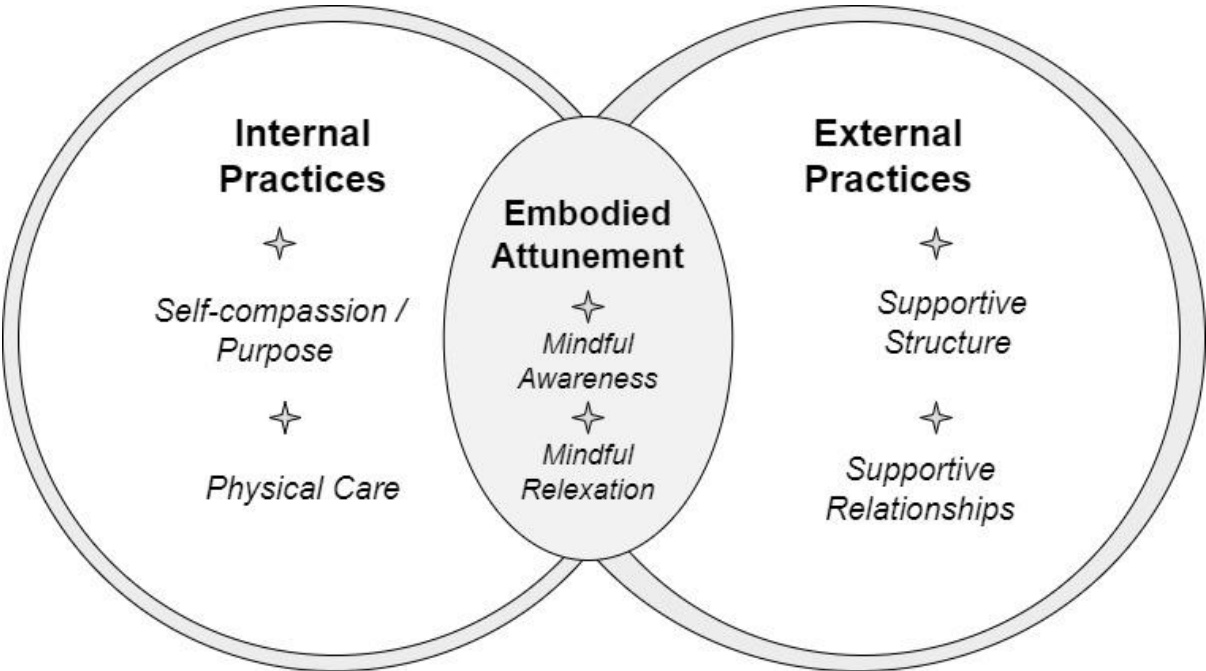
Based on the biopsychosocial model, the *Attuned Representation Model of Self* (ARMS; Cook-Cottone, 2006) provides a framework on how to promote self-caring experiences in order to foster positive embodiment and, consequently, positive BI. Exemplifying the salutogenic perspective of positive psychology, this model emphasizes well-being by highlighting the main component of *attunement* defined as an ability to accurately perceive and respect one's body by being aware of its needs and engaging in adaptive behaviors to address these needs. For

instance, the practice of self-care will enhance positive BI dimensions (Perey & Cook-Cottone, 2020) by engaging in mindful activities, attending to the body's needs, and responding to them in a *body-attuned* manner (Cook-Cottone, 2015, p. 164).

The ARMS model encompasses biological, psychological, and sociocultural factors that could influence *body attunement*. These factors form part of two interdependent systems: the self-system and the cultural system (see Figure 2). According to the ARMS, ED behaviors emerge when the individual encounters risk factors from these systems. Thus, the prevention of EDs must focus on fostering protective factors within these systems as a way to keep attunement to one's bodily states and needs.

Figure 2

The Attuned Representation Model of Self-Care (ARMS): Mindful Self-care Practices (Adapted from Cook-Cottone, 2017)



In the following paragraphs, we will focus on describing the specific protective factors within the self-system that we have addressed in the studies carried out as a part of this doctoral dissertation. These factors are (1) body appreciation, (2) awareness and responsiveness to internal cues, and (3) adaptive ways of regulating one's emotions.

- **Body appreciation.** This is one of the most salient dimensions of the positive BI that encompasses a kind and accepting attitude of holding favorable opinions towards one's body and engaging in healthy behaviors and protective cognitive styles as a way to care for one's body (Avalos et al., 2005; Tylka & Wood-Barcalow, 2015). Individuals who appreciate and respect their bodies are less likely to experience concerns with their body appearance (Augustus-Horvath & Tylka, 2011; Tylka & Kroon Van Diest, 2013), embrace external pressures related to unrealistic thin ideals (Avalos et al., 2005), or engage in EDs behaviors to modify their appearance (Andrew et al., 2016; Linardon, 2021). The perception of one's body from a holistic perspective (e.g., not only focusing on the body imperfections or physical appearance from the third-person perspective) may also foster a self-regulation ability (Avalos et al., 2005). For example, higher body appreciation has been associated with higher attention to one's body needs (i.e., internal hunger and satiety signals) (Todd et al., 2019), rejection of the sociocultural appearance pressures (Halliwell, 2013; Stice, 2001), or promotion of adaptive emotional regulation skills (Linardon et al., 2022).
- **Awareness of and responsiveness to internal hunger and satiety cues.** The awareness of internal (vs. satiety) body cues and body trust are negatively correlated with ED symptoms (Tylka, 2006; Tylka & Kroon Van Diest, 2013). While a lack of trust in one's body sensations has been linked to increased body shape and weight

concerns (Brown et al., 2017; Monteleone et al., 2020) and heightened feelings of body shame (Burgard, 2009), perceiving one's body as "safe" and "trustworthy" is associated with positive BI-related variables (i.e., functionality appreciation, body appreciation, intuitive eating) (Brown et al., 2017; Oswald et al., 2017; Todd et al., 2019).

- **Emotional well-being and the ability to regulate emotions.** A wide body of literature identified self-compassion as a way to increase emotional well-being and regulate emotions, that can act as a protective factor that may lead to a decrease in EDs in both clinical (Kelly et al., 2014a) and non-clinical samples (Albertson et al., 2015). Self-compassion is a multidimensional construct defined as the attitude of being open to one's suffering, not avoiding it but rather approaching it with kindness (Neff, 2003). Self-compassion is composed of three interconnected components: (1) self-kindness or demonstrating kind understanding and awareness of one's suffering (vs. self-judgment and criticism); (2) common humanity or the perception of one's experiences as a part of shared human condition (vs. isolation); and (3) mindfulness or full awareness of one's distressing thoughts, emotions, or shortcomings (vs. overidentification and fusion).

An increasing body of research is emphasizing the protective factors that may contribute to positive BI within the sociocultural challenges that women regularly face (Tylka, 2019). The role self-compassion as a protective factor will be deeply analyzed in the next section.

4. SELF-COMPASSION: a promising approach to increase positive body image, foster positive embodiment, and decrease body image disturbance

Tylka and Kroon Van Diest (2015) proposed four possible ways in which it may reduce the impact of negative BI threats: (a) by buffering against negative BI (e.g., a decrease of experience of shame, guilt, or criticism) (Gilbert, 2014); (b) reducing the perception of threats (e.g., lesser thin-ideal comparison; higher body appreciation) (Andrew et al., 2015; Kelly et al., 2014b); (c) interrupting the mediated links between threats (e.g., perfectionism or shame) (Marta-Simões et al., 2016; Raque-Bogdan et al., 2016) and body dissatisfaction, and (d) moderating the relationship between threats (e.g., thin-ideal internalization or body surveillance) and negative outcomes (e.g., BID or EDs) (Lonegan et al., 2019). Additionally, a recent systematic review from Braun et al. (2016) has identified self-compassion as an “adaptive affect regulation” and coping strategy able to foster positive BI and positive embodiment.

However, further research is required to determine the underlying protective mechanisms of self-compassion (e.g., fear of self-compassion) to design more effective interventions. For instance, the fear of self-compassion frequently found in individuals with EDs has been linked to higher levels of self-criticism and shame (Gilbert et al., 2011) and consequent maintenance of the BID during the treatment (Kelly et al., 2013). Hence, interventions based on self-compassion may help to decrease barriers to help-seeking and promote emotional regulation (Finlay-Jones et al., 2015; Kelly et al., 2014b).

Body compassion is a newly emerging construct that merges the construct of self-compassion (Neff, 2003) and BI (Cash, 2002), which was coined by Altman et al. (2020). Body compassion specifically focuses on one’s appearance, competence, and health state encompassing three factors: (1) defusion, which involves distancing oneself from painful thoughts about one’s body limitations or inadequacies rather than over-identifying or suppressing them; (2) common

humanity, that is referred to the ability to recognize negative BI experiences as a part of the shared human experience instead of adopting an isolating perspective; and (3) acceptance, which involves embracing body-related painful thoughts and feelings with kindness rather than judgment.

While research on this construct is limited, body compassion has been positively associated with healthy BI dimensions (e.g., body flexibility) (Altman et al., 2017) and reduced BI disturbance (e.g., feelings of shame towards one's body or disordered eating patterns) (Barata-Santos et al., 2019; Oliveira et al., 2018). Moreover, body compassion has been linked to positive affect (Altman et al., 2020). These findings suggest that body compassion is a worthy outcome to target in BI and self-compassion intervention. However, studies have yet to explore body compassion within a BI intervention specifically. Further research is needed to evaluate the effectiveness of body-compassion interventions and to better understand the underlying mechanisms that contribute to the development and maintenance of body-compassion.

4.1. The need of including self-compassion interventions as coadjutant

Current ED treatments rely on cognitive-behavioral approaches (Fairburn et al., 2015), which are considered the “gold standard” in ED treatments (Berkman et al., 2006; Hay et al., 2009). However, the limited effectiveness and small effect sizes of these treatments (e.g., Murray et al., 2019; van den Berg et al., 2019; Tresaure et al., 2020) along with the high relapse rates (Berends et al., 2015; Carter et al., 2004), indicate the need to develop new interventions. For instance, the *Cognitive-Behavioral Therapy-Enhanced Model* for EDs (Fairburn et al., 2003) focuses on the overvaluation of body shape and weight as the core psychopathology; however, its efficacy, mainly based on the improvements in the disordered eating behaviors, is limited (Cândea et al., 2018). The meta-analysis

carried out with non-clinical samples using *Cognitive-Behavioral Therapy* treatment points out the need to develop more effective BI treatments (Jarry & Ip, 2005). Furthermore, according to Fairburn et al. (2003), BI treatments based on cognitive-behavioral approaches aimed at targeting thoughts and behaviors associated with ED symptomatology, have only had modest effectiveness among clinical populations.

Given the role of BID in the development and maintenance of EDs, as well as the relapse (Cash & Hrabosky, 2004), there is a pressing need to develop new intervention and prevention approaches (Fairburn et al., 2015; Junne et al., 2019). As it arises from the theoretical overview offered in this chapter, to increase effective treatment and EDs prevention it is essential (1) to further explore the underlying mechanisms involved in the development and maintenance of BID, and (2) to foster adaptive psychological functioning by incorporating protective factors that promote adaptive affect regulation and encourage a healthy and positive connection with one's body.

Considering the evidence stemming from the ARMS and DTE models on the promotion of positive connection to one's own body, and especially, the strong evidence of the protective role of self-compassion in the field of BI, researchers started to develop and examine compassion-based prevention and intervention programs. To date, these interventions show potential as a means to improve individuals' BI by reducing EDs' risk factors and enhancing positive BI (Guest et al., 2019; Turk & Waller, 2020). Moreover, the numerous evidence of the benefits of self-compassion has prompted new therapeutic approaches to address specific BI-related components such as shame and guilt that not only put the individuals at risk of developing BI but also may prevent help-seeking behaviors or difficulty in the self-disclosure during treatment (Ali et al., 2017; Swan & Andrews, 2003).

4.2. The compassion-focused therapy for eating disorders for populations with shame and self-criticism

Grounded on the *Affect Regulation Model* (Gilbert, 2005), compassion-focused therapy for EDs (CFT-E; Gilbert 2010), is a therapeutic approach that integrates cognitive-behavioral therapy, evolutionary psychology, and Buddhist psychology.

The Affect Regulation Model (Gilbert, 2005), derived from the evolutionary and neuroscience model of affect regulation, is based on three specific affect regulation systems: (1) the threat and defense system, associated with rapidly activated emotions (i.e., anxiety, disgust, or anger) and defensive behaviors related to the fight/flight/freeze response (i.e., aggression or avoidance) that are activated due to perceived threats and the need for self-defense; (2) the drive and achievement system, which is associated with goal-oriented actions (e.g., status-seeking, competitiveness, and rejection avoidance) and the avoidance of the negative emotions (e.g., shame or rejection); and (3) the affiliative and soothing system, associated with emotions of safety and well-being and behaviors related to care and affiliation, responsible for soothing and providing compassion to oneself and others, and regulating the other systems.

Gilbert (2014) posits that mental health problems may arise from the deregulation of these three systems. For instance, the overactivation of the threat system coupled with the feelings of body shame, and the hypoactivation of the soothing system due to the inability to regulate these emotions, could manifest as the pursuit of a thin ideal. Therefore, the activation of the drive system may be a way to regulate the threatening emotions in the population with EDs (Goss & Allan, 2009). For example, the threat system may be activated through the process of comparing oneself to the thin ideal and failing to achieve it, and experiencing subsequent negative emotions (e.g., shame or guilt) (Kelly et al., 2014b; Pinkasavage et al., 2015). Another explanation is related to the hyperactivation of the threat system, which leads to showing aggressive or evasive behaviors such

as binge eating, purging, excessive exercise, and/or continued starvation and deprivation. As a result, individuals with EDs often find themselves in a continuous state of perceived danger, unable to use the soothing system (to either calm themselves or receive comfort from others). This leads them to rely on the drive system to manage emotions (such as striving for thinness and taking pride in accomplishing it) or attempt to evade or avoid/numb painful affect (e.g., by engaging in binge-eating behaviors).

CFT aims to foster the soothing system and regulate the overactivation of the threat and drive systems related to feelings of shame and self-criticism (Gilbert, 2010). Consequently, individuals learn how to address their ED-related thoughts, behaviors, and feelings adaptively and without judgment. This approach promotes awareness and understanding of one's emotional reactions while encouraging self-care. Currently, CFT has gathered substantial empirical support for its efficacy (Craig et al., 2020; Kirby et al., 2017).

In addition, the contents of the prevention and intervention programs for BID, exploring new ways to deliver these programs are highly relevant. For this reason, the next section will be aimed at exploring how digital technologies may assist clinicians in assessing and treating BID.

5. EMBRACING DIGITAL HEALTH TECHNOLOGIES IN THE PREVENTION AND INTERVENTION OF BODY IMAGE

5.1. Virtual reality: enhancing effectiveness in assessing and treating body image disturbance

During the last decades, in a progressively digitalized society, the healthcare field has shown strong interest in digital health regarding BID and EDs. Digital health is a wide subject that comprises mHealth, telehealth, digital medicine, and virtual reality (VR) showing promising results in the prevention and treatment of EDs (Linardon et al., 2020).

One of the emerging technologies that have gained exponential importance in the field of EDs is VR (Riva, 2017; Wiederhold et al., 2016). Although relatively new, VR gathers evidence as a useful and highly realistic tool (e.g., 3D avatars in VR-generated environments) (Cornelissen et al., 2015; Mölbert et al., 2018) that may enhance mental health treatments and overcome the limitations found in the traditionally used BID assessment tools (Purvis et al., 2015). VR is particularly well-fitted to assess automatic responses or to measure fluctuations in BID in response to experimental manipulations (e.g., Piryankova et al., 2014; Purvis et al., 2015). For instance, virtual environments may facilitate the “state” assessment of the situational factors that may lead to changes in the BID (Ferrer-García et al., 2009; Gutiérrez-Maldonado et al., 2010). Moreover, VR technology also allows individuals to “embody” 3D avatars (e.g., changing the perception of the whole body or specific body parts) as a way to assess and intervene with the perceptual dimension of BID (Piryankova et al., 2014; Porrás-García et al., 2020; Serino et al., 2019).

The inclusion of VR can be also beneficial in increasing the effectiveness of standard interventions. The results of the randomized-control trials show that the use of VR technology along with cognitive-behavioral therapy may be superior to cognitive-behavioral therapy alone (Cesa et al., 2013; Marco et al. 2013). Recent research has also demonstrated that using a cognitive bias modification paradigm (employed in cognitive-behavioral therapy) that specifically targets thin-ideal and processes of social comparison through a “yes-no” forced choice method, leads to a decrease in concerns about eating and fosters healthier BI (Irvine et al., 2020; Penton-Voak et al., 2013). Recently, Gledhill et al. (2017) successfully adapted the paradigm of cognitive bias modification aiming to decrease the disturbance in perceptual BI (i.e., body size estimation) using computer 2D avatars. Later, Irvine et al. (2020) showed the efficacy of this paradigm adapting it to the VR environments.

Despite the high cost of the equipment as well as the reduced number of clinicians that are trained to use it (Clus et al., 2018), evidence highlights VR as

an effective assessment and intervention tool to be used along with evidence-based ED-related programs.

5.2. Overcoming barriers to the accessibility to prevention and intervention programs

As previously discussed, addressing EDs at a clinical level may be challenging due to potential obstacles that individuals may encounter within the healthcare system, as well as personal barriers, such as the experience of shame. As a result, it may lead to an increase in the future relapse and chronicity of these disorders (Bauer et al., 2013; Mussolino et al., 2016; Stice et al., 2009). The use of technology (e.g., mobile applications, internet-based therapy) may contribute to reducing stigma and costs associated with the traditional delivery of interventions (Andrade et al., 2014; Bennett & Glasgow, 2009) while achieving outcomes comparable to face-to-face therapy (Andersson & Titov, 2014).

In this regard, it should be highlighted the efficacy of compassion-based interventions in different formats. They have been tested in individual and group formats (Voelker et al., 2019) and in a brief format, showing their effectiveness in positive BI and decreasing BID, both in clinical and non-clinical populations (e.g., Anderson et al., 2015; Braun et al., 2012; Nadeau et al., 2020; Toole & Craighead, 2016; Altman et al., 2017; Kelly & Carter, 2015). Their efficacy has also been found when applied as a single self-compassion exercise (vs. frequently practiced tasks), showing the effectiveness for promoting adaptive emotional regulation strategies related to BI threats and promoting internal body orientation and positive embodiment (Augustus-Horvath & Tylka, 2011). For instance, writing a self-compassionate statement following a negative mood-induction task (i.e., viewing pictures of thin female models) has been shown to improve mood, body satisfaction, or body appreciation (e.g., Guest et al., 2019; Odou & Brinker, 2014, Moffitt et al., 2018; Seekis et al., 2017).

Nonetheless, barriers to treatment access (e.g., stigma, and lack of active help-seeking behaviors) persist in these programs (Andersson, 2016). Digital technologies may facilitate easier access to these compassion-based programs. However, existing studies have primarily focused on fostering self-compassion rather than body compassion; hence, the efficacy of the body compassion interventions due to the novelty of this construct is still unknown. Furthermore, research on the mechanisms that may underlie the changes in BI is also scarce. Further investigation is necessary to improve the understanding of these mechanisms in both self-compassion and body compassion-based prevention and intervention programs.

6. OUTLINE OF THIS DISSERTATION

In light of the previous work described above, several recommendations have been made to achieve effective and long-lasting outcomes for ED prevention and intervention programs. First, it is crucial to investigate the underlying factors of affective and perceptual BID. This requires improving the existing assessment tools (e.g., by introducing new methods such as VR programs). Second, further research on factors that may not only constitute risk factors of EDs but also impede help-seeking behaviors (Ali et al., 2017; Linville et al., 2015), such as body shame, is essential. By incorporating these variables into prevention programs, it may be possible to prevent the development of EDs or by encouraging adaptive strategies if EDs emerge. Lastly, emphasizing the promotion of BI-related protective factors (i.e., compassion, body trust) rather than merely reducing BID, could result in more sustainable long-term benefits and improved maintenance of gains achieved through ED interventions (Alleva et al., 2015; Webb et al., 2015; Tylka & Wood-Barcalow, 2015). However, it is necessary to further explore the underlying mechanisms of compassion by incorporating a holistic view of BI and considering the role of the newly researched construct of body compassion.

The ultimate goal of this dissertation is to address these needs as a step toward enhancing existing prevention and treatment strategies in women. In this regard, the objectives of this dissertation are:

- 1) To validate the virtual reality software program as a tool aimed to assess aspects of perceptual and affective BID in women from clinical and non-clinical populations; and to explore the differences in BID between these populations.
- 2) To explore the underlying mechanisms (perceptual “thin-fat” categorical boundary associated with the thin-ideal internalization; and positive and negative affect) affecting the perceptual and the affective BID in adolescents and young adults from clinical and non-clinical populations.
- 3) To conduct a narrative review integrating the construct of BI, embodiment, body shame, and compassion (self-compassion and compassion towards the body).
- 4) To validate and study the psychometric properties of the Body Image Shame Scale (BISS; Duarte et al., 2015) as an instrument to assess internal and external dimensions of body shame in Spanish women.
- 5) To confirm the protective role of self-compassion on the risk of EDs and to analyze the role of positive affect, body trust, and body shame as potential underlying mechanisms between self-compassion and the risk of EDs.
- 6) To validate and study the psychometric properties of the Body Compassion Scale (BCS; Altman et al., 2020) as an instrument to assess body compassion in Spanish women.
- 7) To examine the protective role of body compassion in cultivating positive BI (body appreciation) and decreasing BID (body shame) and the risk of EDs.

- 8) To investigate the efficacy of body compassion micro-intervention in buffering and regulating BI-related variables (body shame, body satisfaction, and body trust) and promoting positive affect.

This dissertation consists of six separate manuscripts formulated with specific theoretical frameworks and discussions. As a result, some of the information will be repeated across the document. However, as each manuscript was written to stand alone, each research manuscript contains in-depth information regarding each examined construct. The aggregation of the findings of all six articles sought to explore the underlying mechanisms that may influence the BID and promote positive BI by fostering caring and non-judgemental relationships with one's own body.

Study 1 and Study 2 aimed to explore the underlying mechanisms (perceptual “thin-fat” categorical boundaries associated with the thin-ideal internalization, and positive and negative affect) of the BID. While Study 1 is a quasi-experimental study carried out with 30 women from the clinical ED population and 57 women from a non-clinical sample at risk of developing EDs; study 2 was an experimental design carried out with 42 adolescents with EDs.

Study 1 is presented in Chapter 2, titled “*Virtual Reality-Based Assessment of the Underlying Mechanisms of Body Image Disturbance in Non-Clinical and Eating Disorders Population.*”. It was designed to validate a virtual reality tool to assess the perceptual and affective dimensions of the BID in women with BI concerns and eating disorders. The findings from this study offer a deeper understanding of perceptual “thin-fat” categorical boundaries in the severity of BID. The assessment of the “thin-fat” cognitive bias for one's own body (i.e., the point at which we shift from classifying a body as “thin” to categorizing it as “fat”), in conjunction with BMI, shows promise in predicting the ideal body size estimation. Given that thin-ideal internalization is a significant factor contributing to the increase in BID among women, these findings may help to enhance the effectiveness of evidence-based prevention and intervention of EDs. Furthermore,

this study provides a validation of an effective and ecologically valid measure to assess BID that was further used in the experimental study 2.

Study 2 is presented in Chapter 3, titled *“The Role of Affect on Body Image Disturbance in Adolescents with Eating Disorders: An Experimental Study Using a Virtual Reality Mood Induction Procedure”*. The study aimed to examine the influence of depressive symptomatology on positive and negative BI and to analyze the impact of affect (both positive and negative) on the perceptual and affective BI dimensions in adolescents with EDs. Understanding the role of these affect-related variables in the severity of perceptual and affective BI alterations is crucial for effectively addressing the emotional regulation process that may maintain the ED symptomatology. Additionally, the findings from the present study extend the evidence on the potential EDs protective factors by examining the positive affect and several positive BI dimensions. Importantly, the findings point out that targeting specific BI-related negative affect (i.e., guilt about eating and shame), as previous studies suggest, may be a more effective way to analyze the role of context-dependent factors on BID. Specifically, the next studies are focused on the role of body shame as a disruptor of the positive connection with one’s body and a potential risk/maintenance factor of ED development.

Study 3 is presented in Chapter 4, titled *“Towards a Comprehensive Understanding of Body Image: Integrating Positive Body Image, Embodiment, and Self-compassion”*. The goal of this study was to carry out a literature review on specific BI-related risk and protective factors that, until recently, have been analyzed independently or have been widely overlooked. Thus, the review of scientific literature was carried out to establish the state of the art on embodiment, compassion (self- and body-specific), and body shame with the main goal to obtain a comprehensive understanding of positive and negative BI as two interdependent factors. As a result, a gap in the literature was identified, constituting a rationale for the theoretical and clinical contributions described in the next chapters of this dissertation.

In Chapter 5 and Chapter 6, two psychometric and cross-sectional studies that aim to translate and adapt two BI-related assessment instruments to the Spanish language are presented. To do so, 728 women from the general population were recruited. In particular, in study 4, titled “*The underlying protective mechanisms of Self-compassion in Decreasing Body Shame and the Risk of Eating Disorders: A Path Analysis Model*”, the Body Image Shame Scale (BISS; Duarte et al., 2015) was validated in a Spanish sample. The first aim of this study was to validate the questionnaire measuring the construct of body shame, as the distinction between internal and external body image shame is still scarce in the literature. We confirmed the two-factor structure on the questionnaire, and we used this instrument to carry out the second aim: to confirm that positive affect, body trust, and body shame were underlying mechanisms of the relationship between self-compassion and the risk of EDs. To our knowledge, this is the first study to point out the theoretical and clinical importance of internal body shame (vs. external) in the risk of developing EDs. In sum, this study confirms that a kind, nonjudgmental attitude towards oneself by fostering positive affect, paying closer attention to how the body feels, and trusting these bodily states may reduce internal body shame and, as a result, the risk of developing ED symptomatology.

In study 5, titled “*The Role of Body Compassion in the Risk of Eating Disorders: Mediation Effects of Body Appreciation and Body Shame*”, the Body Compassion Scale (BCS; Altman et al., 2020) was validated in a Spanish sample. Body compassion is a novel construct that gathers preliminary evidence as a protective factor in the field of BI. However, further research is needed to corroborate its role and the potential mediators in the relationship between body compassion and the risk of EDs. Firstly, this study contributed to adapting and validating the BCS to its use in the Spanish context. Secondly, we confirmed the protective role of body compassion in promoting positive BI (body appreciation) and decreasing body shame/risk of EDs. Importantly, the findings regarding the implication of internal body shame (vs. external) on the risk of developing ED symptomatology were replicated. The findings suggest that women with greater

body compassion are more likely to experience increased body appreciation, which subsequently results in reduced internal body shame and a decreased risk of EDs. In sum, these outcomes emphasize the importance of cultivating an acceptance-based relationship with one's own body as a means of preventing EDs. The design of the experimental study was based on the results of the aforementioned research studies.

Study 6 is presented in Chapter 7, titled “*Through Their Compassionate Gaze’: Protective Role of Body Compassion on Body Shame Induction in Young Adult Women*”. This experimental study aimed to examine the impact of body compassion writing micro-intervention on BI-related variables (body shame, body satisfaction, and body trust) and positive affect. The body compassion micro-intervention was operationalized as a ten-minute writing exercise that consisted in writing sentences to one’s body from the perspective of an unconditionally loving friend. Moreover, the moderating role of the individual’s trait body compassion and body shame on the efficacy of body compassion micro-intervention. Findings revealed the tendency of the practice of body compassion to buffer BID (i.e., decrease the detrimental effects of body shame), as well as to improve positive BI dimensions (i.e., body satisfaction). Moreover, these results seem to be more beneficial for individuals with lower body compassion attitudes or high levels of body shame.

Finally, Chapter 8 presents the general discussion, including a summary of the main conclusions of the six studies responding to the general objectives of this dissertation, as well as the strengths, methodological limitations, and future directions in the field of BI.

This dissertation is aimed at shedding light on the mechanisms underlying the dimensions of BI as well as to promote strategies that may be effective at enhancing the currently evidence-established therapies and prevention programs for women.

7. OVERALL METHODOLOGY

Besides the narrative review, this thesis gathered data from women from the non-clinical population and patients in specialized ED treatment. Two studies were cross-sectional, one study was quasi-experimental, and two studies were experimental. The overall study methodology is presented in Table 1.

Table 1. *Study Methodology Overview*

| | Study 1 | Study 2 | Study 4 | Study 5 | Study 6 |
|-------------|--|--|--|--|---|
| Aims | <p>(1) to investigate the validity of the VR tasks as a tool to assess BID-related variables</p> <p>(2) to determine the influence of the CB on the own one's body and other women's bodies on BID-related variables</p> | <p>(1) to examine the role of depressive symptomatology on BI</p> <p>(2) to analyze the effect of two Mood Induction Procedures of positive and negative affect on BID</p> | <p>(1) to examine the psychometric properties of the Body Image Shame Scale (BISS; Duarte et al., 2015) in a Spanish sample</p> <p>(2) to confirm whether positive affect, body trust, and body shame are potential underlying mechanisms of the relationship between self-compassion and the risk of ED</p> | <p>(1) to examine the psychometric properties of the Body Compassion Scale (BCS; Altman et al., 2020) in a Spanish sample</p> <p>(2) to explore whether body appreciation and body shame were mediators in the relationship between body compassion and the risk of ED</p> | <p>(1) to analyze the effect of a BC micro-intervention in buffering and regulating body shame, body satisfaction, body trust, and positive affect</p> <p>(2) to explore the moderating role of trait levels of BC and body shame in determining the efficacy of the BC micro-intervention in buffering and regulating the aforementioned variables</p> |

| | Study 1 | Study 2 | Study 4 | Study 5 | Study 6 |
|---------------------|--|---|--|---|--|
| Participants | <p>N = 87</p> <ul style="list-style-type: none"> ▪ 30 women with low body dissatisfaction from a non-clinical population (ages 19-26) ▪ 27 women with high body dissatisfaction from a non-clinical population (ages 19-27) ▪ 30 women with ED diagnosis (ages 15-50) | <p>N = 42</p> <p>Adolescents with ED diagnosis (ages 13-18)</p> | <p>N = 440</p> <p>Women from the general population without a history of EDs</p> <ul style="list-style-type: none"> ▪ Confirmatory factor analysis (<i>n</i> = 440; ages 18-40) ▪ Path analysis model (<i>n</i> = 398; ages 18-40) | <p>N = 288</p> <p>Women from the general population without a history of EDs</p> <ul style="list-style-type: none"> ▪ Exploratory factor analysis (<i>n</i> = 288; ages 18-40) ▪ Serial-parallel mediation model (<i>n</i> = 199; ages 18-40) | <p>N = 58</p> <p>Women from the general population with a history of EDs (ages 18-28)</p> |
| Measures | <p>BSQ, BES, EDI-3-RF</p> <p>Designed VR tasks</p> | <p>BDI-II, BSQ, BISS-shame, OBCS (Body shame subscale), BES, EDI-3-RF, BCS, BAS-2, BISS-body satisfaction, PANAS</p> <p>Designed VR tasks</p> | <p>SCS-SF, PANAS, BSQ, MAIA, OBCS (Body shame subscale), EDI-3-RF, BISS-shame</p> | <p>EDI-3-RF, SCS-SF, OBCS (Body shame and Body surveillance subscales), BAS-2, BCS, BISS-shame</p> | <p>BCS, EDE-Q, BAS-2, BSQ, BISS-shame, FCS (From others and From self), I-PANAS-SF, MAIA-2 (Trusting subscale), BISS-body satisfaction, OBCS (Body shame subscale)</p> |

| | Study 1 | Study 2 | Study 4 | Study 5 | Study 6 |
|-----------------------------|--|---|---|--|--|
| Statistical analyses | Person correlation ANOVA + post hoc tests ANCOVA + post hoc tests Hierarchical stepwise regressions | Person correlation Hierarchical stepwise regressions Paired t-tests | Confirmatory Factor Analysis Person correlation Path analysis | Exploratory Factor Analysis Person correlation Serial-parallel mediation | Person correlation ANOVA + post hoc tests Moderated regression analyses with change scores |

Note. BID = Body Image Disturbance; CB = Categorical Boundary; BSQ = Body Shape Questionnaire; BES = Body Esteem Scale; ; EDI-3-RF = Eating Disorders Inventory-3 Referral Form; VR = Virtual Reality; BDI-II = Beck's Depression Inventory-II; BISS-shame = Body Image Shame Scale; OBCS (Body shame subscale) = Objectified Body Consciousness Scale; BCS = Body Compassion Scale; BAS-2 = Body Appreciation Scale-2; BISS- body dissatisfaction = Body Image States Scale; PANAS = Positive and Negative Affect Scale; SCS-SF = Self-Compassion Scale-Short Form; MAIA = Multidimensional Assessment of Interoceptive Awareness; EDE-Q = Eating Disorder Examination-Questionnaire; FCS From Others = Fears of Compassion Scale (receiving compassion subscale); FCS From Self = Fears of Compassion Scale (giving self-compassion subscale)

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CHAPTER 2

Study 1. Virtual Reality-Based Assessment of the Underlying Mechanisms of Body Image Disturbance in Non-Clinical and Eating Disorders Population

This chapter is under review as: Burychka, D., Miragall, M., Lopez-Vilaplana, N., Borrego, A., Llorens, R., & Baños, R. M. Virtual Reality-Based Assessment of the Underlying Mechanisms of Body Image Disturbance in Non-Clinical and Eating Disorders Population

ABSTRACT

Although body image disturbance (BID) is a core symptom of eating disorders (EDs), the underlying mechanisms remain undetermined. Recently, body categorical boundary (CB) – defined as the point on which we categorize a body as thin or fat – has emerged as a possible mechanism to influence the BID. The aim of the study was (1) to examine the validity of the new virtual reality (VR) software to measure BID and (2) to examine the role of body categorization of one's own (vs. body categorization for another's person body – as it has been conventionally done-). A quasi-experimental design with 87 women with low BID ($n = 30$), high BID ($n = 27$), and ED ($n = 30$) was conducted. They completed self-reports to measure BID-related variables and VR tasks to measure body size estimation (real and ideal) and categorize 3D avatars as either “thin” or “fat” to measure the CB for their own body and another's person body. Results show that the developed VR assessment showed adequate construct and content validity. Moreover, significant differences were found between groups in the VR outcomes. Finally, the “thin-fat” CB for the own body (but not the “thin-fat” CB for another's person body) was a predictor of the ideal body size estimation. These findings suggest that the “thin-fat” CB for one's own body may be a risk factor in ED populations. Hence, the assessment of the “thin-fat” CB variable stands out as a possible complementary assessment and opens up the possibility of developing interventions for its modification.

Keywords: virtual reality, eating disorders, body image distortion, validation study, body size estimation, “thin-fat” categorical boundary.

1. INTRODUCTION

Body image disturbance (BID) -an alteration of the way a person perceives their body weight or size- has been widely identified as a risk and maintenance factor in eating disorders (ED) (Sattler et al., 2020). Being present in both clinical and non-clinical populations, BID has been found to be related to a less favorable prognosis and a higher number of relapses in ED (Calugi & Dalle Grave, 2019; Glashouwer et al., 2019). In fact, according to Cardi et al. (2019) or Berends et al. (2018), hardly 25-30% of ED patients recover completely as the BID persists after the end of treatment (e.g., persistent body size overestimation) (Engel & Keizer, 2017; Eshkevari et al., 2014).

BID has a multidimensional nature and can be manifested in several ways (Garner & Garfinkel, 1982), affecting the perceptual dimension (e.g., disturbance in body size estimation -BSE-) (Frank & Treasure, 2016; Gardner & Brown, 2014) and the affective-cognitive-attitudinal dimension (e.g., body dissatisfaction) of body image (BI) (Grogan, 2006; Striegel-Moore & Bulik, 2007).

Specifically, body dissatisfaction questionnaires or the self-discrepancy between the perceived body size and the ideal body size (i.e., internalized ideals about one's physical appearance) have been used (Cash & Deagle, 1997; Ferrer-García & Gutiérrez-Maldonado, 2012) for evaluation of the affective BID. A growing body of research has found that the female "thin ideal" is one of the key contributors to the rising body dissatisfaction in women (Schaefer et al., 2018). Likewise, the perceptual distortion of BI is usually assessed using figure rating scales, photograph adjustment (Gardner, 2012), or more recently, 3D virtual bodies (i.e., Gledhill et al., 2017; Irvine et al., 2020). As regards perceptual BID, the overestimation of one's own body has been found not only in ED patients (e.g., Brown et al., 2021) but also in normal and underweight women (e.g., Cornelissen et al., 2013; D'amour et al., 2022) and this inaccurate perception of body size extends to bodies of other people.

Although it is widely accepted that BID plays an important role in the development, maintenance, and prognosis of ED, these disturbances have often been neglected or given reduced importance in ED treatment programs (Dalhoff et al., 2019). Despite existing evidence regarding distortions in perceptual/sensory (e.g., visuospatial ability) (e.g., Artoni et al., 2020; Case et al., 2012) and affective-attitudinal-cognitive dimensions (e.g., body shame) (e.g., Dakanalis et al., 2015; Duarte et al., 2015), few studies have aimed to determine the underlying mechanisms of these disturbances. Consequently, no effective specific therapies have still been developed that target distorted BI as part of the intervention (Cornelissen & Tovée, 2021; Junne et al., 2019).

One of the proposed mechanisms that may influence the BID is the “thin-fat” categorical boundary (CB), which has been defined as the perceptual point where an individual classifies a body as fat (vs. thin) (Gledhill et al., 2017). Recent research has shown that both faces and bodies can be assessed in a categorical manner (e.g., healthy versus unhealthy, angry versus happy for faces, and thin versus fat for bodies) (Calder et al., 1996; Tovée et al., 2012). Specifically, findings by Tovée et al. (2012) showed that both men and women employ discrete perceptual categories –rather than a continuum– to assess female body attractiveness. Thus, it has been proposed that the threshold or the point at which a body is categorized as “fat” or “thin” could be different for each individual, having implications for the BI itself (Gledhill et al., 2017; Robinson & Kirkham, 2014). Therefore, the manipulation of the CBs could stand as a potential intervention for BID (Gledhill et al., 2017).

Along these lines, Gledhill et al. (2017) developed an innovative procedure directed at individuals with high body shape concerns or a history of Anorexia Nervosa (AN) with the goal of shifting “thin-fat” CB toward bodies with higher Body Mass Index (BMI) (i.e., being less restrictive when categorizing someone’s body as thin) and, thereby, promoting changes in their BI (e.g., lesser body dissatisfaction). Participants were asked to categorize a series of 3D female avatars that varied in BMI and were presented using computer-generated imagery

as “thin” or “fat”. During the training, the program provided personalized feedback based on the initially measured person’s “thin-fat” category threshold in order to increase their CB when assessing the bodies of other women. The training was shown to be successful at shifting CBs and, this outcome had a significant impact on the measures of affective BID (e.g., body weight and shape concerns or dietary restraint) in both controls and patients, that persisted between 2 and 4 weeks after training. A similar study by Szostak (2018) used the same paradigm to manipulate participants' perceptions of body size and to promote a “thin over fat” interpretation of normal-sized bodies in women who had elevated body shape, weight, and eating worries. The training was effective in shifting participants' categorical limits toward larger bodies, and this change also persisted in the 2-week follow-up.

Most recently, Irvine et al. (2020) replicated Gledhill et al. (2017) study using a virtual reality (VR) environment with a longer stimulus presentation. In recent years, VR has emerged as an effective tool in the treatment of BID and ED (Riva et al., 2021). VR allows simulating and displaying realistic environments with life-size avatars or full-length mirrors. Irvine et al. (2020) examined the effects of a 4-day VR-based intervention on body size recategorization of the bodies of other women. The results showed that the intervention gradually modified the CB using inflationary feedback and, as a result, avatars that were categorized as “fat” before the training, were classified as “thin” after the intervention. As in Gledhill et al. (2017) and Szostak et al. (2018), the increase in the CB was accompanied by a significant change in the affective BID (e.g., less concern about one’s own body shape and weight), which persisted 2 weeks after training.

The aforementioned results support the hypothesis that altered “thin-fat” CBs may underlie distortions in BI and altered behavior in ED. Therefore, the shift of the “thin-fat” CB at which bodies are classified as *overweight*, changing a person’s automatic evaluation of what constitutes a fat (vs. thin) body, may lead to a change in disordered eating (e.g., dieting) that persists over time. These encouraging findings require more testing to confirm the long-term effectiveness

of such a tailored intervention, but they may offer a crucial additional therapy option. However, despite these promising results, it remains to be solved whether the changes in one's own body size categorization (vs. other women's bodies as it has been done in the previous studies) would lead to changes in BSE or dissatisfaction with one's own body. To date, there is no evidence to support relationships between altered "thin-fat" CBs for one's own body and impaired BI dimensions. However, some studies suggest that the CB for one's own body could be different from the CB for another person's body. For instance, Alleva et al. (2013) found that women with ED symptoms (vs. women with no symptoms of ED) showed a tendency to evaluate other women's bodies as thinner than their own bodies.

In the current study, a VR assessment method with 3D avatars –based on Gledhill et al. (2017)– was developed: (1) to investigate the validity of the VR tasks as a tool to assess “CB for the person's own body”, “CB for another's person body”, as well as the estimation of the “perceived body size” and “ideal body size”, in both clinical and non-clinical populations; and (2) to determine the influence of the CB for the own one's body and other women's bodies on BID-related variables (e.g., body dissatisfaction, perceived BSE, and the ideal BSE). To do so, we compared women from three groups: (1) non-clinical participants with “low BID”; (2) non-clinical participants with “high BID”; and (3) participants with ED diagnosis (i.e., AN, Bulimia Nervosa, and Unspecified Eating or Feeding Disorder).

Based on the existing literature, several hypotheses were established: (1) the VR tool will show convergent validity with self-reported measurements of BID-related variables (e.g., body dissatisfaction) as well as concurrent (with the BMI) and content validity (i.e., degree of realism and categorization of the avatars' BMI according to the World Health Organization [WHO] categories established in 2004); (2) the “thin-fat” CB will be stricter for judging one's own body in women with ED and the non-clinical participants with “high BID” (vs. non-clinical participants with “low BID”); (3) ED group (vs. non-clinical groups) will have a

stricter lower ideal BSE and higher perceived BSE; and (4) CB for one's own body and CB for another's body will predict the BID-related variables in all the groups; however, the CB for one's own body will explain a higher percentage of variance.

2. METHOD

2.1. PARTICIPANTS

The sample comprised 87 women from the general population with no history of ED, as well as a clinical population with a current ED diagnosis. The sample was constituted of three groups: (1) non-clinical participants with "low BID" ($n = 30$; Body Shape Questionnaire [BSQ] < 105 ; Cooper et al., 1987; age: $M = 21.20$; $SD = 2.28$; Body Mass Index [BMI]: $M = 21.40$; $SD = 3.40$); (2) non-clinical participants with "high BID" ($n = 27$; BSQ ≥ 105 ; age: $M = 20.78$; $SD = 2.19$; BMI: $M = 22.99$; $SD = 2.91$); and (3) participants with ED diagnosis ($n = 30$; Anorexia Nervosa [AN] and Bulimia Nervosa [BN] and Unspecified Eating or Feeding Disorder [USFED]; age: $M = 26.70$; $SD = 10.44$; BMI: $M = 19.91$; $SD = 2.51$).

The inclusion and exclusion criteria were assessed during the screening assessment and, in the case of the ED group, a brief interview with their psychotherapist was conducted. The inclusion criteria for the general population were the following: (1) female; (2) age between 18 and 35; (3) currently not receiving any psychological treatment. For the ED group, the inclusion criteria were: (1) diagnosis of AN, BN, or USFED (American Psychiatric Association, 2013); (2) age between 15 and 50; and (3) BMI > 15.99 .

The exclusion criteria for all groups were: (a) BMI > 30 (obesity) (WHO, 2004), (b) severe mental disorder with psychotic or manic symptoms (e.g., bipolar disorder, schizophrenia), and (c) to have epilepsy or sensory complications that would prevent participation in the experiment (e.g., auditory, visual or tactile deficits) as well as being pregnant. Additionally, in the case of non-clinical

participants, another specific exclusion criterion was to have a history of ED. All interested participants who met the inclusion/exclusion criteria were invited to participate in the study.

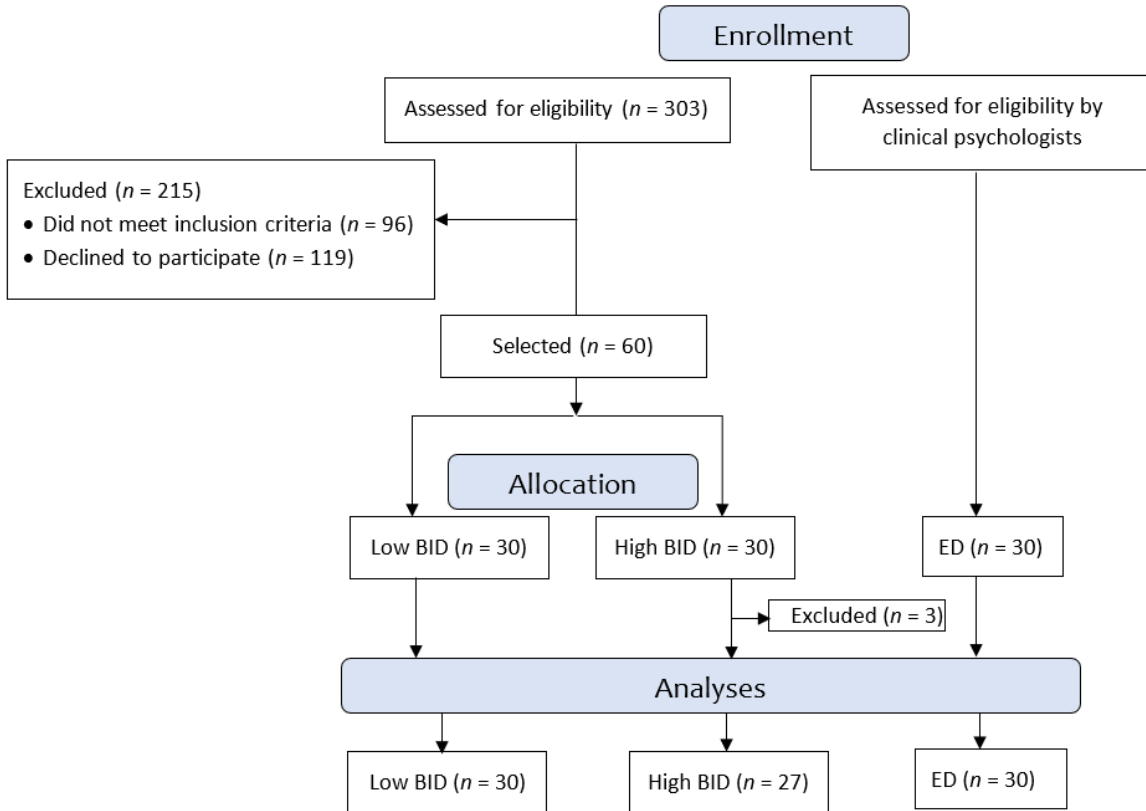
The sample from the general population was recruited using posters at the Faculty of Psychology and Speech Therapy (University of Valencia), email and social networks. They were invited to participate in a study related to "BI variables and the validation of a BI-related questionnaire". The clinical sample was recruited from Doctor Peset University Hospital (Valencia, Spain) ($n = 10$) and Ita PREVI Clinical Psychology Center (Valencia, Spain) ($n = 20$). After the experimental session, the therapeutic team of both medical facilities received a report with results obtained by each of their patients in order to improve their therapeutic sessions. The researcher was not part of the therapeutic team of any medical facility.

The sample size was determined using G*Power 3 (Faul et al., 2007). A total sample of $n = 25$ would be sufficient to detect a medium-large effect size of Cohen's $f = 0.369$ on the primary outcomes according to previous studies (e.g., Mölbert et al., 2018), with an alpha error of .05, and statistical power of .80. To compensate for potential data loss (e.g., due to technical errors) we increased the sample size to 30 participants per group. The participants' flow diagram is shown in Figure 1.

All the participants provided their informed consent before filling out the questionnaires in accordance with the Declaration of Helsinki. The study was approved by two independent ethical committees: the Ethics Committee of the University of Valencia (Procedure number: H1508330529930) and the Doctor Peset University Hospital (Procedure number: 88/19).

Figure 1

CONSORT Flowchart of Participants



2.2. MEASURES

2.2.1. Sociodemographic and anthropometric measurements

Information about the age, level of education, marital status, presence of psychiatric and/or physical problems (i.e., mobility or sight impairments), occupation, weight (in *kg*), and height (in *cm*) was gathered using a brief self-administered form.

2.2.2. Self-reported questionnaires

Body dissatisfaction: *The Body Shape Questionnaire (BSQ; Cooper et al., 1987; Raich et al., 1996)*. This self-reported questionnaire with 34 items on a six-point Likert response scale (1 = *never* to 6 = *always*) is used to assess the attitudes of satisfaction/dissatisfaction with the body shape, fear of weight gain, and desire to lose weight. As specified by Raich (1996), the cut-off point for the Spanish population is 105, where higher than 105 indicated a high degree of dissatisfaction. The Spanish validation showed excellent internal consistency ($\alpha = .97$). In this study, the internal consistency was excellent ($\alpha = .98$).

Body esteem: *The Body Esteem Scale (BES; Franzoi & Shields, 1984; Jorquera et al., 2005)*. This is a self-reported questionnaire with 35 items rated on a five-point Likert scale (1 = *strong negative feelings* to 5 = *strong positive feelings*) used to assess satisfaction/dissatisfaction with different parts of the body. BES contains three subscales: physical attractiveness, upper body strength, and physical condition. The Spanish validation showed excellent internal consistency ($\alpha = .91$). In this study, internal consistency was excellent ($\alpha = .94$).

Traits and psychological constructs associated with ED: *The Eating Disorders Inventory-3-Referral Form (EDI-3-RF; Garner, 2004; Elosua et al., 2010)*. The inventory is composed of 25 items with a Likert scale (1 = *never* to 6 = *always*). It was designed to measure ED risk and can be administered in non-clinical and clinical settings. The instrument measures three subscales related to ED risk: Drive for Thinness, Bulimia, and Body Dissatisfaction. The Spanish validation (Elosua et al., 2010) showed good internal consistency in the non-clinical sample, being $\alpha = .92$, $\alpha = .70$, and $\alpha = .87$, respectively. For the clinical sample, Cronbach's alpha ranged from .87 to .94 (obsession with thinness), .88 to .91 (bulimia), and .89 to .95 (body dissatisfaction), respectively. In this study, internal consistency for Drive for Thinness, Bulimia, and Body Dissatisfaction was between good and excellent ($\alpha = .94$, $\alpha = .83$, $\alpha = .91$), respectively.

2.2.3. VR tasks outcomes

Each of the VR tasks was completed in a randomized order: (1) assessment of the “Thin-fat” CB for the person’s own body (i.e., *“This is your body. Is it thin or fat?”*); (2) assessment of the “thin-fat” CB for the others’ people body (i.e., *“This body is the body of another person. Is it thin or fat?”*); (3) assessment of the BSE of the perceived body (i.e., *“Is this body thinner or fatter than me?”*) and (4) assessment of the BSE of the ideal body (i.e., *“Is this body thinner and fatter than my ideal body?”*). Avatars were displayed in the VR environment with a two-alternative forced-choice (“thin” vs. “fat”), in which the participants had to choose a specific avatar after each question. Body image dissatisfaction was computed using the participants’ responses to ideal and real BSE (with the following formula: $\text{Body Dissatisfaction} = \text{Ideal BSE} - \text{Real BSE}$), in which a higher negative value indicates higher body dissatisfaction.

2.3. VR STIMULI CREATION

A set of nineteen 3D computer-generated women’s bodies was created with “MakeHuman” software program (<http://www.makehumancommunity.org/>) and 3ds Max (Autodesk, San Rafael, CA). The BMI of the avatars ranged between 13 kg/m² (severely underweight) and 31 kg/m² (obesity) (WHO, 2004). Following Gledhill et al. (2017) and Irvine et al. (2020), the age was set at 25 and the avatar’s height at 1.65m, being this number close to the average height for women ranging between 16 and 29 years old according to the National Institute of Statistics (INE)’s dataset (1999). The avatars were dressed in a white crop top and blue shorts exposing the most evaluation-sensitive areas of the body such as the belly, arms, and thighs.

The VR environment was generated using Unity3D (Unity Technologies, San Francisco, CA). Visual feedback was provided by an Oculus Rift S head-mounted display (Oculus VR, Irvine, CA). This device has a resolution of 2160x1200, a field of view of 110 degrees, and a refresh rate of 90Hz. A high-end

computer featuring a 4-core Intel® Core™ i5-7640X @ 4.00 GHz, 16 GB of RAM, and an NVIDIA® GeForce® GTX 1070Ti with 8GB of GDDR5 was used to run the virtual environment.

The tasks were of the "Two-Alternative-Forced-Choice" type. Each participant was presented with a set of avatars and was asked whether the avatars are "fat" or "thin". Figures 2 and 3 show two examples of the virtual scenarios in which the avatars were presented.

In the assessment of the "thin-fat" CB for the other people's body, the BSE of the perceived body, and the BSE of the ideal body, avatars were displayed in 3rd person in front of the participant. In the assessment of the "thin-fat" CB for the person's own body, the 3rd person's avatars were presented in a mirror up to the height of the neck, so that the avatar's head will not be visible in order to promote the participant's identification with the avatar.

Regarding the specific presentation for CB and BSE, the tasks were different. On the one hand, the task to determine the CB consisted of a display of randomly presented 19 avatars with BMI ranging from 13 kg/m² to 31 kg/m². Each avatar was shown 5 times (5 x 19 = 95 presentations) for 150 milliseconds. The randomization ensured that the same avatar would not be shown twice in a row. On the other hand, the BSE tasks consisted of two parts: (1) 8 avatars with BMI ranging from 15 kg/m² to 29 kg/m² were presented in a random order during 10 times; and (2) 5 avatars with BMI ± 2 units from the cut-off point estimated in the first part were presented during 5 times in a random order (e.g., if the person obtained a BMI of 20 kg/m² in the first phase, avatars with a BMI of 18 kg/m², 19 kg/m², 20 kg/m², 21 kg/m², and 22 kg/m² were presented in the second phase). During the BSE task, the avatar remained on the screen all the time and there was no time limit to respond.

Figure 2

Virtual Environment Displayed During the Task that Investigated the “Thin-fat” Categorical Boundary for One’s Own Body



Note. The upper text states "This is my body. It is...". The lower sign states "thin" (left) and "fat" (right).

Figure 3

Virtual Environment Displayed During the Task That Investigated the Body Size Estimation of One's Own Body



Note. The upper text states "*This body is*". The lower sign states "*thinner than mine*" (left) and "*fatter than mine*" (right).

2.4. PROCEDURE

Participation in the study comprised two parts: (1) the online screening measurement and (2) the in-person experimental session. During the screening, participants filled in sociodemographic and anthropometric data as well as the BSQ, BES, and EDI-3-RF questionnaires in paper or online format ("LimeSurvey"; www.encuestas.uv.es). During the experimental session, VR tasks were performed in a single one-hour session. The VR tasks (based on Gledhill et al., 2017) comprised 4 tasks in a counterbalanced order: (1) the "thin-fat" CB for the participant's own body; (2) the "thin-fat" CB for the others' body; (3) the BSE of their perceived body; and (4) the BSE of their ideal body.

Moreover, in order to validate the VR program, for all the avatars, participants were required to: (1) evaluate the extent to which the avatars could exist in real life using a Likert scale ranging from 1 (very unlikely) to 9 (very likely). Experimenters specifically clarified that the question was not asked to evaluate the body, but the likelihood of that body existing in real life. In other words, whether the body proportions are plausible in the real world or if they are unreal and could only be part of a virtual avatar; and (2) to choose the category of the BMI proposed by the WHO (severe underweight, mild underweight, normal range, and overweight, obesity) that better fitted the avatar (WHO, 2004).

After the VR tasks, participants' weight and height were measured. The weight was measured using calibrated scales (TANITA BC-420 MA; Tanita Corporation, Tokyo, Japan), subtracting the approximate weight of each participant's clothes. The height and weight were exclusively revealed if requested to the participants from non-clinical groups.

2.5. DATA ANALYSIS

Statistical analyses were performed using the software SPSS v.28 (IBM Corp, Armonk, NY, USA) for descriptive and correlational analyses. Univariate

normality was examined by the values of Skewness and Kurtosis, which indicated that there was no severe violation of the normal distribution (Kline, 2005).

First, one-way analyses of variance (ANOVAs) for age and BMI, and chi-square for categorical variables were used to explore the differences in characteristics of the sample in the study variables. The means and standard deviations were used to describe the quantitative data and frequencies and percentages for categorical variables (see Table 1).

Second, the validity of the VR tasks was determined with the following procedures: (1) the convergent validity of VR results was evaluated by calculating the Pearson correlation between self-report measures of BI (scores on BSQ, BES, and EDI-3-RF) and the result of the following subtraction: ideal BSE – perceived BSE; (2) the concurrent validity was evaluated by calculating the Pearson correlation between the BSE of the perceived body and BMI; and (3) and the content validity (i.e., degree of realism of the avatars) was calculated using an ANOVA.

Third, the differences in study variables (i.e., the “thin-fat” CB for the person’s own body; the “thin-fat” CB for the others’ body; the BSE of the perceived body and the BSE of the ideal body perceived) between ED patients and two non-clinical groups were calculated by analyses of covariance (ANCOVAs) while adjusting the model for age and BMI as covariates. For significant models, comparisons between groups were carried out through post hoc analyses using Bonferroni’s method.

Finally, multiple hierarchical stepwise regression analyses (with BMI and Age as predictors in Step 1 and “one’s own/other’s body BC as predictors in Step 2) were performed to analyze the predictive role of thin-fat” CB for the person’s own body and others’ body on the perceived and ideal BSE, as well as the scores on self-reported measures (BES, BSQ, EDI-3-RF). In step 1 was used the “enter method”, while in step 2 the “stepwise” regression method was used. All effects were deemed statistically significant at $p < .05$.

3. RESULTS

3.1. DESCRIPTIVE STATISTICS

Means and standard deviations of all sociodemographic, anthropometric, and clinical variables are reported in Table 1. Chi-square tests showed significant group differences in the relationship status, educational level, employment status and previous psychological treatment. One-way ANOVAs comparing the three groups indicated group differences in age (between the groups of low BID and ED, $p = .002$; and high BID and ED, $p = .004$) and BMI (between the groups of high BID and ED, $p < .001$). Post-hoc tests using Bonferroni correction revealed that women from both non-clinical groups were younger than women from the ED group (see Table 1).

Additionally, among the ED sample, 66.67% ($n = 20$) of women fulfilled DSM-5 or CIE-11 criteria for comorbid personality disorder; while 6.67% ($n = 2$) of the group presented a comorbid major depressive disorder and 3.33% ($n = 1$) was also diagnosed with an anxiety disorder.

Table 1*Sociodemographic and Clinical Characteristics of Participants by Group*

| Baseline characteristic | Low BID | High BID | ED patients | ANOVAS / Chi-square |
|---|-------------------|-------------------|--------------------|-------------------------------|
| | (<i>n</i> = 30) | (<i>n</i> = 27) | (<i>n</i> = 30) | |
| | <i>M (SD) / %</i> | <i>M (SD) / %</i> | <i>M (SD) / %</i> | |
| Age | 21.20 (2.28) | 20.78 (2.19) | 26.7 (10.44) | $F(2,84) = 7.83, p < .001$ |
| BMI | 21.40 (3.40) | 22.99 (2.91) | 19.91 (2.51) | $F(2,84) = 7.63, p < .001$ |
| Marital status | | | | $\chi^2(6) = 12.69, p = .048$ |
| Single | 40 | 55.6 | 60 | |
| In a relationship ^a | 60 | 44.4 | 26.7 | |
| Married | 0 | 0 | 10 | |
| Divorced | 0 | 0 | 3.3 | |
| Highest educational level | | | | $\chi^2(8) = 30.65, p < .001$ |
| Middle school | 0 | 0 | 26.7 | |
| High school/some college | 60 | 85.2 | 40 | |
| University degree | 23.3 | 11.1 | 26.7 | |
| Master's degree | 16.7 | 3.7 | 6.6 | |
| Employment status | | | | $\chi^2(6) = 25.99, p < .001$ |
| Unemployed | 6.7 | 0 | 33.3 | |
| Student | 83.4 | 92.6 | 40 | |
| Employed | 10 | 7.4 | 26.7 | |
| Previous psychological treatment^b | | | | $\chi^2(2) = 29.04, p < .001$ |
| ED diagnosis | | | | |
| AN | - | - | 61.3 | |
| BN | - | - | 16.1 | |
| USFED | - | - | 22.6 | |

Note. BMI = Body Mass Index; Low BID = Low Body Image Disturbance; High BID = High Body Image Disturbance; ED = Eating Disorders group; AN = Anorexia Nervosa; BN = Bulimia Nervosa; USFED = Unspecified Eating or Feeding Disorder. ^a includes committed relationship, married/partnered, and living together; ^b Reflects the number and percentage of participants answering “yes” to this question. $n = 79$.

3.2. VALIDITY OF THE VR TASKS

3.2.1. Convergent validity: correlation between BSE (ideal-real) measured by VR, BMI, and self-reported measures

The measures of body dissatisfaction determined by the VR tasks correlated with all scores of the self-reported measures. For the participants with low BID and ED, body dissatisfaction determined with VR tasks correlated with the BSQ, the EDI-3-RF and the BMI, but not with BES. For the participants with high BID, body dissatisfaction using VR correlated with BSQ and BMI (see Table 2).

3.2.2. Concurrent validity: correlation between perceived BSE and the BMI

The measures of the perceived BSE using VR correlated with BMI for all groups: low BID ($r = .72, p < .01$), high BID ($r = .63, p < .01$), and ED ($r = .46, p < .05$). The partial correlation of the BMI and the perceived BSE, controlling for age, considering the data of all three groups together was also significant ($r = .57, p < .01$).

3.2.3. Content validity: realism of the designed 3D avatars between groups

Average realism of the continuum of virtual bodies did not significantly differ between groups, $F(2, 71) = 0.79, p = .460, \eta^2 = 0.022$, for low BID ($M = 7.84$,

$SD = 1.02$), high BID ($M = 8.02$, $SD = 0.98$), and the ED group ($M = 7.59$, $SD = 1.45$),

Regarding the classification of the avatars' BMI, participants with low BID classified the "normal" body following the BMI classification of the WHO (BMI between 18 and 25), while this classification was more restrictive for the participants with high BID (i.e., BMI between 17 and 23) and participants in the ED group (i.e., BMI between 15 and 21), respectively (for a detailed description of realism scores and category assigned to each virtual body per groups see Table 1, 2 and 3 in Supplemental Materials).

Table 2

Convergent Validity Between Body Dissatisfaction (Ideal-Real) Measured by VR, BMI and Self-reported Measures

| | Low BID | | High BID | | ED patients | | All groups | |
|-----------------|-------------------------------------|----------|----------|----------|-------------|----------|------------|----------|
| | Body dissatisfaction using VR tasks | | | | | | | |
| | <i>n</i> | <i>r</i> | <i>n</i> | <i>r</i> | <i>n</i> | <i>r</i> | <i>n</i> | <i>r</i> |
| BSQ | 29 | -.66*** | 27 | -.48* | 29 | -.39* | 85 | -.70*** |
| EDI-3-RF | 29 | -.50** | 27 | -.24 | 28 | -.53** | 84 | -.69*** |
| BES | 29 | .32 | 27 | .19 | 29 | .15 | 85 | .54*** |
| BMI | 29 | -.67*** | 27 | -.38* | 29 | -.38* | 86 | -.25* |

Note. BSQ = Body Shape Questionnaire; EDI-3-RF = Eating Disorders Inventory-3-Referral Form; BES = Body Esteem Scale; BMI = Body Mass Index; BID = Body Image Disturbance; ED = Eating Disorders. * $p < .05$; ** $p < .01$; *** $p < .001$.

3.3. GROUP DIFFERENCES IN BI-RELATED VARIABLES, ED SYMPTOMATOLOGY AND BID DIMENSIONS (Controlling for Age and BMI)

ANCOVAs -with age and BMI as covariates- showed a main effect of condition on the “thin-fat” CB for the person’s own body (see Table 3). Specifically, post hoc tests revealed that the ED group (vs. non-clinical population groups) had more restrictive “thin-fat” CBs for their body ($p < .001$ for low BID and $p = .020$ for high BID). However, the main effect of the condition on the “thin-fat” CB for the other people's bodies was not significant ($p = .072$).

Regarding the perceived BSE, a main effect of the condition was also found. Post hoc tests revealed significant differences between the low BID and ED ($p = .009$), but not between low and high BID ($p = .551$). Specifically, the ED group (vs. low BID) showed greater BSE of their own body.

Regarding the ideal BSE, there were significant differences between the three groups. Post hoc scores revealed a thinner ideal body in the ED group (vs. high BID and low BID, respectively) ($p < .001$). There were also significant differences between high BID and low BID ($p = .023$).

Regarding body dissatisfaction (i.e., the difference between ideal BSE and perceived BSE), significant differences were found between all groups: low BID and high BID, $p = .009$; low BID and ED, $p < .001$, and high BID and ED, $p < .001$. Hence, the ED group (vs. non-clinical sample) showed the highest body dissatisfaction, followed by the high BID group.

In the self-report measures, the main effects of the condition were found for all the outcomes, showing differences between groups. Post hoc tests revealed significant differences between all three groups. On the one hand, the ED group (vs. non-clinical sample) showed the highest scores on body dissatisfaction (BSQ) ($p < .001$) and the ED symptomatology severity (EDI-3-RF) ($p < .001$). Moreover, there were significant differences between BSQ and EDI-3-RF scores in the low

BID and high BID groups ($p < .001$). Hence, the low BID group showed the lowest ED-symptomatology-related scores, while the ED group obtained the highest scores. On the other hand, low BID and high BID groups showed significantly higher body esteem (BES) (vs. ED group) ($p < .001$). Post hoc analyses also showed significant differences between body esteem scores in the low BID and high BID groups ($p = .002$). Hence, the low BID group showed the highest body esteem scores, while the ED group obtained the lowest scores.

Table 3

Between-group Differences in BSQ, EDI-3-RF, BES, and VR Outcomes

| Measures | Low BID (n = 30) | | | | High BID (n = 27) | | | | ED (n = 30) | | | | ANCOVAs | | | |
|----------------------|---------------------|-------|-------|----|----------------------|-------|----|--------|----------------|----|--------|-------|-----------------------------|----------|-----------------------------|--|
| | n | M | SD | n | M | SD | n | M | SD | n | M | SD | F | η^2 | Post-hoc tests | |
| BSQ | 30 | 72.70 | 18.56 | 27 | 124.44 | 16.41 | 30 | 150.93 | 29.60 | 30 | 150.93 | 29.60 | $F(2,82) = 90.75, p < .001$ | .69 | Low BID > High BID > ED | |
| EDI-3-RF | 30 | 12.86 | 9.47 | 27 | 42.11 | 14.48 | 29 | 55.68 | 14.11 | 29 | 55.68 | 14.11 | $F(2,81) = 87.89, p < .001$ | .69 | Low BID > High BID > ED | |
| BES | 30 | 96.70 | 15.09 | 27 | 81.51 | 14.02 | 30 | 63.16 | 13.51 | 30 | 63.16 | 13.51 | $F(2,82) = 39.10, p < .001$ | .49 | Low BID > High BID > ED | |
| VR outcomes | | | | | | | | | | | | | | | | |
| Perceived BSE | 30 | 20.34 | 2.37 | 27 | 22.19 | 2.66 | 29 | 21.50 | 3.11 | 29 | 21.50 | 3.11 | $F(2,81) = 4.80, p = .011$ | .11 | Low BID < ED | |
| Ideal BSE | 29 | 19.78 | 1.32 | 27 | 18.78 | 1.85 | 30 | 15.85 | 1.54 | 30 | 15.85 | 1.54 | $F(2,81) = 34.20, p < .001$ | .46 | Low BID > High BID > ED | |
| Own CB | 30 | 21.28 | 1.17 | 27 | 20.58 | 1.54 | 29 | 18.37 | 2.22 | 29 | 18.37 | 2.22 | $F(2,81) = 12.55, p < .001$ | .24 | Low BID > ED; High BID > ED | |
| Other's CB | 30 | 21.79 | 1.18 | 27 | 21.51 | 1.80 | 30 | 19.76 | 3.10 | 30 | 19.76 | 3.10 | $F(2,82) = 2.72, p = .072$ | .06 | Non-sig. | |
| Body Dissatisfaction | 29 | -0.43 | 2.10 | 27 | -3.41 | 2.52 | 29 | -5.60 | 3.80 | 29 | -5.60 | 3.80 | $F(2,80) = 27.30, p < .001$ | .41 | Low BID > High BID > ED | |

Note. BMI = Body Mass Index; BSQ = Body Shape Questionnaire; EDI-3-RF = Eating Disorders Inventory-3-Referral Form; BES = Body Esteem Scale; BSE = Body Size Estimation; CB = Categorical boundary; BID = Body Image Disturbance; ED = Eating Disorders.

3.4. "THIN-FAT" CB AS PREDICTORS OF BI-RELATED VARIABLES: Multiple Regression Analyses

Coefficients of determination, unstandardized coefficients and their 95% confidence intervals, standard errors, standard coefficients, and *t*-statistics for each hierarchical multiple regression analysis are shown in Table 4. The statistical models that explain the changes in the perceptual and affective dimensions of BI for the three groups are described below.

Models for predicting the BSE of the perceived body. BMI positively predicted perceived BSE for participants with low BID, $F(1,28) = 29.51, p < .001$, R^2 Adjusted = 50%, high BID, $F(1,25) = 16.78, p < .001$, R^2 Adjusted = 38%, and participants with ED, $F(1,27) = 7.32, p = .012$, R^2 Adjusted = 18%. Higher BMI predicted higher perceived BSE for all groups. However, the "thin-fat" CB for the person's own body and the "thin-fat" CB for the others' body were not significant predictors.

Models for predicting the BSE of the ideal body. BMI along with the "thin-fat" CB for the person's own body positively predicted the BSE of the ideal body in participants with high BID group, $F(2,24) = 9.85, p < .001$, R^2 Adjusted = 41%, and participants with ED, $F(2,26) = 7.54, p = .003$, R^2 Adjusted = 32%, but not in participants with low BID, where results were marginally significant, $F(2,26) = 2.89, p = .074$, R^2 Adjusted = 12%. The "thin-fat" CB for the others' bodies was not a significant predictor of the ideal BSE.

Models for predicting body dissatisfaction measured through VR and a self-report (BSQ), the severity of ED symptomatology (EDI-3-RF), and body esteem (BES). BMI positively predicted change in the BSQ, $F(1,28) = 7.38, p = .011$, R^2 Adjusted = 18%, the EDI-3-RF, $F(1,28) = 16.05, p < .001$, R^2 Adjusted = 34%, and the BES, $F(1,28) = 6.19, p = .019$, R^2 Adjusted = 15.2%, only for the group with low BID. The "thin-fat" CB for the own body and "thin-fat" CB for the others' bodies were not significant predictors.

Table 4

Regression Analyses Models of the “Thin-fat” CB as Predictors of BID-related Variables

| Effect | B | SE | 95% CI [LL, UL] | β | t | p | R | Adjusted R² | R² change |
|--------------------------------|----------|-----------|----------------------------|---------------------------|----------|----------|----------|-----------------------------------|---------------------------------|
| Low BID group (n = 30) | | | | | | | | | |
| Perceived BSE | | | | | | | | | |
| Constant | 9.68 | 1.98 | [5.60, 13.74] | | 4.87 | <.001 | | | |
| BMI | 0.50 | 0.09 | [0.31, 0.69] | .72 | 5.43 | <.001 | .72 | .50 | .51 |
| Ideal BSE | | | | | | | | | |
| Constant | 8.06 | 4.88 | [-1.97, 18.10] | | 1.65 | .111 | | | |
| BMI | 0.07 | 0.07 | [-0.08, 0.22] | .17 | 0.98 | .337 | .13 | -.02 | .02 |
| Own CB | 0.48 | 0.21 | [0.05, 0.92] | .41 | 2.29 | .030 | .43 | .12 | .17 |
| BSQ | | | | | | | | | |
| Constant | 19.48 | 19.84 | [-21.16, 60.11] | | 0.98 | .34 | | | |
| BMI | 2.49 | 0.92 | [0.61, 4.3] | .46 | 2.72 | .011 | .46 | .18 | .21 |
| BES | | | | | | | | | |
| Constant | 137.03 | 16.41 | [103.42, 170.65] | | 8.35 | <.001 | | | |
| BMI | -1.88 | 0.76 | [-3.4, -0.33] | -.43 | -2.49 | .019 | .43 | .15 | .18 |
| EDI-3-RF | | | | | | | | | |
| Constant | -23.03 | 9.07 | [-41.61, -4.45] | | -2.54 | .017 | | | |
| BMI | 1.68 | 0.42 | [.82, 2.5] | .60 | 4.01 | <.001 | .60 | .34 | .36 |
| High BID group (n = 27) | | | | | | | | | |
| Perceived BSE | | | | | | | | | |
| Constant | 8.88 | 3.28 | [2.13, 15.62] | | 2.71 | .012 | | | |
| BMI | 0.58 | 0.14 | [0.29, 0.87] | .63 | 4.10 | <.001 | .63 | .40 | .40 |
| Ideal BSE | | | | | | | | | |
| Constant | 2.05 | 3.78 | [-5.75, 9.85] | | 0.54 | .59 | | | |
| BMI | 0.04 | 0.11 | [-0.19, 0.27] | .07 | 0.37 | .715 | .39 | .12 | .15 |
| Own CB | 0.77 | 0.21 | [0.33, 1.20] | .64 | 3.63 | .001 | .67 | .41 | .30 |
| BSQ | | | | | | | | | |
| Constant | 105.17 | 25.59 | [52.48, 157.90] | | 4.11 | <.001 | | | |
| BMI | 0.84 | 1.12 | [-1.43, 3.12] | .15 | 0.76 | .452 | .15 | -.02 | .02 |
| BES | | | | | | | | | |
| Constant | 102.50 | 21.87 | [57.45, 147.54] | | 4.69 | <.001 | | | |
| BMI | -0.91 | 0.94 | [-2.86, 1.03] | -.19 | -0.97 | .343 | .19 | -.003 | .04 |

| | | | | | | | | | |
|-----------------------------|--------|-------|-----------------|-----|------|------|-----|------|-----|
| EDI-3-RF | | | | | | | | | |
| Constant | 21.02 | 22.61 | [-25.55, 67.59] | | 0.93 | .361 | | | |
| BMI | 0.92 | 0.98 | [-1.09, 2.93] | .19 | 0.94 | .356 | .19 | -.01 | .03 |
| ED patients (n = 30) | | | | | | | | | |
| Perceived BSE | | | | | | | | | |
| Constant | 9.56 | 4.45 | [.43, .18.68] | | 2.15 | .041 | | | |
| BMI | 0.61 | 0.22 | [0.15, 1.06] | .46 | 2.71 | .012 | .46 | .18 | .21 |
| Ideal BSE | | | | | | | | | |
| Constant | 7.91 | 2.90 | [1.95, 13.86] | | 2.73 | .011 | | | |
| BMI | 0.01 | 0.10 | [-0.20, 0.22] | .02 | 0.13 | .900 | .01 | -.04 | .01 |
| Own CB | 0.42 | 0.10 | [0.20, 0.64] | .61 | 3.88 | .001 | .61 | .32 | .37 |
| BSQ | | | | | | | | | |
| Constant | 110.55 | 47.39 | [13.32, 207.79] | | 2.33 | .027 | | | |
| BMI | 2.01 | 2.38 | [-2.9, 6.90] | .16 | 0.84 | .407 | .16 | -.01 | .03 |
| BES | | | | | | | | | |
| Constant | 45.36 | 21.18 | [1.90, .88.82] | | 2.14 | .041 | | | |
| BMI | 0.93 | 1.07 | [-1.3, 3.12] | .17 | 0.88 | .390 | .17 | -.01 | .03 |
| EDI-3-RF | | | | | | | | | |
| Constant | 44.26 | 22.59 | [-2.17, 90.70] | | 1.96 | .061 | | | |
| BMI | 0.55 | 1.14 | [-1.8, 2.88] | .10 | 0.49 | .632 | .10 | -.03 | .01 |

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit; BMI = Body Mass Index; BSQ = Body Shape Questionnaire; EDI-3-RF = Eating Disorders Inventory-3-Referral Form; BES = Body Esteem Scale; BSE = Body Size Estimation; CB = Categorical boundary; BID = Body Image Disturbance; ED = Eating disorders.

4. DISCUSSION

The purpose of this study was to (1) validate a VR assessment method with 3D avatars and (2) to explore the role of CBs for the person's own body and CBs for another's person body on BID-related variables (i.e., perceived and ideal BSE, body dissatisfaction measured by the VR program as well as the BSQ, BES, and EDI-3-RF) in women from clinical and non-clinical samples. To our knowledge, there are no studies analyzing the differences between the CBs for the person's own body or others' bodies, and no other studies have explored the role of both variables using 3D avatars in VR as predictors of affective and perceptual BID-related dimensions.

Regarding the psychometric properties of the developed VR assessment, the first hypothesis of the study was confirmed. The four outcomes obtained by the VR-based task (i.e., perceived BSE, ideal BSE, CB for the person's own body, and CB for another's body) confirmed an adequate convergent validity. Specifically, results point out the usefulness of the measurement of the self-ideal discrepancy (i.e., the difference between the perceived and the ideal body size) (Cash, 1994; Porrás-García et al., 2020), to assess body dissatisfaction besides the usage of traditional self-reported scales (i.e., BSQ). The higher discrepancy between perceived and ideal scores points out higher discomfort and dissatisfaction with the body (Higgins, 1987). Being less prone to social desirability effects (Glashouwer et al., 2019), the self-ideal discrepancy measurement by VR software may constitute an effective and ecologically valid measure of body dissatisfaction.

Moreover, regarding content validity, 3D avatars were assessed as realistic by all groups. In addition, as expected, the classification of the avatars' BMI according to the WHO categories showed that the groups with high BID and the ED group (vs. low BID) were less accurate when classifying "normal" or "overweight" bodies (e.g., categorizing a body as "normal" weight or "overweight" with BMI below the BMI classification of the WHO). These findings

are in line with the results found previously by Gledhill et al. (2017) that showed that the ED sample (vs. non-clinical groups) tended to categorize bodies as overweight or obese more strictly, identifying lower-weight bodies as obese relative to non-clinical groups. Hence, the validity of the VR assessment method with 3D avatars to measure BID variables can be assumed.

Partially supporting the second hypothesis, we found that the “thin-fat” CB for one's own body was more restrictive in the ED population and high BID (vs. low BID) group. However, there were no significant differences in the thin-fat CB for others' bodies between groups. These findings partially align with Smeets (1997), where the ED sample demonstrated stricter evaluations of both their own and others' bodies.

The third hypothesis was also partially confirmed, as the ED group showed a stricter ideal BSE compared to both non-clinical groups. This is consistent with Lantz et al. (2018), where patients with AN and BN displayed abnormally small ideal BSEs. The internalization of the thin ideal (i.e., distortion in affective BID) may be more noticeable in ED patients and high BID groups, potentially increasing their risk of developing ED-related symptoms to attain their ideal body (Stice, 2001). However, differences in perceived BSE were only observed between the low BID and ED groups, with the ED group estimating their body size as larger. This is in agreement with previous studies that reported ED samples overestimating their body size compared to non-clinical samples (e.g., Brown et al., 2021; Gardner & Brown, 2014; Hamamoto et al., 2022; Mölbert et al., 2017). These results are especially relevant as the distortion in the perceptual dimension of BI correlates with a higher drive for thinness and body dissatisfaction (Brown et al., 2021).

In terms of the affective dimension of BI, we identified significant differences between all groups concerning body dissatisfaction, the severity of ED symptoms, and body esteem. ED patients exhibited higher scores on instruments measuring negative BI dimensions and lower scores in body esteem adding evidence to the pervasive role of affective BID in the field of EDs (e.g.,

McLean & Paxton, 2019; Mendelson et al., 2002; Uchôa et al., 2019; Vinkers et al., 2012). As the non-clinical groups were initially divided based on their scores from the BSQ, these differences were anticipated. However, the disparities in body dissatisfaction measured by VR mirrored the results obtained through self-report measures, thereby supporting the validity of using VR software to evaluate the affective dimension of BI in both clinical and non-clinical populations.

Contrary to our fourth hypothesis concerning the predictive role CBs for one's own body (vs. others' body) on the BID measures, the results showed that the BMI (and not the CBs for one's own body or others' body) that predicted the perceived BSE for all the groups. A higher BMI seemed to lead to a higher perceived BSE, being this prediction stronger for the group with low BID. Therefore, this finding suggests that in the BSE of one's own body (i.e., overestimation or underestimation), the BMI of the person is more relevant than the CB as fat or thin. Moreover, the BMI was also a predictor of other BID variables. Specifically, in the case of individuals with low BID, BMI was the most important (and only) predictor of higher body dissatisfaction (BSQ), lower body esteem (BES), and the risk of ED (EDI-3-RF). These findings confirm the well-established role of BMI as a risk factor for the development of BID (e.g., Paxton et al., 2006; Radwan et al., 2019).

Regarding the BSE of the ideal body, the multiple regressions showed that the CB for one's own body (not CB for others' bodies), along with BMI, predicted the ideal BSE in the high BID group and ED group. In other words, the stricter is the CB for the person's own body, the lower is the ideal body size. The explained variance was stronger for the high BID group (vs. ED group), explaining between 41% and 32% of its variance, respectively. Hence, our fourth hypothesis was supported for the estimation of the ideal body. In line with the existing literature (e.g., Mölbert et al., 2018), women with ED symptomatology tend to show a preference for severely underweight bodies. Following Stice's (2001) Dual Pathway model, the pressure to be thin and the interiorization of the thin ideal are associated with the development and maintenance of ED. Hence, the assessment

and modification of the CBs for one's own body could be an effective adjuvant technique in the prevention and intervention of ED through the modification of the ideal BSE. Especially, as the sociocultural pressures on achieving the thin ideal seem to have a stronger influence among people with high BID (Dittmar et al., 2009; Schaefer et al., 2019), the prevention programs should specifically target this population. Particularly, the prevention might be related to the exposure of a wider range of diverse bodies in order to promote the appreciation of different body shapes (Hernández-López et al., 2019; Moreno-Domínguez et al., 2019).

In sum, the current findings show that an automatic process of categorizing one's body as thin or fat (i.e., the perceptual dimension of BI) may influence the severity of the BID affective dimension (i.e., the estimation of one's ideal body). These results are in line with Gledhill et al. (2017) and Szostak et al. (2018) research, pointing out that the increase of the categorical thin-fat limit could have a direct impact on the ideal BSE. Nonetheless, contrary to the previous studies, body CBs did not seem to influence the ED-related aspects (i.e., ED risk or weight and shape concerns) for any of the studied groups. Over and above that, current findings highlight the need to modify body size perception by using CB for one's own body (vs. CB for others' body) in order to positively affect BID (i.e., less restrictive ideal BSE).

The present study benefitted from several strengths, as it was a quasi-experimental design that involved both non-clinical and clinical groups. It is also worth noting that the clinical group was constituted of ED patients from two different medical centers which helped to diversify the sample characteristics. However, there are several limitations to consider when interpreting our results. First, nonetheless, similar studies have shown that smaller samples can be adequate for regression models (Mölbert et al., 2015), the sample size of the current study was small. Therefore, in order to replicate the results, studies with larger samples should be carried out. Secondly, a 3D scanner could be used in future studies to reproduce participants' body shapes in VR and test the obtained results with more precise avatar models. Third, due to the quasi-experimental

design, it is not possible to establish a causal direction. Therefore, future studies should develop longitudinal designs to address the causal relationships among studied variables.

Although preliminary, current results provide deeper insight into the mechanisms underlying BID and evidence of the utility of VR in the assessment of different ED-related aspects. The measurement of the “thin-fat” CB for one’s own body, along with BMI, emerges not only as a promising assessment tool that may help to predict the ideal BSE but also as a useful complementary intervention strategy. These findings open the possibility of the modification of the person’s own body CBs (instead of the CBs for other’s people bodies -as it has been conventionally done-) to increase the efficacy of the evidence-based treatments for BID and ED patients. Nonetheless, further research needs to be carried out with larger samples and wider clinical populations.

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6. APPENDIX

Table A1

Degree of Realism of the Designed 3D Avatars per Group

| BMI | Low BID (<i>n</i> = 30) | | | High BID (<i>n</i> = 27) | | | ED patients (<i>n</i> = 30) | | |
|-----|-----------------------------|----------------------|-----------|------------------------------|----------------------|-----------|---------------------------------|----------------------|-----------|
| | <i>M</i> | <i>M_e</i> | <i>SD</i> | <i>M</i> | <i>M_e</i> | <i>SD</i> | <i>M</i> | <i>M_e</i> | <i>SD</i> |
| 13 | 5.47 | 7.00 | 2.92 | 5.81 | 6.00 | 2.34 | 6.00 | 6.50 | 2.97 |
| 14 | 5.57 | 6.00 | 2.62 | 6.33 | 7.00 | 2.34 | 6.44 | 8.00 | 2.92 |
| 15 | 6.50 | 7.00 | 2.58 | 6.96 | 7.00 | 2.01 | 6.82 | 8.00 | 2.56 |
| 16 | 6.93 | 8.00 | 2.23 | 7.63 | 8.00 | 1.74 | 8.11 | 8.50 | 1.08 |
| 17 | 7.63 | 8.00 | 1.69 | 8.37 | 9.00 | 0.84 | 7.78 | 8.50 | 1.59 |
| 18 | 8.23 | 9.00 | 1.33 | 8.52 | 9.00 | 0.85 | 7.94 | 8.50 | 1.63 |
| 19 | 8.67 | 9.00 | 0.61 | 8.44 | 9.00 | 1.22 | 8.22 | 9.00 | 1.44 |
| 20 | 8.73 | 9.00 | 0.45 | 8.67 | 9.00 | 0.78 | 8.22 | 9.00 | 1.40 |
| 21 | 8.53 | 9.00 | 0.90 | 8.52 | 9.00 | 1.01 | 8.11 | 9.00 | 1.37 |
| 22 | 8.73 | 9.00 | 0.58 | 8.63 | 9.00 | 0.69 | 8.17 | 9.00 | 1.30 |
| 23 | 8.70 | 9.00 | 0.60 | 8.52 | 9.00 | 0.94 | 8.06 | 8.50 | 1.31 |
| 24 | 8.47 | 9.00 | 1.04 | 8.48 | 9.00 | 1.01 | 8.06 | 9.00 | 1.51 |
| 25 | 8.50 | 9.00 | 0.68 | 8.56 | 9.00 | 0.80 | 7.72 | 8.50 | 1.87 |
| 26 | 8.37 | 9.00 | 1.03 | 8.30 | 9.00 | 0.99 | 7.67 | 8.50 | 2.14 |
| 27 | 7.87 | 9.00 | 1.70 | 8.30 | 9.00 | 1.10 | 7.78 | 9.00 | 2.34 |
| 28 | 8.33 | 9.00 | 0.99 | 8.07 | 9.00 | 1.54 | 8.00 | 9.00 | 1.57 |
| 29 | 7.93 | 8.00 | 1.44 | 8.19 | 9.00 | 1.27 | 7.44 | 8.50 | 2.06 |
| 30 | 7.97 | 8.00 | 1.35 | 8.07 | 9.00 | 1.54 | 7.17 | 8.50 | 2.46 |
| 31 | 7.83 | 8.50 | 1.60 | 8.11 | 9.00 | 1.16 | 7.33 | 8.50 | 2.14 |

Note. BMI = Body Mass Index; BID = Body Image Disturbance; ED = eating disorders.

Table A2

Assessment of the BMI Categories (according to WHO) of the Designed 3D Avatars per Group

| BMI | Low BID (<i>n</i> = 30) | | | High BID (<i>n</i> = 27) | | | ED patients (<i>n</i> = 18) | | |
|-----------------|--------------------------|----------------------|-----------|---------------------------|----------------------|-----------|------------------------------|----------------------|-----------|
| | <i>M</i> | <i>M_e</i> | <i>SD</i> | <i>M</i> | <i>M_e</i> | <i>SD</i> | <i>M</i> | <i>M_e</i> | <i>SD</i> |
| 13 | 1.00 | 1.00 | 0 | 1.04 | 1.00 | 0.19 | 1.22 | 1.00 | 0.43 |
| 14 | 1.00 | 1.00 | 0 | 1.22 | 1.00 | 0.42 | 1.39 | 1.00 | 0.61 |
| 15 ^a | 1.27 | 1.00 | 0.45 | 1.26 | 1.00 | 0.45 | 1.94 | 2.00 | 0.90 |
| 16 | 1.60 | 2.00 | 0.56 | 1.81 | 2.00 | 0.79 | 2.39 | 3.00 | 0.92 |
| 17 | 2.23 | 2.00 | 0.50 | 2.30 | 2.00 | 0.61 | 2.61 | 3.00 | 0.50 |
| 18 | 2.67 | 3.00 | 0.48 | 2.74 | 3.00 | 0.45 | 2.89 | 3.00 | 0.58 |
| 19 | 2.83 | 3.00 | 0.38 | 2.93 | 3.00 | 0.27 | 3.06 | 3.00 | 0.42 |
| 20 | 2.93 | 3.00 | 0.25 | 3.07 | 3.00 | 0.27 | 3.28 | 3.00 | 0.46 |
| 21 | 3.03 | 3.00 | 0.32 | 3.15 | 3.00 | 0.36 | 3.50 | 3.50 | 0.51 |
| 22 | 3.20 | 3.00 | 0.48 | 3.41 | 3.00 | 0.50 | 3.61 | 3.50 | 0.70 |
| 23 | 3.33 | 3.00 | 0.55 | 3.56 | 4.00 | 0.51 | 3.56 | 4.00 | 0.51 |
| 24 | 3.53 | 3.00 | 0.68 | 3.67 | 4.00 | 0.56 | 3.72 | 4.00 | 0.96 |
| 25 | 3.67 | 4.00 | 0.66 | 3.93 | 4.00 | 0.39 | 4.17 | 4.00 | 0.38 |
| 26 | 4.00 | 4.00 | 0.53 | 4.00 | 4.00 | 0.28 | 4.33 | 4.00 | 0.49 |
| 27 | 4.17 | 4.00 | 0.38 | 3.93 | 4.00 | 0.68 | 4.44 | 4.00 | 0.51 |
| 28 | 4.23 | 4.00 | 0.43 | 4.48 | 4.00 | 0.51 | 4.50 | 4.50 | 0.51 |
| 29 | 4.37 | 4.00 | 0.49 | 4.56 | 5.00 | 0.51 | 4.56 | 5.00 | 0.51 |
| 30 | 4.53 | 5.00 | 0.51 | 4.67 | 5.00 | 0.48 | 4.72 | 5.00 | 0.46 |
| 31 | 4.63 | 5.00 | 0.49 | 4.85 | 5.00 | 0.36 | 4.72 | 5.00 | 0.46 |

Note. BMI = Body Mass Index; WHO = World Health Organization; BID = Body Image Disturbance; ED = eating disorders; 1 = severe underweight; 2 = mild-moderate underweight; 3 = normal range; 4 = overweight; 5 = obese. ^a *n*=17 in the ED group

Table A3

Percentage of the of the Designed 3D Avatars Assigned per Each the BMI Categories (according to WHO) per Group

| BMI | Low BID (n = 30) | | | | | High BID (n = 27) | | | | | ED patients (n = 18) | | | | |
|-----------------|------------------|------|------|------|------|-------------------|------|------|------|------|----------------------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 13 | 100 | 0 | 0 | 0 | 0 | 96.3 | 3.7 | 0 | 0 | 0 | 77.8 | 22.2 | 0 | 0 | 0 |
| 14 | 100 | 0 | 0 | 0 | 0 | 77.8 | 22.2 | 0 | 0 | 0 | 66.7 | 27.8 | 5.6 | 0 | 0 |
| 15 ^a | 73.3 | 26.7 | 0 | 0 | 0 | 74.1 | 25.9 | 0 | 0 | 0 | 41.2 | 23.5 | 35.3 | 0 | 0 |
| 16 | 43.3 | 53.3 | 3.3 | 0 | 0 | 40.7 | 37.0 | 22.2 | 0 | 0 | 22.2 | 22.2 | 50.0 | 5.6 | 0 |
| 17 | 3.3 | 70.0 | 26.7 | 0 | 0 | 7.4 | 55.6 | 37.0 | 0 | 0 | 0 | 38.9 | 61.1 | 0 | 0 |
| 18 | 0 | 33.3 | 66.7 | 0 | 0 | 0 | 25.9 | 74.1 | 0 | 0 | 5.6 | 5.6 | 83.3 | 5.6 | 0 |
| 19 | 0 | 16.7 | 83.3 | 0 | 0 | 0 | 7.4 | 92.6 | 0 | 0 | 0 | 5.6 | 83.3 | 11.1 | 0 |
| 20 | 0 | 6.7 | 93.3 | 0 | 0 | 0 | 0 | 92.6 | 7.4 | 0 | 0 | 0 | 72.2 | 27.8 | 0 |
| 21 | 0 | 3.3 | 90.0 | 6.7 | 0 | 0 | 0 | 85.2 | 14.8 | 0 | 0 | 0 | 50.0 | 50.0 | 0 |
| 22 | 0 | 0 | 83.3 | 13.3 | 3.3 | 0 | 0 | 59.3 | 40.7 | 0 | 0 | 0 | 50.0 | 38.9 | 11.1 |
| 23 | 0 | 0 | 70.0 | 26.7 | 3.3 | 0 | 0 | 44.4 | 55.6 | 0 | 0 | 0 | 44.4 | 55.6 | 0 |
| 24 | 0 | 0 | 56.7 | 33.3 | 10.0 | 0 | 0 | 37.0 | 59.3 | 3.7 | 5.6 | 0 | 27.8 | 50.0 | 16.7 |
| 25 | 0 | 0 | 43.3 | 46.7 | 10.0 | 0 | 0 | 11.1 | 85.2 | 3.7 | 0 | 0 | 0 | 83.3 | 16.7 |
| 26 | 0 | 0 | 13.3 | 73.3 | 13.3 | 0 | 0 | 3.7 | 92.6 | 3.7 | 0 | 0 | 0 | 66.7 | 33.3 |
| 27 | 0 | 0 | 0 | 83.3 | 16.7 | 3.7 | 0 | 3.7 | 85.2 | 7.4 | 0 | 0 | 0 | 55.6 | 44.4 |
| 28 | 0 | 0 | 0 | 76.7 | 23.3 | 0 | 0 | 0 | 51.9 | 48.1 | 0 | 0 | 0 | 50.0 | 50.0 |
| 29 | 0 | 0 | 0 | 63.3 | 36.7 | 0 | 0 | 0 | 44.4 | 55.6 | 0 | 0 | 0 | 44.4 | 55.6 |
| 30 | 0 | 0 | 0 | 46.7 | 53.3 | 0 | 0 | 0 | 33.3 | 66.7 | 0 | 0 | 0 | 27.8 | 72.7 |
| 31 | 0 | 0 | 0 | 36.7 | 63.3 | 0 | 0 | 0 | 14.8 | 85.2 | 0 | 0 | 0 | 27.8 | 72.2 |

Note. BMI = Body Mass Index; WHO = World Health Organization; BID = Body Image Disturbance; ED = eating disorders; 1 = severe underweight; 2 = mild-moderate underweight; 3 = normal range; 4 = overweight; 5 = obese. ^a n =17 in the ED group.

The background of the entire page is a close-up photograph of a branch with white cherry blossoms. The blossoms are in various stages of bloom, with some showing pinkish-purple centers. The background behind the flowers is dark and has a cracked, stone-like texture. The text is overlaid on this image.

CHAPTER 3

Study 2. The Role of Affect on Body Image Disturbance in Adolescents with Eating Disorders: An Experimental Study Using a Virtual Reality Mood Induction Procedure

This chapter is under review as: Burychka, D., Miragall, M., Zapata, M., Álvarez, J., & Baños, R. M. The Role of Affect on Body Image Disturbance in Adolescents with Eating Disorders: An Experimental Study Using a Virtual Reality Mood Induction Procedure

ABSTRACT

Eating disorders (EDs) are associated with numerous physical and psychological complications. However, little research has examined depressive symptomatology and affect as risk and maintenance factors in adolescents with EDs. The present study aimed to examine the role of depressive symptomatology on negative and positive body image (BI). Another aim was to examine the effect of positive and negative mood induction procedures (MIP) on BI disturbance. Forty-two female adolescents with EDs [Age: $M = 15.88$, $SD = 1.40$, range: 13-18 years old; Body Mass Index (BMI): $M = 18.30$; $SD = 2.60$; range: 14-27 kg/m^2] completed two virtual reality tasks (to measure perceived and ideal body size estimation) and questionnaires related to depressive symptomatology (BDI-II; Beck et al., 1996), body dissatisfaction (BSQ; Cooper et al., 1987), body appreciation (BAS-2; Tylka & Wood-Barcalow, 2015), body esteem (BES; Franzoi & Shields, 1984); body compassion (BCS; Altman et al., 2020), body shame (BISS, Duarte et al., 2015) body objectification (OBCS; McKinley & Hyde, 1996), and eating pathology (EDI-3-RF; Garner, 2004). Results showed that depressive symptomatology -once the BMI was controlled- predicted higher negative BI and lower positive BI. Regarding the MIP using VR, results showed that positive-MIP led to an increase in the ideal body size estimation and higher body satisfaction, whereas we did not find any differences in the role of negative-MIP on BI disturbance. Future studies should further examine the relationship between depressive symptomatology, affect, and the maintenance of ED symptomatology. The promising protective role of positive affect in the maintenance of BI disturbance is discussed.

Keywords: depressive symptomatology, positive affect, negative affect, eating disorders, virtual reality.

1. INTRODUCTION

Eating disorders (EDs) are severe mental disorders defined by significant physical and psychological impairment (5th ed.; DSM–5; American Psychiatric Association [APA], 2013). EDs mainly affect females, set up in adolescence (Herpertz-Dahlmann, 2009), convey high chronicity, relapse, and mortality rates (Fairburn et al., 2015; Franko et al., 2013; Stice et al., 2009), and impact severely individual's quality of life. EDs also have been shown to have high rates of comorbidity with anxiety and depressive disorders in both adults and adolescents (Dagani et al., 2018; Mehler & Brown, 2015; Vall & Wade, 2016).

Body image disturbance (BID) has been identified as one of the main ED risk and maintenance factors (Sattler et al., 2020). This construct is referred to the altered person's experience regarding their body weight and shape and entails two interdependent dimensions (Garner & Garfinkel, 1981): (1) the affective-cognitive-attitudinal dimension of body image (BI) such as thoughts, evaluations, or feelings regarding one's body (e.g., body dissatisfaction or shame) (Hagman et al., 2015; Sharpe et al., 2018); and (2) the perceptual dimension that includes the accuracy/distortion in the estimation of one's body size, weight, and shape (e.g., body size overestimation) (Cornelissen et al., 2018; Mölbert et al., 2018). Moreover, BID has been found to persist after the treatment (e.g., persevering body size overestimation) (Engel & Keizer, 2017; Eshkevari et al., 2014), leading to future relapses (Glashouwer et al., 2019). This fact highlights the need to better comprehend the potential factors contributing to BID in order to develop more effective treatments (Glashouwer et al., 2019; Jansen et al., 2016).

In addition to BID, a large body of evidence suggests that disturbances in affect and inadequate emotional regulation strategies to affective states may be crucial risk factors contributing to EDs (Haynos & Fruzzetti, 2011; Svaldi et al., 2012). The deficit in adaptive emotion regulation has been broadly identified as a transdiagnostic factor and has been shown to play a central role in the maintenance of ED (Fairburn et al., 2003; Prefit et al., 2019). Evidence from

longitudinal studies explains the maintenance of ED symptoms as a result of maladaptive management of distressful emotional states (e.g., suppression, blocking, or distraction as an attempt to regulate negative affect -NA-) (e.g., Haynos & Fruzzetti, 2011; Pinto-Gouveia et al., 2014). This inability to regulate adverse emotional states can aggravate the severity of the ED symptomatology (Brand-Gothelf et al., 2014; Rothschild-Yakar et al., 2019) and maintain the affective symptoms (e.g., persistence in the negative mood) (Mason & Lewis, 2014; Mikhail & Kring, 2019). Specifically, two affect-related risk factors involved in both the origin and maintenance of BID are depressive symptomatology (e.g., Kenny et al., 2022; Sharpe et al., 2018) and NA (i.e., distress and negative mood such as feeling ashamed or upset) (e.g., Engel et al., 2013; Vannucci et al., 2015; Vanzhula et al., 2020).

Regarding depressive symptomatology, current evidence from a meta-analysis of 30 studies points out a possible bi-directional relationship, in which the interference caused by ED or depressive symptoms may increase the vulnerability and trigger the development of the other one (i.e., ED or depressive symptomatology), tending to maintain each other in a bi-directional feedback loop (Puccio et al., 2016). Some studies have already identified depression as another risk factor for the development and maintenance of ED (e.g., Goldschmidt et al., 2012; Sharpe et al., 2018), and recent exploratory evidence suggests that depressive symptomatology may arise before ED symptoms (Kenny et al., 2022). Nonetheless, although the bi-directional relation between ED and depressive symptomatology has been described, the role of depressive symptomatology as a risk factor on ED severity in adolescents has been hardly clarified.

As regards NA, negative affective states (e.g., Baker et al., 1995; Taylor & Cooper, 1992), along with other factors such as food intake (e.g., Thompson et al., 1993; Vocks et al., 2007), BI-related emotional contexts (Gutiérrez-Maldonado et al., 2010) have been found to modify BID. Several experimental studies point out that BI may not be completely stable but rather it can be influenced by both internal and external factors (Farrell et al., 2005). Evidence shows that certain

contextual cues may trigger attentional bias for body-related information (Lee & Shafran, 2004; Smeets et al., 2008; 2011) or increase negative emotional states leading to fluctuations in BID (e.g., higher body dissatisfaction or body size overestimation) (Smeets et al., 2011; Taylor & Cooper, 1992). Taken together, these findings support the dynamic and state-dependent nature of BI (Cash, 2002; Farrell et al., 2005; Rudiger et al., 2007). Therefore, a deeper understanding of the contributing role of state and context-related variables (e.g., NA) on the fluctuations in BID could have relevant clinical and theoretical implications on EDs.

Even though several studies have found a relationship between depression or aversive affective states (i.e., NA) in the ED population (e.g., Allen et al., 2013; Lee & Vaillancourt, 2018; Masheb & Grilo, 2008; Vanzhula et al., 2020), their role as potential risk factors on ED severity or its relationship with the positive BI dimensions has not been fully outlined. As positive BI -characterized by the acceptance, appreciation, and respect toward one's body- (Tylka & Wood-Barcalow, 2015), may act as a protective factor against ED, a detailed exploration of the role of affect on positive BI dimensions is needed.

Additionally, regarding the role of the affect, to date there is little and no well-contrasted evidence regarding the influence of the induced positive affective states on BID or the role of depressive symptomatology on positive BI dimensions (e.g., body appreciation or body esteem). Most studies have focused on how negative affective states are linked to BI issues and ED, but it is also important to study protective factors that can help prevent these problems. The promotion of positive emotions could buffer NA (Fredrickson, 2001) and promote health-related behaviors, boosting ED recovery (Cardi et al., 2015; Tylka & Wood-Barcalow, 2015). Thus, the current study aimed to contribute to the understanding of ED protective factors by also incorporating the positive affect (PA) and positive BI dimensions as a potential way to increase interventions' efficacy.

Taken together, since maladaptive emotional regulation is particularly problematic for adolescents (Ahmed et al., 2015), the clarification of the role of both depressive symptomatology and affect in negative and positive BI could be

of particular importance for the design and implementation of more efficacious interventions in this population (Tiggemann, 2010). A comprehensive understanding of the influence of depressive symptomatology and affect (positive and negative) on BI could help to explain the great variability of results in the current literature, helping to draw up more consistent conclusions regarding the fluctuation in BID (perceptual and affective) as well as to provide the basis for the development of more effective interventions based on adaptive emotional regulation strategies (Peñate et al., 2020). Thus, the aims of the present study were: (1) to examine the role of depressive symptomatology on the dimensions of positive and negative BI, as well as (2) to analyze the effect of two Mood Induction Procedures (MIPs) of positive (i.e., happiness) and negative (i.e., sadness) affect on the perceptual dimension and affective dimension of BI in adolescents with ED. In order to enhance the quality of the MIP in terms of higher immersion and to increase the reliability of the body size estimation (Diniz-Bernardo et al., 2020; Purvis et al., 2015), these procedures were performed in virtual reality (VR). Moreover, a within-subject design was conducted in order to assess changes within the same individuals over two different MIPs.

According to the literature, we hypothesized that: (H1) higher scores of depressive symptomatology will predict higher scores in the dimensions of BID and lower scores in the dimensions of positive BI; (H2) the experimental manipulation of affective states (positive and negative) through a positive MIP will improve both affective and perceptual dimensions of BID; and (H3) the experimental manipulation of affective states (positive and negative) through a negative MIP will worsen both affective and perceptual dimensions of BID.

2. METHODS

2.1. PARTICIPANTS

The sample was composed of 42 Spanish female adolescents ranging in age from 13 to 18 years ($M = 15.88$; $SD = 1.40$). Participants were treated at the Eating Disorders Unit of the Psychiatry Department of the Hospital Clínico Universitario Lozano Blesa (Zaragoza, Spain) ($n = 40$), at the Mental Health Ward of the Hospital Doctor Peset of Valencia (Valencia, Spain) ($n = 1$) and at Ita PREVI Clinical Psychology Center (Valencia, Spain) ($n = 1$). They were following an inpatient or outpatient treatment. The inclusion criteria were the following: (1) age between 13 to 18 years; (2) having a diagnosis of ED according to DSM-5 (APA, 2013) and/or ICD-10 (WHO, 1992) criteria; and (3) having a score from 0 to 28 in the Beck Depression Inventory-II (BDI-II; Beck et al., 1996) (absent, mild or moderate depressive symptomatology). Thirty-nine (92.85%) had a diagnosis of Anorexia Nervosa (AN), one (2.38%) had Bulimia Nervosa (BN) and two (4.76%) had Unspecified Eating or Feeding Disorder [USFED]. Participants were assessed by their psychiatrists/psychologists in order to check the inclusion/exclusion criteria.

Participants were excluded from the study if they: (1) had a high suicide risk assessed by the mental health professional (i.e., having previously made a suicide attempt or currently demonstrating active suicidal ideation); (2) had a Body Mass Index (BMI) below 14 or over 28; (3) were diagnosed with a severe mental disorder with psychotic or manic symptoms (e.g., bipolar disorder, schizophrenia), epilepsy or sensory complications that would prevent exposure to VR (e.g., auditory, visual or tactile deficits); (4) showed abuse of chemical substances; (5) had a diagnosis of Binge Eating Disorder; and (6) were pregnant.

The sample size was determined with the G*Power program (version 3.1; Faul et al., 2007), and it was determined that 84 participants per group were needed to detect a moderate effect size (Cohen's $d = 0.4$), statistical power of .95,

and a significance level of .05. The choice of effect size was based on studies with similar variables (Baker et al., 1995; Plies & Florin, 1992; Taylor & Cooper, 1992).

All the participants provided their informed consent before filling out the questionnaires, in accordance with the Declaration of Helsinki. The study was approved by the Ethics Committee of the University of Valencia (Procedure number: 1127840) and the Doctor Peset University Hospital (Procedure number: 23/21).

2.2. MEASURES

2.2.1. Sociodemographic and anthropometric measurements

A brief self-administered form gathered information about the age, level of education, presence of psychiatric and/or physical problems (i.e., mobility or sight problems), occupation, weight (in *kg*), and height (in *cm*).

2.2.2. Trait self-reported questionnaires

Depressive symptomatology: The Beck Depression Inventory-II (BDI-II; Beck et al., 1996; Sanz et al., 2003). The BDI-II is a 21-statement self-report questionnaire developed to assess the severity of depressive symptomatology in both clinical and non-clinical populations. Each item refers to different experiential states in the past 4 weeks and has four response questions (from 0 to 3), except for items 16 and 18 which have six response options. The total score ranges from 0 to 63 (severity of depressive symptomatology: 0-13, absent or minimal; 14-19, mild; 20-28, moderate; 29-63, severe). The Spanish version of BDI-II showed a high-reliability index ($\alpha = .92$) for psychiatric patients. In the present study, a high Cronbach's alpha was obtained when was administered before the "positive MIP" ($\alpha = .77$) and the "negative MIP" ($\alpha = .78$).

Body dissatisfaction: The Body Dissatisfaction Questionnaire (BSQ; Cooper et al., 1987; Raich et al., 1996). The BSQ is a self-reported questionnaire with 34 items measured on a six-point Likert scale (0 = *never* to 6 = *always*) that assesses the attitudes of satisfaction/dissatisfaction with one's own body. The Spanish validation showed excellent internal consistency ($\alpha = .97$). In this study, the internal consistency was excellent ($\alpha = .97$).

Body image shame: The Body Image Shame Scale (BISS; Duarte et al., 2015; Spanish translation conducted by the authors). The BISS is a 14-item self-report instrument designed to measure BI-focused with two subscales: external and internal BI shame. This 7-item measure includes is rated on a 5-point scale (0 = *never* to 4 = *almost always*). The BISS's global score reliability was found to be excellent in the original version ($\alpha = .92$), as well as for the internal ($\alpha = .92$) and external ($\alpha = .90$) BI shame. In the current study, Cronbach's alphas were also adequate ($\alpha = .92$).

Body image shame. The Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996; Moya-Garófano et al., 2017). The OBCS scale was developed to examine objectified body perception in young women. It contains 24 items rated on a seven-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The OBCS scale comprises three factors: body shame, body surveillance, and control beliefs. In the Spanish version, Cronbach's alpha was acceptable (α ranging from .68 to .89). In the present study, Cronbach's alpha was .79, indicating acceptable consistency.

Body self-esteem: The Body Esteem Scale (BES; Franzoi & Shields, 1984; Jorquera-Rodero et al., 2005). The BES is a self-reported questionnaire with 35 items on a five-point Likert scale (1 = *strong negative feelings* to 5 = *strong positive feelings*) used to assess satisfaction with diverse parts of the body. The Spanish validation showed excellent internal consistency ($\alpha = .91$). In this study, internal consistency was excellent ($\alpha = .91$).

The severity of the eating disorder symptomatology: Eating Disorders Inventory-3-Referral Form (EDI-3-RF; Garner, 2004; Elosua et al., 2010). The inventory is composed of 25 items with a Likert-type response format (1 = *always* to 6 = *never*). It was designed to measure ED risk and can be administered in non-clinical and clinical settings. The Spanish validation (Elosua et al., 2010) showed good internal consistency with Cronbach's alpha for these dimensions. For the clinical sample, alpha ranged from .87 to .94 (obsession with thinness), .88 to .91 (bulimia), and .89 to .95 (body dissatisfaction), respectively. In this study, internal consistency for the total score was excellent ($\alpha = .91$).

Body compassion: The Body Compassion Scale (BCS; Altman et al., 2020; Spanish translation conducted by the authors). The BCS assesses the feeling of self-compassion towards one's own body by combining the constructs of BI and self-compassion. The scale consists of 23 items to be rated on a 5-point Likert scale (1 = *almost never* to 5 = *almost always*). The original version of the questionnaire obtained good results in terms of validity and reliability, showing excellent internal consistency for the total score ($\alpha = .92$). In the present study, internal consistency was excellent ($\alpha = .92$).

Body appreciation. The Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015; Swami et al., 2017). The BAS-2 scale assesses an individual's acceptance, positive opinions, and respect for the body. Its 10 items are rated on a 5-point Likert scale (1 = *never* to 5 = *always*). Internal consistency of the Spanish validation (Swami et al., 2017) was excellent ($\alpha = .94$). In this current study, Cronbach's alpha was also high ($\alpha = .92$).

2.2.3. State self-reported questionnaires

State body dissatisfaction: The Body Image States Scale (BISS; Cash, 2002; translated by the authors of the study). The BISS is a self-report scale used to measure the state of different BI experiences and the degree of one's satisfaction with the body. It consists of 6 items measured on a 9-point Likert-type

scale (1=*extremely dissatisfied* to 9 = *extremely satisfied*). Participants must answer the response that most closely matches their current experience (e.g., "*Right now I feel extremely dissatisfied with my appearance*"). In the present study, the BISS is administered before and after each MIP (i.e., a total of four times). Cronbach's alpha values are acceptable for the "positive MIP" at pre ($\alpha = .85$) and at post ($\alpha = .88$), as they are for the "negative MIP" at pre ($\alpha = .76$) and at post ($\alpha = .85$).

Positive and negative affect. The Positive and Negative Affect Scales (PANAS; Watson et al., 1988; López-Gómez et al., 2015). The PANAS consists of two scales: positive affect scale (PA) and negative affect scale (NA), each consisting of 10 items. The items are scored using a five-point Likert scale (1 = *not at all or very slightly* to 5 = *very much*) in the in the last month. The two scores are obtained with the sum of the scores of each of the items on the scale. In the present study, the scale shown an adequate internal consistency ($\alpha = .91$ for PA and $.86$ for NA).

2.2.4. VR tasks

Body Size Estimation (BSE) of the perceived and the ideal body. Each of the tasks was completed in a randomized order: (1) assessment of the BSE of the perceived body (i.e., "*Is this body thinner or fatter than me?*") and (2) assessment of the BSE of the ideal body (i.e., "*Is this body thinner and fatter than my ideal body?*"). The tasks were of the "Two-Alternative-Forced-Choice" type. The task is an adaptation of the procedure followed by Gledhill et al. (2017). Each participant was presented with a set of avatars and was asked whether the avatars were "fat" or "thin". Figure 1 shows an example of the virtual scenarios in which the avatars were presented. In these tasks, the avatars were displayed in the third person in front of the participant. Both tasks were presented in a counterbalanced manner to the participants in four different times: before and after the positive MIP, and before and after the negative MIP.

Body image dissatisfaction (VR-body dissatisfaction). It was calculated using the participants' responses to ideal and real BSE and using the following formula: $\text{Body Dissatisfaction} = \text{Real BSE} - \text{Ideal BSE}$. A higher value indicates higher body dissatisfaction.

Figure 1

Example of the VR task to Evaluate One's Body Size Estimation



Positive and negative MIPs. Negative and positive MIPs were conducted through VR (VR-MIP). This procedure was used because the efficacy of this VR-MIP in inducing sadness and happiness has been demonstrated in previous studies (e.g., van Strien et al., 2019). The scenario takes place in an urban park and includes several methods to induce NA: (1) Velten's tasks (1968) (e.g., interactive phrase formulations with negative thoughts and beliefs about the self, e.g. '*I don't have any future*', '*I am not valuable enough*'); (2) visualizing pictures

from the International Affective Picture system (IAPS; Lang et al. 2005); (3) listening to a piece of music and watching a movie scene that has previously demonstrated its effectiveness in inducing positive and NA (Donen et al. 1952; Eich & Metcalfe, 1989; Gross & Levenson, 1995), and, finally, (4) an autobiographical memory (i.e., relate out loud a personal memory that resembles the emotional state they are experiencing at the moment). This virtual park has already been used in previous studies by our group, being an effective MIP (Baños et al., 2006).

2.3. HARDWARE AND SOFTWARE FEATURES

A set of nineteen 3D computer-generated women's bodies was created with "MakeHuman" software program (MakeHuman 1.1.1 r2128; The MakeHuman team) and the Autodesk 3ds Max (Autodesk 3ds Max 2017 19.0 SP3; Autodesk, San Rafael, CA). The BMI of the displayed avatars ranged between 13 kg/m² (severe underweight) and 31 kg/m² (obesity) (WHO, 2004). All the avatars were configured by adjusting the height, muscular mass, weight, or body proportions to increase their realism. To expose the most evaluation-sensitive areas of the body (i.e., belly or thighs), the computer-generated bodies were dressed in a white top and blue shorts.

The VR environment was generated with Unity3D (Unity 5.6.0f3; Unity Technologies, San Francisco, CA). Visual feedback was provided by an Oculus Rift HMD and Oculus Rift S (Oculus VR, Irvine, CA). The device has a resolution of 2160x1200, a field of view of 110 degrees, and a refresh rate of 90Hz. A high-end computer was used to generate the VR environment. The hardware components of the computer included a 4-core Intel® Core™ i5-7640X @ 4.00 GHz, 16 GB of RAM, and an NVIDIA® GeForce® GTX 1070Ti with 8GB of GDDR5.

The BSE tasks consisted of two parts: (1) 8 avatars with BMI ranging from 14 to 29. Each avatar was presented 10 times in random order; (2) 5 avatars with BMI±2 units from the cut-off point estimated in the first part (e.g., if the person

obtained a BMI of 20 in the first phase, avatars with a BMI of 18, 19, 20, 21, and 22 are presented in the second phase). Each avatar was presented 5 times in random order. There was no time limit to respond to any of the VR tasks.

2.4. PROCEDURE

Participation in the study comprised two parts: (1) the screening; and (2) the experimental session (positive MIP and negative MIP). Each MIP was carried out in separate sessions of 4 days minimum. Once the participants had agreed to participate, they were fully informed about the voluntary nature of their cooperation and the confidentiality of the collected data and participants provided their informed consent. The first phase consisted of a short review of the participant clinical data by their mental health professionals to determine whether participants met the exclusion/inclusion criteria. The participants who met the inclusion criteria were invited to participate in two one-hour-long sessions with VR. Each experimental session was carried out in a quiet office of each of the participating medical centers. Before the first session, baseline measures were filled (i.e., sociodemographic and anthropometric data, BCS, BCS, EDI-3-RF, BISS-shame, BAS-2, and BES). The battery of questionnaires was implemented in the “LimeSurvey” platform (<https://encuestas.uv.es/admin> with the account of one of the study investigators) or in the paper-and-pen format. The approximate duration for answering them was 15-20 minutes. Before each of the two sessions, each participant filled in the BDI-II questionnaire. The sessions of participants who obtained scores higher than 28 on the questionnaire were canceled or rescheduled.

During the experimental sessions, participants completed the pre-MIP measures (lasting around 15 minutes): BISS-state body dissatisfaction and completed ideal and perceived BSE on the VR task. Afterward, participants were randomly assigned using Random Allocation Software 2.0 package (Saghaei, 2004) to two conditions: a) negative MIP and b) positive MIP. Subsequently, the

participants completed the MIP in the virtual park. The MIP task lasted around 15 minutes, and the participant was left alone during the MIP, so that not interfere with the results. After the MIP participants filled in post-induction measures: BISS-state body dissatisfaction, ideal BSE, and perceived BSE. Instructions emphasized the importance of focusing on how they felt “*right now*” while completing the pre-post MIP.

After approximately a week between sessions (and a minimum of 4 days), each participant completed the second experimental session, receiving the opposite MIP (e.g., positive MIP if they previously completed the negative MIP).

Mood repair task. The mood repair task consisted in receiving the positive MIP at the end of the negative MIP session for ethical reasons. Each participant was offered a “walk through the happy park completing the similar tasks to the ones filled in in the sadness induction park”.

Debriefing. After completing both experimental sessions, each participant was thoroughly debriefed to remove any lingering effects of the study.

2.5. DATA ANALYSES

Statistical analyses were performed using the software SPSS v.28 (IBM Corp, Chicago, IL, USA) for descriptive and correlational analyses. First, descriptive statistics were used to explore the characteristics of the sample in the study variables. The means and standard deviations were used for quantitative data and frequencies and percentages for categorical variables (see Table 1).

Univariate normality was examined by the values of skewness and kurtosis, verifying that skewness values were $\leq |2|$, and kurtosis values were $\leq |7|$ (West et al., 1995). Pearson correlation coefficients were used for the associations between the variables in the study.

Finally, multiple hierarchical regression analyses (with BMI as a predictor in Step 1 and BDI-II scores in Step 2) were performed to analyze the predictive role

of BMI and severity of depressive symptomatology on perceptual (i.e., perceived BSE) and affective dimensions of BID (i.e., VR body dissatisfaction, ideal BSE, BISS-state body dissatisfaction, BSQ, EDI-3-RF, OBCS, BISS-shame, BAS-2, BES, BCS).

To check the effectiveness of the MIP, the effects of the condition on PA and NA were examined with paired *t*-tests. Similarly, to examine the effect of each condition of the dependent variables (perceived BSE, ideal BSE, VR body dissatisfaction, and state body dissatisfaction -BISS-), paired *t*-tests were conducted. Cohen's *d* was calculated to estimate the effect size, and it was taken into account that $d = 0.20$ was a small effect, $d = 0.50$ was a moderate effect and $d = 0.80$ was a large effect (Cohen, 1988). All effects were deemed statistically significant at $p < .05$.

3. RESULTS

3.1. DESCRIPTIVE STATISTICS

The values of skewness and kurtosis indicated that there was no severe violation of the normal distribution (Kline, 2005). Means and standard deviations for all sociodemographic, anthropometric, and clinical variables are reported in Table 1.

Table 1

Baseline Sociodemographic, Clinical Characteristics of Participants and Descriptive Scores of the BI Self-report Measures (n = 42)

| Baseline characteristic | M (SD) / % |
|--|-------------------|
| Age ^a | 15.9(1.40) |
| BMI | 18.3(2.60) |
| Achieved educational level | |
| Primary school | 42.9 |
| Middle school | 57.1 |
| Employment status | |
| Student | 97.6 |
| Employed | 2.4 |
| Previous psychological treatment ^b | 35.7 |
| Medication treatment ^c | 76.19 |
| ED diagnosis | |
| AN | 92.85 |
| BN | 2.38 |
| EDNOS | 4.76 |
| Years since the diagnosis | |
| < 6 months | 9.5 |
| Between 6 months and 1 year | 4.8 |
| Between 1 and 2 years | 54.8 |
| Between 2 and 3 years | 19.1 |
| > 3 years | 7.1 |

Note. BMI = Body Mass Index; ED = Eating Disorders; AN = Anorexia Nervosa; BN = Bulimia Nervosa; EDNOS = Eating Disorders Not Otherwise Specified. ^a *n* = 41. ^b *n* = 38. ^c Reflects the percentage of participants who have prescribed medication as part of their mental health treatment.

3.2. RELATIONSHIP BETWEEN BMI, BDI-II, AND THE AFFECTIVE AND PERCEPTUAL OF BI

As shown in Table 2, BMI and BDI-II were positively correlated with VR-body dissatisfaction and the perceived BSE. Moreover, BDI-II was also positively correlated with dimensions of negative BI (BSQ, EDI-3-RF, BISS-shame, and OBCS), and was negatively associated with dimensions of the positive BI (BAS-2, BCS, and BES).

The perceived BSE was positively associated with VR-body dissatisfaction, BSQ, EDI-3-RF, BISS-shame, and OBCS, as well as negatively correlated with BAS-2 and BES; nonetheless, it was not significantly correlated with BISS–state body dissatisfaction and ideal BSE.

The ideal BSE negatively correlated with affective BID dimensions (VR-body dissatisfaction, EDI-3-RF, BISS-shame, and OBCS), and it was positively correlated with positive BI dimensions (BAS-2 and BCS).

Lastly, VR-body dissatisfaction was positively correlated with negative BI dimensions (BSQ, EDI-3-RF, BISS-shame, and OBCS) and negatively correlated with positive BI (BAS-2, BCS, and BES).

Table 2. Pearson Correlations Between BMI, BDI-II and Self-report and VR Measures of the Affective and Perceptual BID

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|--|--------|---------|---------|-------|---------|---------|---------|---------|---------|------|--------|--------|-------|
| 1. BMI | — | | | | | | | | | | | | |
| 2. BDI-II | .10 | — | | | | | | | | | | | |
| 3. Perceived BSE (VR) | .69*** | .41** | — | | | | | | | | | | |
| 4. Ideal BSE (VR) | .29 | -.16 | .11 | — | | | | | | | | | |
| 5. VR-Body dissatisfaction | .51*** | .46** | .88*** | -.37* | — | | | | | | | | |
| 6. BSQ | .25 | .48** | .63*** | -.25 | .73*** | — | | | | | | | |
| 7. EDI-3-RF | .28 | .62*** | .61*** | -.32* | .72*** | .81*** | — | | | | | | |
| 8. BISS-shame | .18 | .53*** | .50*** | -.33* | .62*** | .85*** | .76*** | — | | | | | |
| 9. OBCS | .21 | .45** | .40** | -.34* | .53*** | .77*** | .82*** | .73** | — | | | | |
| 10. BISS-state body dissatisfaction | .09 | -.14 | -.02 | .25 | -.14 | -.28 | -.31* | -.25 | -.20 | — | | | |
| 11. BAS-2 | -.09 | -.61*** | -.53*** | .31* | -.65*** | -.71*** | -.73*** | -.84*** | -.60*** | .30 | — | | |
| 12. BCS | .02 | -.51*** | -.31* | .37* | -.47** | -.73*** | -.75*** | -.75*** | -.72*** | .31 | .77*** | — | |
| 13. BES | -.28 | -.57*** | -.53*** | .14 | -.56*** | -.75*** | -.74** | -.83*** | -.70*** | .15 | .76** | .71*** | — |
| n | 42 | 41 | 42 | 42 | 42 | 40 | 42 | 42 | 42 | 41 | 42 | 42 | 42 |
| M | 18.33 | 17.54 | 19.77 | 16.75 | 3.01 | 116 | 41.54 | 2.11 | 14.74 | 4.03 | 2.44 | 55.33 | 98.17 |
| SD | 2.60 | 7.17 | 3.80 | 1.94 | 4.07 | 38.62 | 18.33 | 0.87 | 2.19 | 1.47 | 0.77 | 11.88 | 17.36 |

Note. BMI = Body Mass Index, BDI-II = Beck's Depression Inventory-II, BSE = Body Size Estimation, VR = Virtual Reality, BSQ = Body Shape Questionnaire, EDI-3-RF = Eating Disorder Inventory-3 Referral Form, BISS-shame = Body Image Shame Scale, OBCS = Objectified Body Consciousness Scale, BISS-state body dissatisfaction = Body Image States Scale, BAS-2 = Body appreciation Scale-2, BCS = Body Compassion Scale, BES = Body Esteem Scale. * $p < .05$. ** $p < .01$. *** $p < .001$.

3.3. HIERARCHICAL MULTIPLE REGRESSION: Is Depressive Symptomatology a Predictor of the Affective and Perceptual BID?

Coefficients of determination, unstandardized coefficients, standard errors, standard coefficients, and t-statistics for each step of the multiple regression analysis are shown in Table 3. The statistical models including the BDI-II as a predictive model to explain the perceptual and affective dimensions of BI are described in the following paragraphs. It should be noted that BMI was included in the first step in order to control the variability of the body weight of the participants in the outcomes (see Table 3).

Models for predicting the perceptual BID (i.e., perceived BSE). The model including BMI and BDI-II as predictors of the perceived BSE was significant ($F(2,38) = 28.95, p < .001, R^2 \text{ Adjusted} = 58.3\%$). Higher BMI and higher levels of depressive symptomatology significantly predicted higher perceived BSE.

Models for predicting the affective BID measured by VR (i.e., VR-body dissatisfaction). The model including BMI and BDI-II as predictors of the ideal BSE was marginally significant ($F(2,38) = 2.64, p = .084$). However, only BMI was a significant variable predicting the ideal BSE. The model including BMI and BDI-II predicting VR-body dissatisfaction was significant ($F(2,38) = 14.94, p < .001, R^2 \text{ Adjusted} = 40.3\%$). Higher BMI and higher levels of depressive symptomatology significantly predicted higher VR-body dissatisfaction.

Models for predicting the affective BID measured by negative BI self-report measures (BSQ, EDI-3-RF, BISS-shame, OBCS, BISS-state body satisfaction). The models including BDI-II and BMI as predictors of the following variables were significant: self-reported body dissatisfaction (BSQ) ($F(2,38) = 6.58, p = .004, R^2 \text{ Adjusted} = 22.7\%$), the severity of eating symptomatology (EDI-3-RF) ($F(2,38) = 14.16, p < .001, R^2 \text{ Adjusted} = 39.7\%$), body shame (BISS-shame) ($F(2,38) = 8.02, p = .001, R^2 \text{ Adjusted} = 26.0\%$), body objectification (OBCS)

($F(2,38) = 5.75, p = .007, R^2 \text{ Adjusted} = 23.3\%$). However, only the scores in BDI-II significantly predicted these outcomes, as the BMI remained non-significant. Regarding the state body dissatisfaction (BISS), the predictive model including BMI and BDI-II was not significant ($F(2,38) = 0.57, p = .572$).

Models for predicting the affective BID measured by positive BI self-report measures (BAS-2, BCS, BES). The models including BDI-II and BMI as predictors of the following variables were significant: body appreciation (BAS-2) ($F(2,38) = 11.45, p < .001, R^2 \text{ Adjusted} = 34.3\%$), body compassion (BCS) ($F(2,38) = 6.99, p = .003, R^2 \text{ Adjusted} = 23.0\%$), and body esteem (BES) ($F(2,38) = 11.46, p < .001, R^2 \text{ Adjusted} = 34.3\%$). However, only the scores in BDI-II significantly predicted these outcomes.

Table 3

BMI and BDI-II as Predictors: Hierarchical Multiple Regression Analyses

| Effect | <i>B</i> | <i>SE</i> | 95% CI [<i>LL</i> , <i>UL</i>] | β | <i>t</i> | <i>p</i> | <i>R</i> | Adjusted <i>R</i> ² | <i>R</i> ² change |
|------------------------------------|----------|-----------|-------------------------------------|---------|----------|----------|----------|-----------------------------------|---------------------------------|
| Perceptual BID | | | | | | | | | |
| Perceived BSE | | | | | | | | | |
| Step 1 | | | | | | | .70 | .48 | .49 |
| Constant | 1.16 | 3.08 | [-5.08, 7.40] | | 0.38 | 0.710 | | | |
| BMI | 1.02 | 0.17 | [0.68, 1.36] | .70 | 6.11 | <.001 | | | |
| Step 2 | | | | | | | .78 | .58 | .12 |
| Constant | -1.13 | 2.84 | [-6.88, 4.62] | | -0.40 | .690 | | | |
| BMI | 0.97 | 0.15 | [0.67, 1.27] | .67 | 6.49 | <.001 | | | |
| BDI-II | 0.18 | .06 | [0.07, 0.29] | .34 | 3.31 | .002 | | | |
| Affective BID (VR) | | | | | | | | | |
| Ideal BSE | | | | | | | | | |
| Step 1 | | | | | | | .29 | .06 | .09 |
| Constant | 12.77 | 2.11 | [8.50, 17.04] | | 6.05 | <.001 | | | |
| BMI | 0.22 | 0.11 | [-0.01, 0.45] | .29 | 1.90 | 0.650 | | | |
| Step 2 | | | | | | | .35 | .08 | .04 |
| Constant | 13.44 | 2.16 | [9.07, 17.82] | | 6.22 | <.001 | | | |
| BMI | 0.23 | 0.11 | [0.00, 0.46] | .31 | 2.03 | .049 | | | |
| BDI-II | -0.05 | 0.04 | [-0.14, 0.31] | -.20 | -1.27 | .210 | | | |
| VR-Body dissatisfaction | | | | | | | | | |
| Step 1 | | | | | | | .52 | .25 | .27 |
| Constant | -11.61 | 3.96 | [0.35, 1.13] | | -2.94 | .006 | | | |
| BMI | 0.80 | 0.21 | [0.35, 1.13] | .52 | 3.75 | <.001 | | | |
| Step 2 | | | | | | | .66 | .40 | .17 |
| Constant | -14.57 | 3.63 | [-21.92, -7.22] | | -4.01 | <.001 | | | |
| BMI | 0.74 | 0.19 | [0.35, 1.13] | .48 | 3.87 | <.001 | | | |
| BDI-II | 0.24 | 0.07 | [0.09, 0.38] | .41 | 3.35 | .002 | | | |
| Affective BID (self-report) | | | | | | | | | |
| BSQ | | | | | | | | | |
| Step 1 | | | | | | | .25 | .04 | .06 |
| Constant | 50.03 | 42.94 | [-36.96, 137.03] | | 1.17 | .251 | | | |
| BMI | 3.65 | 2.32 | [-1.05, 8.35] | .25 | 1.59 | .124 | | | |

| Effect | <i>B</i> | <i>SE</i> | 95% CI [<i>LL</i> , <i>UL</i>] | β | <i>t</i> | <i>p</i> | <i>R</i> | Adjusted <i>R</i> ² | <i>R</i> ² change |
|--|----------|-----------|-------------------------------------|---------|----------|----------|----------|-----------------------------------|---------------------------------|
| Step 2 | | | | | | | .52 | .23 | .21 |
| Constant | 20.00 | 39.62 | [-60.35, 100.35] | | 0.51 | .617 | | | |
| BMI | 2.97 | 2.09 | [-1.27, 7.20] | .20 | 1.42 | .164 | | | |
| BDI-II | 2.42 | 0.76 | [0.88, 3.97] | .46 | 3.18 | .003 | | | |
| EDI-3-RF | | | | | | | | | |
| Step 1 | | | | | | | .28 | .05 | .08 |
| Constant | 5.56 | 20.09 | [-35.07, 46.19] | | 0.28 | .783 | | | |
| BMI | 1.96 | 1.09 | [-0.23, 4.16] | .28 | 1.81 | .078 | | | |
| Step 2 | | | | | | | .65 | .40 | .35 |
| Constant | -13.85 | 16.54 | [-47.33, 19.62] | | -0.84 | .041 | | | |
| BMI | 1.55 | 0.87 | [-0.21, 3.31] | .22 | 1.78 | .083 | | | |
| BDI-II | 1.54 | 0.32 | [0.89, 2.19] | .59 | 4.81 | <.001 | | | |
| BISS-shame | | | | | | | | | |
| Step 1 | | | | | | | .18 | .01 | .03 |
| Constant | 1.00 | 0.97 | [-0.96, 2.97] | | 1.04 | .305 | | | |
| BMI | 0.06 | 0.52 | [-0.45, 0.17] | .18 | 1.16 | .253 | | | |
| Step 2 | | | | | | | .55 | .26 | .26 |
| Constant | 0.21 | 0.87 | [-1.54, 1.96] | | 0.24 | .811 | | | |
| BMI | 0.04 | 0.05 | [-0.05, 0.14] | .13 | 0.97 | .341 | | | |
| BDI-II | 0.06 | 0.02 | [0.03, 0.10] | .52 | 3.77 | <.001 | | | |
| OBCS | | | | | | | | | |
| Step 1 | | | | | | | .21 | .02 | .04 |
| Constant | 11.55 | 2.44 | [6.62, 16.48] | | 4.74 | <.001 | | | |
| BMI | 0.17 | 0.13 | [-0.94, 0.44] | .21 | 1.31 | .198 | | | |
| Step 2 | | | | | | | .48 | .19 | .19 |
| Constant | 9.84 | 2.28 | [5.23, 14.45] | | 4.32 | <.001 | | | |
| BMI | 0.14 | 0.12 | [-0.11, 0.38] | .16 | 1.14 | .264 | | | |
| BDI-II | 0.14 | 0.04 | [0.05, 0.22] | .44 | 3.07 | .004 | | | |
| BISS-state body dissatisfaction | | | | | | | | | |
| Step 1 | | | | | | | .09 | -.02 | .01 |
| Constant | 3.10 | 1.65 | [-0.24, 6.45] | | 1.88 | .068 | | | |
| BMI | 0.05 | 0.09 | [-0.13, 0.23] | .09 | 0.58 | .575 | | | |
| Step 2 | | | | | | | .17 | -.02 | .02 |
| Constant | 3.48 | 1.71 | [0.02, 6.94] | | 2.71 | .012 | | | |
| BMI | 0.06 | 0.09 | [-0.12, 0.24] | .10 | 0.65 | .520 | | | |
| BDI-II | -0.03 | 0.03 | [-0.10, 0.04] | -.15 | -0.90 | .372 | | | |

| Effect | <i>B</i> | <i>SE</i> | 95% CI [<i>LL</i> , <i>UL</i>] | β | <i>t</i> | <i>p</i> | <i>R</i> | Adjusted <i>R</i> ² | <i>R</i> ² change |
|--------------|----------|-----------|-------------------------------------|---------|----------|----------|----------|-----------------------------------|---------------------------------|
| BAS-2 | | | | | | | | | |
| Step 1 | | | | | | | .10 | -.02 | .01 |
| Constant | 2.94 | 0.85 | [1.21, 4.66] | | 3.44 | .001 | | | |
| BMI | -0.03 | 0.05 | [-0.12, 0.06] | -.10 | -0.63 | .535 | | | |
| Step 2 | | | | | | | .61 | .34 | .37 |
| Constant | 3.75 | 0.71 | [2.32, 5.19] | | 5.30 | <.001 | | | |
| BMI | -.012 | 0.04 | [-0.9, 0.06] | -.04 | -0.31 | .758 | | | |
| BDI-II | -0.07 | 0.01 | [-0.09, -0.04] | -.61 | -4.72 | <.001 | | | |
| BCS | | | | | | | | | |
| Step 1 | | | | | | | .02 | -0.03 | .00 |
| Constant | 53.13 | 20.21 | [12.26, 94.00] | | 2.63 | .012 | | | |
| BMI | 0.10 | 1.09 | [-2.11, 2.31] | .02 | 0.09 | .928 | | | |
| Step 2 | | | | | | | .52 | .23 | .27 |
| Constant | 69.58 | 18.05 | [33.04, 106.12] | | 3.86 | <.001 | | | |
| BMI | 0.45 | 0.95 | [-1.48, 2.37] | .07 | 0.47 | .639 | | | |
| BDI-II | -1.30 | 0.35 | [-2.01, -0.60] | -.52 | -3.74 | <.001 | | | |
| BES | | | | | | | | | |
| Step 1 | | | | | | | .28 | .06 | .08 |
| Constant | 132.88 | 18.99 | [94.47, 171.29] | | 7.00 | <.001 | | | |
| BMI | -1.90 | 1.03 | [-3.97, 0.18] | -.28 | -1.85 | .072 | | | |
| Step 2 | | | | | | | .61 | .34 | .30 |
| Constant | 149.77 | 16.34 | [116.71, 182.86] | | 9.17 | <.001 | | | |
| BMI | -1.54 | 0.86 | [-3.28, 0.21] | -.23 | -1.79 | .082 | | | |
| BDI-II | -1.34 | 0.32 | [-1.98, -0.70] | -.55 | -4.24 | <.001 | | | |

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit; BMI = Body Mass Index; BDI-II = Beck's Depression Inventory-II; BSE = Body Size Estimation; VR = Virtual Reality; BSQ = Body Shape Questionnaire; EDI-3-RF = Eating Disorder Inventory-3 Referral Form; BISS-shame = Body Image Shame Scale; OBCS = Objectified Body Consciousness Scale; BISS-state body dissatisfaction = Body Image States Scale; BAS-2 = Body appreciation Scale-2; BCS = Body Compassion Scale; BES = Body Esteem Scale.

3.4. MANIPULATION CHECK ANALYSES: testing the efficacy of the positive and negative MIP in changing PA and NA

Paired sample *t*-tests showed a significant increase in the PA and a decrease in the NA scores after undergoing the positive-MIP. However, there were no significant changes in the PA nor NA as a result of receiving the negative-MIP (see Table 4).

Table 4

Differences in Pre-post Induction PA and NA per Condition

| | Pre-MIP | | Post-MIP | | <i>t</i> | <i>df</i> | <i>p</i> | Cohen's <i>d</i> | 95% CI | |
|---------------------|----------|-----------|----------|-----------|----------|-----------|----------|---------------------|-----------|-----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | | | | | <i>LL</i> | <i>UL</i> |
| Positive MIP | | | | | | | | | | |
| PA | 26.61 | 9.02 | 30.00 | 9.28 | -5.06 | 40 | <.001 | -.79 | -1.14 | -0.43 |
| NA | 24.02 | 8.32 | 17.31 | 6.55 | 6.80 | 40 | <.001 | 1.06 | 0.67 | 1.44 |
| Negative MIP | | | | | | | | | | |
| PA | 26.47 | 8.31 | 26.40 | 9.36 | 0.08 | 39 | .941 | .01 | -0.30 | .32 |
| NA | 24.62 | 8.25 | 22.40 | 7.62 | 1.98 | 39 | .055 | .31 | -0.07 | .63 |

Note. PA = Positive Affect (PANAS); NA = Negative Affect (PANAS).

3.5. EFFECT OF POSITIVE- AND NEGATIVE-MIP ON THE SELF-REPORTED AND VR MEASURES OF THE AFFECTIVE AND PERCEPTUAL BID

As shown in Table 5, in the positive-MIP condition, paired sample *t*-test showed that participants rated significantly higher their ideal BSE (i.e., less restriction on the BMI of the ideal body) and showed higher body satisfaction (measured by VR) after receiving the induction. Regarding the self-reported measure of body satisfaction (BISS-state body dissatisfaction), paired sample *t*-

test showed marginally significant differences (pre-MIP < post-MIP; $p = .084$). There were no significant differences between the perceived BSE.

In the negative-MIP condition, there were no significant differences among studied variables: ideal and perceived BSE, and body dissatisfaction (measured by the VR and the self-reported BISS-state body dissatisfaction).

Table 5

Results of the Paired Samples t -tests for Perceived and Ideal BSE and Body Dissatisfaction (Measured by VR and Self-Report)

| | Pre-MIP | | Post-MIP | | t | df | p | Cohen's d | 95% CI | |
|---------------------------------|---------|------|----------|------|-------|------|------|-------------|--------|------|
| | M | SD | M | SD | | | | | LL | UL |
| Positive MIP | | | | | | | | | | |
| Perceived BSE | 19.79 | 3.71 | 19.53 | 3.71 | 1.39 | 41 | .172 | .215 | -.09 | .51 |
| Ideal BSE | 16.90 | 1.71 | 17.25 | 1.82 | -2.36 | 40 | .023 | -.369 | -.68 | -.05 |
| BISS-state body dissatisfaction | 3.77 | 1.51 | 3.96 | 1.58 | -1.77 | 40 | .084 | -.277 | -.59 | .04 |
| VR-Body dissatisfaction | 2.87 | 4.03 | 2.22 | 4.04 | 2.47 | 40 | .018 | .386 | .07 | .70 |
| Negative MIP | | | | | | | | | | |
| Perceived BSE | 19.75 | 3.85 | 19.86 | 4.78 | -0.29 | 41 | .777 | -.044 | -.35 | .26 |
| Ideal BSE | 16.95 | 1.92 | 17.16 | 1.88 | -1.27 | 41 | .213 | -.195 | -.50 | .11 |
| BISS-state body dissatisfaction | 3.90 | 1.42 | 3.93 | 1.42 | -0.36 | 40 | .721 | -.056 | -.36 | .25 |
| VR-Body dissatisfaction | 2.81 | 4.11 | 2.70 | 5.05 | 0.22 | 41 | .828 | .034 | -.27 | .34 |

Note. CI = confidence interval; LL = lower limit; UL = upper limit; BSE = Body Size Estimation; BISS-state body dissatisfaction = Body Image States Scale; VR = Virtual Reality.

4. DISCUSSION

The general purpose of this study was to explore the relationship between depressive symptoms, affect (positive and negative), the perceptual and affective dimensions of BID, and the dimensions of positive BI in adolescents with EDs. Specifically, we analyzed the baseline measurements to explore the role of depressive symptomatology on the dimensions of positive and negative BI (objective 1), and we conducted an experimental within-subject design to analyze the effect of positive and negative MIPs supported by VR on the perceptual and affective dimensions of BI in adolescents with EDs.

Consistent with our first hypothesis, results confirmed that baseline severity of depressive symptomatology -once the effect of the BMI was controlled- was associated with higher scores in negative BI and lower scores in the positive BI dimensions. Interestingly, regarding body dissatisfaction, depressive symptomatology only showed to predict body dissatisfaction when it was measured with VR, but not when measured with a self-report questionnaire (i.e., BISS), which may be due to the social desirability bias of the assessment measure.

The role of depressive symptomatology in predicting BID suggests that emotional alterations may be contributing to the maintenance of the ED symptomatology (i.e., increased perceived BSE, body dissatisfaction, or body shame) (Keel et al., 2001; Presnell et al., 2009). In this regard, it can be speculated that female adolescents with ED may engage in maladaptive regulation strategies (i.e., restraint or bingeing) (Presnell et al., 2009) in order to regulate depressed mood, leading to the maintenance of the ED symptomatology. However, this explanation should be tested in longitudinal studies or ecological momentary assessments. In addition, results showed that higher depressive symptomatology was associated with a more judgmental and less appreciative relationship with one's own body (i.e., reduced positive BI) (Alleva et al., 2017; Gillen, 2015; Tylka et al., 2015). Hence, these findings confirm that depressive symptoms may predict the maintenance of BID and low positive BI in adolescents, being in line with the

previous literature that identifies depressive symptomatology as a predictor of the onset of food restraint (Johnson et al., 2002) or the increase in unhealthy weight management behaviors in adolescents (McCabe & Ricciardelli, 2006), among others. However, the bi-directionality of these relationships should be further studied in order to establish, for example, whether positive BI dimensions could be potential protective factors against depressive symptomatology in the ED sample (Linardon et al., 2023).

Regarding our second hypothesis, it was partially supported as we found that the experimental manipulation of positive mood provoked changes in specific dimensions of BID. Positive-MIP was successful in increasing state PA and decreasing state NA, as well as decreasing the ideal BSE (i.e., an increase of the ideal body size) and the levels of body satisfaction (i.e., lower levels of the dissonance between perceived and ideal body measured by VR). However, there were no changes in the perceived BSE or the body dissatisfaction measured by self-report. Hence, these findings provide additional support for ED's cognitive-behavioral models that state the role of environmental and emotional events in distorted BSE (Williamson, 1990). While NA has been found to influence an individual's vulnerability to the thin ideal (Tylka & Subich, 2004), PA has been shown to have a protective role on the ideal body size and body dissatisfaction (Góngora, 2014) -as also found in the current study-. As proposed by the "ongoing hypothesis" from the positive psychology framework, fostering PA could reduce risk factors (Fredrickson & Levenson, 1998; Silk et al., 2006) and enrich both prevention and intervention programs (Wong et al., 2021). The intervention strategies that would help to increase positive mood (e.g., MIPs) or promote the development of effective adaptive emotional regulation for reducing depressive symptoms (e.g., self-compassion) could be a good addition to the already used evidence-based techniques.

Thus, a higher positive mood may trigger more general processing (Hess et al., 2012), which provoke in turn, lower BID (i.e., lower VR-body dissatisfaction as well as higher ideal BSE). In fact, during the debriefing of this study, the

participants confirmed the “broadening” effect of PA (Fredrickson, 2001) on the recall of their perceived body when performing the BSE tasks in VR (i.e., “*I was not able to focus clearly on specific parts of my body I usually do not like*”). Hence, the positive mood induction could act as a buffer for negative moods or as a promotor of healthier emotional regulation strategies (Cardi et al., 2015). Nonetheless, more research on the possible underlying mechanisms is needed to understand their contribution to both the origin and maintenance of ED symptomatology. Additionally, following to Cardi et al. (2015), it would be interesting to explore whether a repeated positive mood induction has a cumulative impact over time.

The results partially confirmed the third hypothesis. Contrary to the previous evidence where negative mood inductions lead to an increase in body dissatisfaction (Stice, 2001) or greater perceived BSE (Fox et al., 2012; Taylor & Cooper, 1992), the negative MIP did not have a significant effect on the perceptual or the affective BID. However, these findings should be considered with caution because the manipulation check showed that the negative MIP did not have the expected effect on the PA and NA. Although the further examination is required, one of the possible explanations for these findings is the use of maladaptive regulation strategies by the ED sample. As aforementioned, due to the intolerance of mood states (Fairburn, 2008), individuals with ED may inhibit, suppress (i.e., modulate or block their emotions) or avoid the awareness of the sadness (Espeset et al., 2012; Geller et al., 2000). Considering the transdiagnostic role of NA in EDs, additional research regarding the effect of negative mood states induction is needed.

Our study holds several clinical implications. Firstly, it highlights the importance of addressing both depressive symptomatology and affect (especially PA) in the treatment of ED in adolescents as they are at higher risk of developing major depressive disorder (Filipponi et al., 2022; Lee et al., 2014). Specifically, our findings emphasize the role of adaptive emotional regulation as a target to be explored in future ED interventions for adolescents. Secondly, this study provides

evidence of the use of VR as an assessment tool for the affective and perceptual BID. By presenting an immersive and interactive environment that realistically represents the body and facilitates embodiment (Cornelissen et al., 2015; Fisher et al., 2020; Wolf et al., 2021), the use of VR helps to overcome the limitations of traditional techniques (e.g., lack of reliability or validity of the silhouettes or video distortion methods) (Ferrer-García & Gutiérrez-Maldonado, 2012). Although preliminary, our results add evidence to the idea of fluctuating body representations in ED (Cash, 2002; Rudiger et al., 2007) and, most importantly, highlight the potentially clinically relevant role of positive mood induction in the BID.

Nonetheless, this study is not without limitations. Firstly, the use of self-report measures to assess depressive symptoms and affect may be susceptible to social desirability bias. Additionally, this study only investigates two basic emotions related to PA (i.e., mainly happiness) and NA (i.e., mainly sadness). Hence, future studies may include other salient in ED sample emotional states (i.e., anger or shame) (Elliott et al., 2020). Furthermore, it would be interesting to also add measures of state positive BI to the future experimental designs in order to assess changes associated with affect to this construct. In regard to the clinical sample, the severity of the underweight could have influenced patients' insight and their capacity to notice and respond to their emotional experiences, and this issue may not have been fully resolved by including patients from different states of treatment. Moreover, although the study included various ED diagnoses to capture a wide range of ED presentations, the sample was weighted towards the more restrictive presentation of EDs (i.e., restrictive type of AN), and the generalizability of the findings to other populations is unknown.

To better understand the origin and maintenance of EDs, future studies should continue examining the bi-directionality of the relationship between BID and context-dependent factors. Longitudinal and within-person network analysis may be used to investigate the role of affect and depressive symptoms over time. Specifically, future research may focus on the study of the networks of emotional

distress (e.g., shame, depression, or anxiety), including PA, and EDs (Elliott et al., 2020; Solmi et al., 2018) in the adolescent population (Kenny et al., 2022). Recent findings suggest that guilt about eating and shame could be promising targets for ED interventions (Wong et al., 2021). Lastly, to improve the generalizability of the results, future studies should comprise more diverse samples, including individuals of different ages and gender, as well as different ED diagnoses.

In conclusion, although in need of replication, the present findings could be of value for higher efficacy of ED interventions. Considering the role of depressive symptomatology and the PA on the maintenance of EDs, gaining a better understanding of the processes involved in the severity of perceptual and affective BI alterations is important in combating EDs. Furthermore, the current study highlights the importance of PA in ED symptomatology, which is often overlooked.

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CHAPTER 4

Study 3. Towards a Comprehensive Understanding of Body Image: Integrating Positive Body Image, Embodiment and Self-compassion

This chapter is published as: Burychka, D., Miragall, M., & Baños, R. M. (2021). Towards a Comprehensive Understanding of Body Image: Integrating Positive Body Image, Embodiment and Self-compassion. *Psychologica Belgica*, 61(1), 248. <https://doi.org/10.5334/pb.1057>



Towards a Comprehensive Understanding of Body Image: Integrating Positive Body Image, Embodiment and Self-Compassion

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THEORETICAL-
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ABSTRACT

Body image (BI) disturbance is a relevant factor in the etiology and treatment of eating disorders (ED). Although progress has been made in recent decades in understanding BI and its relationship with ED, the efficacy of BI disturbance prevention and intervention programs is still limited. In order to reach deeper understanding of BI disturbance and clarify the interactions between some protective and risk factors related to this construct, we carried out a literature review on some specific BI-related factors that so far have been analyzed independently. We specifically examined positive and negative BI; embodiment and its role in the development of positive and negative BI; and self-compassion as a protective factor that promotes positive embodiment (vs. disembodiment) and protection against body shame. We conclude that integrating the available evidence on these factors into BI models may be used to enhance our understanding of BI and improve the efficacy of prevention and intervention programs to help fight negative BI (by reducing body shame and disembodiment) and promote positive BI (by increasing self-compassion and positive embodiment).

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KEYWORDS:

body image; positive
embodiment; body shame;
self-compassion

TO CITE THIS ARTICLE:

Burychka, D., Miragall, M.,
& Baños, R. M. (2021).
Towards a Comprehensive
Understanding of Body Image:
Integrating Positive Body
Image, Embodiment and
Self-Compassion. *Psychologica
Belgica*, 61(1), pp. 248-261.
DOI: [https://doi.org/10.5334/
pb.1057](https://doi.org/10.5334/pb.1057)

Body Image (BI) is a multidimensional concept that involves people's positive and negative perceptions, thoughts, behaviors, and attitudes about their body and appearance (Gardner, 1996; Garner & Garfinkel, 1982, Grogan, 2016). The term was coined by Paul Schilder (1935), who defined BI as the mental representation of one's body that everyone develops. The BI development process is dynamic, and it is influenced not only by the physical (e.g., body size or shape) or psychological (e.g., perfectionism, low self-esteem) characteristics of the individual, but also by the socio-cultural context (e.g., cultural ideal of beauty, media pressure to achieve an ideal of beauty) (Cash, 2002; Wertheim & Paxton, 2011). Moreover, BI is linked to the multifaceted psychological experience of embodying one's body (Cash, 2004). Hence, BI is not only related to the way people perceive their body, but it also influences the way they interact with the world through that body (Piran & Teall, 2012).

BI disturbance (BID) has been identified as a key factor in the development and maintenance of eating disorders (ED) in general (Glashouwer et al., 2019; Mora-Giral et al., 2004; Stice & Shaw, 2002) and anorexia nervosa (Dakanalis et al., 2016) and bulimia nervosa (Degortes et al., 2018; Sattler et al., 2019), in particular. Furthermore, BID is also a crucial factor in the relapse and poor prognosis of these disorders (Bachner-Melman et al., 2006; Carter et al., 2004; Glashouwer et al., 2019), as well as their increasing prevalence (Mitchison et al., 2020), especially in the adolescent and young adult population (Treasure et al., 2010). Furthermore, even in the absence of an ED, BID is a risk factor that impacts the individual's quality of life (Hosseini & Padhy, 2019).

Despite the large amount of research being conducted in the field, the efficacy of BI-focused interventions in ED remains limited (Alleva et al., 2015; Ziser et al., 2018). Particularly, interventions targeting BI only, lead to small improvement, highlighting the need for enhancing current therapeutic strategies (Alleva et al., 2015; Linardon et al., 2017, 2018; Linardon & Wade, 2018). Additionally, there is evidence that BID persists in patients with ED once the intervention is finished (Engel & Keizer, 2017; Eshkeviri et al., 2014). Thus, it is necessary to consider other relevant BI-related protective and risk factors that may help improve existing assessment and intervention ED programs. For instance, there is evidence on the relationship between lower BID and higher level of positive embodiment (Cook-Cottone, 2015; Homan & Tylka, 2014) and higher levels of self-compassion (Braun et al., 2016). However, although over the last years these protective factors have gained prominence in the positive BI field (Braun et al., 2016), they have been explored independently (i.e., have not been integrated in explicative models of BID). Integrating these factors in more comprehensive explicative models may increase our understanding on the origin and maintenance of BID in patients with ED.

The aim of this paper was to carry out a narrative review of the existing literature on key protective and risk factors that are being related to higher positive BI and lower negative BI (i.e., sense of embodiment, self-compassion, and body shame). Specifically, this study will review: (1) positive and negative BI, (2) embodiment and its role in the development of positive and negative BI, and (3) self-compassion as a protective factor that promotes positive embodiment (vs disembodiment) and protects against body shame. Analysis of these factors may provide further insights into the complex construct of BI and help us to better understand their role in ED.

In this narrative review, we first analyze the traditional perspective, which is focused on negative BI. However, we also highlight the importance of positive BI (e.g., body acceptance), as well as its associated protective and risk factors. Thus, we first consider *positive embodiment* (vs. *disembodiment*) -a positive connection with one's body-as a protective factor of positive and negative BI (Cook-Cottone, 2018). Embodiment, although considered for decades as relevant in this field (Cash, 2004), has been long overlooked and requires reconsideration to reach a more comprehensive understanding of BI. Second, we examine *body shame* a self-conscious emotion that can disturb the connection to one's body (Piran & Neumark-Sztainer, 2020), a specific risk factor of negative BI in patients with ED and non-clinical ED samples (e.g., Ferreira et al., 2013; Duarte et al., 2015). Finally, we explore the role of *self-compassion* the experience of understanding one's own pain in a non-judgmental way and seeing suffering as a part of a shared human experience (Neff, 2003), given its role in cultivating connection to one's own body (positive embodiment) and positive BI (Braun et al., 2016). Self-compassion has emerged as a protective factor against body shame and disembodiment, and is one of the most effective intervention techniques in this field to reduce BID (Braun et al., 2016).

This review proposes that the integration of dimensions from positive and negative BI will result in a more comprehensive approach to BI. Therefore, the incorporation of factors associated to positive BI (i.e., positive embodiment, self-compassion), together with the extensively studied factors associated to negative BI (e.g., disembodiment, body shame), may improve not only the theoretical understanding of BI, but also lead to a development of specific therapeutic strategies to improve the intervention of BID and ensure long-lasting outcomes.

THE CLASSIC VIEW OF BI: NEGATIVE BI AND ITS DIMENSIONS

The BI construct seems to be composed of two dimensions: negative BI and positive BI. To date, research has focused primarily on the study of the negative dimension (Smolak & Cash, 2011; Tylka, 2011), characterized by BID. As

noted above, BID is a key element in the expression of ED and one of the more common characteristics in anorexia nervosa and bulimia nervosa (Cash & Deagle, 1997; Cornelissen et al., 2013, 2015), as well as a key component in its development, maintenance, and relapse (Stice & Shaw, 2002; Treasure et al., 2020). Moreover, BID can also be found in the non-clinical population (McCabe et al., 2006; Stice & Whitenton, 2002), making its study and understanding even more relevant.

Regarding negative BI, the research has focused on the extensive examination of two independent subdimensions that can be disturbed (Garner & Garfinkel, 1982): (a) the perceptual dimension (which refers to the estimation of one's body size and weight); and (b) the affective-attitudinal-cognitive dimension (which involves feelings, attitudes, and thoughts about one's body size and weight) (Bulik et al., 2006). Perceptual disturbance is manifested as an underestimation or overestimation of body size or weight, whereas disturbance in the affective dimension is characterized mainly by body dissatisfaction and/or overvaluation of body size and weight (Cornelissen et al., 2013; Dakanalis et al., 2016). Therefore, disturbance can be found in one or both BI dimensions.

Most studies have prioritized the exploration of perceptual dimension disturbance. Currently, there is enough evidence to state there is a trend in patients with anorexia nervosa to be impaired in this dimension, characterized by greater overestimation of their perceived body size in comparison to control groups with no history of ED (Brown et al., 2021; Hagman et al., 2015; Gardner & Brown, 2014; Mölbert et al., 2017). This overestimation is likely to persist over time despite demanding diets and significant weight loss, which usually occurs in these patients (Riva et al., 2015). In the past few decades, the underlying mechanisms of this disturbance have been investigated in order to develop effective interventions to readjust body size estimation (Cornelissen et al., 2013).

Regarding the affective dimension of BI, several authors have emphasized its relevance, as well as its relationship with the perceptual dimension (Mölbert et al., 2018; Preston & Ehrsson, 2014, 2016). Overall, the evidence suggests that people with ED experience higher body dissatisfaction, greater concerns about body weight and/or size, an increased drive for thinness, and a lower desired weight, compared to people with no history of ED (Cash & Deagle, 1997; Moscone et al., 2017). In addition, studies have found that high levels of body dissatisfaction are associated with greater inaccuracy in one's body size perception (Keizer et al., 2011), and that an increased drive for thinness is associated with greater overestimation of one's body size (Hagman et al., 2015). Similarly, Gardner and Bokenkamp (1996) concluded that body dissatisfaction could be a causal factor in overestimating body size. Thus, there is a large body of research on the psychopathological symptoms

associated with BI (e.g., Smolak, 2012; Thompson et al., 1999). In short, latest studies (Hagman et al., 2015; Mölbert et al., 2018) point out the importance of studying in depth the affective dimension of BI (e.g., body shame) to understand perceptual BID (e.g., body overestimation).

Additionally, although most of these studies have focused on the negative BI, new explanatory models of ED have recently been developed. The need to study the "positive" side of BI has emerged, leading to a better understanding of both the risk factors and the possible protective factors in the development of ED (Tylka, 2012).

POSITIVE BI: A NECESSARY DIMENSION FOR THE COMPREHENSIVE UNDERSTANDING OF BI

Positive BI was initially defined as an opposite concept to negative BI (Smolak, 2012; Tylka, 2011, 2012), so that a reduction in BID was associated with an increase in positive BI characteristics (Tylka & Wood-Barcalow, 2015). Based on this approach, BI was originally considered a continuum with negative and positive BI situated at opposite ends (Webb et al., 2015). However, a growing body of evidence indicates that negative and positive BI are not opposite ends of the same continuum, but rather two different constructs that are negatively correlated (Avalos et al., 2005; Tylka, 2011, 2018; Tylka & Wood-Barcalow, 2015). Thus, interventions in negative BI would not necessarily promote positive BI (e.g., an individual with high levels of body appreciation can still experience body dissatisfaction) (Tiggemann & McCourt, 2013; Tylka & Wood-Barcalow, 2015).

Positive BI is characterized by the acceptance, appreciation, and respect for one's body (Tylka, 2013). More specifically, according to Avalos et al. (2005), positive BI has four components: (1) favorable opinions about the body; (2) acceptance of the body with its imperfections, regardless of weight or body shape; (3) respect for the body by attending to its needs and engaging in healthy behaviors; and (4) protecting the body by rejecting unrealistic BIs portrayed in the media (e.g., positive media information is internalized, whereas negative media information is denied or reformulated).

Several studies state that positive BI is associated with healthy behaviors (Andrew et al., 2013; Gillen, 2015). According to Avalos et al. (2005), developing positive feelings towards the body can result in increased psychological well-being. Hence, positive BI is associated with lower development of ED symptoms (Wood-Barcalow et al., 2010) through its (1) direct influence on psychological well-being (Avalos et al., 2015); (2) indirect influence on reducing the impact of contextual influences (e.g., appearance-centered media) (Swami et al., 2008); and (3) promotion of protective cognitive styles (e.g., rejecting messages of criticism regarding one's weight or

interpreting ambiguous appearance-related messages as positive ones) and, as a result, higher resistance to the effects of appearance-centered media (Halliwell & Diedrichs, 2012).

In the past few years, mainly from the field of Positive Psychology, acceptance and appreciation of the body have been promoted as therapeutic targets for building a more positive BI. Programs designed to encourage body acceptance (e.g., not worrying about or exhibiting vanity about one's appearance, rejecting socio-cultural ideals of beauty) can be more effective than programs that do not focus on this component (Stice et al., 2007). In addition, body appreciation which implies an attitude of kindness, respect, and gratitude toward one's bodily characteristics, functions, and physical condition has been identified as a key protective factor of positive BI in young women (Wood-Barcalow et al., 2010). It promotes body acceptance by rejecting unrealistic ideals of beauty and enhancing individual psychological well-being by engaging in healthy behaviors (Avalos et al., 2005). In addition, body appreciation has been negatively related to risk factors associated with ED, such as body shame, body surveillance, and drive for thinness (Avalos et al., 2005).

In conclusion, positive BI stands out as a key dimension in BI that should be considered in the prevention and intervention of ED. Increasing positive BI by promoting body appreciation and recognition of one's body needs goes beyond decreasing negative BI (Tylka, 2015). Promoting positive BI may have effective long-lasting effects and counteract the experience of disconnection from one's body (i.e., disembodiment) (Tylka & Wood-Barcalow, 2015). Therefore, focusing on positive BI may help prevent ED intervention in individuals with ED (Piran, 2015; Tylka & Piran, 2019) by developing acceptance and respect towards their body (Avalos et al., 2005). However, more studies are needed to identify factors that enhance positive BI.

EMBODIMENT: CONSIDERING THE WAY WE INHABIT OUR BODY AS A PROTECTIVE FACTOR OF POSITIVE BI

As noted above, BI is not an easily defined concept. Cash (2004) defined BI as a multifaceted psychological experience of embodying a body that involves self-perceptions, attitudes, thoughts, beliefs, feelings, and behaviors. Despite this complexity, the concept of embodiment has hardly been included in explanatory theories of BI. Nevertheless, as the latest research suggests that difficulty in embodying one's body could contribute to the explanation of BID in ED.

According to her developmental theory of Embodiment (Piran, 2016), which integrates Buddhist psychology and mindfulness, the experience of positive embodiment includes five processes: (1) positive connection with

the body, manifested by feeling comfortable and "at home" when embodying one's body and interacting with the world from it; (2) experience of agency and functionality of one's body (e.g., physical ability or body functions); (3) perception and awareness of bodily needs (e.g., hunger or sexual desire); (4) self-care in response to perceived internal needs (e.g., resting when tired or eating when hungry); and (5) embodying or "inhabiting" one's body in the first person (as opposed to an objective or third-person perspective).

Although the concept of embodiment and positive BI dimensions may overlap (Menzel & Levine, 2011; Tylka, 2019) due to their focus on a positive connection with the body (Tylka & Piran, 2019), both constructs are different (Cook-Cottone, 2016). Developing a positive BI comes hand-in-hand with having a healthy, embodied awareness of internal and external aspects of self (Cook-Cottone, 2015). Positive embodiment promotes the growth of positive BI, as it involves a constructive connection with one's body, which leads to caring for it with acceptance and non-judgment (Cook-Cottone, 2015; Piran, 2015), simultaneously encompassing all processes of the developmental theory of embodiment (Piran, 2016). In this regard, positive embodiment has been associated with mindfulness practice and, more specifically, the practice of self-compassion (Cook-Cottone, 2006, 2015; Tylka, 2012). Mindfulness practice has shown positive outcomes for variables that are negatively correlated with positive embodiment, such as body shame (Goldsmith et al., 2014; Woods & Proeve, 2014) and self-objectification (Cox et al., 2016).

In contrast, disembodiment implies the interruption of the connection with the body (the way it feels as well as its functions) (Tylka & Wood-Barcalow, 2015), which leads the person to perceive the body from an observer's perspective (i.e., experience the body from a third-person perspective) (Menzel & Levine, 2011). Disembodiment has been positively associated with a lack of interoceptive awareness and a sense of disconnection from one's body (Piran, 2015, 2016). According to Piran (2016), the lack of connection with the body could constitute an avoidance strategy that emerges in situations of discomfort where others can observe the body. Therefore, disembodiment, or the experience of adopting an observer's perspective of one's body by being an "object for others", has been suggested as an altered mechanism in ED, a risk factor for negative BI. In this regard, disembodiment seems to be closely related to the concept of self-objectification. Self-objectification refers to the perception of oneself in the third person: the person perceives him/herself as an object that others evaluate based on physical appearance rather than on the body's functionality or psychological qualities (Fredrickson & Roberts, 1997). Bodily self-objectification has been associated with increased body shame and decreased interoceptive awareness (Ainley et al., 2013), and it has been identified as an obstacle to

body appreciation (Augustus-Horvath & Tylka, 2011). On the contrary, positive embodiment has been associated with less objectified body consciousness (Avalos et al., 2005; Menzel et al., 2011).

Lastly, another recent research area in the field of disembodiment focuses on studying mechanisms that underlie the experience of disconnection from the body in the ED patients. In recent years, research on the induction of perceptual illusions of ownership mainly of a rubber hand (Botvinick & Cohen, 1998) or a full-body using visuo-tactile stimulation (Keizer et al., 2016) has been carried out to induce the sense of embodiment with a false limb or a virtual avatar. This research area promotes the study of the basic components of embodiment (i.e., ownership, agency, and location of the body) in the disturbance of body representation. Findings indicate that patients with ED who show interoceptive deficits and self-objectification (Eshkevari et al., 2012; Herbert, 2020; Schaefer & Thompson, 2018), are more likely to detach (or experience disembodiment) from their body and embody another body or part of the body (e.g., a rubber hand) (Eshkevari et al., 2012, 2014; Keizer et al., 2014). That is, the fact of experiencing greater capability of embodying any other body, different from its own body, constitutes a sign of disembodiment in individuals with ED. This malleability of the bodily self persists even after ED recovery (Eshkevari et al., 2014). Therefore, a deeper understanding of the basic components of embodiment could promote long-lasting changes in the key mechanisms of BID by adjusting distorted body representations. For instance, the induction of bodily illusions by embodying a body that is thinner than one's own results in lower body overestimation in women with AN (Keizer et al., 2016; Serino et al., 2019), as well as higher body satisfaction (Preston & Ehrsson, 2014; van der Hoort et al., 2011). Thus, induction of perceptual illusions that aim to manipulate the individual's perception of the body -by making it thinner or fatter- is a promising alternative in the assessment and intervention of BID.

In conclusion, embodiment or the way we inhabit or embody our body and the connection we establish with it could be associated with our level of positive or negative BI. Therefore, assessing the experience of positive embodiment (or disembodiment) could contribute to a more comprehensive understanding of BI.

BODY SHAME: A RISK FACTOR ASSOCIATED WITH DISEMBODIMENT AND NEGATIVE BI

Body shame is an emotion that is increasingly being addressed in recent studies of BID in ED (Cesare et al., 2016, Duarte et al., 2016, Mustapic et al., 2015, 2016). According to Gilbert (Gilbert, 2003; Gilbert & Miles, 2002), shame is a painful and self-conscious emotion

that arises during the process of social competition as a warning sign that certain personal characteristics, attributes, or behaviors may be perceived as undesirable and, consequently, be judged negatively by others. The concept of shame has been divided into two dimensions: external shame and internal shame (Duarte et al., 2015; Gilbert, 2003). On the one hand, external shame arises when the individual perceives that s/he could be judged negatively by others (Gilbert & Miles, 2014; Tangney & Dearing, 2002). On the other hand, internal shame arises when the individual internalizes the negative judgment of others and, therefore, becomes her/his own judge (Gilbert, 2003).

More specifically, body shame has been studied within the affective dimension of negative BI (Menzel et al., 2011). It refers to a painful emotion that consists of cognitive, behavioral, affective, and social components related to appearance and body-related functions (Gilbert, 2003). The experience of body shame has mainly been associated with two theories that have attempted to explain the development and maintenance of ED symptoms.

On the one hand, the social comparison theory (Festinger, 1954) states that individuals, mainly women, tend to compare themselves with people from their social context. An unfavorable evaluation, experienced as inferiority, results in increased negative affect and reduced self-esteem. In this regard, evidence shows that social comparison has a negative impact on the level of body satisfaction (Myers & Crowther, 2009) because self-surveillance or the act of observing oneself is directly associated with appearance anxiety (Fredrickson & Roberts, 1997). Similarly, the anxiety experienced in exposure tasks using images of thin bodies has been shown to increase body dissatisfaction through the process of social comparison (Friederich et al., 2007). Therefore, this theory suggests that increased body dissatisfaction may be related to a higher tendency to observe anxiety-inducing body parts (Jansen et al., 2005).

On the other hand, the self-objectification theory posits that body shame arises from comparing one's body to an internalized socio-cultural ideal (Fredrickson & Roberts, 1997). In other words, according to this theory, self-objectification has its origins in the internalization of the ideal of socio-cultural beauty, which entails the constant tendency to self-monitor the body and observe it from a third-person perspective. This process of self-monitoring and self-objectification leads to increased body shame, greater appearance anxiety, poor interoceptive awareness, increased negative affect (Miner-Rubino et al., 2002), and increased depressive symptoms (Muehlenkamp & Saris-Baglama, 2002; Szymanski & Henning, 2007). A negative self-evaluation in this context leads individuals to perceive themselves as inferior, unattractive, or unwanted (Duarte et al., 2015; Gilbert & Miles, 2014).

Both theories coincide in that a negative evaluation of one's physical appearance resulting from social comparison leads to increased body shame (Cook-Cottone et al., 2008). Body shame is one of the most frequent consequences of the internalization of the Western body ideal (Lamont, 2019). In addition, body shame is one of the most common emotional states associated with negative BI in ED (Goss & Gilbert, 2014; Hayaki et al., 2002; Pinto-Gouveia et al., 2014), and it can be found in both clinical and non-clinical populations (Dakanalis et al., 2014; Doran & Lewis, 2011).

Furthermore, body shame is an emotion associated with the experience of disembodiment or disconnection from one's body (Piran, 2016; Piran & Neumark-Sztainer, 2020). Therefore, it is important to identify strategies to reduce the experience of body shame. In this regard, self-compassion is emerging as a variable that protects against body shame and improves women's BI (Halliwell, 2015). Some findings show that individuals with higher self-compassion levels have lower levels of body shame (Breines et al., 2014; Ferreira et al., 2019; Liss & Erchull, 2015). Hence, practice of self-compassion could constitute an intervention strategy to enhance positive embodiment or a better way to inhabit or interact with one's body.

SELF-COMPASSION: A PROTECTIVE FACTOR THAT PROMOTES POSITIVE EMBODIMENT AND POSITIVE BI?

Self-compassion, a concept derived from Buddhist psychology, involves an openness to perceiving one's suffering as part of the human experience, without avoiding it or distancing oneself from it, and the desire to alleviate it with kindness and without judgment (Neff, 2003). The self-compassion construct consists of three main components (Neff, 2003): (1) mindfulness (vs over-identification), defined as the ability to observe thoughts and feelings, including body-related ones, without judgment or over-identification with them; (2) common humanity (vs isolation), defined as the ability to understand and identify one's life experience as human and feel connected to others by identifying the experience as common (e.g., worrying about weight or not fulfilling the ideal of beauty); (3) self-kindness (vs self-criticism), defined as the ability to understand and be kind to oneself, take care of oneself, and accept one's mistakes (e.g., being understanding when gaining weight).

Some evidence shows that self-compassion is a predictor of positive affect and happiness (Neff et al., 2007; Neff & Vonk, 2009). In a recent meta-analysis, self-compassion was identified as an adaptive emotional regulation strategy (Turk & Waller, 2020) associated with alleviating shame and self-criticism (Gilbert, 2010; Leary et al., 2007; Neff, 2003; Neff & Vonk, 2009). More specifically, the self-kindness component would prevent

negative self-evaluations involving shame, whereas the mindfulness component would prevent generalizing errors to the whole self through the ability to maintain thoughts and feelings without over-identifying with them (e.g., the person can regard a mistake made as something transitory, without over-identifying with it) (Neff, 2003). Furthermore, the self-kindness component has been associated with understanding oneself during situations of stress and danger (Neff, 2003). Therefore, in stressful situations related to BI (e.g., viewing advertisements that include bodies that meet the ideal of beauty), an individual with higher levels of self-compassion will be better able to counteract the discomfort caused by these situations (e.g., less self-criticism related to body size and weight) (Webb et al., 2014). In the case of negative BI, the evidence suggests that self-compassion is associated with a decrease in concern about body size and weight, body shame, self-objectification, and the influence of internalizing the ideal of beauty (Braun et al., 2016; Ferreira et al., 2013; Wasylikiw et al., 2012).

In addition to its role in decreasing negative BI, self-compassion is considered a protective variable associated with the development and maintenance of positive BI (Braun et al., 2016; Neff, 2003; Siegel et al., 2020; Wasylikiw et al., 2012). The evidence suggests that there is a link between increased BI flexibility defined as a compassionate response in accepting aversive body-related thoughts and feelings (Sandoz et al., 2013), increased acceptance of negative BI-related experiences (Daye et al., 2014; Kelly et al., 2014; Mosewich et al., 2011; Wasylikiw et al., 2012), and greater body appreciation (Ferreira et al., 2013). Therefore, high levels of self-compassion seem to contribute to lower negative BI and higher positive BI.

In this regard, Altman et al. (2017) developed the Body Compassion Scale to assess self-compassion related to one's body. It combines the constructs of self-compassion (from Buddhist psychology) and BI (explained from the cognitive-behavioral approach). The scale has three dimensions: (1) defusion (e.g., "When I am frustrated with my body's lack of ability to do something, I tend to feel alienated and isolated from others"); (2) common humanity (e.g., "When I am frustrated with some aspect of my appearance, I try to remind myself that most people feel this way all the time"); and (3) acceptance (e.g., "I accept my appearance as it is"). The scale is designed to assess individuals' relationship with their body (e.g., presence of BID or positive BI) using an acceptance and mindfulness-based approach. Nonetheless, it is unclear whether body compassion (versus self-compassion) is a protective variable that explains more variance in the reduction of negative BI and the increase in positive BI, and whether body compassion (versus self-compassion) should have a more significant role in the assessment and treatment of BID.

Self-compassion focused interventions could contribute to increasing the connection with the body and decreasing

self-objectification (Piran, 2015). These interventions try to modify individuals' relationships with their appearance by fostering acceptance and appreciation of body size and weight, with the ultimate goal of promoting positive embodiment (vs disembodiment). They are aimed at promoting both body appreciation and self-care, buffering the tendency to compare oneself with others or with certain ideals (Avalos et al., 2005). The studies by Albertson et al. (2015) and Toole and Craighead (2016) analyzed the effectiveness of online interventions based on self-compassion in samples of undergraduate female students with high negative BI concerns. The results showed that the intervention programs were effective in increasing body appreciation and decreasing body shame and body dissatisfaction, among other effects. Similarly, self-compassionate letter writing is an effective intervention to promote treatment-seeking motivation in patients with anorexia nervosa (Kelly & Waring, 2018) and improve body satisfaction in undergraduate women (Stern & Engeln, 2018). Consequently, we can determine that the practice of self-compassion seems to be a promising area of intervention, not only for decreasing negative BI, but also for enhancing positive BI.

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS IN THE STUDY OF BI

We carried out a narrative review of several protective and risk factors related to positive and negative BI (i.e., positive embodiment/disembodiment, body shame, and self-compassion) in order to understand this construct from a comprehensive perspective. We think this perspective should be taken into consideration in the assessment and intervention of BID in ED. Nonetheless, there are still many questions on this path that need to be clarified.

First, evidence points out the need to consider the positive (and not only the negative) dimension of BI for a comprehensive understanding of BID in patients with ED. To this end, additional and independent research on each of the specific components of positive BI (e.g., appreciation of body appearance or body functionality) is required in order to: (1) develop specific instruments (for both trait and state positive BI); and (2) integrate the BI positive components (e.g., body appreciation) into theoretical models that can explain the associations between these variables and the negative BI variables (e.g., body dissatisfaction).

Second, this review also highlights a long-neglected issue in the assessment and treatment of BI: the experience of embodiment. Although this aspect is included in some of the well-known definitions of BI, such as Cash's (2004), it has not been thoroughly studied. This research field may provide novel experimental paradigms to explore the underlying mechanisms of

positive embodiment (e.g., self-compassion) in patients with ED. More specifically, deeper understanding of how embodiment is developed may help improve prevention and intervention programs for BID by enhancing the psychological processes responsible for positive connections to one's own body.

In addition, following the positive embodiment model incorporated in the developmental theory of Embodiment (Piran, 2015), discussed in this paper, there is a need (1) to conduct more studies related to activities that promote positive embodiment (e.g., yoga or exercise) and have benefits for body awareness or the experience of self-objectification, among others; (2) to develop instruments to delimit the different dimensions of positive embodiment; (3) to explore how risk factors (e.g., disembodiment) interact with protective factors of BI (e.g., positive embodiment) (Piran, 2016); and, finally, (4) to define underlying mechanisms of the association between the concepts of positive embodiment and self-compassion, as well as disembodiment and body shame.

Third, in recent years, the need to integrate body shame assessment as part of the impairment in the BID affective dimension has been highlighted. This variable appears to be associated with disembodiment, and through this interaction, body shame could lead to negative BI. Additionally, along with body shame, this review indicates the relevance of self-compassion because it can play a relevant role in fostering positive BI by cultivating positive embodiment. Therefore, it is necessary (1) to identify the mechanisms of action of self-compassionate practice and its effect on the decrease in body shame, as well as the promotion of positive BI, (2) to establish the role of the constructs of body self-compassion versus self-compassion in promoting positive embodiment and healthy BI, and finally, (3) to design effective interventions that integrate self-compassion to reduce body shame, increase positive embodiment, and consequently, increase positive BI and reduce negative BI.

Inclusion of these protective and risk factors in theoretical BI models has the potential to provide a comprehensive perspective of this complex concept and may allow using strategies and instruments to improve BI assessment, prevention, and treatment in patients with ED. Hence, more studies are required to establish the protective role of positive embodiment and self-compassion in the development, maintenance, and relapse of ED. Moreover, a shift in future study designs is needed to better understand the variables described in this review: greater diversity in the samples and the implementation of longitudinal studies. It is necessary to strive for greater heterogeneity among the participants because most of the published studies have been conducted on young, white, heterosexually oriented adult women with significant concerns about BI and no physical disabilities (Atkinson & Wade, 2016; Toole & Craighead, 2016). To develop effective BID-related interventions

in ED, full understanding of the BI construct is required considering positive BI (e.g., body functionality, body flexibility) and negative BI (e.g., body disgust, “feeling fat”) dimensions. In this regard, it is essential to explore different populations to capture all risk and protective factors involved in BID. Therefore, future studies should include a representative sample of diverse cultural groups, different age groups (especially children and the elderly), and the male population.

In addition to increasing sample diversity, a thorough examination of life transition periods (e.g., adolescence, pregnancy, or menopause) is required due to their impact on BI development and modification (Piran, 2015). Studying the impact of time on the different components of BI and the embodiment experience could lead to the development of specific interventions that may address specific protective and risk factors during each period. For example, the prevalence of negative BI in adolescents indicates the relevance of prevention programs for this age group by identifying specific variables that would facilitate the promotion of healthy BI, such as body acceptance. Likewise, there is a need to conduct longitudinal studies in order to examine the causal relationships between the aforementioned variables. The results of these studies could be incorporated into the theoretical models of the psychological processes involved in the development and maintenance of positive BI and prevention of BID in ED. Moreover, dismantling studies (e.g., Roehrig et al., 2006) would help to determine the role of the components of the BI dimensions and their relationships, in addition to designing interventions with specific components for healthy BI development.

In conclusion, this review emphasizes the importance of considering new protective and risk factors—and the links they maintain with each other—of BI conceptualization, to continue to advance in its understanding. Inclusion of the positive dimension of BI, and considering positive embodiment and self-compassion as protective factors—opposed to the disconnection from our body and body shame—will allow us to reach a deeper and more comprehensive understanding of the BI construct. This perspective may lead to a more suitable approach for researching and developing future prevention and intervention programs focusing not only on reducing negative BI (through decreasing body shame and disembodiment), but also on positive BI connection with one’s own body (through increasing self-compassion and positive embodiment).

FUNDING INFORMATION

This work was supported by the Ministry of Science, Innovation and Universities of Spain under AN-BODYMENT (PSI2017-85063-R) and the grant “Programme for the Training of Researchers” (Formación de Personal

Investigador, FPI), with the reference number PRE2018-084882, as well as, CIBEROBN, an initiative of ISCIII (CB06/0052).

COMPETING INTERESTS

The authors have no competing interests to declare.

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TO CITE THIS ARTICLE:

Burychka, D., Miragall, M., & Baños, R. M. (2021). Towards a Comprehensive Understanding of Body Image: Integrating Positive Body Image, Embodiment and Self-Compassion. *Psychologica Belgica*, 61(1), pp. 248–261. DOI: <https://doi.org/10.5334/pb.1057>

Submitted: 12 January 2021 Accepted: 12 July 2021 Published: 27 July 2021

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Psychologica Belgica is a peer-reviewed open access journal published by Ubiquity Press.



CHAPTER 5

Study 4. The underlying protective mechanisms of Self-compassion in Decreasing Body Shame and the Risk of Eating Disorders: A Path Analysis Model

This chapter is under review as: Burychka, D., Miragall, M., & Baños, R. M. The underlying protective mechanisms of Self-compassion in Decreasing Body Shame and the Risk of Eating Disorders: A Path Analysis Model

ABSTRACT

Introduction: Self-compassion has been broadly identified as a protective factor against eating disorders (EDs), although the variables that might underlie this relationship have hardly been studied. **Objectives:** The main objective of this study was to analyze whether positive affect, body trust and body shame are potential underlying mechanisms of the relationship between self-compassion and the risk of ED. To carry out this aim, firstly, the psychometric properties of the Spanish version of The Body Image Shame Scale (BISS; Duarte et al., 2015) were analyzed. **Methods:** Participants were Spanish women ($N = 440$) from general population, between 18 and 40 years old, with a Body Mass Index between 16 and 35 kg/m². **Results:** Confirmatory analysis of the Spanish version of the BISS showed an adequate fit with two factors (internal and external body shame) and adequate reliability and construct validity. Path analysis results supported a direct association between self-compassion and ED, but also indirect effects through an increase in positive affect and body trust, as well as a decrease in the internalized body shame. The hypothesized path model indicated an adequate model fit, explaining 48.9% of the risk of ED. **Conclusions:** This study contributes to the growing body of evidence linking self-compassion and ED risk. Moreover, the findings highlight the need to cultivate a positive body image through self-compassion, positive affective states and body trust in order to counteract internalized body shame, a key predictor of ED symptomatology.

Keywords: Self-compassion, body shame, eating disorders, positive affect, body trust.

1. INTRODUCTION

Eating disorders (ED) are severe psychological disorders with negative consequences for physical health and psychosocial functioning (American Psychiatric Association, 2013). Although effective treatments are available (Linardon et al., 2017), the high mortality rates and the persistence of the symptoms in the long term (Dobrescu et al., 2020) indicate the need to better understand the mechanisms involved in the onset, maintenance, and relapse of ED. Moreover, greater efforts should be made to identify potential protective variables that can prevent the development of ED symptomology.

A growing body of research points to self-compassion as having a protective role against ED psychopathology (Barnard & Curry, 2011; Muris & Petrocchi, 2017). Self-compassion involves having a kind and comprehensive attitude towards one's suffering when considering personal shortcomings or failures. According to Neff (2003), it is defined by three mutually interacting components: (1) mindfulness, which refers to the ability to be aware of the present moment, recognizing one's suffering without overly identifying with negative thoughts and feelings; (2) self-kindness, which refers to having an attitude of warmth and understanding towards oneself in times of suffering instead of engaging in self-criticism and judgment; and (3) shared humanity, which involves understanding that the human condition is imperfect and shared, rather than feeling isolated when considering one's flaws and mistakes. The interaction among these components has been associated with less dependence on external contingencies when assessing one's physical appearance (Homan & Tylka, 2015) and less risk of developing an ED (Gilbert & Procter, 2006; Oliveira et al., 2018). A systematic review of 28 studies, carried out by Braun et al. (2016), found that self-compassion played a protective role against a negative body image and ED.

Specifically, self-compassion seems to be implicated in the two interdependent dimensions of body image: negative and positive body image (Turk & Waller, 2020). On the one hand, self-compassion has been negatively

associated with buffering the detrimental effects of negative body image-related variables, such as body dissatisfaction and body shame (e.g., Braun et al., 2016; Ferreira et al., 2013; Mosewich et al., 2011). On the other hand, self-compassion has also been found to be beneficial in the development and maintenance of a positive body image (Kelly et al., 2014; Siegel et al., 2020; Tylka, 2019; Ziemer et al., 2019). The practice of self-compassion appears to buffer the impact of sociocultural, physical, and psychological factors, promoting body appreciation (Raque-Bogdan et al., 2016; Wasylikiw et al., 2012) and body acceptance (Ferreira et al., 2013; Tylka et al., 2015).

According to Tylka and Wood-Barcalow (2015), reducing a negative body image without promoting a positive body image may result in neutral or tolerant attitudes toward one's body. Instead, by increasing a positive body image through the practice of self-compassion (Wasylikiw et al., 2012; Webb et al., 2015), we might not only mitigate a negative body image, but we could also promote mindful ways to relate to one's body, reacting to aversive body-related emotions (e.g., body shame) in an adaptive and non-judgmental manner (Braun et al., 2016; Siegel et al., 2020). Nonetheless, despite extensive research on self-compassion as a mechanism of action in different forms of therapy (Baer, 2010; Leaviss & Uttley, 2015), the specific contribution of this construct and the mechanisms through which self-compassion acts as a protective factor against ED have been poorly researched. The specific mechanisms of action that have been proposed to explain the role of self-compassion in the field of body image and ED are summarized in the following paragraphs.

First, self-compassion has been identified as an *adaptive emotional regulation strategy* for body image concerns (Turk & Waller, 2020). Specifically, it seems to promote the regulation of negative body-related emotions (e.g., a feeling of shame or criticism of one's body) by increasing positive affect (e.g., gratitude, appreciation of the body) (Germer & Neff, 2013). Based on the theory of positive emotions (Fredrickson, 1998), greater positive affect -resulting from self-

compassion practice- may promote more flexible thinking and, more importantly, help to foster health-related behaviors (Braun et al., 2016).

Second, self-compassion has been found to promote a *feeling of trust in one's body* by fostering mindful awareness and tenderness toward one's body-related thoughts and emotions (Albertson et al., 2015; Daubenmier, 2005). Body trust -defined as the extent to which one perceives the body as safe and reliable- is a facet of interoceptive awareness that has shown a robust and consistent relationship with body image facets such as body appreciation, lower overweight preoccupation, or lesser appearance orientation (Todd et al., 2019). Particularly, trusting in bodily signals has been associated with a positive body image (e.g., Brown et al., 2017; Oswald et al., 2017; Zamariola et al., 2019), whereas body mistrust -defined as the perception of one's body as unsafe and the signals coming from it as dangerous (Boswell et al., 2019; Thompson-Brenner et al., 2019)- has been associated with ED symptoms (Brown et al., 2017). Furthermore, Brown et al. (2020) recently suggested that body trust could be one of the ED maintenance mechanisms.

Third, in a recent meta-analysis, self-compassion was identified as a protective factor (Turk & Waller, 2020) associated with alleviating self-criticism, shame (Gilbert, 2010; Leary et al., 2007; Neff & Vonk, 2009), and, specifically, body shame (Sick et al., 2020). Specific compassion directed to the body (not in general) has also been shown to have a protective effect against body image shame (Oliveira et al., 2018). Along the same lines, Linardon and Messer (2023) pointed out that self-compassion may help people to respond to negative experiences in a more adaptive manner (e.g., approaching negative experiences with kindness).

As regards body shame, an extensive body of research has shown that this negative cognitive-affective response plays a central role in the onset and maintenance of ED (Goss & Allan, 2009; Troop & Redshaw, 2012) in clinical, sub-clinical, and non-clinical samples of women (Blythin et al., 2018; Duarte et al., 2014, 2017). Body shame is a distressing self-conscious emotion that can be

conceptualized in two dimensions (Gilbert & Miles, 2002): (a) external shame (i.e., the perception that others can judge one's physical appearance, leading to criticism or rejection) (Goss et al., 1994); and (b) internal shame (i.e., a negative evaluation and feelings with an internal focus -such as self-criticizing one's physical appearance- due to the internalization of external shame). Both internal and external shame have been associated with increased ED risk (Gilbert & Miles, 2002; Troop et al., 2008).

Therefore, there is promising evidence identifying self-compassion as a protective factor in the development and maintenance of eating psychopathology in women (e.g., Blythin et al., 2018; Turk & Waller, 2020). Although the establishment of the mechanisms that underlie self-compassion (i.e., positive affect, body trust and body shame) may lead to an improvement in existing ED interventions. Hence, the main aim of the study was to confirm whether self-compassion is positively associated with constructs able to promote adaptive mechanisms (i.e., positive affect and body trust) for coping with aversive body-related emotions (i.e., body shame) that have been shown to decrease the risk of ED.

Firstly, because the questionnaires designed to measure both dimensions of body shame are scarce -especially in Spanish-, we tested the psychometric properties of the Body Image Shame Scale (BISS; Duarte et al., 2015) in a Spanish sample. A more thorough understanding of the role each dimension (i.e., external vs. internal body shame) plays in ED onset could be relevant in clinical practice, as it would make possible to address the relevant dimensions of body shame during interventions to prevent ED. Secondly, we aimed to confirm a hypothesized path model on the protective role of self-compassion in relation to positive affect, body trust and body shame, against the development of ED symptomatology.

Based on the findings of previous studies, we hypothesized that (H1) self-compassion would be negatively associated with the risk of ED. Regarding the proposed underlying mechanisms, we hypothesized that (H2) both positive affect and body trust would be positively associated with self-compassion and negatively

associated with body shame (internal and external); and (H3) self-compassion would be negatively associated with body shame (internal and external). Lastly, (H4) body shame (internal and external) would be negatively associated with the risk of ED.

2. METHODS

2.1. PARTICIPANTS

A total of 440 Spanish women from the general population were recruited. The participants' ages ranged from 18 to 40 years, and their Body Mass Index (BMI) ranged from 16 to 35 kg/m². 166 participants were excluded from the study as they: were male, confirmed a history of ED, were under 18 or over 40 years old, had a BMI below 16 or above 35, completed less than 70% of the questionnaires; or came to Spain when they were more than seven years old. All duplicate or erroneous data were eliminated ($n = 43$). Therefore, participants' data were deleted if they took the survey more than once or failed at least one of four items embedded in the survey to check their attention (e.g., "Respond 5 if you are reading this") (Tylka & Wood-Barcalow, 2015). Therefore, from the initial data set of 649 participants, data from 440 women were analyzed in the confirmatory factor analysis of the BISS (Objective 1), and data from 398 women – who completed all the measures - were analyzed in the path analysis (Objective 2).

2.2. MEASURES

2.2.1. Sociodemographic and anthropometric information: sex, age, educational level, job status, nationality, height, and weight.

2.2.2. Self-report measures:

Self-compassion. The Self-Compassion Scale–Short Form (SCS-SF, Raes et al., 2011; Garcia-Campayo et al., 2014). This is a 12-item short form of

a longer 26-item SCS designed to measure the tendency to treat oneself with kindness, recognizing common humanity, and being mindful when considering negative aspects of oneself. The responses are rated on a 5-point Likert scale (1 = *almost never* to 5 = *almost always*). In the present study, Cronbach's alpha was found to be .87, showing good internal consistency.

Positive affect. The Positive and Negative Affect Scales (PANAS; Watson et al., 1988; López-Gómez et al., 2015). The Positive Affect (PA) scale of PANAS consists of 10 items scored using a five-point Likert scale (1 = *not at all or very slightly* to 5 = *very much*), referring to the past month. In the present study, items pertaining to the PA were analyzed, and the scale showed adequate internal consistency ($\alpha = .91$).

Body dissatisfaction. Body Shape Questionnaire (BSQ; Cooper et al., 1987; Raich et al., 1996). This self-reported questionnaire contains 34 items rated on a six-point Likert response scale (1 = *never* to 6 = *always*), and it is used to assess attitudes of satisfaction with one's figure, fear of weight gain, and the desire to lose weight. The Spanish validation showed excellent internal consistency ($\alpha = .97$). Internal consistency in this study was excellent ($\alpha = .98$).

Body trust. The Trusting subscale of the Multidimensional Assessment of Interoceptive Awareness (MAIA; Mehling et al., 2012; Valenzuela-Moguillansky & Reyes-Reyes, 2015). The MAIA is a 32-item self-report questionnaire that assesses eight dimensions or subscales of interoceptive awareness using a six-point Likert-scale (0 = *never* to 5 = *always*). The MAIA subscales have demonstrated acceptable psychometric properties in ED (Brown et al., 2017) and non-ED populations (Machorrinho et al., 2019; Mehling et al., 2012). Only the Trusting subscale was used in the present study to measure the experience of one's body as safe and trustworthy. In the present study, Cronbach's alpha for the Trusting subscale was .88, indicating good internal consistency.

Body image shame. The Body Shame Subscale of Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996; Moya-Garófano et al., 2017). The Body Shame subscale of the OBCS is used to measure the degree of shame experienced when the cultural standards for the female body are not met. It contains eight items rated on a seven-point Likert scale (1 = *strongly disagree* to 7=*strongly agree*). In the present study, Cronbach's alpha was .86, indicating acceptable consistency.

Risk of ED. The Eating Disorder Inventory-3-Referral Form (EDI-3-RF; Garner, 2004; Elosua et al., 2010). The EDI-3-RF is an abbreviated form of the EDI-3; it is composed of 25 items with a Likert-type response format (1 = *always* to 6 = *never*). It was designed to measure ED risk and can be administered in non-clinical and clinical settings. The instrument measures three subscales related to ED risk: Drive for Thinness, Bulimia, and Body Dissatisfaction. In our sample, Cronbach's alpha for the total EDI-3-RF was .71, showing acceptable internal consistency.

Body image shame. The Body Image Shame Scale (BISS; Duarte et al., 2015). The BISS is a 14-item self-report instrument designed to measure body image-focused shame and its phenomenology. This measure includes two subscales with seven items each: (1) the external body image shame subscale, which evaluates perceptions of others' negative evaluations about one's physical appearance; and (2) the internal body image shame subscale, which refers to negative self-evaluations about one's physical appearance and resulting behaviors to control body image exposure. Participants rate each item on a five-point scale (0 = *never* to 4 = *almost always*) that reflects the frequency with which they experience body image shame, with higher scores revealing higher levels of body image shame. With the authors' permission, the process of translating the BISS to Spanish was conducted using the forward and backward translation method. During the process, the original version of the BISS was translated into Spanish by two independent bilingual professionals, maintaining the semantic equivalence between English and Spanish. The two translations were then

evaluated by discussing and editing any minor discrepancies. The back-translated version was always guided by the original theoretical definition of each dimension of the scale, addressing the differences in the two versions of the translation following the principles of content validity. The final version of the translated questionnaire was translated into English by a professional translator. The back-translated version was verified and approved by Dr. Cristiana Duarte, one of the original developers of the BISS.

2.3. PROCEDURE

The sample was recruited from the general population through two routes. First, we used posters at the University campus, as well as emails and social networks. Individuals were invited to participate in a study related to “the validation of a body-image related questionnaire”. Second, a total of 250 participants were recruited through the individuals listed as participants in the “Laboratory for Research in Behavioral Experimental Economics (LINEEX)”. LINEEX is a recruitment service at the University of Valencia that can apply different filters to recruit the most suitable sample for the research and give monetary compensation to the participant (www.lineex.es). In this study, participants who completed the survey through this platform were compensated with five euros.

Once the participants had agreed to participate, they signed the consent form. Depending on the source of the sample, self-reported measures were presented in paper-and-pen formats or online (through the online survey portal "LimeSurvey" (www.encuestas.uv.es)).

2.4. STATISTICAL ANALYSES

Statistical analyses were performed using the software SPSS v.28 (IBM Corp, Armonk, NY, USA) and R 4.2.21 (R Core Team, 2016).

The psychometric properties of the scale were analyzed using Confirmatory Factor Analysis (CFA). A two-factor model (internal body shame/external body shame) was tested, because this structure has provided a better fit than the unidimensional one according to the results of confirmatory factor analyses of the BISS in female and male samples (Duarte & Ferreira, 2022; Khanjani et al., 2020) as found in the original version (Duarte et al., 2015). The normality of the sample was analyzed, verifying skewness values $\leq |2|$ and kurtosis values $\leq |7|$ (Russell, 2002; West et al., 1995). The CFA was estimated with the Weighted Least Squares Mean and Variance corrected (WLSMV) estimator, which is considered the appropriate method of choice for ordinal variables (Finney & DiStefano, 2006). To determine a good fit between the model and the data, we used a combination of several fit indexes, following the recommended cut-off criteria (Hu & Bentler, 1999; Kline, 2015; Tanaka, 1993). Thus, we used the combination of: (1) the chi-square statistic (χ^2); (2) the Comparative Fit Index (CFI), which assumes a non-central chi-square distribution with cut-off criteria of $\geq .90$ -or ideally $\geq .95$ -; (3) the standardized root mean squared residual (SRMR) and its 90% confidence interval, with values of $\leq .08$ considered a reasonable fit; and (4) the Root Mean Square Error of Approximation (RMSEA), with values $\leq .06$. We used caution when considering the results of the chi-square index (χ^2) -given that it is sensitive to sample size and to minor or potentially nonconsequential violations of model fit-, and the RMSEA -given that it is sensitive to the degrees of freedom and sample size- (Kenny et al., 2015). Moreover, we verified that all the standardized factor loadings were above the recommended cut-off point of .40 (Tabachnick et al., 2007).

Additionally, Cronbach's alpha and the McDonald coefficient (ω) were assessed as evidence of the reliability of the proposed two-factor structure. Moreover, construct validity was calculated using the Pearson correlation between the two dimensions of the BISS and other variables: BSQ, OBCS (Body shame subscale), and EDI-3-RF.

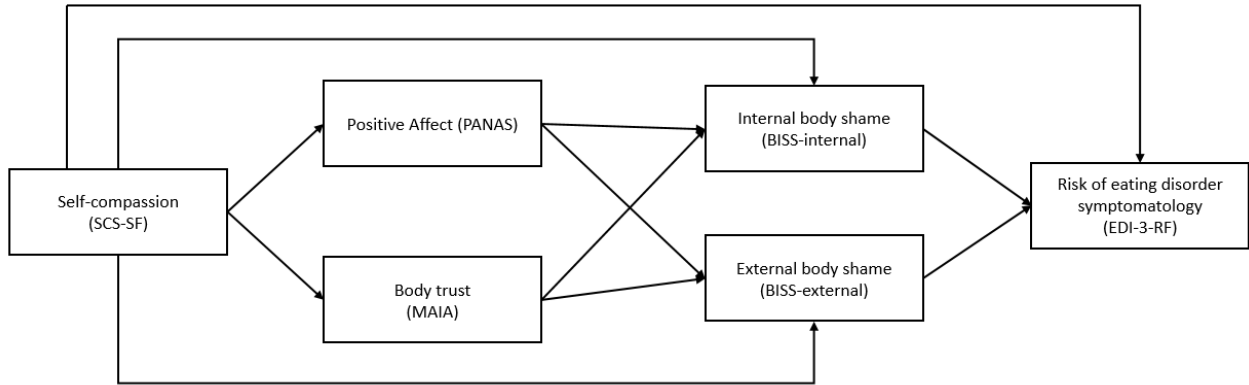
Finally, Pearson's correlations were calculated between self-compassion (SCS-SF), body shame (BISS), affect (PANAS), body trust (MAIA), and the risk of ED (EDI-3-RF). Then, to test the main hypothesis of this study based on the theoretical framework, one model was specified and tested. The model included a sequence of variables aimed at verifying the protective role of self-compassion in the risk of ED in association with three underlying mechanisms (increasing positive affect, increasing body trust and decreasing body shame) (see Figure 1). The analysis was carried out using the *lavaan* package (Rosseel, 2012) with R 4.2.21 (R Core Team, 2016) to examine the fit of the hypothesized model (see Figure 1). Assessment of the data for normality indicated that there were neither univariate (all $p < .001$) nor multivariate normality (Mardia's skewness = 150.21, $p < .001$, Mardia's kurtosis = 1.33, $p = .183$), so parameter estimates were obtained using the robust maximum likelihood method (MLR) with the Satorra-Bentler correction (Satorra & Bentler, 2001). The Mardia's coefficient was calculated using the *semTools* package.

To evaluate the best fitting model for our data, we calculated the various goodness of fit indexes with the cut-off criteria described above, including the chi-squared test, CFI, SRMR, and RMSEA. However, TLI and RMSEA were not considered because they are not recommended as fit indices for models with small degrees of freedom (Kenny et al., 2015; Shi et al., 2019). Moreover, the fit of the model was also evaluated by including the absence of large modification indices. Indirect effects were also calculated following the recommendations of MacKinnon et al. (2007), and the CI around the estimated effects were computed using a bootstrap resampling method.

To control for the inflated probability of type I error, p values were adjusted with the *stats* package (R Core Team, 2016) using the false discovery rate method (Benjamini & Hochberg, 1995), as recommended by Cribbie (2007).

Figure 1

Graphical Representation of the Proposed Hypothesized Path Analysis



Note. SCS-SF = Self-Compassion Scale-Short Form; PANAS = Positive and Negative Affect Scale; MAIA = Multidimensional Assessment of Interoceptive Awareness; BISS = Body Image Shame Scale; EDI-3-RF = Eating Disorders Inventory-3 Referral Form.

3. RESULTS

3.1. DESCRIPTIVE CHARACTERISTICS OF THE SAMPLE

Table 1 shows all the sociodemographic and anthropometric characteristics of the sample as well as the self-reported variables.

Table 1*Sociodemographic and Anthropometric Characteristics of the Participants*

| | Confirmatory factor analysis (<i>n</i> = 440) | | | | Path analysis model (<i>n</i> = 398) | | | |
|----------------------------------|---|-------|----------|-----------|--|-------|----------|-----------|
| | <i>n</i> | % | <i>M</i> | <i>SD</i> | <i>n</i> | % | <i>M</i> | <i>SD</i> |
| Age | | | 23.74 | 5.11 | | | 23.95 | 5.19 |
| BMI | | | 22.06 | 3.37 | | | 22.05 | 3.42 |
| Underweight (BMI <18.5) | 42 | 9.33 | | | 37 | 9.3 | | |
| Normal weight | 334 | 74.22 | | | 294 | 73.86 | | |
| Overweight or obese (BMI > 25) | 74 | 16.44 | | | 67 | 16.83 | | |
| Country of birth | | | | | | | | |
| Spain | 429 | 97.50 | | | 390 | 98.0 | | |
| Other ^a | 11 | 2.50 | | | 8 | 2.0 | | |
| Marital status | | | | | | | | |
| Single | 370 | 84.10 | | | 332 | 83.4 | | |
| Married/partnered | 68 | 15.50 | | | 64 | 16.1 | | |
| Divorced/separated | 2 | 0.50 | | | 2 | 0.5 | | |
| Highest educational level | | | | | | | | |
| Primary school | 1 | 0.20 | | | 1 | 0.3 | | |
| Middle school | 122 | 27.70 | | | 107 | 26.9 | | |
| University/vocational training | 213 | 48.40 | | | 193 | 48.5 | | |
| Master's degree | 100 | 22.70 | | | 93 | 23.4 | | |
| PhD degree | 4 | 0.90 | | | 4 | 1.0 | | |
| Employment | | | | | | | | |
| Unemployed | 24 | 5.50 | | | 24 | 6.0 | | |
| Student | 284 | 64.50 | | | 254 | 63.8 | | |
| Employed | 126 | 28.60 | | | 114 | 28.6 | | |

| | | | | | | | |
|--------------------------|---|------|-------|-------|------|--|-------------|
| Other | 6 | 1.40 | | 6 | 1.50 | | |
| SCS-SF | | | 34.15 | 9.45 | | | 34.26 9.48 |
| PANAS positive | | | 30.64 | 8.20 | | | 30.8 8.18 |
| Body Trust (MAIA) | | | 3.63 | 1.20 | | | 3.64 1.20 |
| BISS | | | | | | | |
| Internal | | | 1.79 | 0.84 | | | 1.77 0.84 |
| External | | | 1.30 | 0.74 | | | 1.29 0.76 |
| Total | | | 1.55 | 0.76 | | | 1.53 0.77 |
| BSQ | | | 82.52 | 34.34 | | | 82.75 34.47 |
| OBCS (Body shame) | | | 3.67 | 1.33 | | | 3.66 1.35 |
| EDI-3-RF | | | 9.62 | 6.00 | | | 9.62 6.00 |

Note. BMI = Body Mass Index; SCS-SF = Self-Compassion Scale-Short Form; PANAS = Positive and Negative Affect Scale; MAIA = Multidimensional Assessment of Interoceptive Awareness; BISS = Body Image Shame Scale; BSQ = Body Shape Questionnaire; OBCS = Objectified Body Consciousness Scale; EDI-3-RF = Eating Disorders Inventory-3-Referral Form.

^a Reflects the number and percentage of participants who indicated that they came to Spain when they were younger than seven y.o.

3.2. PSYCHOMETRIC PROPERTIES OF THE SPANISH ADAPTATION OF THE BODY IMAGE SHAME SCALE (BISS)

Descriptive statistics for all the items on the BISS are shown in Table 2. BISS items' skewness values and kurtosis values indicated that there was no violation of normal distribution (Kline, 2005).

Table 2

Descriptive Statistics for all the Items on the BISS and Standardized Factor Loadings and Communalities of the Confirmatory Factor Analysis with a Two-factor Structure

| BISS item | M(SD) | Skewn | | Kurtosis | | Factor loadings | | h ² |
|--|-------------|-----------|------------|-----------|-----------|-----------------|----------------|----------------|
| | | ess index | ness index | sis index | sis index | Internal shame | External shame | |
| 1. Evito llevar ropa ajustada que ponga al descubierto mi figura [I avoid wearing tight clothes that reveal my body shape] | 1.75 (1.05) | 0.40 | -0.27 | -0.27 | -0.27 | .74 | .74 | .55 |
| 2. Evito situaciones sociales (salir de fiesta, etc.) por mi apariencia física [I avoid social situations (e.g., going out and parties) because of my physical appearance] | 0.84 (0.74) | 0.85 | 1.32 | 1.32 | 1.32 | .78 | .78 | .60 |
| 2. Me molesta ver mi cuerpo desvestido [It bothers me to see my body undressed] | 1.63 (1.00) | 0.45 | -0.03 | -0.03 | -0.03 | .84 | .84 | .71 |
| 4. Cuando veo mi cuerpo en el espejo siento que soy una persona defectuosa [When I see my body in the mirror I feel I am a defective person] | 1.61 (1.07) | 0.56 | -0.23 | -0.23 | -0.23 | .85 | .85 | .72 |
| 5. Escojo ropa que esconda partes de mi cuerpo que considero feas o desproporcionadas [I choose clothes that hide parts of my body that I consider ugly or disproportional] | 2.18 (1.13) | -0.02 | -0.81 | -0.81 | -0.81 | .78 | .78 | .60 |
| 6. La relación que tengo con mi cuerpo me impide tener una relación cercana con alguien [The relationship I have with my body prevents me from having an intimate relationship with someone] | 1.18 (0.94) | 0.81 | 0.58 | 0.58 | 0.58 | .74 | .74 | .55 |

| | | | | | |
|--|-------------|------|-------|-----|-----|
| 7. Presto mucha atención a los movimientos y postura de mi cuerpo con el fin de ocultar partes del cuerpo que no me gustan [<i>I pay close attention to the movements and posture of my body to hide parts that I do not like</i>] | 1.70 (1.07) | 0.36 | -0.50 | .70 | .49 |
| 8. Me siento mal conmigo misma cuando llevo ropa que enseña mi figura [<i>I feel bad about myself when I use clothes that reveal my body shape</i>] | 1.54 (0.96) | 0.60 | 0.30 | .92 | .85 |
| 9. Evito mover mi cuerpo (por ejemplo, bailar) en sitios públicos porque siento que así expongo mi apariencia física a ser criticada por los demás [<i>I avoid moving my body (for example, dancing) in public places because I feel I am exposing my physical appearance to the criticism of others</i>] | 1.05 (0.93) | 1.07 | 1.18 | .78 | .61 |
| 10. Me siento incomoda en situaciones sociales porque siento que la gente podría criticar mi figura [<i>I feel uncomfortable in social situations because I feel that people may criticize me because of my body shape</i>] | 1.42 (0.97) | 0.62 | 0.35 | .94 | .89 |
| 11. Hay partes de mi cuerpo que prefiero esconder [<i>There are parts of my body that I prefer to hide</i>] | 2.15 (1.02) | 0.06 | -0.60 | .86 | .75 |
| 12. Mi apariencia física me hace sentir inferior en comparación con los demás [<i>My physical appearance makes me feel inferior in relation to others</i>] | 1.80 (1.08) | 0.34 | -0.44 | .82 | .67 |
| 13. No me gusta hacer ejercicio frente a los demás ya que me da miedo cómo puedan evaluar mi cuerpo [<i>I do not like to exercise in front of others because I am afraid of how they might evaluate me</i>] | 1.49 (1.16) | 0.58 | -0.49 | .66 | .44 |
| 14. Mi apariencia física me hace difícil sentirme cómoda en situaciones sociales [<i>The relationship I have with my physical appearance makes it difficult for me to feel comfortable in social situations</i>] | 1.40 (0.93) | 0.49 | 0.01 | .84 | .71 |

Note. $N = 440$. $h^2 =$ communality coefficient. The extraction method was principal axis factoring with oblique (Promax with Kaiser Normalization) rotation. Reverse-scored items are denoted with an (R)

A two-factor CFA model was estimated and tested in the total sample. Results revealed that the model presented acceptable global fit indexes (see Table 3). The two BISS' subscales were positively and significantly correlated with each other ($r = .83, p < .001$). All items showed adequate standardized factor loadings and adequate communalities.

Regarding reliability, the BISS demonstrated adequate internal consistency in the present sample, both for the Internal BISS Subscale ($\alpha = .907, \omega = .907$) and for the External BISS Subscale ($\alpha = .886, \omega = .887$).

Regarding validity, Pearson's correlation coefficients showed adequate construct validity. In the case of the "internal body shame" of the BISS, there were positive and significant correlations with: the OBCS ($r = .72, p < .001$), the BSQ ($r = .77, p < .001$), and the EDI-3-RF ($r = .66, p < .001$). Regarding the "external body shame", there were positive and significant correlations with the OBCS ($r = .63, p < .001$), the BSQ ($r = .67, p < .001$), and the EDI-3-RF ($r = .56, p < .001$).

Table 3

Fit Indexes for the Confirmatory Factor Analysis (CFA) of the Spanish version of the BISS with a Two-factor Structure (n = 440) and the Path Analysis Models (n = 398)

| | χ^2 | <i>df</i> | <i>p</i> | CFI | SRMR | RMSEA | RMSEA [90% CI] |
|----------------------|----------|-----------|----------|-------|-------|-------|----------------|
| CFA | 987.190 | 76 | <.001 | 0.972 | 0.056 | 0.165 | [.156, .174] |
| Path analysis | 36.279 | 3 | <.001 | 0.972 | 0.051 | 0.167 | [.121, .218] |

Note. BISS = Body Image Shame Scale; χ^2 = Satorra-Bentler corrected Chi-Square statistic; *df* = degrees of freedom; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of approximation; RMSEA [90% CI] = Root mean squared error of approximation with a 90% Confidence Interval.

3.3. THE PROTECTIVE ROLE OF SELF-COMPASSION IN THE RISK OF ED: THE MEDIATION ROLE OF POSITIVE AFFECT, BODY TRUST, AND BODY SHAME

Pearson's correlations between all the variables included in the path analysis model are shown in Table 4.

Table 4

Pearson Correlations Between SCS-SF, PANAS, MAIA (Body Trust), BISS (Internal and External Dimensions) and EDI-3-RF (n = 398)

| | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------------------|---------|---------|---------|--------|--------|--------|
| 1. Self-compassion (SCS-SF) | - | | | | | |
| 2. Positive affect (PANAS) | .50*** | - | | | | |
| 3. Body trust (MAIA) | .55*** | .44*** | - | | | |
| 4. Internal body shame (BISS) | -.45*** | -.34*** | -.53*** | - | | |
| 5. External body shame (BISS) | -.45*** | -.37*** | -.51*** | .83*** | - | |
| 6. Risk of ED (EDI-3-RF) | -.48*** | -.37*** | -.52*** | .67*** | .57*** | - |
| <i>M</i> | 34.26 | 30.80 | 3.64 | 1.77 | 1.29 | 9.62 |
| <i>(SD)</i> | (9.48) | (8.18) | (1.20) | (0.84) | (0.75) | (6.00) |

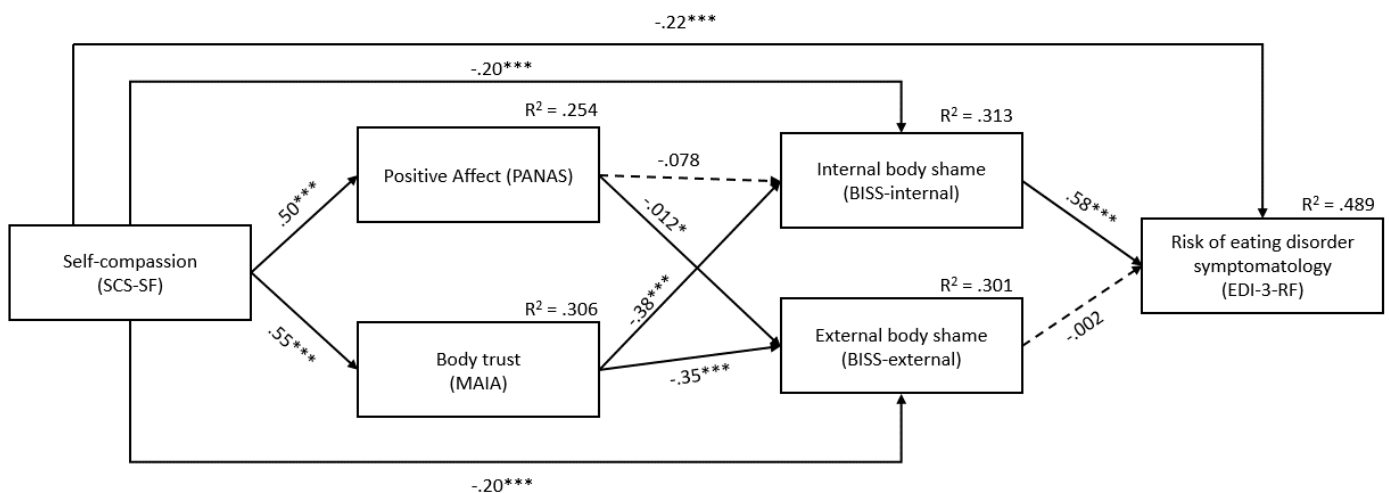
Note. SCS-SF = Self-Compassion Scale-Short Form; PANAS = Positive and Negative Affect Scales; MAIA = Multidimensional Assessment of Interoceptive Awareness; BISS= Body Image Shame Scale; EDI-3-RF = Eating Disorders Inventory-3-Referral Form. *** $p < .001$.

To test the main hypothesis of this study, framed in theoretical assumptions, a path analysis was initially specified and tested (Figure 1). Overall fit of the path model was acceptable. Standardized regression coefficients of the hypothesized model are depicted in the Figure 2.

The model also tested four indirect effects, in which only one was significant: a) *indirect effect 1*: SCS → MAIA → Internal BISS → EDI-3-RF, $\beta = -0.122$, $SE = 0.023$, $p < .001$, 90% [-0.17, -0.76]. The remaining indirect effects were not significant: b) *indirect effect 2*: SCS → PANAS → Internal BISS → EDI-3-RF, $\beta = -0.023$, $SE = 0.014$, $p = .114$, 90% [-0.05, .005]; c) *indirect effect 3*: SCS → MAIA → External BISS → EDI-3-RF, $\beta = 0.001$, $SE = 0.012$, $p = .972$, 90% [-0.024, 0.024]; d) *indirect effect 4*: SCS → PANAS → External BISS → EDI-3-RF, $\beta = 0.001$, $SE = 0.004$, $p = .972$, 90% [-0.007, 0.008].

Figure 2

Graphical Representation of the Final Path Analysis



Note. SCS-SF = Self-Compassion Scale-Short Form; PANAS = Positive and Negative Affect Scale; MAIA = Multidimensional Assessment of Interoceptive Awareness; BISS = Body Image Shame Scale; EDI-3-RF = Eating Disorders Inventory-3 Referral Form. The dashed lines represent nonsignificant effects. * $p < .05$. *** $p < .001$.

4. DISCUSSION

Although a large body of research has thoroughly examined the relationship between self-compassion and ED (e.g., Braun et al., 2016; Linardon, 2021; Siegel et al., 2020), little is known about the underlying mechanisms between the self-compassion's protective role and the risk of ED. Thus, the goal of the current study was to explore the protective role of self-compassion in the risk of ED via its relationship with positive affect, body trust, and body shame. To carry out the main goal, firstly, we examined the psychometric properties of the Spanish version of the Body Image Shame Scale (BISS; Duarte et al., 2015) in a large sample of Spanish women from the general population.

With regard to the psychometric properties of the Spanish version of the BISS, the two-factor structure (internal and external body image shame) provided an adequate fit, supporting the original two-factor solution (Duarte et al., 2015). As for reliability and construct validity, internal consistency and convergent validity analyses showed that the BISS is a reliable and valid Spanish self-report for measuring the external and internal dimensions of body shame in a non-clinical Spanish female sample.

Regarding the proposed path analysis model, the results corroborated (H1) the direct association between self-compassion and the risk of ED, providing more support for self-compassion's protective role against poor body image and ED (Braun et al., 2016; Ferreira et al., 2014; Linardon, 2021). However, in the tested model, there were several significant indirect effects that accounted for 48.9% of the explained variance in the lower risk of ED symptomatology. Thus, (H2) higher self-compassion was associated with higher positive affect and increased body trust; whereas body trust was negatively associated with body shame (external and internal) and, partly confirming our hypothesis, positive affect was negatively associated with external body shame (but not internal body shame).

In relation to the association of self-compassion with affective states, as expected, the results add more evidence in favor of the research that establishes

the role of self-compassion as an emotional regulation strategy (e.g., Neff et al., 2007; Polivy & Herman, 2002; Sirois et al., 2015). To regulate one's emotional state, self-compassion can activate the positive affective system (i.e., contentment, safety), which leads to responding to threatening or aversive stimuli (e.g., shame or criticism) in a self-soothing way (Goss & Gilbert, 2014; Svendsen et al., 2016). Nonetheless, regarding its association with body shame (internal and external), our hypothesis was partially confirmed as positive affect was negatively associated only with external (vs. internal) body shame. Thus, the increase in positive emotional states has been related to reduced perception of negative social evaluation of one's appearance (i.e., external body shame) (Germer & Neff, 2013). Being the internal body shame more closely linked to the self (e.g., self-evaluating oneself as flawed or inadequate) and associated with strong feelings of self-criticism or self-hatred (Tangney, 1995), other variables with the potential protective role on the internal body shame should be explored.

Related to this, body trust has been found to be positively associated with self-compassion and negatively with body shame (internal and external). Whereas lack of trust in the body's sensations has been associated with greater body shape and weight concerns (Brown et al., 2017; Monteleone et al., 2020) and an increase in feelings of body shame (Burgard, 2009), identifying one's body as "safe" and "trustworthy" has been associated with several positive body image dimensions (Brown et al., 2017; Todd et al., 2019). The practice of self-compassion has been shown to lead to the activation of the self-soothing system, which is responsible for feelings of safety and the promotion of secure attachment (Bartnett & Sharp, 2016; Raque & Bogdan et al., 2016), making it possible to assess and listen to the interoceptive signals (e.g., feeling hunger) in a self-kind and non-critical manner.

Lastly, (H3) self-compassion was also associated with a decrease in body shame (external and internal) providing supporting evidence to the protective role of mindful and self-kind relationship when encountering body-threats (e.g., comparing oneself to the thin-ideal) (Braun et al., 2016; Turk & Waller, 2020). Furthermore, one of the most salient findings of the present model was that (H4)

only internalized body shame (vs. externalized) was significantly associated with the likelihood of ED development, partially confirming our hypothesis. That is, becoming one's own judge (i.e., an inner critical voice about one's shortcomings) (Gilbert, 1998; 2003) and the subsequent attempt to correct and improve the self (Gilbert & Irons, 2009; Gilbert & Procter, 2006) represent the type of shame may contribute to the development of disordered eating habits. This result is supported by previous research that has found a link between perceiving oneself as flawed or inadequate (i.e., the core component of internal body shame) and a greater probability of developing ED (e.g., Fennig et al., 2008; Ferreira et al., 2014; Mendes & Ferreira, 2020).

Taking the findings of the mediational model together, self-compassion was negatively related to the risk of ED and body shame. In addition, the results indicate that the effect of the protective role of self-compassion is associated with fostering of positive emotions and with the increase of the feelings of safety in one's body (Bartnett & Sharp, 2016; Todd et al., 2019). Regarding the role of body shame, the results highlight the importance of focusing on the internal body image shame (vs. external) due to its relationship with the risk of ED.

Although the present study offers several valuable insights into the relationship between self-compassion and ED risk, certain limitations should be considered. First, given the cross-sectional and correlational nature of the data, inferences about causality cannot be made. Thus, longitudinal and experimental studies are needed to further clarify the mechanisms that underlie the protective role of self-compassion and the risk of ED, and to test the reciprocal relationships among self-compassion, underlying mechanisms, and risk of ED. Recently, Linardon and Messer (2022) concluded in a 8-month longitudinal study that self-compassion and eating pathology showed reciprocal and invers relationships, but more research is needed to add robustness to this finding. Furthermore, only women from the general population were included in the present study, and given the growing number of males suffering from ED (e.g., Bomben et al., 2022; Mitchison & Mond, 2015), further research with men is needed. Additionally, these

mechanisms should also be researched in clinical samples to further establish the validity of the model. Finally, it is worth noting that the study participants were self-selected; therefore, the sample composition may not represent the characteristics of the general Spanish female population.

Despite the aforementioned limitations, this study has relevant implications for the clinical field of ED in terms of the protective role of self-compassion. First, the study provides evidence of the psychometric robustness of the Spanish version of the BISS for use with women from the general population. Second, and more importantly, the current study makes key contributions by confirming the direct and, mainly, an indirect association of self-compassion with ED risk via positive affect, body trust and internal body shame. The findings support self-compassion-based intervention approaches (e.g., Albertson et al., 2015; Rodgers et al., 2018; Toole & Craighead, 2016) that focus on overcoming the potential risk of ED by cultivating a mindful, self-kind, and nonjudgmental attitude towards oneself. Nonetheless, even though the existing compassion-based interventions for ED have been found to have promising results (Turk & Waller, 2020), they do not necessarily target the specific underlying components associated with the protective role of self-compassion. The focus on the promotion of trust in one's bodily sensations, as well as the ability to generate positive emotional states and decrease of negative self-evaluation regarding one's physical appearance (i.e., lower internal body shame), could be relevant self-compassion-related therapeutic targets to reduce the high risk of ED (e.g., Braun et al., 2016; Todd et al., 2019; Turk & Waller, 2020).

Furthermore, given the compelling evidence about the role of a positive body image in numerous physical and psychological health benefits (e.g., Avalos & Tylka, 2006; Cook-Cottone, 2015; Tylka, 2018), future intervention programs should not only reduce the negative body image (e.g., decreasing body shame), but also promote acceptance and respect towards one's body (e.g., body appreciation or body flexibility). The focus on evaluating and intervening in these

variables could increase the probability of women developing more positive, long-lasting, and non-judgmental attitudes toward their bodies (Braun et al., 2016).

In summary, this study contributes to the growing body of evidence linking self-compassion to ED risk by being one of the first to examine the role of the underlying mechanisms associated with cultivating a positive body image. Thus, when one is confronted with experiences that could promote internal body shame, cultivating a mindful, self-kind, and nonjudgmental attitude towards oneself by fostering positive affect, paying closer attention to how the body feels and trusting these bodily states may reduce the risk of developing ED symptomatology.

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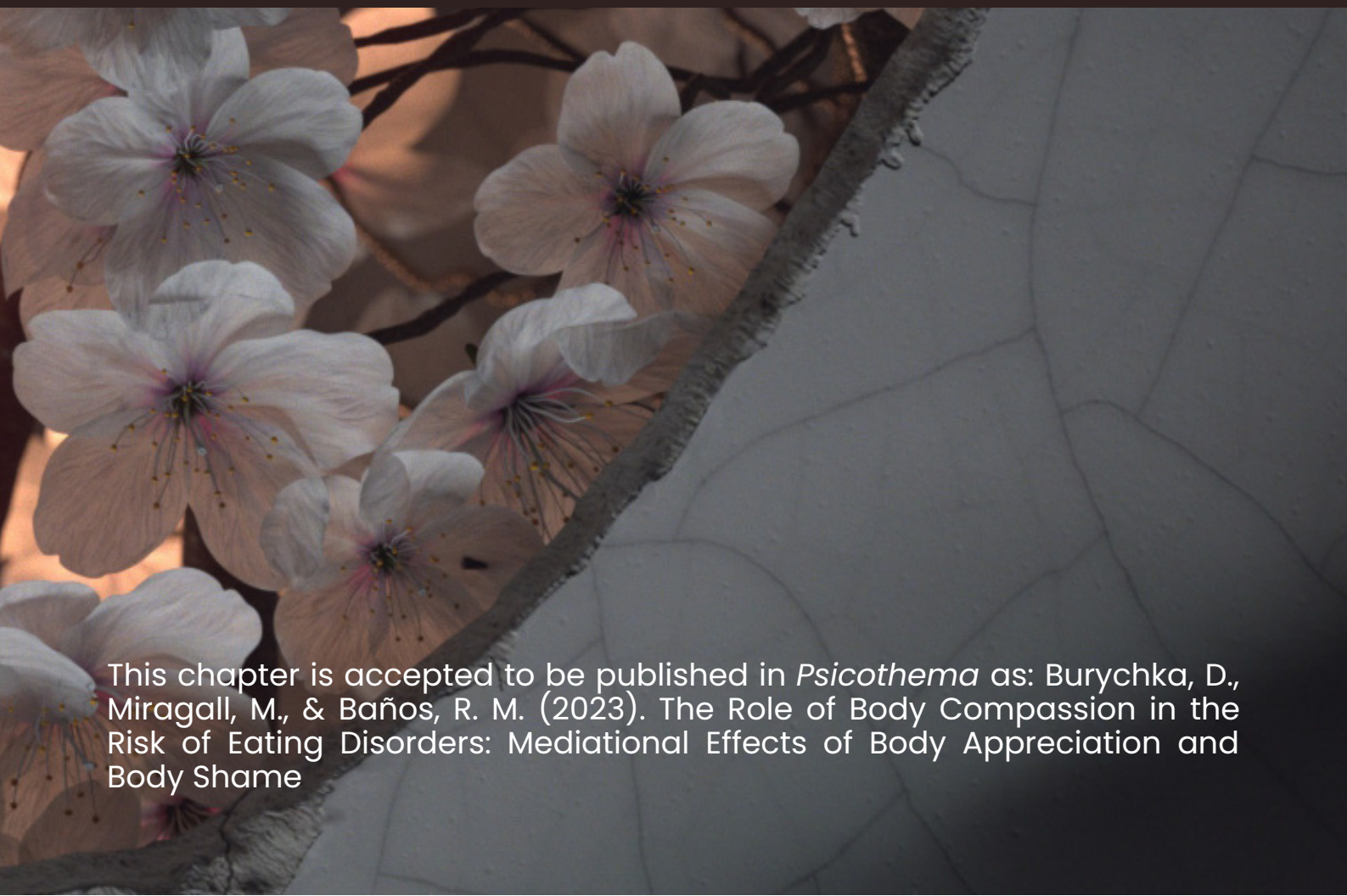
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CHAPTER 6

Study 5. The Role of Body Compassion in the Risk of Eating Disorders: Mediation Effects of Body Appreciation and Body Shame



This chapter is accepted to be published in *Psicothema* as: Burychka, D., Miragall, M., & Baños, R. M. (2023). The Role of Body Compassion in the Risk of Eating Disorders: Mediation Effects of Body Appreciation and Body Shame

RESUMEN

Antecedentes: La compasión hacia el cuerpo (CC) es un factor protector en el campo de los trastornos alimentarios (TA) que se ha asociado con una mayor apreciación y una menor vergüenza corporales. Sin embargo, se necesitan más estudios para desentrañar el papel protector de la CC en el riesgo de TA. Los objetivos fueron examinar (1) las propiedades psicométricas de la adaptación española de la Escala de Compasión hacia el cuerpo y (2) si la apreciación y la vergüenza corporales eran mediadoras entre la CC y el riesgo de TA. **Método:** 288 mujeres (rango: 18-40 años; $M = 24.65 \pm 5.02$) de la población general española cumplieron cuestionarios online. **Resultados:** La escala era fiable y válida. Un modelo de mediación serial-paralelo confirmó el papel protector de la CC y la apreciación corporal sobre la vergüenza corporal y el riesgo de TA, explicando el 68,88% de la varianza. **Conclusiones:** Los resultados indican que las mujeres que presentan mayor CC tienden a mostrar mayor apreciación corporal, lo que conduce a una menor vergüenza corporal interna y un menor riesgo de TA. Estos resultados apoyan la necesidad de promover una relación positiva y compasiva con el cuerpo con el fin de prevenir TA.

Palabras clave: Compasión corporal, vergüenza corporal, mediación serial-paralela, apreciación corporal.

ABSTRACT

Background: Body compassion is a protective factor in the field of eating disorders (ED) that has been associated with higher body appreciation and lower body shame. However, more studies are needed in order to disentangle the protective role of compassion in regard to the risk of ED. The aims were to analyze (1) the psychometric properties of the Spanish adaptation of the Body Compassion Scale (BCS) and (2) whether body appreciation and body shame were mediators in the relationship between body compassion and the risk of ED. **Method:** 288 women (range: 18-40 years old; $M = 24.65 \pm 5.02$) from the general Spanish population filled in online questionnaires. **Results:** Spanish adaptation of the BCS was reliable and valid. Results of a serial and parallel mediation model confirmed the protective role of body compassion and body appreciation on body shame and the risk of ED, accounting for 68.88% of the variance. **Conclusions:** Findings indicate that women who present higher body compassion tend to show higher body appreciation, which leads in turn to lower internal body shame and lower risk of ED. These results support the need to develop a positive and compassionate relationship with one's body, in order to prevent ED.

Keywords: Body compassion, body shame, serial-parallel mediation, body appreciation.

1. INTRODUCTION

A large body of research has evidenced the role of compassion in diverse mental health problems, especially, in eating disorders (ED) (Ferrari et al., 2019; Turk & Waller, 2020). In the field of body image (BI), the self-compassion role has been related to the promotion of positive affect and positive BI dimensions (Albertson et al., 2015; Ziemer et al., 2019), as well as the decrease in the negative BI features (Kelly & Waring, 2018; Piran, 2015), leading to a lower risk of ED (Turk & Waller, 2020). Nonetheless, during the last few years, there has been a surge in interest in the field of BI on the novel concept of compassion towards the body (Altman et al., 2020).

While the self-compassion construct includes the concepts of common humanity or kind acceptance from a more general trait-level stance (Neff, 2003; Mills et al., 2022), body compassion (BC) shifts the focus to the role of compassion directed specifically towards one's own body, merging the constructs of BI (Cash, 2000) and compassion (Neff, 2003). This construct is composed of 3 factors (Altman et al., 2020): (1) *defusion* (i.e., decentering from painful thoughts rather than over-identifying thoughts of one's body limitations or inadequacies); (2) *common humanity* (i.e., the ability to face one's negative BI-experiences as part of a human experience rather self-isolating); and (3) *acceptance* (i.e., acceptance of the body and body-related painful thoughts and feelings). Despite the scarce study of this construct, BC has already been favorably linked to positive BI (e.g., body flexibility) (Altman et al., 2017), and also to lesser BI disturbance (e.g., feeling of body shame or disordered eating patterns) (Barata-Santos et al., 2019; Oliveira et al., 2018). Additionally, similarly to self-compassion, BC also has been associated with higher positive affect, such as feeling determined or inspired (Altman et al., 2020).

Self-compassion-focused interventions have been shown to promote positive BI and decrease negative BI (Ferrari et al., 2019; Turk & Waller, 2020). Hence, directing compassion specifically toward the body could be a valuable

element on the way to more effective ED prevention and treatment approaches (Oliveira et al., 2018), as they may explicitly focus on one's appearance (vs. the general "self") when promoting a kind, accepting and non-judgmental attitude towards oneself (Altman et al., 2020). In recent years, the constructs of self-compassion and BC have been closely related to positive BI (Tylka & Wood-Barcalow, 2015), but more studies are needed to delineate the role BC plays in the risk factors of ED, as well as the underlying mediators of this relationship.

In this regard, body appreciation has emerged as a promising protective mechanism in relation to ED (Oliveira et al., 2017; Tylka & Wood-Barcalow, 2015), which promotes a positive relationship regarding one's body. This construct has been conceptualized as the attitude of holding favorable opinions about one's body regardless of perceived physical imperfections while paying attention to how the body feels, engaging in healthy behaviors, and rejecting unreasonable beauty ideals (Avalos et al., 2005). Body appreciation has been widely linked to positive psychological constructs (Tylka, 2019), particularly those related to the adaptive emotional regulation processes (Marta-Simões & Ferreira, 2019; Ramos-Martins et al., 2021). Moreover, body appreciation has also been negatively associated with the risk of ED (Avalos et al., 2005; Linardon et al., 2020). Specifically, it has been associated with reduced body-based social comparison (Siegel et al., 2020), or reduced thin-ideal internalization (Halliwell et al., 2015). The practice of a mindful and non-judgmental attitude towards one's experiences could lead to a more balanced and appreciative (vs. the judgmental) relationship with one's own body (e.g., Andrew et al., 2016; Homan & Tylka, 2015). Additionally, taking into consideration Webb et al.'s affect regulation framework (2014) or the research conducted by Homan and Tylka (2015), self-compassion along with body appreciation is promoting more adaptive emotional strategies when facing BI-related threats. However, more studies regarding these constructs are needed in order to disentangle the protective role of compassion and positive BI-related constructs in dealing with the risk of ED.

In a similar line, BI-focused shame has recently arisen as one of the widely acknowledged predictors of ED (Nechita et al., 2021). Body shame -a painful self-conscious emotion- is developed from negative feelings towards one's own body and perceiving its characteristics as unattractive and/or inadequate (Duarte et al., 2015). The construct has been divided into two dimensions (Duarte et al., 2015): external body shame, which is experienced when a person perceives that their bodily features (e.g., overweight) could be rejected by others; and internal body shame, which occurs when the individual internalizes other's negative views of their body and perpetuates self-devaluating judgment of one's own body.

According to the Objectification theory (Fredrickson & Roberts, 1997), BI-focused shame arises when the individual fails to meet the internalized thin-body ideals, leading to the activation of the maladaptive emotion regulation processes (e.g., body surveillance) (e.g., Duarte et al., 2016; Oliveira et al., 2017) in order to decrease distress (e.g., Gilbert & Miles, 2002). In the long term, these responses have been associated with feelings of insecurity, and overall, a greater risk of psychopathology (see Gilbert & Miles, 2002). In contrast, the self-compassion practice may adaptively decrease shame (Braun et al., 2016) through the activation of the self-soothing system (Gilbert, 2014). However, in order to advance the field of research on BI and identify new protective factors that could effectively prevent ED, it is necessary to conduct further studies and investigations. In the current study, we focus on examining the protective role of BC (not general self-compassion), and its potential mediators, on the risk factors of ED. Despite being a novel construct, BC could enable the inclusion of a body-specific compassionate perspective (e.g., the body acceptance subscale of the BCS) (Oliveira et al., 2018), which may be of particular interest in therapies that approach specific body-related risk factors (e.g., BI-related shame).

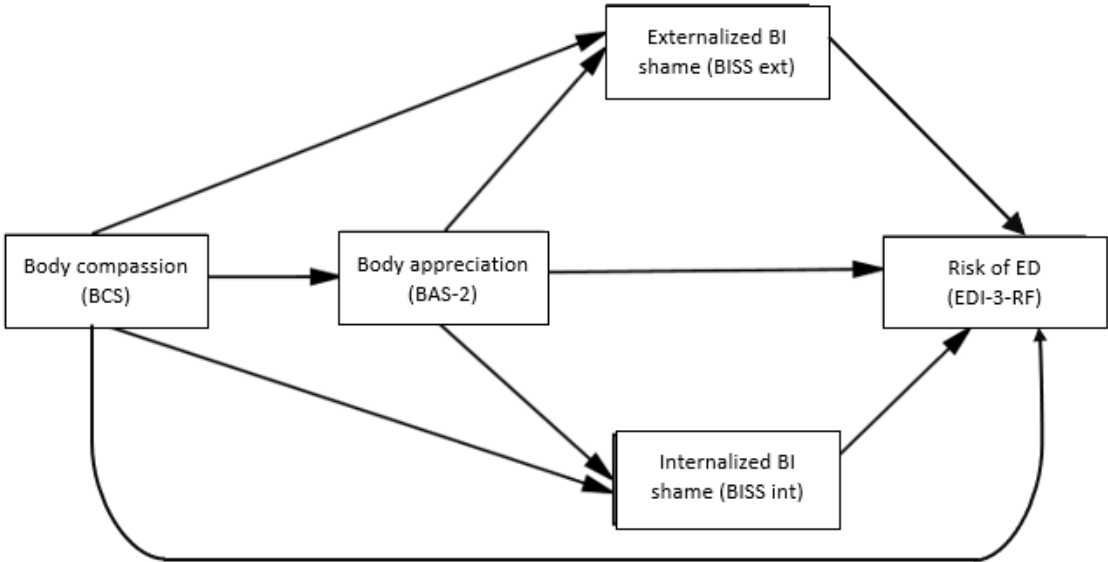
Firstly, as the questionnaire designed to measure BC has not been validated in Spanish, we tested the psychometric properties of the Body Compassion Scale (BCS; Altman et al., 2020) to confirm its three-factor structure in a sample of Spanish women. To our knowledge, no research on the psychometric qualities of

BCS has been conducted in the Spanish-speaking population and there is a need to have validated measurements for this novel construct that could allow a deeper understanding of the role of BC in the prevention of EDs. Moreover, we expected the construct of BC to show good convergent validity with positive BI measures (e.g., body appreciation) and divergent validity with negative BI-related measures (e.g., risk of developing EDs).

Secondly, we aimed to explore whether BC, mediated by body appreciation, plays a protective role in EDs' risk through body shame (see Figure 1). To this end, based on the findings of previous studies, we set up the following hypotheses: (H_{1a}) BC will be directly and negatively associated with body shame and (H_{1b}) the risk of ED, and (H_2) body appreciation and BI shame will mediate the relationship between BC and risk of ED.

Figure 1

Proposed Serial-parallel Mediation Model



Note. BCS= Body Compassion Scale; BAS-2 = Body Appreciation Scale-2; BISS = Body Image Shame Scale; EDI-3-RF = Eating Disorders Inventory-3 Referral Form; BI = Body Image; ED = Eating Disorders.

2. METHOD

2.1. PARTICIPANTS

The sample was comprised of 288 Spanish women from the general population ($M_{Age} = 24.65$; $SD_{Age} = 5.02$; $M_{BMI} = 21.93$; $SD_{BMI} = 2.88$). Participants were excluded from the study if they had a history of ED, were under 18 or over 40 years old, had a Body Mass Index (BMI) below 17 or above 34.9, or came to Spain when they were more than 7 years old. Participants' data were deleted if they failed at least one out of the four embedded "attentional control questions" (e.g., "Respond 5 if you are reading this").

All the participants provided their informed consent before filling out the questionnaires, in accordance with the Declaration of Helsinki. The study was approved by the Ethics Committee of the University of Valencia (Procedure number: 1127840).

2.2. INSTRUMENTS

As a first step of the survey, all participants provided their sex, age (in years), marital status, education level, employment status, height, and weight. BMI was calculated by dividing current weight (in *kg*) by height squared (in *m*).

Risk of ED. The Eating Disorder Inventory-Referral Form (EDI-3-RF; Garner, 2004; Elosua et al., 2010). The EDI-3-RF is composed of 25 items with a 6-point Likert scale (1 = *always*; 6 = *never*). It was designed to measure EDs' risk and can be administered in non-clinical and clinical settings. The Spanish validation showed good internal consistency in the non-clinical sample. In our sample, Cronbach's alphas for the three dimensions were .91, .85, and .87, respectively.

Self-compassion. The Self-Compassion Scale–Short Form (SCS-SF, Raes et al., 2011; Garcia-Campayo et. Al., 2014). This scale is a 12-item

designed to measure the tendency to treat oneself with kindness, recognize common humanity, and be mindful when considering negative aspects of oneself on a 5-point Likert scale (1 = *almost never*; 5 = *almost always*). As in the Spanish validation ($\alpha = .85$), in the present study the SCS-SF showed good internal consistency ($\alpha = .87$).

Objectified body consciousness. The Internal body orientation subscale of the Objectified Body Surveillance Scale (OBCS; McKinley & Hyde, 1996; Moya-Garófano et al., 2017). The Body Surveillance factor of the OBCS scale has 8 items to be rated on a 7-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*). If inversed, higher scores of the subscale correspond to greater “internal body orientation” (Homan & Tylka, 2014, p.101) or body functionality, which is focused on the body’s physical capacities and internal processes (Alleva et al., 2015). The Spanish version of the subscale questionnaire showed adequate reliability (α between .68 and .73). In the present study, Cronbach’s alpha for body surveillance was acceptable ($\alpha = .77$).

Body appreciation. The Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015; Swami et al., 2017). The BAS-2 measures an individual’s acceptance of the body, respect for, and positive opinions towards her/his body. Its 10 items are rated on a 5-point Likert scale (1 = *never*; 5 = *always*). As in the Spanish validation ($\alpha = .94$), in the present study the BAS-2 showed excellent internal consistency ($\alpha = .94$).

Body compassion. The Body Compassion Scale (BCS; Altman et al., 2020; Spanish translation conducted by the authors). The BCS assesses the feeling of self-compassion towards one’s own body: (1) *Defusion* (e.g., “When I notice aspects of my body that I do not like, I get down on myself”), (2) *Common Humanity* (e.g., “When I am concerned if people would consider me good-looking, I remind myself that most everyone has the same concern.”) and (3) *Acceptance* (e.g., “I am accepting of my looks just the way they are.”). BCS consists of 23 items to be rated on a Likert scale (1 = *almost never*; 5 = *almost always*), with total scores ranging from 23 to 115. In the present study, participants completed a

Spanish translation of the BCS obtained using the parallel back-translation procedure. A bilingual translator not affiliated with the study translated the obtained items from English to Spanish until obtaining full consensus among the authors. The original version of the questionnaire obtained good results in terms of validity and reliability, showing excellent internal consistency for the total score ($\alpha = .92$) and the subscales (Defusion: $\alpha = .92$; Common Humanity: $\alpha = .91$; Acceptance: $\alpha = .87$). The BCS was translated into Spanish using the forward and backward translation technique. Two separate multilingual specialists translated the BCS into Spanish while retaining the semantic equivalence between English and Spanish during the procedure. The back-translated version was always edited in accordance with the original theoretical definition of each of the scale's dimensions taking into consideration the principles of content validity. The final version of the questionnaire was translated into English by an expert translator. All the authors of this article evaluated and approved the back-translated version. The Spanish validation of the BCS can be found at <https://osf.io/fpu6t/>.

BI-focused shame. The Body Image Shame Scale (BISS; Duarte et al., 2015; Spanish translation conducted by the authors). The BISS is a 14-item instrument, rated on a 5-point Likert scale (0 = *never*; 4 = *almost always*), designed to measure BI-focused shame and its phenomenology. This measure includes two subscales: *external BI shame*, and *internal BI shame*. The BISS's global score reliability was found to be excellent in the original version ($\alpha = .92$), as well as for the internal ($\alpha = .92$) and external ($\alpha = .90$) BI shame. In the current study, Cronbach's alphas were also adequate ($\alpha = .93$ for the total score; $\alpha = 0.89$ for the internal BI shame; $\alpha = .88$ for the external BI shame). The translation of BISS to Spanish was carried out as a part of its validation, following the same aforementioned steps as the BCS (Altman et al., 2020).

2.3. PROCEDURE

The sample was recruited from the general population. Self-report measures were presented in online and paper-and-pen forms depending on the provenance of the sample. The measures were not filled out in the presence of the authors. Online forms were provided as a link to the online survey portal “LimeSurvey”.

Part of the sample ($n = 100$) was recruited from a Laboratory for Research in Behavioral Experimental Economics (LINEEX) online platform, which works as a pool recruitment service that provides opportunities to complete online questionnaires for monetary compensation. Interested participants were directed to an online link and, after its completion, were paid 5 euros. Other participants ($n = 188$) were recruited from the University of Valencia, as well as social networks. By taking part in the study, these participants entered a raffle for 3 gift experience boxes (valued at 30 euros each). Hence, we did not expect differences across two different samples as both received a reward. Moreover, to control the potential error associated with careless or nonsensical responses, four “attentional control questions” were inserted following Tylka and Wood-Barcalow’s (2015) procedure.

2.4. DATA ANALYSES

Statistical analyses were performed using the software SPSS v.26. Descriptive analyses were carried out to examine sample demographics. Univariate normality was examined by the Skewness and Kurtosis (West et al., 1995), which indicated that there was no severe violation of the normal distribution (Kline, 2005). To test the construct validity, Pearson correlation tests were conducted among Spanish versions of BCS, SCS-SF, and BMI. In addition, we assessed the nomological validity of the BCS considering the Objectification Theory (Fredrickson & Roberts, 1997) and the relationships found in the literature between BC, body appreciation, the internal orientation of OBCS, body shame,

and self-compassion (e.g., Alleva et al., 2020; Homan & Tylka, 2014) through Pearson's correlations.

Furthermore, the explorative factor analysis (EFA) was performed to determine the factorial validity of the BCS using the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. Cronbach's alpha was used to determine the internal consistency reliability of the BCS.

The hypothesized relationships between the variables (BC, body appreciation, body shame, and risk of ED) were analyzed using the PROCESS function, V3.5, in IBM SPSS, V.28 (Hayes, 2018). First, PROCESS model 81 was used to estimate serial-parallel mediation effects while including age and BMI as covariates. Nonparametric analyses using 5,000 bootstrapped samples were applied to estimate 95% confidence intervals for indirect effects and mediational effects. This model allowed us to test the specific indirect effect of BC on the dependent variable (risk of ED) through body appreciation (as the primary mediator) and body shame (as the secondary mediator). As PROCESS requires complete data, only the sample that completed all the measures ($n = 199$) was included through the listwise deletion in the serial-parallel mediation analysis.

3. RESULTS

3.1. DESCRIPTIVE CHARACTERISTICS OF THE SAMPLE

All the characteristics of the sample as well as the self-reported variables used to perform the exploratory factor analysis ($n = 288$) and the serial-parallel mediation model ($n = 199$) can be found in the Table 1. Besides the differences in the EDI-3-RF scores, there were no significant differences between the two samples (see Table S1 at <https://osf.io/fpu6t/>).

Table 1*Sociodemographic and Anthropometric Characteristics of the Participants*

| | Exploratory factor analysis (n = 288) | | Serial-parallel mediational model (n = 199) | |
|---|--|--------------|--|--------------|
| | % | M(SD) | % | M(SD) |
| Age | | 24.65(5.03) | | 24.87(5.21) |
| BMI | | 21.94(2.89) | | 22.14(2.95) |
| Underweight (BMI < 18.5) | 7.29 | | 6.53 | |
| Normal weight | 77.08 | | 75.38 | |
| Overweight or obese (BMI > 25) | 15.62 | | 18.09 | |
| Country of birth | | | | |
| Spain | 94.79 | | 93.97 | |
| Other ^a | 5.2 | | 6.03 | |
| Marital status | | | | |
| Single | 86.1 | | 85.4 | |
| Married/partnered | 13.2 | | 18.6 | |
| Divorced/widowed | 0.7 | | 0 | |
| Highest educational level | | | | |
| Middle school | 23.6 | | 21.1 | |
| University/vocational training | 45.8 | | 47.2 | |
| Master's degree | 28.1 | | 29.1 | |
| PhD degree | 2.4 | | 2.5 | |
| Employment | | | | |
| Unemployed | 9.7 | | 11.1 | |
| Student | 59.0 | | 56.8 | |
| Employed | 29.5 | | 30.2 | |
| Other | 1.7 | | 2.0 | |
| Self-compassion (SCS-SF) | | 34.95(9.41) | | 34.88(8.79) |
| Internal Body Orientation (OBCS) | | 3.50(1.02) | | 3.53(1.00) |
| Body Appreciation (BAS-2) | | 3.47(0.81) | | 3.64(1.20) |
| BISS | | | | |
| Internal | | 1.72(0.83) | | 1.69(0.88) |
| External | | 1.21(0.78) | | 1.10(0.82) |
| Total | | 1.47(0.77) | | 1.39(0.81) |
| BC (BCS) | | | | |
| Defusion | | 28.50(7.76) | | 28.59(7.76) |
| Common Humanity | | 24.28(7.57) | | 23.68(7.90) |

| | Exploratory factor analysis (<i>n</i> = 288) | | Serial-parallel mediational model (<i>n</i> = 199) | |
|-----------------------------------|--|------------------------|--|------------------------|
| | % | <i>M</i> (<i>SD</i>) | % | <i>M</i> (<i>SD</i>) |
| Acceptance | | 17.76(4.83) | | 17.65(4.81) |
| Total | | 70.54(14.33) | | 69.92(13.99) |
| Body dissatisfaction (BSQ) | | 83.30(34.99) | | 83.40(35.11) |
| Risk of ED (EDI-3-RF) | | 24.24(19.64) | | 28.55(20.05) |

Note. BMI = Body Mass Index; SCS-SF = Self-Compassion Scale-Short Form; OBCS = Objectified Body Consciousness Scale; BAS-2 = Body Appreciation Scale-2; BISS = Body Image Shame Scale; BC = Body Compassion; BCS = Body Compassion Scale; BSQ = Body Shape Questionnaire; EDI-3-RF = Eating Disorders Inventory-3 Referral Form. ^a Percentage of participants answering that they came to Spain when they were less than 7 y.o.

3.2. PSYCHOMETRIC PROPERTIES OF THE SPANISH ADAPTATION OF THE BODY COMPASSION SCALE (BCS)

The KMO = .91 exceeded the recommended value of .60 (Kaiser, 1974), and Bartlett's Test of Sphericity, $\chi^2(253) = 4188.09, p < .001$, revealed that the data were appropriate to perform an EFA. Parallel analysis (Horn, 1965), using a macro for SPSS (O'Connor, 2000), determined that three factors should be retained. Items with communalities less than 0.2 were excluded from the EFA (Munro, 2005). The maximum likelihood factorial rotation with three factors using oblique rotation "oblimin" was carried out, accounting for 61.41% of the total variance. The factorial solution showed that all the items had minimum factor loadings above ≥ 0.40 , and the derived factors were labeled based on Altman et al. (2020): (1) Defusion; (2) Common Humanity; and (3) Acceptance (see Table 2). Skewness and kurtosis for all the items are shown in Table S2 of the Supplemental Materials (see <https://osf.io/fpu6t/>).

The internal consistency of the BCS was good for the total score ($\alpha = .89$) as well as for Defusion ($\alpha = .89$) and Common humanity ($\alpha = .89$); and excellent for the Acceptance subscale ($\alpha = .93$). All subscales showed a strong significant positive correlation with the total BCS score. Moreover, regarding the subscales, Defusion showed a significant relationship with Acceptance, but a non-significant correlation was found with Common Humanity ($r = .013$; $p = .830$). Common Humanity correlated positively and significantly with Acceptance.

Regarding the construct validity, there was a significant moderate positive correlation between the BCS and the SCS-SF. The relationship between the BCS and the BMI was significant, showing a weak significant negative correlation. As regards the nomological validity, Defusion and Acceptance subscales were significantly correlated with the OBCS internal body orientation subscale, and the SFS-SF, the BAS-2, and the BISS. The Common Humanity subscale correlated significantly with the SFS-SF and the internal orientation subscale of OBCS. The BCS total score correlated significantly with all the measures. Moreover, the Common Humanity subscale significantly correlated positively with internal body orientation ($r = .14$; $p = .021$). However, no significant associations were found between BI measures (BISS, the internal body orientation of OBCS, and the BAS-2) and the Common Humanity subscale. The complete table of correlations can be found in Table S3 of the Supplemental Materials (see <https://osf.io/fpu6t/>).

The BCS total score ($M = 70.54$; $SD = 14.33$) was similar to the Altman et al. (2020) study. Furthermore, BCS (vs. SCS-SF) showed stronger correlations with the positive BI dimensions (i.e., internal body orientation and body appreciation) and were negatively associated with the negative BI dimensions (e.g., body shame).

Table 2

Descriptive Statistics for all the Items of the BCS and Standardized Factor Loadings and Communalities of the Exploratory Factor Analysis with a Three-Factor Structure

| BCS item | M(SD) | Factor loading | | | h^2 |
|---------------------------------------|-------------|----------------|-----------------|------------|-------|
| | | Defusion | Common Humanity | Acceptance | |
| Factor 1: Defusión | | | | | |
| Item 1(R) | 3.45(1.09) | .69 | | | .53 |
| Item 2(R) | 3.34(1.14) | .68 | | | .63 |
| Item 3(R) | 3.31(1.17) | .71 | | | .51 |
| Item 4(R) | 3.10(1.19) | .78 | | | .63 |
| Item 5(R) | 2.81 (1.12) | .77 | | | .53 |
| Item 6(R) | 3.33(1.25) | .41 | | | .39 |
| Item 7(R) | 3.69(1.16) | .60 | | | .29 |
| Item 8(R) | 2.75(1.15) | .59 | | | .57 |
| Item 9(R) | 2.73(1.24) | .50 | | | .53 |
| Factor 2: Humanidad Compartida | | | | | |
| Item 10 | 2.55(1.14) | | .64 | | .43 |
| Item 11 | 2.75(1.15) | | .73 | | .54 |
| Item 12 | 2.60(1.16) | | .77 | | .58 |
| Item 13 | 2.88(1.09) | | .55 | | .44 |
| Item 14 | 2.81(1.22) | | .75 | | .54 |
| Item 15 | 2.70(1.14) | | .89 | | .77 |
| Item 16 | 2.57(1.09) | | .85 | | .69 |
| Item 17 | 2.92(1.10) | | .52 | | .31 |
| Item 18 | 2.51(1.16) | | .59 | | .36 |
| Factor 3: Aceptación | | | | | |
| Item 19 | 3.72(1.01) | | | .87 | .76 |
| Item 20 | 3.56(1.17) | | | .88 | .77 |
| Item 21 | 3.51(1.13) | | | .90 | .82 |
| Item 22 | 3.43(1.05) | | | .72 | .71 |
| Item 23 | 3.53(1.10) | | | .73 | .60 |

Note. BCS= Body Compassion Scale. $N = 288$. h^2 = communality coefficient.

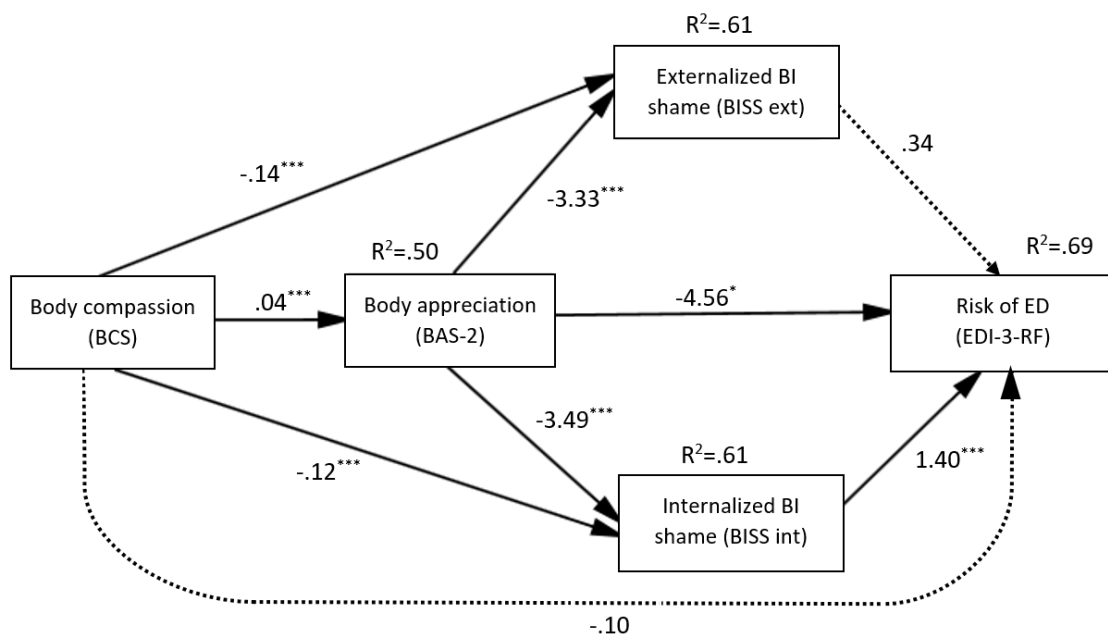
Reverse-scored items are denoted with an (R).

3.3. THE PROTECTIVE ROLE OF BC IN THE RISK OF ED: THE MEDIATIONAL ROLE OF BODY APPRECIATION AND BODY SHAME

The estimated direct effects between the variables in the serial-parallel mediation model are presented in Figure 2.

Figure 2

Model of the Mediation Effects of Body Appreciation and Body Shame in the Relationship Between BC and Risk of ED (n = 199)



Note. BCS = Body Compassion Scale; BAS-2 = Body Appreciation Scale-2; BISS = Body Image Shame Scale; EDI-3-RF = Eating Disorders Inventory-3 Referral Form; BI = Body Image; ED = Eating Disorders. The dashed line represents nonsignificant effects. * $p < .05$. *** $p < .01$.

Findings from the mediation analysis (Figure 2) showed that BC significantly predicted both external and internal BI shame, but did not have a direct effect on the risk of ED. However, the model indicated that the effect of BC on the risk of ED was fully mediated by body appreciation and internal body shame, as the indirect effects in Table 1 show. The indirect effect 4 “*BC → external body shame → risk of ED*” and the indirect effect 5 “*BC → body appreciation → external body shame → risk of ED*” were not significant. The total effect was also significant and the tested mediation model including all the variables explained 68.88% of the variance of the risk of ED, $F(6, 192) = 70.82$, $p < .001$. The detailed results of the mediation analysis can be found in Table S4 of the Supplemental Materials (see <https://osf.io/fpu6t/>).

Table 3

Results for the Indirect and Total Effect of the Mediational Model

| | <i>b</i> | <i>SE</i> | 95% CI [<i>LL,UL</i>] |
|--|----------|-----------|-------------------------|
| Indirect effects | | | |
| Indirect effect 1: | | | |
| <i>BC → Body appreciation → Internal BI shame → Risk of ED</i> | -0.18 | 0.04 | [-0.269, -0.109] |
| Indirect effect 2: | | | |
| <i>BC → body appreciation → risk of ED</i> | -0.17 | 0.07 | [-0.309, -0.043] |
| Indirect effect 3: | | | |
| <i>BC → internal body shame → risk of ED</i> | -0.16 | 0.05 | [-0.278, -0.070] |
| Indirect effect 4: | | | |
| <i>BC → external body shame → risk of ED</i> | -0.05 | 0.04 | [-0.139, 0.030] |
| Indirect effect 5: | | | |
| <i>BC → body appreciation → external body shame → risk of ED</i> | -0.04 | 0.04 | [-0.117, 0.029] |
| Total effect | | | |
| Total effect model | -0.71 | 0.08 | [-0.856, -0.556] |

Note. BC = Body Compassion; BI = Body image; ED = Eating Disorders; X = independent variable; M = mediator variable; Y = outcome or dependent variable; b = the association between the mediator and dependent variable(s).

4. DISCUSSION

The purpose of the present study was (1) to examine the three-factor structure of the Body Compassion Scale (BCS, Altman et al., 2020) in a sample of Spanish women from the general population; and (2) to test the protective role of BC on body shame and the risk of ED through body appreciation.

Regarding the BCS, the present study provides evidence for the validity and reliability of the Spanish version of the BCS, maintaining a three-factor solution with 23 items. The BCS constitutes a useful instrument to measure compassion towards one's own body in the general Spanish female population. Equally to the original validation (Altman et al., 2020) or the Italian validation of BCS (Policardo et al., 2022), the three subscales in the Spanish version were correlated to each other (except for the correlation between Defusion and the Common Humanity), as well as with the total BCS score. As in Van Niekerk et al. (2023) or Wong et al. (2022), the results of the lack of correlation between the Defusion and Common Humanity factors indicate a lesser relationship between these two constructs. Regarding the body-specific measures, the Common Humanity subscale was also weakly or non-significantly correlated with positive and negative BI. Moreover, the case study of the BC-targeting intervention also has shown that only the effects on the Defusion and Acceptance (vs. Common Humanity) dimensions of BCS were maintained over time (Altman et al., 2017), showing the independence of Common Humanity from the other two dimensions. Given the above-stated, it can be established that the ability to attribute negative bodily experiences to a shared human condition does not seem to represent a prominent aspect when explaining BI disturbance (Altman et al., 2017; Van Niekerk et al., 2023).

Overall, the Spanish version of BCS showed good convergent validity and nomological validity. As expected, the scores of BCS had a negative correlation with BMI and a positive correlation with SCS-SF, as in the English or Chinese versions (Altman et al., 2020; Wong et al., 2022). Moreover, the Defusion and Common Humanity subscales were positively linked to positive BI dimensions associated with a kind and accepting attitude towards one's body and negatively associated with body-threat-related measures (i.e., body shame). Hence, in comparison to general self-compassion, the construct of BC appears to be closely related to the BI dimensions in line with the Italian or Australian versions (Policardo et al., 2022; Van Neikerk et al., 2023).

The second goal of this study was to develop an explanatory model for the protective role of BC on the risk of ED. The tested model accounted for 68.88% of the risk of ED variance. Particularly, the first hypothesis of the study was partially confirmed as BC was found to be directly associated with body shame (internal and external) in line with Altman et al. (2020) or Oliveira et al. (2018); however, it was not directly associated with a lower risk of ED. Thus, contrary to the direct protective role of general self-compassion on disordered eating and BI disturbance (Braun et al., 2016; Turk & Waller, 2020), current findings point out a mediating mechanism through which specific compassion towards the body may act on the decrease of the risk of ED.

Findings of the tested model point out body appreciation as a possible underlying mechanism that could explain the protective role of BC on the feelings of body shame and the risk of ED, supporting the second hypothesis of this study. Specifically, this model confirmed that the practice of BC may be associated with alternative ways of valuing oneself when facing body-related threats (e.g., Homan & Tylka, 2015). Therefore, while the perception of one's appearance inferiority has been associated with adverse self-evaluating emotional states (i.e., body shame) (Avalos et al., 2005; de Vries et al., 2016), the practice of body appreciation could promote the selection of more adaptive coping strategies (Wood-Barcalow et al., 2010). In particular, the development of a kind relationship towards one's body

(e.g., practicing compassionate attitudes towards oneself; receiving body acceptance from others), may promote the rejection of unrealistic societal appearance ideals (Tylka & Wood-Barcalow, 2015) and act as a protective factor against ED in women (Máximo et al., 2017).

Lastly, in accordance with the previous literature (e.g., Mendes et al., 2017; Oliveira et al., 2017), the tested model showed that BI-focused shame was strongly associated with higher levels of ED risk. Specifically, our results revealed that only *internal* shame (vs. external) was associated with the risk of ED. According to Duarte et al. (2015), this dimension of body shame measures one's engagement in self-loathing/criticism as well as body concealment behaviors. Although the research on *internal* body shame is scarce, the association between shame and ED risk is consistent with the previous studies, where *internalized* shame predicted symptoms of bulimia nervosa (Troop et al., 2008) and was closely associated with self-criticism and ED (Duarte et al., 2014; Pinto-Gouveia et al., 2014). In all, our findings point out the need to distinguish the role of body shame dimensions in the development and maintenance of ED. Whereas external body shame is associated with other people's judgment of one's own appearance, internal body shame is focused inwards, on the internal affect regulation (Gilbert, 2008; 2014). Hence, it seems that maintaining the self-judgmental view of one's own body appearance (i.e., *internal* shame), and not receiving a negative evaluation from the social context (i.e., *external* shame), which appears to be closely associated with the risk of developing ED. Nonetheless, due to the novelty of this measure, further distinction on the role of body shame dimensions on ED risk is needed.

Overall, the results of the current cross-sectional study could be tentatively explained by the emotional regulation strategies they use. Previous studies have found that women that manifest more body self-criticism tend to be defensive and use unhealthy emotion-regulation techniques that, in the long term, could lead to maladaptive bodily and eating-related behaviors (Berking & Whitley, 2014). Conversely, women with high levels of compassion and body appreciation may

choose more adaptive emotional strategies when facing body-related threats (e.g., Marta-Simões et al., 2016; Tylka et al., 2015), through the activation of the self-soothing system (Gilbert & Procter, 2006). Thus, future intervention programs should aim to cultivate compassion and appreciation specifically directed toward one's body (Prefit et al., 2019); for example, BC micro-interventions (e.g., brief self-guided exercises such as short videos or writing exercises focused on BC psychoeducation or writing a compassionate letter to one's body) have been shown to promote higher body satisfaction (Stern & Engeln, 2018). The compassion-focused therapy for ED (CFT-E) stands out as an effective approach in populations with high shame and self-criticism (Gilbert & Miles, 2014; Goss & Allan, 2014). CFT-E is based on the premise that disordered eating constitutes a set of non-adaptive strategies to regulate body-related threats (Goss & Allan, 2014). In this regard, our preliminary findings suggest that the established evidence-based techniques (e.g., CFT-E) could be complemented with additional techniques targeting specially BC in order to foster a higher body appreciation. The specific focus on BC may help to cope more effectively with the dysfunctional and distressful thoughts and feelings related to body image by promoting adaptive self-soothing regulation strategies (Gilbert & Miles, 2014; Goss & Allan, 2014). Nonetheless, further research on the protective role of BC should be carried out.

These results should be interpreted in acknowledgment of several limitations. Firstly, the cross-sectional and correlational design impedes the establishment of cause-effect relationships. Therefore, although previous theoretical models support that compassion and body appreciation are the protective factors against body shame and ED (Carter et al., 2022; Turk & Waller, 2020) and that shame is an antecedent of the risk of ED (Braun et al., 2016), future research should include longitudinal and experimental designs to further explore these relationships. Additionally, the results must be interpreted with caution as the measure of BISS (Duarte et al., 2015) is not yet adapted to Spanish. Secondly, the sample of this study was non-clinical, participating in this study women from the general population. Further studies should broaden the age groups to include

more female at-risk populations, such as children and adolescents (Treasure et al., 2020), as well as include men and populations with ED. Lastly, future studies should address other dimensions of positive BI, such as the appreciation of body functionality, in relationship with BC, as well as the use of BC attitudes as emotional regulation strategies of BI-related threats (i.e., activation of the self-soothing system through the fostering of feelings of safety or the general positive affect that could regulate the feelings of shame) (Gilbert & Miles, 2014; Odou & Brinker 2015).

In sum, this study indicates that the Spanish version of BCS is a reliable and valid assessment tool to be used in female non-clinical populations; the findings also underline the potential mediating mechanisms of the protective role of BC. The tested model, besides providing support for the unique contributions of the BI shame dimensions (*internal vs. external*) on the risk of ED, emphasizes the importance of promoting a kind, non-judgmental, and appreciative relationship with one's own body in ED prevention and treatment programs. Although future experimental research is required, these findings highlight the potential value of targeting BC and body appreciation for reducing internal body shame and, therefore, preventing the risk of ED.

5. REFERENCES

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CHAPTER 7

Study 6. "Through Their Compassionate Gaze": The Protective Role of Body Compassion on Body Shame Induction In Young Adult Women

This chapter is under review as: Burychka, D., Miragall, M., & Baños, R. M. "Through Their Compassionate Gaze": The Protective Role of Body Compassion on Body Shame Induction in Young Adult Women

ABSTRACT

Compassion-based interventions have shown efficacy in reducing eating disorder' risk factors; however, the role of the newly developed construct of body compassion (BC) on the body image-related variables remains unexplored. The goal of this study was to (1) determine whether a BC micro-intervention could buffer and regulate state body shame, and enhance body satisfaction, body trust, and positive affect; (2) examined if trait BC and body shame would moderate the effect of the BC. 58 young women with body concerns (21.66 ± 2.46 years old; body mass index 22.60 ± 3.01 kg/m²) completed state measures of body shame, body trust, body satisfaction, and positive affect in four different time points. Participants were assigned to either BC or well-being (WB) condition. Following the BC micro-intervention or, for the WB group, positive event reflection, all participants underwent body shame induction. As the last step, all participants received a BC micro-intervention. The results, although marginally significant, indicated that the BC group (vs. WB) buffered the induced body shame and its consequences on the levels of body trust. However, the WB group experienced greater benefits in body trust and body shame after receiving the BC micro-intervention. Furthermore, the moderation analyses revealed that the individuals from the WB group with high in trait body shame or low in trait BC who benefitted most from the BC micro-intervention. These preliminary findings suggest that a BC micro-intervention may serve as an effective buffer and emotional regulation tool for the effects of the state body shame.

Keywords: body compassion, body shame, micro-intervention, thin ideal, positive affect, body trust.

1. INTRODUCTION

Body shame or the shame of one's appearance is a negative painful self-conscious emotion that can occur when one compares their appearance (i.e., body shape, size, or weight) to a specific sociocultural standard (Duarte et al., 2015). It has been recognized as a consequence of the internalization of the cultural standards of appearance, along with body surveillance or body dissatisfaction (Fredrickson & Roberts, 1998; Lamont, 2019) and is considered as a risk and maintenance factor for eating disorders (ED) (Turk & Waller, 2020).

Based on the evolutionary approach, the compassion-based therapies (CFT-E; Gilbert, 2010; Germer & Neff, 2019) posits that individuals perceive, interpret, and respond to social situations in accordance with an emotional regulation model composed of three interacting systems (Depue & Morrone-Strupinsky, 2005; Gilbert 2005, 2010): threat-defense, drive-striving, and safeness-soothing system. The threat-defensive system aims to protect individuals from threats by stimulating fight-or-flight defensive responses such as fear or disgust to internal (e.g., shame when one's social acceptance is at stake) or external (e.g., social comparison situations) stimuli. The drive-striving system aims to pursue personal goals and the activation of dopamine reward systems. Finally, the safeness-soothing system helps to cope with stress and promote social bonds by fostering feelings of safety, trust, warmth, and connection to others. Moreover, the soothing system acts as a balance of the other two systems when they are excessively active by regulating the reward-focused behaviors or decreasing the feeling of distress that is a consequence of threat-related situations (Gilbert, 2009).

The threat-based affect regulation system can be activated by body shame, leading to unrealistic body expectations and disordered eating (Matos et al., 2017; Treasure et al., 2012), but it also can increase the resistance to the activation of the self-soothing system resulting in a lack of affiliative and compassionate feelings towards one's appearance (e.g., self-criticism or self-disgust) (Gilbert,

2007; Matos et al., 2017) or the fear of giving/receiving compassion (Ferreira et al., 2019; Gilbert et al., 2010; Kirby et al., 2019). Consequently, individuals with high levels of body shame may not seek help for their ED symptoms (Ali et al., 2020) or, when in treatment, they can limit their disclosure (Swan & Andrews, 2003).

Although body shame has been documented as a significant risk and maintenance ED factor, there is limited research on its effective management. To date, current interventions based on cognitive-behavioral approaches have limited effectiveness (Cândea et al., 2018). Decreasing risk factors such as body shame may not necessarily lead to the promotion of positive body image (Gable & Haidt, 2005; Tylka, 2011), and consequently, the protection against body image disturbance and the onset of ED symptoms (Linardon, 2021). An alternative promising approach is the cultivation of self-compassion, which has been shown to foster a kind, mindful, and non-judgmental understanding of one's suffering and desire to alleviate it (Neff, 2003). Self-compassion has emerged as a protective factor in the field of body image disturbance and ED (Braun et al., 2016; Ferreira et al., 2019). Moreover, it has been found to promote an adaptive emotional regulation (Turk & Waller, 2020) by (a) increasing awareness and willingness to experience/acknowledge negative emotions such as self-criticism or shame (Gilbert, 2010; Neff & Vonk, 2009) and (b) responding to them in a self-soothing way (e.g., feelings of safety or general positive affect) (Gilbert, 2014; Klimecki et al., 2014; Odou & Brinker 2015).

Self-compassion may counteract the threat-defense system (Breines et al., 2014; Wasylikiw et al., 2012) by promoting the activation of the soothing system (Gilbert, 1989; Gilbert & Irons, 2005; Neff, 2011). As a result, self-compassion can foster feelings of safeness and trust leading to a more positive and accepting view of oneself (Bartnett & Sharp, 2016), which would be incompatible with the self-critical and shameful self-evaluation (Neff, 2011).

Recently, Altman et al. (2020) developed the Body Compassion Scale to assess compassion specifically directed toward the body. This new construct

integrates the concepts of self-compassion (coming from Buddhist psychology; Neff, 2003) and body image (described from the cognitive-behavioral approach; Cash, 2000). Body compassion (BC) evaluates individuals' relationship with their bodies in a new mindful- and acceptance-based construct (Altman et al., 2020). It is composed of three dimensions: (1) defusion or the ability to experience body-related thoughts and feelings from an observer perspective; (2) common humanity or the recognition of shared human experience regarding body-related experiences, and (3) acceptance or the ability to embrace one's body appearance, health, and its functions. Although it is a relatively new construct, research has shown that BC has positive effects on body image (i.e., higher body satisfaction and body flexibility) and affective states (e.g., lesser body shame and higher positive affect) (Altman et al., 2017, 2020; Barata-Santos et al., 2019; Oliveira et al., 2018). As self-compassion, BC may promote the self-soothing system, enhancing calm and security in one's own body (Gilbert, 2015; Neff, 2003), and fostering a higher sense of safety in one's own body (Albertson et al., 2015).

Self-compassion-based interventions have been demonstrated to have a medium-to-large effect on body image disturbance and ED (Turk & Waller, 2020), reducing body objectification, shame, internalized body ideals, and body dissatisfaction, among others. Moreover, these interventions have been shown effects on increasing positive affect, body appreciation, and motivation for self-improvement (e.g., Barbeau et al., 2021, Moffitt et al., 2018, Turk & Waller, 2020). Specifically, compassion-based interventions, such as CFT-E, can help to promote a kinder and more positive relationship with one's own body (e.g., Barnett & Sharp, 2016; Ferreira et al., 2013; Kelly et al., 2014) and decrease the consequences of the self-objectification (i.e., body shame) (Piran, 2015).

In addition, brief self-compassion interventions have shown to be effective in reducing body image disturbance (Toole et al., 2021; Turk & Waller, 2020), and online self-compassion interventions have been found to promote higher compassion, body satisfaction, and body appreciation while reducing body shame and body dissatisfaction in women with body concerns (e.g., Albertson et al.,

2015; Ferrari et al., 2019; Toole & Craighead, 2016; Ziemer et al., 2019). In recent years, the micro-interventions, such as short videos or writing tasks, have become more used as prevention or early interventions (Fuller-Tyszkiewicz et al., 2019). These brief self-guided activities are designed to be easily accessible, low-cost, and have the potential to increase the reach (e.g., via digital technologies) and engagement in mental health interventions (Atkinson & Diedrichs, 2021; Matheson et al., 2020). Specifically, micro-interventions based on self-compassion have been found effective in increasing body satisfaction and body appreciation (Moffitt et al., 2018; Seekis et al., 2017) during body threat-related situations (i.e., negative body image induction). However, there is limited evidence on how one's compassionate attitude directed toward the body could promote a higher state of body satisfaction or positive mood (Stern & Engeln, 2018).

The current study aimed to analyze whether a BC micro-intervention can mitigate body shame (experimentally induced), as well as increase body satisfaction, body trust, and positive affect in a sample of young adult women⁴. The objectives were twofold. On the one hand, the first objective was to analyze the effect of a BC micro-intervention in buffering and regulating body shame, body satisfaction, body trust, and positive affect (i.e., *before* and *after* an experimental mood induction procedure of body shame [MIP-shame]) in women with body image disturbance. On the other hand, considering that high body shame or low BC may be associated with difficulties in activating the self-soothing system (Gilbert, 2005), the second objective was to explore the moderating role of both trait levels of BC and body shame in determining the efficacy of the BC micro-intervention in buffering and regulating the aforementioned variables. A BC micro-intervention was operationalized as a ten-minute writing-based short and easily operationalized exercise that can be used on a daily base. The control group consisted of a similar exercise, but the writing content was the content was related to writing exercises regarding a positive event from the previous day related to

⁴ The present study was limited to young Spanish women based on findings that young adult women report lower compassion, higher body shame, and are at higher risk of ED (Albertson et al., 2015).

the general well-being (WB). Thus, the sample was randomized between two conditions: BC condition and WB condition. In the BC condition, the BC micro-intervention was applied before and after the MIP-shame in order to assess it as a buffering strategy and as an emotion regulation strategy; while in the WB condition, the BC micro-intervention was applied only after the MIP-shame in order to analyze its effect as an emotion regulation strategy. Based on prior research, we expected that the BC micro-intervention will be effective both in buffering and regulating body shame, body satisfaction, body trust, and positive affect after the MIP-shame. Therefore, the first hypothesis was that the BC condition (vs. WB condition) will buffer and regulate to a greater extent the effects of the MIP-shame (in terms of positive affect, body satisfaction, body trust, and body shame). The second hypothesis was that the WB condition will also regulate the effects of the MIP-shame, but the benefits will be lower in positive affect, body satisfaction, body trust, and body shame. Finally, the third hypothesis was that the trait characteristics of the participants in terms of BC and body shame will moderate the effect of the condition on buffering and regulate the effects of the MIP-shame on positive affect, body satisfaction, body trust, and body shame. Specifically, participants in the BC condition (vs. WB condition) with lower BC and high body shame will report lower induced body shame (i.e., a higher buffering effect) and less difficulty in regulating the effects of the MIP-shame (i.e., a higher regulation effect).

2. METHOD

2.1. PARTICIPANTS

A total of 58 Spanish women from the general population were recruited ($n = 29$ per condition). Based on a previous study (study 3 by Stern & Engel, 2018), we calculated with the G*Power program (version 3.1; Faul et al., 2007) that a minimum sample size of twenty-nine participants per group was necessary to

detect a moderate effect size (Cohen's $d = 0.36$), a statistical power of .90 and a significance level of .05.

The participants' ages ranged from 18 to 28 years (BC condition: $M_{age} = 22.17$, $SD = 2.93$; WB condition: $M_{age} = 21.14$, $SD = 1.78$), and their Body Mass Index (BMI) ranged from 17.5 (underweight) to 30 kg/m² (overweight) (BC condition: $M_{BMI} = 22.15$, $SD = 2.76$; WB condition: $M_{BMI} = 23.04$, $SD = 3.22$). The BMI mean score fell within the “normal” weight range (World Health Organization, 2019) and the BMI distribution of the sample was representative of the female Spanish population (National Institute of Statistics, 2017): 3.45% of the women were underweight (BMI < 18.5: $n = 2$), 72.41% showed a normal weight (18.5 ≤ BMI ≤ 24.99; $n = 42$), and 24.14% were overweight (BMI > 25; $n = 14$). The flowchart of participants is depicted in Figure 1.

Participants were excluded from the study if they: (1) had a history of ED (e.g., "Have you ever been diagnosed with an ED?") ($n = 11$); (2) were under 18 or over 30 years old ($n = 10$); (3) had a BMI below 17.5 or above 30 ($n = 9$); (4) have a total score on the questionnaire measuring body shame (BISS, Duarte et al., 2015) below 0.5 or above 3.0 (indicating whether low and high body shame; $n = 36$); (5) being pregnant or (6) being not fluent in Spanish. Additionally, participants' data were deleted if they had failed at least one of four items embedded in the survey to check their attention (e.g., "*We want to check your attention. Respond 5 if you are reading this*").

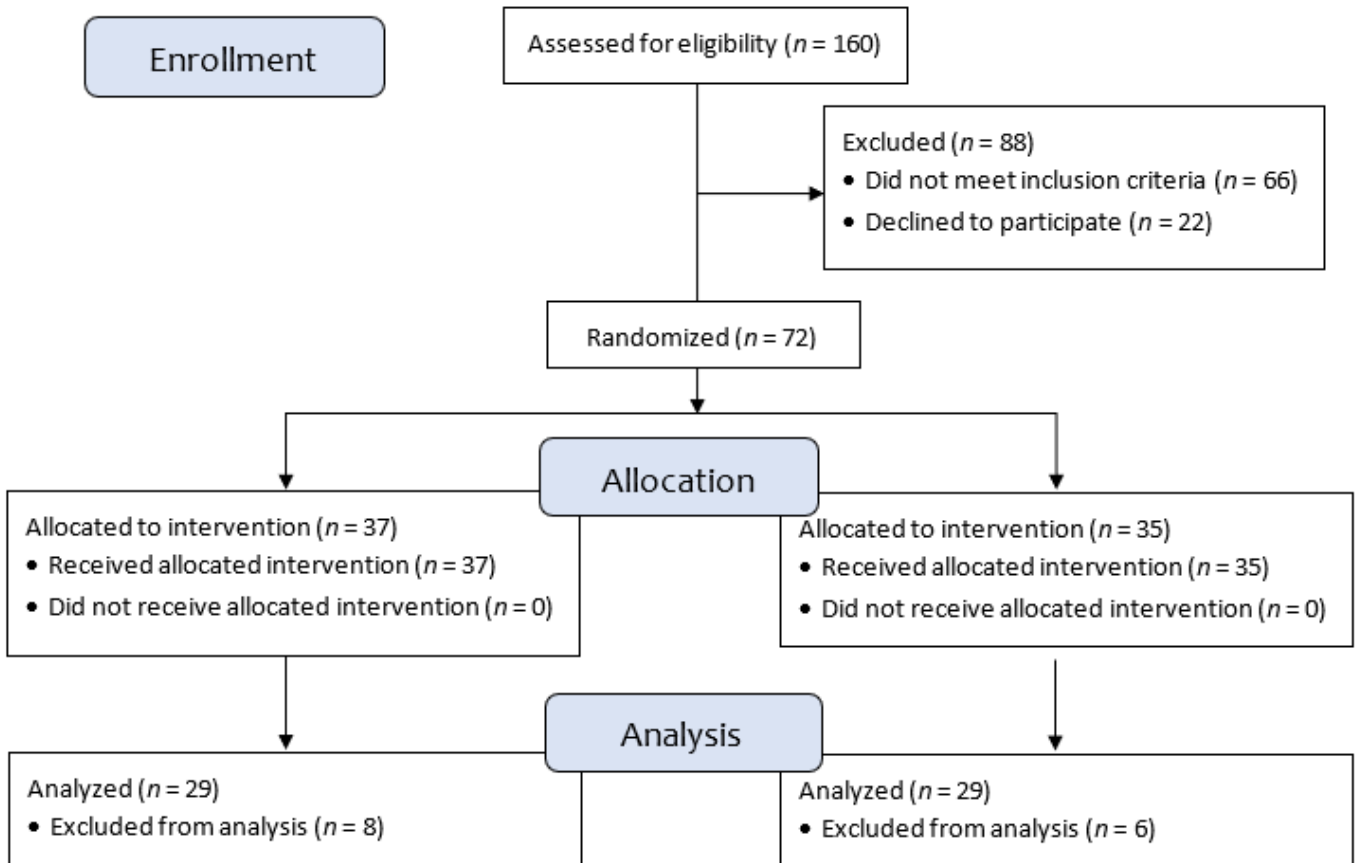
The participation was limited to young women from the general population to be consistent with prior mindfulness-based interventions of body image and disordered eating (e.g., Albertson et al., 2015; Toole & Craighead, 2016). This age group is particularly vulnerable to body image disturbance (e.g., body dissatisfaction or body shame) and reports lower self-compassion (e.g., Albertson et al., 2015; Carter et al., 2020).

All the participants provided their informed consent before filling out the questionnaires, in accordance with the Declaration of Helsinki. The study was

approved by the Ethics Committee of the University of Valencia (Procedure number: 1856772).

Figure 1

CONSORT Flowchart of Participants



2.2. MEASURES

2.2.1. Sociodemographic and anthropometric information

An *ad hoc* questionnaire was made to collect information about sex, age, marital status, highest completed educational level, height, and weight. Body mass index (BMI) was calculated by dividing current weight (in kg) by height squared (in m) (World Health Organization [WHO], 2000) measured during the

experimental session. This questionnaire was administered as part of the screening process for the study.

2.2.2. Trait body image measures

BC. The Body Compassion Scale (BCS; Altman et al., 2020; Spanish translation conducted by the authors). The BCS assesses the feeling of self-compassion towards one's own body, which includes three dimensions that combine the constructs of body image and self-compassion: (1) Defusion (e.g., "*When I notice aspects of my body that I do not like, I get down on myself*"); (2) Common Humanity (e.g., "*When I am concerned if people would consider me good-looking, I remind myself that most everyone has the same concern*"); and (3) Acceptance (e.g., "*I am accepting of my looks just the way they are*"). It consists of 23 items to be rated on a 5-point Likert scale (1 = *almost never* to 5 = *almost always*). In the present study, Cronbach's alpha was 0.88, indicating good internal consistency.

Risk of ED. The Eating Disorder Questionnaire (EDE-Q; Fairburn & Beglin, 2008; Pélaez-Fernández et al., 2012). The EDE-Q is a 36-item screening questionnaire measuring ED symptomatology over the past 28 days. The response format is a seven-point Likert scale (0 = *never* to 6 = *every day*). The mean of each subscale (i.e., Shape concern, Weight concern, Eating Concern, and Dietary restraint) yields a composite global score. The EDE-Q has good test-retest reliability (Luce & Crowther, 1999). In the Spanish validation, Cronbach alpha values ranged between 0.74 and 0.93 indicating good internal consistency. In the present study, Cronbach's alpha was 0.93, indicating excellent internal consistency.

Body Appreciation. The Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015; Swami et al., 2017). The self-report questionnaire consists of 10 items rated on a five-point Likert scale (0 = *never* to 5 = *always*) measuring an individual's acceptance and respect of the body. Scores are

averaged to produce a total score, with higher scores reflecting greater body appreciation. Internal consistency of the Spanish validation (Swami et al., 2017) was excellent ($\alpha = 0.94$). Cronbach's alpha in our sample was 0.91, indicating excellent internal consistency.

Body Dissatisfaction. Body Shape Questionnaire (BSQ; Cooper et al., 1987; Raich et al., 1996). This questionnaire contains 34 items rated on a six-point Likert response scale (1 = *never* to 6 = *always*), and it is used to assess attitudes of satisfaction with one's figure, fear of weight gain, and the desire to lose weight. Higher scores indicate greater dissatisfaction with one's body. The Spanish validation showed excellent internal consistency ($\alpha = 0.97$). Internal consistency in this study was also excellent ($\alpha = 0.93$).

Body Image Shame. The Body Image Shame Scale (BISS; Duarte et al., 2015; Spanish translation conducted by the authors). The BISS is a 14-item self-report instrument designed to measure body image-focused shame and its phenomenology. This measure includes two subscales: (1) the external body image shame subscale, and (2) the internal body image shame subscale. Participants rate each item on a five-point scale (0 = *never* to 4 = *almost always*) that reflects the frequency with which they experience body image shame. The Spanish validation showed between good and excellent internal consistency (α ranging from 0.89 to 0.91). Internal consistency in this study was good ($\alpha = 0.88$).

Fears of Compassion. The Fears of Compassion Scale (FCS; Gilbert et al., 2011; Spanish translation conducted by the authors). FCS is a self-report measure, composed of 3 subscales: (1) fear of compassion for others (i.e., FCS For Others; fear of being compassionate to others); (2) fear of compassion for self (i.e., FCS From Self; fear of being compassionate and kind towards oneself in adverse situations); and (3) fear of compassion from others (i.e., FCS From Others; fear of receiving compassion or demonstrations of compassion from others). In the present study, the subscale fear of compassion for self (FCS From Self) and the subscale of the fear of compassion from others (FCS From Others) were used. The items are rated on a five-point scale (0 = *don't agree at all* to 4 = *completely*

agree). The original version of FCS showed adequate internal consistency for FCS From Self and FCS From Others, with Cronbach's alpha of 0.85 and .92, respectively. In the present study, Cronbach alpha for FCS From Self and FCS From Others were 0.87, for both scales, showing good internal consistency.

2.2.3. State body image measures

The same measurements were performed in the BC and WB conditions, at the beginning of the experiment (T1), after receiving the BC induction/WB task (T2), after receiving MIP-shame (T3), and right after the BC induction (T4).

Positive Affect. The Positive and Negative Affect Scales (I-PANAS-SF; Karim et al. 2011; Spanish translation conducted by the authors). The positive affect scale (PA) scale of the I-PANAS-SF consisted of 5 items. The items are scored using a five-point Likert scale (1 = *not at all or very slightly* to 5 = *very much*), referring to “this moment”. The total score is obtained by adding up the scores for the items. In the present study, the PA scale showed adequate internal consistency during all the assessment moments (α between .76 and .88).

Body Trust. The Trusting subscale of the Multidimensional Assessment of Interoceptive Awareness (MAIA-2; Mehling et al., 2018; Desdentado et al., 2022; state version adapted by the authors of the study). The Trusting subscale of the MAIA-2 was used to measure the experience of one's body as safe and trustworthy. MAIA-2 is rated using a six-point Likert-scale (0 = *never* to 5 = *always*). The MAIA-2 subscales have demonstrated acceptable psychometric properties in non-ED populations (Desdentado et al., 2022; Machorrinho et al., 2019; Mehling et al., 2012). In the present study, it was adapted to state subscale (“*at this moment*” and Likert-scale ranged from 0 = *not at all* to 5 = *very strongly*), and Cronbach's alpha for Trusting subscale for all the assessment moments was found to be between .87 and .91, showing good internal consistency.

Body Satisfaction. The Body Image States Scale (BISS; Cash et al., 2002; Spanish translation conducted by the authors). The BISS scale contains 6 items that range on a nine-point Likert scale (1 = *extremely dissatisfied* to 9 = *extremely satisfied*) to measure the state body satisfaction. Higher scores of BISS indicate greater body satisfaction. In the present study, Cronbach's alpha for BISS was found to be between .85 and .89, showing good internal consistency.

Body Shame. Adaptation of the Body shame subscale of the Objectified Body Surveillance Scale (OBCS; McKinley & Hyde, 1996; Moya-Garófano et al., 2017; state version adapted by the authors of the study). The Body Shame subscale of the OBCS is used to measure the degree of shame experienced when the cultural standards for the female body are not met. It contains eight items rated on a seven-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). In the present study, the Body Shame subscale was adapted to measure state body shame (i.e., “*at this particular moment*”), Cronbach's alpha was between .79 and .87, indicating good consistency.

2.2.4. Manipulation check questions

Several manipulations check questions were administered after the BC and WB videos, as well as after the MIP-shame exercise. In the BC/WB videos participants rated the extent to which they have engaged in the video viewing, as well as the clarity of the explained concepts (in BC condition: “general compassion and compassion specifically directed to one’s body”; and in the WB condition: “psychological WB”) on a scale from 0 to 100. In the MIP-shame exercise, the strength of the body image shame induction was assessed with a question that ranged on a ten-point scale (0 = *not at all* to 10 = *extremely much*) asking about the vividness of the recalled situation.

2.3. MATERIALS

2.3.1. MIP of Body Image Shame (MIP-shame)

The MIP-shame was adapted from the *Autobiographical Emotional Memory Task* in order to generate emotion through the reminiscence of personal emotional memories (Prkachin et al., 1999; Mills & D'Mello, 2014). The original task was reliable to induce shame (e.g., Houazene et al., 2021). In this exercise, participants were asked to write in detail a situation in which they felt a high degree of body shame and describe it in such a way that a person reading a description becomes ashamed just by hearing the situation. The task was modified adding instructions regarding the imagery techniques following to Blackwell and Holmes (2010) in order to increase the realism and vividness of the recalled situation. The current induction was confirmed by comparing the scores in the adapted Body Shame subscale of the OBCS (McKinley & Hyde, 1996). The instruction for the MIP-shame can be found in the supplementary materials.

2.3.2. Micro-interventions of the BC and WB Exercise

Participants in the BC condition received instructions based on Stern and Engeln (2018) (original version available online at <https://osf.io/fvgcp/>) that consisted in writing a compassionate letter to one's body from the perspective of an unconditionally loving friend, which is effective in previous studies (e.g., Altman et al., 2017; Kelly & Waring, 2018). The adaptation of the exercise to Spanish was carried out by the authors and can be found in online Supplementary materials at <https://osf.io/5u9hk>.

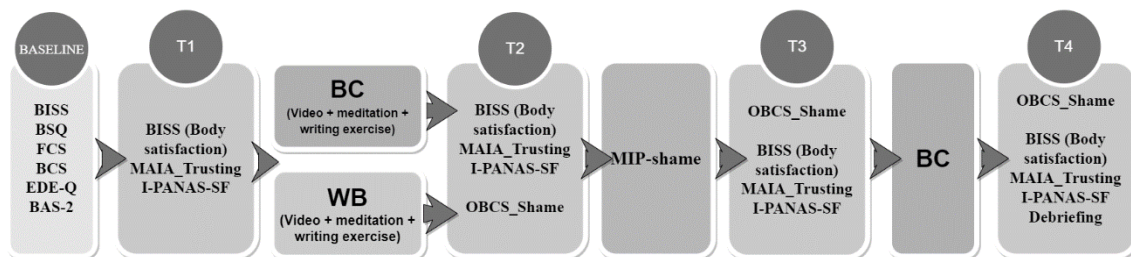
Participants in the WB condition were asked to write about a positive event that occurred during the previous day. After the MIP-shame, the WB condition also completed the BC writing exercise.

2.4. PROCEDURE

The study was a 2 (micro-intervention: BC, WB) × 4 (Time: T1-T4) mixed experimental design (see Figure 2). The sample was recruited from the general population through posters at the University campus, as well as emails and social networks. Individuals were invited to participate in a study related to the "study of the strategies that could help to promote psychological and body WB". Participation in this study was voluntary, and a giveaway of three pairs of wireless headphones was conducted after finishing the sample collection. Recruitment began on April 8th, 2022, with data collection ceasing on December 23rd, 2022.

Figure 2

Study Design Flowchart Indicating Experimental Sequence and Collection of Repeated Measures



Note. BISS = Body Image Shame Scale; BSQ = Body Shape Questionnaire; FCS = Fears of Compassion Scale; BCS = Body Compassion Scale; EDE-Q = Eating Disorder Examination-Questionnaire; BAS-2 = Body Appreciation Scale-2; BISS (Body satisfaction) = Body Image States Scale; MAIA Trusting = Adapted Trusting subscale of the Multidimensional Assessment of Interoceptive Awareness; I-PANAS-SF = International positive and negative affect schedule short-form; BC condition = Body Compassion Condition; WB condition= Well-being Condition; OBCS Shame = Adapted Body Shame Subscale of the Objectified Body Consciousness Scale.

Participants were not informed about the actual aim or the hypotheses of the study. After providing informed consent, participants completed a demographic form and a battery of trait measures as shown in Figure 2 in order to examine the inclusion/exclusion criteria. Following Tylka and Wood-Barcalow's (2015) procedure, to control the potential error associated with careless or nonsensical responding, four items were inserted in these self-report questionnaires (e.g., "*We want to check your attention. Respond with a 5 if you are reading this*").

Participants who met the inclusion criteria were scheduled for a lab session and randomly assigned using Random Allocation Software 2.0 package (Saghaei, 2004) to two conditions: BC ($n = 29$) and WB ($n = 29$). The whole experimental session, including the writing intervention, was conducted online through the Qualtrics platform. Each session took between an hour and an hour and a half. During the in-person session, participants completed a battery of baseline state self-report measures (T1; pre-induction of BC/WB) and, depending on the assigned condition, they watched videos that introduced them to the concept of BC or WB. After the videos, each participant listened to a *Soles of the Feet Meditation* (adapted from Singh et al., 2003). Further information on the videos, as well as the script adaptation of the meditation, can be found in the online supplementary materials at <https://osf.io/5u9hk>. The instruction directed participants to stand and focus their attention on the sensations of their feet while walking alone around the lab room. After the BC or WB exercise, participants completed the same battery of questionnaires again (T2). Next, participants underwent a MIP-shame, which lasted for approximately 10 min to recall a situation of strong body shame. After the MIP-shame, state body shame along with the baseline state measures (T3), were assessed. Lastly, participants in both conditions were exposed to the BC micro-intervention to regulate the feelings of body shame.

After the experimental session tasks, the participant's weight and height were measured using calibrated scales (TANITA, model: BC-420 MA), subtracting

the approximate weight of each participant's clothes. At the end of the session, all participants were debriefed about the study objectives and provided with referrals for any concerns regarding body image shame.

2.5. STATISTICAL ANALYSES

Statistical analyses were performed using the software SPSS v.28 (IBM Corp, Armonk, NY, USA) and the macro PROCESS, v3.5 (Hayes, 2018).

First, descriptive statistics (*t*-tests for independent samples for age and BMI and chi-square for categorical variables) were used to explore the characteristics of the sample in the study variables. The means and standard deviations were used for quantitative data, while frequencies and percentages were for categorical variables (see Table 1). The normality of the sample was analyzed, verifying skewness values $\leq |2|$ and kurtosis values $\leq |7|$ (Russell, 2002; West et al., 1995).

To explore the effects of the BC condition (vs. WB condition) and the interaction between time x condition on participants' state measures of body trust, positive affect, and body shame, a series of 2×4 mixed measures analyses of variance (ANOVAs) were performed. The prerequisites for performing the tests (normal distribution and homogeneity of variance) were tested with the Shapiro-Wilk and Levene tests. In the case of the violation of the assumption of Sphericity with Mauchly's test, degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (Field, 2013). In addition, Bonferroni post hoc analysis was used to determine the location of significance in case of significant and homogeneity of variances; in case of violation of homogeneity of variances Games-Howell post-hoc tests were used. Partial eta squared (partial η^2) effect size (small = .01, medium = .06, large = .14) is reported for the ANOVA results (Cohen, 1969).

Finally, moderated regression analyses for the change in state-dependent variables (i.e., body shame, body trust, positive affect, body satisfaction) were

conducted using model 1 of the macro “PROCESS” (Hayes, 2018). The change in the studied variables was evaluated by constructing differences scores that were used as dependent variables: T3-T2 (i.e., the capacity of the BC micro-intervention to buffer the effects of MIP-shame) and T4-T3 (i.e., the capacity of the BC micro-intervention to regulate the effects of MIP-shame). The baseline trait levels of BC (BCS) and body shame (BISS) were used as moderators of the effect of the condition on the studied state-dependent variables. To control for the effect of differences in the previous time points (i.e., T1, T2), we included the scores from previous time points when testing the moderation models on the dependent variables (e.g., when examining the moderation model of the change in T3-T4, the scores from T1 and T2 were entered as covariates). The simple slopes analyses tested whether the predictor variables affected state outcomes (i.e., MAIA Trusting, I-PANAS-SF, OBCS Shame) at low (1 *SD* below the mean), moderate (mean), and high (1 *SD* above the mean) levels of trait BC and body shame. All regression coefficients were reported in unstandardized form as *b*-values. There was no missing data, and preliminary analyses were conducted prior to running the regression analyses to ensure no violations of the assumptions. All effects were deemed statistically significant at $p < .05$.

3. RESULTS

3.1. PRELIMINARY ANALYSES: descriptive characteristics and baseline of the sample

Skewness values and kurtosis values were in the acceptable range according to cut-off values (Kline, 2005). Table 1 shows all the sociodemographic and anthropometric characteristics of the BC ($n = 29$) and WB condition ($n = 29$). Chi-square and *t*-test analyses confirmed that there were no baseline differences between the conditions on any demographic variables or the scores on the trait variables suggesting that randomization was successful in creating equal groups.

Table 1*Sociodemographic and Anthropometric Characteristics of the Participants*

| Baseline characteristic | BC | WB | <i>t</i> -tests / Chi-square |
|----------------------------------|-------------------------------|-------------------------------|--|
| | condition (<i>n</i> = 29) | condition (<i>n</i> = 29) | |
| | <i>M</i> (<i>SD</i>) / % | <i>M</i> (<i>SD</i>) / % | |
| Age | 22.17 (2.93) | 21.14 (1.78) | <i>t</i> (46.32) = 1.62, <i>p</i> = .056 |
| BMI | 22.15 (2.76) | 23.04 (3.22) | <i>t</i> (56) = -1.13, <i>p</i> = .131 |
| Marital status | | | χ^2 (2) = 2.88, <i>p</i> = .237 |
| Single | 93.1 | 86.2 | |
| In a relationship | 3.4 | 13.8 | |
| Divorced | 3.4 | 0 | |
| Highest educational level | | | χ^2 (2) = 3.263, <i>p</i> = .196 |
| Middle school | 0 | 0 | |
| High school/some college | 55.2 | 75.9 | |
| University degree | 41.4 | 24.1 | |
| Master's degree | 3.4 | 0 | |
| Employment status | | | χ^2 (2) = 1.84, <i>p</i> = .398 |
| Unemployed | 3.4 | 0 | |
| Student | 82.8 | 93.1 | |
| Employed | 6.9 | 3.4 | |
| BCS | 65.62 (13.18) | 61.24 (13.54) | <i>t</i> (56) = 1.25, <i>p</i> = .109 |
| EDE-Q | 1.69 (1.07) | 1.88 (0.99) | <i>t</i> (56) = -0.71, <i>p</i> = .241 |
| BAS-2 | 3.14 (0.67) | 2.88 (0.64) | <i>t</i> (56) = 1.48, <i>p</i> = .072 |
| BSQ | 99.82 (22.67) | 104.48 (26.32) | <i>t</i> (56) = -0.72, <i>p</i> = .237 |
| BISS (shame) | 1.52 (0.52) | 1.61 (0.71) | <i>t</i> (56) = -0.54, <i>p</i> = .296 |
| FCS From Others | 13.14 (7.74) | 16.69 (9.48) | <i>t</i> (56) = -1.56, <i>p</i> = .062 |
| FCS From Self | 14.31 (7.86) | 16.21 (9.23) | <i>t</i> (56) = -0.84, <i>p</i> = .201 |

Note. BMI = Body Mass Index; BCS = Body Compassion Scale; EDE-Q = Eating Disorder Examination-Questionnaire; BAS-2 = Body Appreciation Scale-2; BSQ = Body Shape Questionnaire; BISS (shame) = Body Image Shame Scale; FCS From Others = Fears of Compassion Scale (receiving compassion subscale); FCS From Self = Fears of Compassion Scale (giving self-compassion subscale).

3.2. CHECKING THE RESPONSES OF THE BC AND WB TO THE MIP-SHAME: Word Count and Vividness of the Imagined Situation

The first author checked the content of participants' writing exercise responses in order to verify that they matched the instructions of their condition. There were no significant differences between BC ($M = 173.28$, $SD = 90.23$) and WB conditions ($M = 209.28$, $SD = 123.98$) in word count ($t(56) = -1.26$, $p = .211$), nor between BC ($M = 8.03$, $SD = 1.27$) and WB condition ($M = 8.48$, $SD = 1.30$) in the degree of vividness ($t(56) = -1.33$, $p = .189$) when imagining the described body shame situations.

3.3. TESTING THE EFFECTS OF THE BC (VS. WB CONDITION): Group Differences in Body Shame, Body Satisfaction, Body Trust, and Positive Affect After the MIP-shame

The descriptive statistics for the state outcome variables across conditions are shown in Table 2 and Figure 2.

Table 2

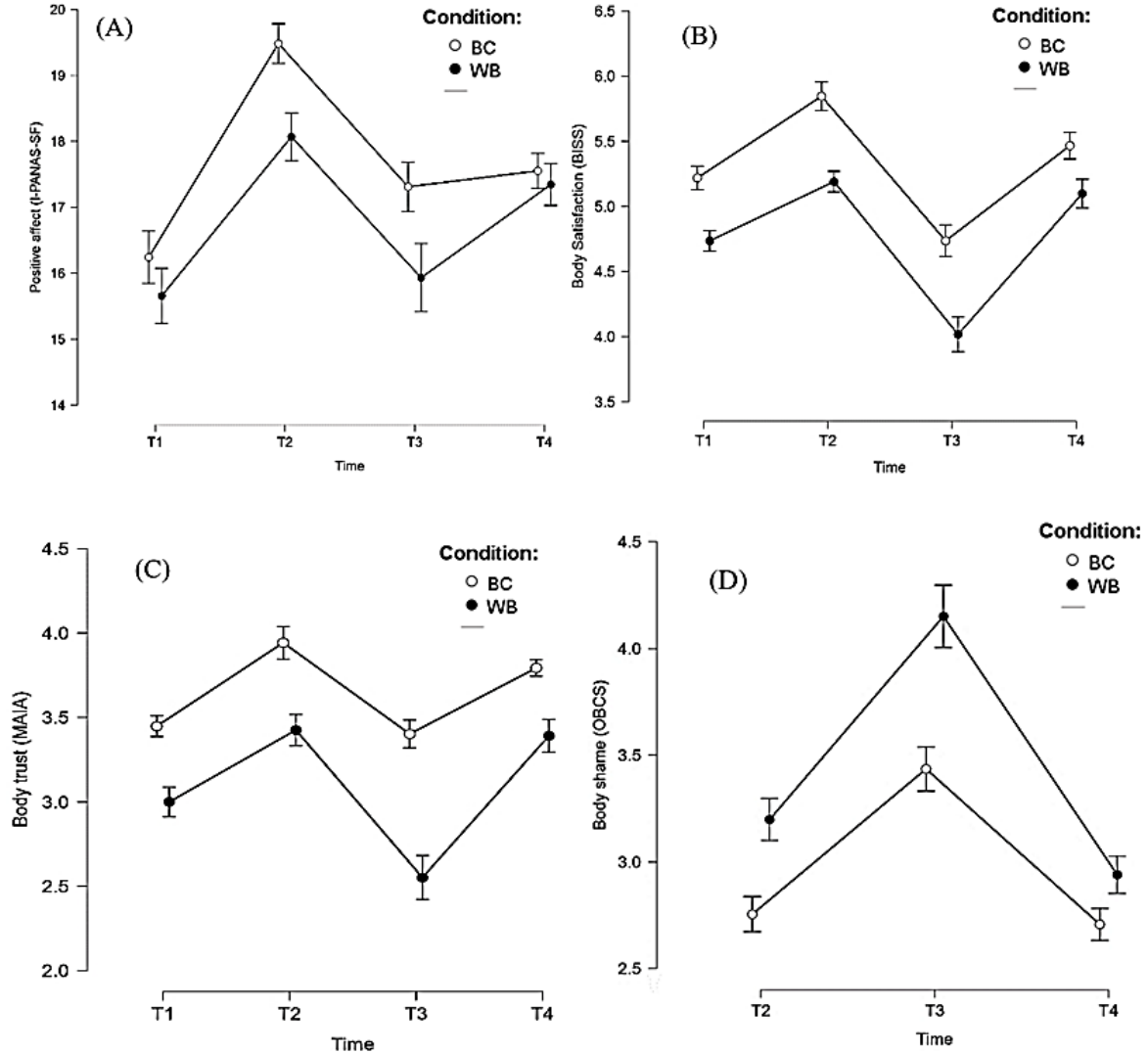
Means and Standard Deviations on State Variables per Groups Between Moments of Experimental Session

| Measures | Value ranges | BC condition (n = 29) | | | | WB condition (n = 29) | | | |
|-------------------------------------|--------------|-----------------------|-------------|-------------|-------------|-----------------------|-------------|-------------|-------------|
| | | T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| | | M(SD) | M(SD) | M(SD) | M(SD) | M(SD) | M(SD) | M(SD) | M(SD) |
| Positive Affect (I-PANAS-SF) | 5-25 | 16.24 (0.70) | 19.48(0.62) | 17.31(0.87) | 17.55(0.71) | 16.66(0.70) | 18.07(0.62) | 15.93(0.87) | 17.35(0.46) |
| Body Satisfaction (BISS) | 1-9 | 5.22(0.25) | 5.85(0.23) | 4.74(0.28) | 5.47(0.22) | 4.74(0.25) | 5.19(0.23) | 4.02(0.28) | 5.10(0.22) |
| Body Trust (MAIA Trusting) | 0-5 | 3.45(0.21) | 3.94(0.21) | 3.40(0.23) | 3.79(0.20) | 3.00(0.21) | 3.43(0.21) | 2.55(0.23) | 3.39(0.20) |
| Body Shame (OBCS Shame) | 0-4 | - | 2.75(0.21) | 3.44(0.25) | 2.71(0.19) | - | 3.20(0.21) | 4.15(0.25) | 2.94(0.19) |

Note. BC = Body Compassion; WB = Well-being; T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4. I-PANAS-SF = International positive and negative affect schedule short-form; BISS = Body Image States Scale; MAIA Trusting = Adapted Trusting subscale of the Multidimensional Assessment of Interoceptive Awareness; OBCS Shame = Adapted Body Shame Subscale of the Objectified Body Consciousness Scale.

Figure 2

Estimated Marginal Means for All Outcome Measures Across All Study Timepoints by Intervention Condition



Note. Figures show within- and between-groups changes following the body compassion/well-being exercise (between Timepoints 1 and 2), following the MIP-shame (between Timepoints 2 and 3), after the body compassion micro-intervention after the MIP-shame (between Timepoints 3 and 4). I-PANAS-SF = International positive and negative affect schedule short-form; BISS = Body Image States Scale; MAIA Trusting = Adapted Trusting subscale of the Multidimensional Assessment of Interoceptive Awareness; OBCS Shame = Adapted Body Shame Subscale of the Objectified Body Consciousness Scale.

The repeated measures 2x4 ANOVAs with a Greenhouse-Geisser correction showed a significant effect of time between all the time points for positive affect (I-PANAS-SF), body trust (MAIA Trusting), body satisfaction (BISS), and body shame (OBCS), $p < .001$. Pairwise post hoc comparisons are shown in Table 3. The main results indicated that: (a) from T1 to T2 (i.e., after the BC and WB micro-intervention), scores in positive affect, body trust, and body satisfaction increased; (b) from T2 to T3 (i.e., pre-post the MIP-shame), scores in positive affect, body trust and body satisfaction decreased; and lastly, (c) from T3 to T4 (i.e., pre-post the BC micro-intervention after the MIP-shame) scores in body trust and body satisfaction increased again. However, the average scores in positive affect did not have a significant change from T3 to T4 ($p = .108$). Regarding body shame, as expected, the average scores of OBCS Shame increased from T2 to T3 (i.e., after the MIP-shame) and decreased from T3 to T4 (i.e., after the BC micro-intervention -after the MIP-shame).

The repeated measures 2x4 ANOVAs with a Greenhouse-Geisser correction showed no significant effect of Time x Condition effect for positive affect (I-PANAS-SF) and body satisfaction (BISS). There was a marginally significant interaction effect of the condition by time for body trust (MAIA Trusting) ($p = .074$) and induced body shame (OBCS) ($p = .077$). Regarding MAIA Trusting, post hoc pairwise comparisons using the Bonferroni correction showed that participants in the BC condition (vs. WB condition) showed higher levels of state body trust after receiving the MIP-shame (T3) (3.40 ± 0.23 vs. 2.55 ± 0.23 , $p < .001$), suggesting the tendency of the BC condition on buffering the feelings of body trust. Additionally, simple effects analyses aimed at testing Time x Condition interaction effects between paired time-points indicated that average scores for body trust at the T3 were significantly different from T1 ($F(1, 56) = 5.53$, $p = .022$, $\eta_p^2 = 0.90$) and T4 ($F(1, 56) = 5.29$, $p = .025$, $\eta_p^2 = 0.86$) between both conditions. Specifically, the decrease in the average scores in the T3 was significantly higher for the WB condition, indicating that the BC micro-intervention buffered the effects of the MIP-shame on body trust. On the contrary,

the increase in the average scores in the T4 (vs. T1) was significantly higher for the WB condition (vs. BC), showing that the BC writing exercise performed for the first time led to higher body trust after the MIP-shame.

Regarding body shame, simple contrasts aimed at testing the interaction effects indicated that average scores for body shame at the T3 were significantly higher from T4 ($F(1, 56) = 4.73, p = .034, \eta_p^2 = 0.78$) for the WB condition. Therefore, the BC (vs. WB) condition buffered to a greater extent the levels of body shame after the MIP-shame.

Table 3

Effects BC (vs. WB) on State Variables: Main Effects of Time and Time x Condition results

| Measures | ANOVAs | | | | | | | | | |
|-------------------------------------|---------------------|----------------|----------|------------|--------------|-------------------------|----------------|----------|------------|----------|
| | Main effect of Time | | | | | Condition x Time effect | | | | |
| | <i>F</i> | <i>df</i> | <i>p</i> | η_p^2 | Post hoc | <i>F</i> | <i>df</i> | <i>p</i> | η_p^2 | Post hoc |
| Positive Affect (I-PANAS-SF) | 21.01 | (2.33, 130.48) | < .001 | .27 | T1 < T2** | 1.27 | (2.33, 130.48) | .287 | .02 | - |
| | | | | | T2 > T3** | | | | | |
| | | | | | T1 < T4** | | | | | |
| | | | | | T2 > T4** | | | | | |
| Body Satisfaction (BISS) | 44.40 | (2.38, 133.64) | < .001 | .44 | T1 < T2** | 1.17 | (2.39, 133.64) | .319 | .02 | - |
| | | | | | T2 > T3** | | | | | |
| | | | | | T3 < T4** | | | | | |
| | | | | | T1 > T3** | | | | | |
| | | | | | T1 < T4* | | | | | |
| T2 > T4* | | | | | | | | | | |
| Body Trust (MAIA Trusting) | 26.58 | (2.35, 131.77) | < .001 | .32 | T1 < T2** | 2.54 | (2.35, 131.77) | .074 | .04 | T1 > T3* |
| | | | | | T2 > T3** | | | | | |
| | | | | | T3 < T4** | | | | | |
| | | | | | T1 > T3* | | | | | |
| | | | | | T1 < T4** | | | | | |
| T3 < T4* | | | | | | | | | | |
| T3: BC > WB* | | | | | | | | | | |
| Body Shame (OBCS-shame) | 52.94 | (1.52, 85.19) | < .001 | .49 | T2 < T3** | 2.85 | (1.52, 85.19) | .077 | .05 | T3 > T4* |
| | | | | | T3 > T4** | | | | | |
| | | | | | T3: BC < WB* | | | | | |

Note. I-PANAS-SF = International positive and negative affect schedule short-form; BISS = Body Image States Scale; MAIA Trusting = Adapted Trusting subscale of the Multidimensional Assessment of Interoceptive Awareness; OBCS Shame = Adapted Body Shame Subscale of the Objectified Body Consciousness Scale; BC = Body Compassion; WB = Well-being; T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4. ** $p < .001$; * $p < .05$

3.4. TRAIT BC AND BODY SHAME AS MODERATORS IN THE EFFECTS OF THE BC MICRO-INTERVENTION ON STUDY VARIABLES

The moderation models were tested with the condition as the independent variable, change in the state of body shame, body satisfaction, body trust, and positive affect as the outcome variables, and trait BC and body shame as the moderators. The scores from T1 were entered as covariable for the moderation models of the changes in T2-T3, and correspondingly, scores from T1 and T2 were entered as covariables for the moderation models of the changes in T3-T4⁵.

The significant moderation models indicated that trait body shame ($F(5, 52) = 6.07, p < .001$) was a significant moderator of the effect of condition on the regulation of state body trust (T3-T4), accounting for 36.87% of the change in body trust. Simple slopes analyses showed that this effect was significant in women with “average” scores on the BISS trait ($b = 0.44, SE = 0.17, t = 2.55, p = .014 [0.09, 0.79]$) or “high” trait levels of body shame ($b = 0.87, SE = 0.25, t = 3.48, p = .001 [0.37, 1.36]$) (see Figure 3).

Regarding the change in state body satisfaction (T3-T4), the tested moderation models showed that both, trait BC ($F(5, 52) = 5.28, p < .001$) and trait body shame ($F(5, 52) = 5.47, p < .001$) were significant moderators of the effect of condition on the regulation of state body satisfaction, accounting for 33.69%

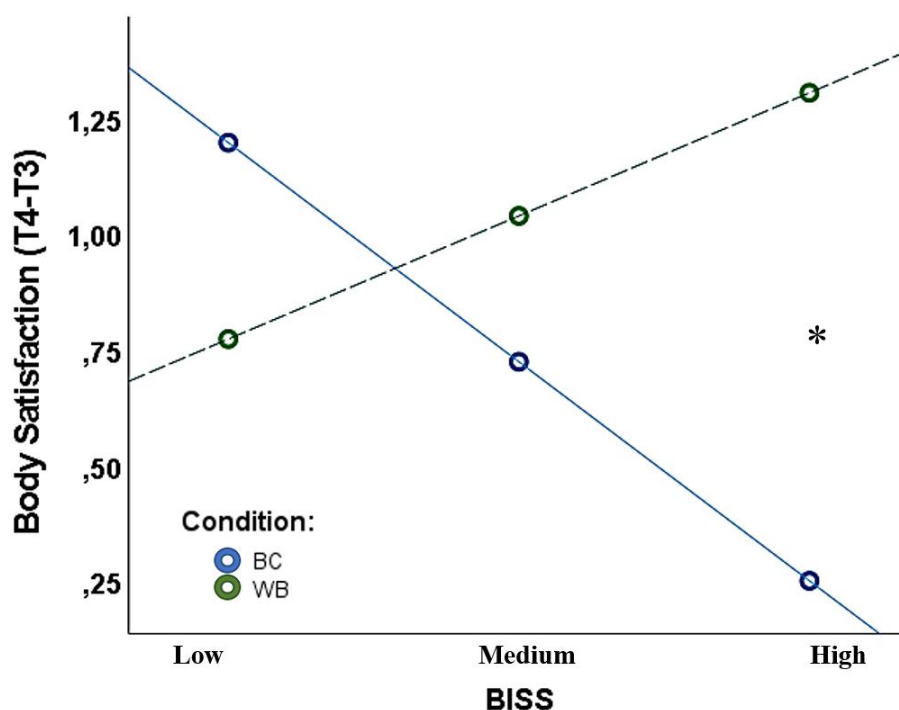
⁵ Regarding the change in state body shame (T3-T4), as the OBCS was only assessed in T2, T3 and T4, only the scores of T2 were entered as covariable.

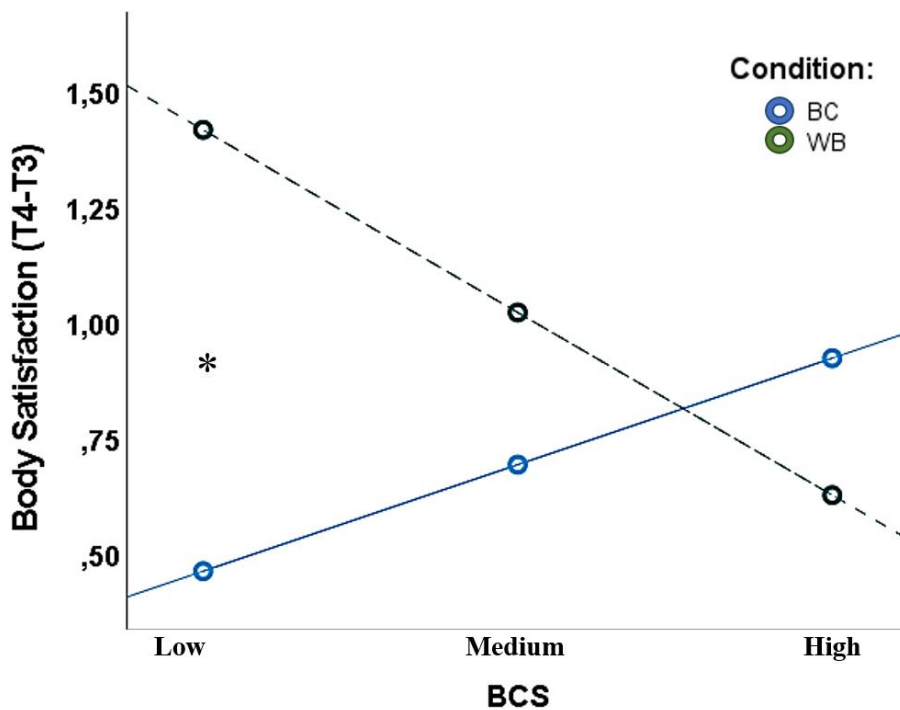
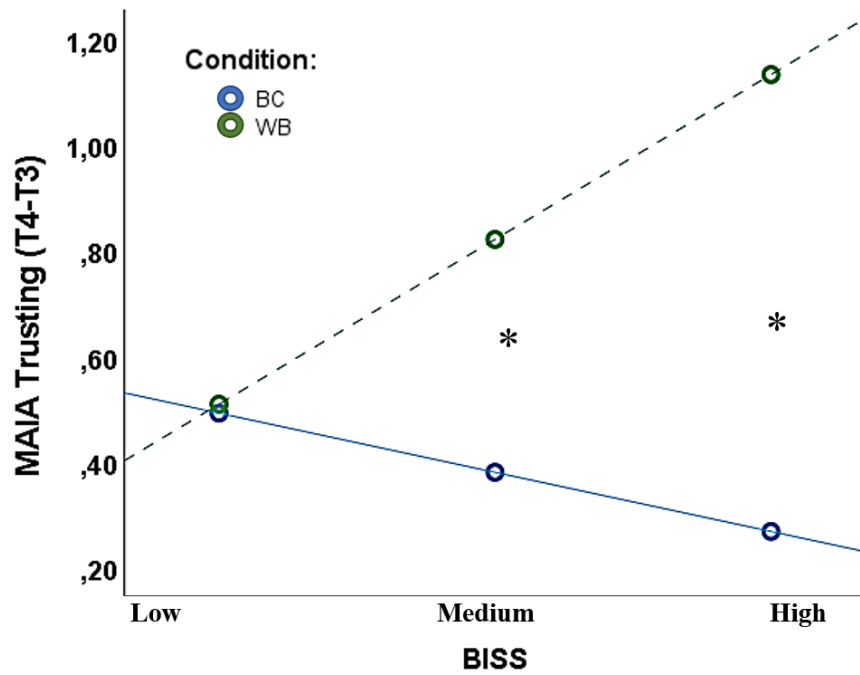
and 34.45% of the change in body satisfaction (T3-T4), respectively. Simple slopes analyses showed that this effect was significant in women with “low” scores on trait BC ($b = 0.95$, $SE = 0.31$, $t = 3.04$, $p = .004$ [0.32, 1.58]) or “high” trait levels of body shame ($b = 1.05$, $SE = 0.32$, $t = 3.28$, $p = .002$ [0.41, 1.70]) (see Figure 3). These results showed that participants who benefitted in a greater extent from the BC condition between T3 and T4 (an increase in body satisfaction) are people with low BC and high body shame that completed the BC exercise for the first time (i.e., WB group).

The rest of the tested moderation models were not statistically significant ($p > .05$). The main effects on the tested models can be found in the Table S1 of the Supplemental Materials.

Figure 3

Simple Slopes Graph of the Moderated Regression of Trait BC and Body Shame for State Body Satisfaction and State Body Trust





Note. BC = Body Compassion; WB = Well-being; BCS = Body Compassion Scale; BISS = Body Image Shame Scale. "Low", "medium" and "high" levels of the moderator represent the mean (*M*) and ± 1 standard deviation (*SD*). Significant *p* values (* $p < .05$) represent the moderator level at which the conditional effect of condition on induced state body satisfaction is significant.

4. DISCUSSION

The current study aimed to examine the efficacy of a BC micro-intervention on buffering and regulating PA, body trust, body satisfaction, and body shame resulting from a MIP-shame (i.e., a recall of a strong body shame situation). More specifically, we examined whether a ten-minute BC writing task (vs. a WB-based exercise) completed *before* and *after* a MIP-shame (1) helped to buffer or regulate body shame and (2) promoted body satisfaction, positive affect, and body trust; and test whether the levels of the trait body shame or the BC moderated the effects of the BC micro-intervention. The ultimate goal of this study is to enhance our understanding of the etiology and maintenance of EDs, and the resistance to treatment-seeking, and promote more accessible evidence-based treatments (Ali et al., 2017; Andersson, 2016; Kelly et al., 2014).

The results partially supported our first hypothesis. Participants in both conditions showed similar changes in the dependent variables (i.e., positive affect, body satisfaction, and body trust) following the BC/WB exercises and the MIP-shame. Interestingly, both BC and WB exercises had comparable effects on positive affect or body satisfaction. The increase in the positive affect was an expected effect after applying the BC micro-intervention or WB-based exercise (i.e., the recall of a positive event) (e.g., Altman et al., 2020; Quoidbach et al., 2015). However, the increase in body satisfaction or body trust in the WB group was unexpected and may reflect additional or unforeseen effects of the meditation prior to the BC/WB exercise meditation (i.e., Soles of the Feet). Hence, further explorations are needed to better understand the underlying mechanisms contributing to these unexpected changes.

When comparing the efficacy of both conditions, the results revealed marginally significant differences in body trust and body shame between groups. Specifically, these marginally significant results indicated that the BC micro-intervention (vs. WB-based exercise) showed a tendency to buffer the impact on the decrease of body trust after the MIP-shame; that is, the WB condition (vs. BC

condition) experienced a larger change in scores, as participants showed lower levels of body trust after MIP-shame than at the baseline. Additionally, marginally significant differences between conditions were also found in the state of body shame after the MIP-shame (i.e., the body shame was higher after the MIP-shame in the WB condition than in the BC condition), suggesting a possible buffering effect of the BC micro-intervention (vs. the WB-based exercise) on the experienced shame.

These preliminary results imply that the BC micro-interventions may have an effect on reducing and buffering the effects of body shame. The intervention could have improved “*how [they] relate to [themselves] in instances of perceived failure, inadequacy, or personal suffering*” (Neff, 2016, p. 265). Hence, it may be suggested that participants experienced the recalled body image-threatening situation more adaptively, and, as a result, showed lower levels body shame and not mistrusting their body to the extent the WB group did. These findings provide initial evidence that the BC micro-intervention may have a positive impact on participants' perception of their bodies and their ability to navigate body image-related challenges more effectively.

Regarding our second hypothesis, the findings indicate that the increase in body trust and the regulation of the state of body shame (in comparison to the levels of body shame and body trust experienced before BC micro-intervention) were higher for the WB group once they underwent the BC micro-intervention (vs. individuals in the BC condition who received the BC micro-intervention twice). These unexpected results may have two possible explanations. The first explanation is related to the habituation or boredom that might have caused receiving the BC micro-intervention for the second time (as found in Naismith et al., 2023). The second explanation may be related to the aftereffects of the first BC exercise; that is, the WB condition (not having undergone the BC micro-intervention before the MIP-shame) may have been not able to buffer the levels of induced shame as effectively (i.e., regulating body shame more desadaptively; thus, as a result, the BC condition experienced lower levels of body shame after

the MIP-shame as a result of a more adaptive emotional regulation). As a result, the WB condition experienced higher levels of shame after the MIP-shame -and consequently, the possibility of change was higher-. Consequently, the BC micro-intervention task could assist them in regulating body shame more adaptively and similarly to the levels experienced by the BC group at the end of the session.

Our third hypothesis was also partially confirmed, indicating the moderating role of the trait body shame and trait BC on the effect of the condition on the change in the studied variables. The tested moderation models were only significant for the changes in body satisfaction and body trust between the time-points “after the MIP-shame” and “after the BC-exercise applied for both groups”. Although both conditions experienced improvements in body satisfaction and body trust, the benefits of the BC micro-intervention after the MIP-shame were greater for individuals in the WB condition that received the micro-intervention for the first time. Specifically, the WB participants with high-trait body shame and low-trait BC reported higher increases in body satisfaction, while those with average or high levels of trait body shame revealed higher body trust at the end of the experimental session. However, these results should be taken cautiously, as the participants in the WB condition started from a higher level of body shame and body mistrust after the MIP-shame, and the potential of changing was higher in this condition.

High body shame or low BC have been linked to difficulties activating the self-soothing system (Gilbert, 2005; Goss & Allan, 2015). Thus, according to our moderation analysis findings, individuals who do not usually practice compassionate attitudes towards their body or tend to judge harshly their body appearance against the thin ideal may benefit most from the BC micro-intervention in the moment of regulating emotions; that is, after the body image-related threatening situation. The brief writing exercise could provide them with timely tools to regulate the effects of MIP-shame on body satisfaction or the trust put into one's body. This result also indicates that individuals with high BC or low body shame who received BC micro-intervention after the body-shame situation,

could be better equipped to manage the consequences of the induced body shame more adaptively (Altman et al., 2017; Turk & Waller, 2020). In such cases, the activation of the soothing system could foster feelings of safeness and security (i.e., body trust) and deactivate the threat system (i.e., body shame) (Gilbert & Irons, 2005; Kirby et al., 2017).

Despite reaching marginal statistical significance, these findings extend the previous literature on the protective role of compassionate interventions (e.g., Altman et al., 2017; Atkinson & Wade, 2015) and add evidence for the effectiveness of the use of brief writing micro-intervention when facing state body image threats (Moffitt et al., 2018; Seekis et al., 2017; Stern & Engeln, 2018). Moreover, the use of BC micro-intervention yields clinically significant improvements in the participant's WB. The debriefing carried out by a clinical psychologist was found to facilitate further emotional regulation of the experienced body shame and promoted help-seeking behaviors (e.g., "*I didn't realize how harsh I was toward my body, and I want this to change*") in line with the self-compassion-based interventions (Finlay-Jones et al., 2015; Kelly et al., 2014). Thus, although in need of further replication, it appears that BC micro-intervention was able to generate dissonance between the usual way to treat one's body and the compassionate attitude towards it (Halliwell & Driedrich, 2019).

There are several limitations to consider when interpreting the results of this study. First, the study focused on the body image concerns of the young female population without EDs which are most at risk of thin-ideal internalization (i.e., white women with high academic status; Cheng et al., 2019), but this limits the generalizability of the findings. Additionally, the study only involved one or two applications of a 10-minute BC micro-intervention within the same session. The effects of repeated exposure (e.g., habituation) or longer duration on fostering resilience against future body image-related threats remain unclear, therefore they require further investigation. Since the experience of body shame (as explained by the Objectification Theory; Fredrickson & Roberts, 1997) is relatively common in a day-to-day experience, it would be interesting to explore the impact

of BC micro-intervention on responses to future body shaming experiences. Lastly, the lack of state BC measure may arise as another limitation, as its evaluation could have helped to evaluate the efficacy of the BC micro-intervention on the self-compassionate attitude towards one's body and, additionally, to spot if there were any resistance to be induced in BC. Lastly, although compassion-based exercises are promising, focusing on one's own body could have triggered self-objectified body-related schemas in some individuals leading to a rejection of compassionate attitudes that must further be explored.

Thus, further research is needed to explore whether these interventions may activate the trait BC toward the body and help to buffer future effects of the upward appearance comparison before incorporating them into evidence-based clinical prevention and intervention packages for EDs. The study must be replicated in larger and more diverse samples (e.g., subclinical, and clinical ED samples or male participants), and encompass other body image-related constructs or emotional processes (e.g., body appreciation, self-hatred) closely related to the risk of developing EDs. For instance, since self-compassion helps to experience adverse emotions and not suppress them (Neff, 2003), it would be interesting to explore the emotional regulation strategies associated with BC micro-intervention.

Moreover, additional experimental research is needed on the underlying mechanisms of the BC protective role. While the current design allowed us to examine the impact of BC on body satisfaction, positive affect, and body trust, other important mechanisms of BC (e.g., body appreciation) may be worth including in future research designs (Kraemer, 2016). Future studies should also examine whether the changes on the micro-level body shame, body trust, and positive affect would be maintained over time as a "macro-level" effect (Fuller-Tyszkiewicz et al., 2019). Lastly, as engagement in the appearance comparison is a daily experience for women (Fredrickson & Roberts, 1997) and considering the more pronounced benefits from BC micro-intervention observed in the WB group, another question for future studies arises: Will these interventions be more useful

as a regulation strategy rather than a protective buffer? And if so, for which populations (e.g., high body shame or low BC)?

In sum, the present research offers preliminary evidence that a brief BC writing micro-intervention may mitigate body shame and its effects on body-related variables (i.e., body trust) among young Spanish women. Furthermore, the BC micro-intervention may foster dissonance between a judgmental perspective on one's body and the practiced body compassionate attitude. In need of further research, we tentatively conclude that practicing BC could buffer the shame and its effects on the body image-related variables.

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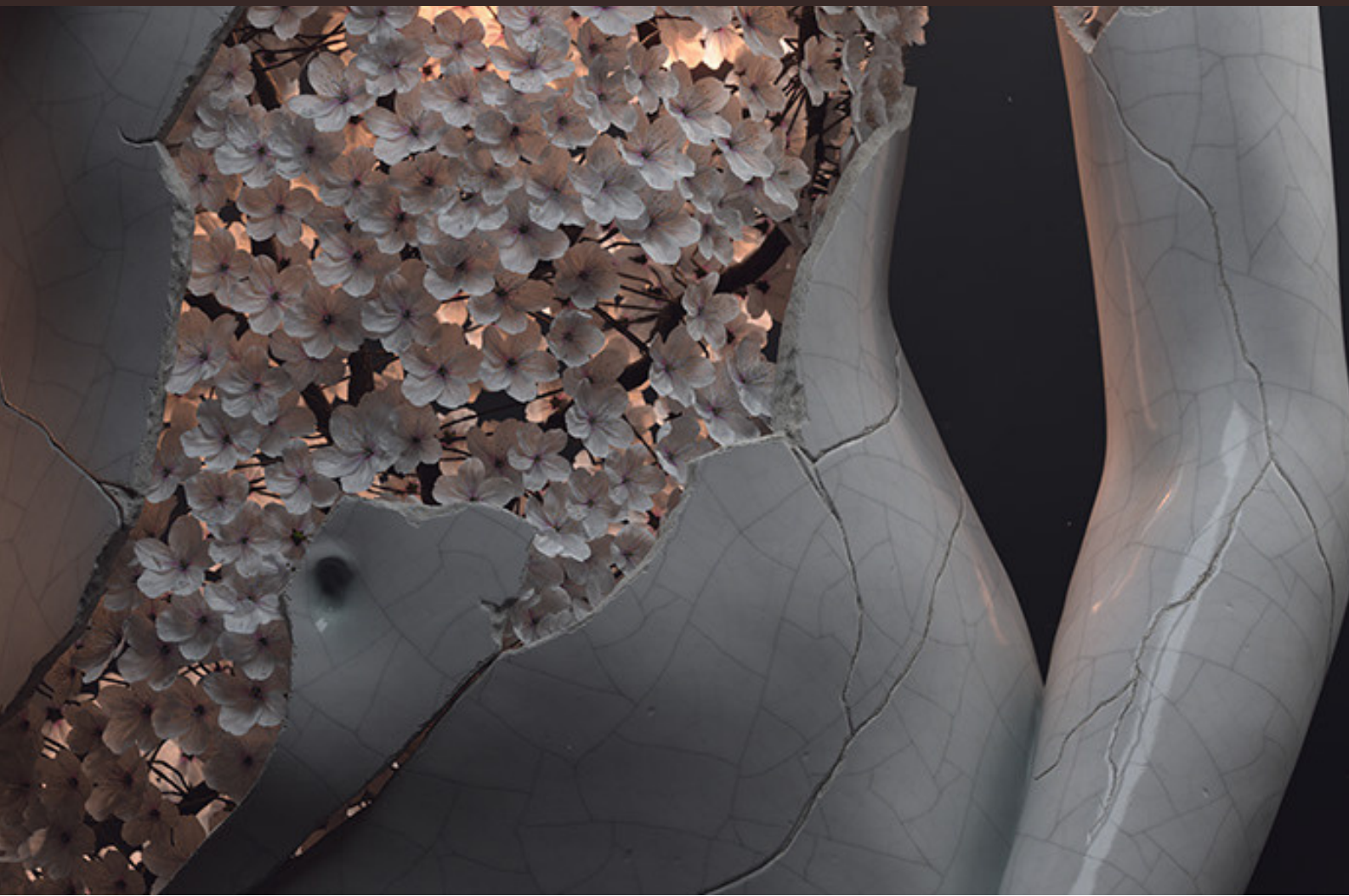
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CHAPTER 8

Discussion and conclusions



1. SUMMARY OF THE MAIN FINDINGS

Throughout this doctoral dissertation, several psychological processes have been identified as underlying mechanisms in ED-related symptomatology that could be useful for establishing key recommendations to improve the effectiveness and long-term outcomes of ED prevention and intervention programs for women. These recommendations aim to address important aspects that have emerged from the research findings.

Firstly, there is a need to understand the underlying factors contributing to affective and perceptual BID. Specifically, cognitive bias related to the "thin-fat" categorical boundary, depressive symptomatology, and positive and negative affect have been highlighted as important factors to consider. By examining these factors, it becomes possible to gain insights into the mechanisms that contribute to BID and could be targeted in the development of new interventions.

Secondly, it is crucial to address barriers to help-seeking behaviors that may impede individuals from seeking support for their ED symptoms. Body shame is, not only widely identified as a risk and maintenance factor of EDs but can also constitute a significant barrier when accessing or practicing disclosure in the prevention or intervention programs (Ali et al., 2017; Linville et al., 2015). By addressing body shame, individuals can be empowered to seek help and develop adaptive strategies to manage their ED symptoms effectively.

Lastly, promoting protective factors related to BI, particularly self-compassion, is essential for sustainable and long-term benefits in ED prevention and intervention programs. Understanding the underlying mechanisms of compassion, such as body trust and body appreciation, can provide valuable insights into fostering positive BI. Incorporating interventions that cultivate compassion and target specific BI-related variables, such as body shame, body trust, and body satisfaction, can enhance the effectiveness of programs aimed at women at risk of developing EDs.

Thus, to address these statements, six studies were designed using a combination of correlational, quasi-experimental, and experimental methods along with a narrative review of the relevant constructs. The specific aims of the carried-out studies were: (1) to validate the virtual reality software program as a tool aimed to assess aspects of perceptual and affective BID in women from clinical and non-clinical populations; and to explore the differences in BID between these populations; (2) to explore the underlying mechanisms (perceptual “thin-fat” categorical boundary associated with the thin-ideal internalization; and positive and negative affect) affecting the perceptual and the affective BID in adolescents and young adults from clinical and non-clinical populations; (3) to carry out a narrative review that would integrate the construct of BI, embodiment, body shame, and self- and body compassion; (4) to validate and study the psychometric properties of the Body Image Shame Scale (BISS; Duarte et al., 2015) as an instrument to assess internal and external dimensions of body shame in Spanish women; (5) to confirm the protective role of self-compassion on the risk of EDs and to analyze the role of positive affect, body trust, and body shame as potential underlying mechanisms between self-compassion and the risk of EDs; (6) to validate and study the psychometric properties of the Body Compassion Scale (BCS; Altman et al., 2020) as an instrument to assess body compassion in Spanish women; (7) to examine the protective role of body compassion in cultivating positive BI (body appreciation) and decreasing BID (body shame) and the risk of EDs; and (8) to investigate the efficacy of body compassion micro-intervention in buffering and regulating BI-related variables (body shame, body satisfaction, and body trust) and promoting positive affect.

In the following subsections, a general discussion will be presented, putting together all the results derived from these studies. Afterward, the strengths and limitations of the present dissertation are summarized. Finally, in light of the theoretical and clinical implications, future directions and general conclusions are drawn.

1.1. Body image disturbance in a clinical and non-clinical population: using the lens of virtual reality

Study 1 and Study 2 aimed to validate the virtual reality software to assess BID dimensions (Objective 1) and to explore the factors (perceptual “thin-fat” categorical boundary, positive and negative affect) contributing to the development and maintenance of BID (perceptual and affective dimensions) (Objective 2). While Study 1 focused on examining cognitive bias of the “thin-fat” categorization as a risk and maintenance factor in women from both general and ED populations; Study 2 investigated the prospective role of depressive symptomatology and affect (negative and positive) as the BID maintenance factors in adolescents with EDs. Both studies were conducted with virtual reality software.

1.1.1. The cognitive bias of the “thin-fat” categorization as a risk and maintenance factor in women from both general and ED populations

One of the outcomes of Study 1 was the design and validation of the virtual reality software as a valid instrument for measuring BID (affective and perceptual dimensions). In order to do so, besides filling out the self-report measures, participants completed five carefully designed virtual reality tasks to measure the estimation of body size (ideal and perceived), as well as the way to categorize their own and other’s body as thin or fat. Additionally, the difference between the ideal and perceived estimated body size (i.e., self-ideal discrepancy) was used to measure body dissatisfaction. The results from these tasks evidence the value of virtual reality in the assessment of BID.

However, a key objective of Study 1 was to examine the effect of the “thin-fat” categorical boundary on BID (perceptual and affective). Consistent with previous studies (Gledhill et al., 2017; Szostak et al., 2018), our findings support the notion that cognitive bias associated with the perception of the “thin-fat” category can influence the severity of the affective dimension of the BID (i.e., the estimation of one's ideal body). However, our study stands out by adopting a

distinctive approach, highlighting the influence of cognitive bias of the “thin-fat” categorization for *one’s own body* (vs. the “thin-fat” categorization for *the bodies of other people*) on the BID. These findings hold particular relevance for women with high body dissatisfaction as they may engage in greater social comparison, resulting in a negative comparison between their body and the internalized ideal (e.g., Dittmar et al., 2009; Schaefer et al., 2019). In turn, this negative comparison can further increase body dissatisfaction (Stice, 2001), potentially leading to adopting unhealthy BI behaviors (e.g., dieting, purging) (Holland & Tiggemann, 2016; Lantz et al., 2018) and negative emotional states (Stice, 2001). Consequently, these disordered ED behaviors and negative affect, may, in turn, increase the risk of developing EDs.

Regarding the ED group, our results align with the existing literature (e.g., Mölbert et al., 2018), indicating a strong preference for severely underweight bodies among women with ED. As the persistence of the thin-ideal internalization may increase the likelihood of relapse (Schaefer et al., 2018), intervention programs need to address more effectively this issue. In our study, when confronted with their idealized thin bodies in virtual reality, several ED participants displayed strong negative emotional responses expressing awareness of the unattainability of such ideals (i.e., “*I’m aware I’ll never be able to reach this ideal body*”; “*I know it is not good for me to strive for this thin body*”). Thus, addressing this estimation of the ideal (unrealistic) body could be explored as a helpful strategy when working on thin-ideal internalization.

Addressing BID remains one of the most challenging aspects of EDs to address. The CBT-E (Fairburn et al., 2003) has demonstrated effectiveness in treating EDs, focusing primarily on improving disordered eating behaviors (Cândeia et al., 2018). Recent studies suggest that training aimed at modifying cognitive bias associated with thin ideals can lead to a reduction in BI-related concerns (Irvine et al., 2020). While this is a step forward, it is crucial to consider the assessment and modification of cognitive biases specifically related to *one’s own body* (vs. another person’s body as done by Irvine et al. (2020) or Gledhill et

al. (2017)), as the internalization of thin ideals is directed toward individual's self-perception of their own body. Incorporating techniques that address cognitive biases for *one's own body*, rather than others, may serve as a more effective adjuvant technique in the prevention and intervention of EDs, potentially leading to modifications in ideal body size estimation. Additionally, prevention efforts for women with high body dissatisfaction could involve exposure to a wider range of diverse body shapes to promote the appreciation of different body shapes (Hernández-López et al., 2019; Moreno-Domínguez et al., 2019), enhance their body satisfaction, and challenge the thin ideal (Ogden et al., 2020). Future research should explore the impact of categorical boundaries on positive BI dimensions and investigate the potential benefits of modifying these boundaries to enhance positive BI while decreasing BID (Halliwell & Diedrichs, 2014).

Moreover, our study supports the use of virtual reality as an ecologically valid and useful tool for assessing self-ideal discrepancy in BI research (Ferrer-García & Gutiérrez-Maldonado, 2012; Glashouwer et al., 2019). The findings stress the salience of the thin ideal as a risk and maintenance factor in EDs, highlighting the importance of addressing this factor in future prevention and intervention programs. However, further research is needed to fully explore and validate these findings.

1.1.2. The role of depressive symptomatology and affect (negative and positive) as BID maintenance factors in adolescents with EDs

Study 2 was carried out using the validated virtual reality software from the previous study (Study 1). As the development of BID is especially relevant in adolescent women (Kantanista et al., 2015; Uchôa et al., 2019) and the severity of the trait body dissatisfaction may be related to greater variability in BI states (Melnik et al., 2004), an experimental within-subject study was designed to study the impact of the affect (positive and negative) and depressive symptomatology on the BID of adolescents with EDs.

First, findings confirmed the influence of depressive symptomatology on several dimensions of positive and negative BI. The comorbidity of EDs and depressive symptoms (Rodgers & Paxton, 2014) is often overlooked in prevention and intervention programs, highlighting the need for interventions that address both conditions comprehensively. Furthermore, the role of depressive symptoms in relation to positive BI dimensions is an emerging area in the field of BI. Considering the protective role of positive BI in reducing ED symptoms (Cook-Cottone, 2015; Piran, 2015), further exploration into the effect of depressive symptoms on the decrease of body appreciation or body esteem, among other positive BI dimensions, is warranted.

Regarding the role of the affect in the affective and perceptual BID, the potential role of the negative affect as an ED maintenance factor was not corroborated by our study findings. One explanation is that, due to ED behaviors, participants could avoid or suppress their feelings or use rumination strategies of emotion regulation (Aldao et al., 2010), which may explain the lack of significant effect of the negative mood induction on BID. Given the transdiagnostic implications of negative affect in EDs (i.e., increased selective attention to the body-related stimuli or body dissatisfaction) (Rodgers & DuBois, 2016), further investigation is necessary to better understand the relationship between emotional dysregulation, negative mood, and BID (Tylka & Subich, 2004). Furthermore, based on the findings by Wong et al. (2021), exploring specific affective components of negative affect that may be central to the ED symptomatology such as guilt for eating or shame, would be beneficial.

However, the results indicated that the positive mood induction (i.e., a decrease in the negative affect and an increase in the positive affect) resulted in a more adjusted estimation of the ideal body size. This highlights the “broadening” role of positive affect (Fredrickson, 2001) in promoting healthier body size preferences that are less influenced by thin ideals (Williamson, 1990; Wong et al., 2021). The findings also demonstrated the influence of contextual information, such as induced happiness or sadness, on the variability of BID states related to

one's physical appearance (Yamamiya et al., 2005).

These findings emphasize the need for a deeper understanding of contextual factors that influence BID disturbance to develop more effective interventions and prevent the development of BID in populations at risk of developing EDs. It also highlights the importance of further research on the potential protective factors such as emotional regulation, which appears to be impaired in the population (Weinbach et al., 2018; Wong et al., 2021). Promoting positive BI dimensions that have a protective role in decreasing the severity of ED symptomatology and acting as a prevention factor in at-risk populations should be a focus of attention (Piran, 2015).

The use of virtual reality facilitated the insight regarding their BID in the participants, as some of them became aware of their strictness on body judgment that may have been due to the influence of emotional states. Although not reflected by the significant results, the patients did mention the facility to recall their BI in detail after the sadness induction, being able to focus on the parts of their body they disliked. Conversely, as mentioned in the discussion of the corresponding chapter, the induction of the positive emotional states was related to less detail-oriented processing of the BI-related information (i.e., *“I was not able to focus clearly on specific parts of my body I usually do not like”*).

Furthermore, the debriefing at the end of the study 2 promoted personal insight into the role of the affect on the BI fluctuations. As already suggested by Cash and Hrabosky (2003), the self-monitoring of these states along with the information on how the changes in one's BI are triggered or maintained daily (i.e., intra-personal variability of their BI), could promote positive outcomes in therapy. Thus, besides pointing out the statistical results obtained in Study 2, we want to highlight the clinical implications of the debriefing session as one of the ways to promote one's monitoring of thoughts, behaviors, and feelings as a way to improve their therapy process.

In sum, both studies enhance our understanding of the processes involved in the severity of the perceptual and affective BID, with implications for complementing the existing theoretical frameworks and for improving clinical practice. The use of virtual reality as an effective assessment instrument of affective and perceptual state and trait-level BID is promising, although further research is needed to address acceptance and dropout issues (e.g., including game design elements) (Fairburn & Rothwell, 2015; Yim & Schmidt, 2019).

The findings support the central role of the thin ideal as a potential risk and maintenance factor in EDs. Additionally, contextual factors (i.e., affect) and depressive symptomatology may play a role in maintaining and exacerbating the ED severity in female adolescents. The assessment of BI states and the factors influencing these changes has valuable implications for the treatment and prevention of BID (Cash et al., 2002), with emotional dysregulation emerging as a promising target in ED interventions (Lavender et al., 2015).

1.2. In pursuit of a holistic perspective on body image: incorporating positive body image, embodiment, and self- and body-compassionate attitude

Given the importance of protective factors to the BI field, scholars have started to integrate some protective variables (self- and body compassion, body trust, body appreciation, embodiment) into many of the field's dominant theoretical frameworks in an attempt to explain its potential impacts on BI and the risk of EDs, although this approach is still in its infancy.

To fulfill the next objectives of this dissertation, a narrative review was first carried out to examine the body of literature concerning BI (positive and negative), embodiment (positive and negative), and compassion (self-compassion and body compassion) as protective factors in the field of BI and EDs (Objective 3). The review emphasizes the importance of integrating the dimensions of positive and

negative BI when working on the prevention and intervention of EDs. The novelty of the narrative was to include the long-overlooked construct of embodiment -a construct difficult to distinguish from the positive BI- to foster positive connections to one's body that may be lost due to the experiences of self-objectification (Cook-Cottone, 2018; Piran & Teall, 2012).

The conclusions of this narrative review helped to set a theoretical framework for the next studies: to gain a deeper understanding of the role of body shame and body compassion, we first validated the measures for its use in the Spanish population (Objectives 4 and 6). The gathered data was also used to test a mediational model, including body appreciation, positive affect, and body trust as underlying mechanisms of the protective role of compassion on body shame and the risk of ED (Objectives 5 and 7). Finally, based on the narrative review and the findings from these studies, the last experimental study was designed as a way to reach Objective 8; that is, to examine the efficacy of a body compassion micro-intervention to decrease BID (body shame) and BI-related variables (body satisfaction and body trust) and positive affect.

1.3. The role of holding a kind, non-judgemental attitude toward body-related threats

Study 4 and Study 5 addressed Objectives 4 to 7 of this dissertation. Study 4 aimed to examine the psychometric properties of the Spanish version of The Body Image Shame Scale (BISS; Duarte et al., 2015) (Objective 4); and to explore the mediating role of positive affect, body trust, and body shame in the relationship between self-compassion and the risk of EDs (Objective 5). Although the construct of body shame has been extensively explored in relation to various ED-related variables and recognized as a risk and maintenance factor in EDs, previous research has primarily relied on scales such as the Other as a Shamer Scale (OAS; Allan, 1994); the Body Shame of the Objectified Body Consciousness Scale

(McKinley & Hyde, 1996); the Body Image Guilt and Shame Scale (BIGSS; Thompson et al., 2003) or the Internalized Shame Scale (ISS; Cook, 2001), among others. These scales primarily aimed to evaluate external shame, the proneness to shame, internalized shame, or specifically, body shame, without explicitly differentiating between internal and external body shame. Thus, one of the goals of this dissertation was to examine the unique contributions of internal and external BI shame to the field of EDs by testing the psychometric properties of the Spanish version of a construct able to differentiate between the unique contributions of *internal* and *external* body image shame to the field of the EDs. A deeper comprehension of the role each dimension (*internal* vs. *external* body shame) plays in the onset of EDs could be clinically significant, as it would allow for addressing the pertinent dimensions of body shame during interventions aimed at preventing EDs.

The path analysis carried out in Study 4 contributed to the growing body of evidence linking self-compassion and ED risk (Braun et al., 2016; Turk & Waller, 2020). Importantly, our findings highlight the importance of cultivating a positive BI through self-compassion, positive affective states, and body trust in order to counteract *internal* body shame -a key predictor of ED symptomatology-. Hence, when faced with situations that may elicit internal body shame, it should be nurtured a mindful, self-compassionate, and nonjudgmental attitude towards oneself through the enhancement of positive affect, attentively tuning in to bodily sensations, and trusting these bodily states (Bartnett & Sharp, 2016; Todd et al., 2019). These outcomes support intervention approaches based on self-compassion (e.g., Albertson et al., 2015; Rodgers et al., 2018; Toole & Craighead, 2016) and increase the likelihood of women developing more positive, long-lasting, and non-judgmental attitudes toward their bodies (Braun et al., 2016). Furthermore, consistent with previous studies, self-compassion is associated with increased positive emotional states. According to Fredrickson's broaden-and-build theory (2001), positive emotions may contribute to adaptive and flexible problem-solving approaches, broadening one's perspective (i.e., when comparing

oneself to the internalized thin ideal).

The findings of this study support the evidence of body trust as a protective factor against BID and ED symptomatology. Recent research has demonstrated that body trust along with other dimensions of interoceptive awareness -attentional regulation (i.e., ability to sustain the focus on the body sensations) and self-regulation (i.e., ability to regulate distress by focusing on body sensations)- (Mehling et al., 2012), can be enhanced through mindfulness-based practices (Bornemann et al., 2015). In fact, self-compassion has been shown to promote self-soothing systems of emotional regulation (Amy Louise Finlay-Jones, 2017), leading to feelings of safety and calmness (Kirby et al., 2017). Despite coming from a cross-sectional design, our results align with the previous findings suggesting that a self-compassionate attitude may promote the experience of one's body as safe and trustworthy. To further extend the evidence of the protective role of body trust, this construct was included in the experimental design examining the protective role of body compassion on the risk of EDs (study 4).

One of the most salient findings of Study 4 was the role of *internal* (vs external) body shame on the risk of EDs. *Internal* body shame involves being self-critical and holding an inner critical voice regarding one's perceived flaws or shortcomings. Attempts to correct and improve oneself often stem from this type of shame (Gilbert, 2003; Gilbert & Irons, 2008; Gilbert & Procter, 2006), and it is associated with the development of disordered eating habits. Previous research has consistently shown a link between perceiving oneself as flawed or inadequate (the core component of *internal* body shame) and a higher likelihood of developing an ED (Fennig et al., 2008; Ferreira et al., 2014; Mendes & Ferreira, 2020). The construct of shame, characterized by self-criticism, overidentification with one's thoughts, and isolation, may be defined as the opposite to compassion (Germer, 2023; Gilbert & Irons, 2004). Our results indicate that fostering a kind and non-judgemental attitude may decrease the internalized self-judgemental voice regarding one's appearance.

In Study 5, we aimed to validate the Body Compassion Scale (BCS; Altman et al., 2020) (Objective 6), and to examine the protective role of the body compassion construct as a way to promote positive BI (body appreciation) and decrease body shame and the risk of EDs (Objective 7).

The psychometric properties of the Spanish version of the BCS demonstrated its reliability and validity in measuring compassion specifically directed towards one's own body. This indicated that the Spanish version of the BCS can be considered a reliable tool for both research purposes (e.g., extending the evidence of the protective role of the body compassion construct in the Spanish population) and clinical purposes (e.g., using it as a screening measure for women at risk of developing EDs).

The results of a mediation model confirm the protective role of body compassion and body appreciation in reducing body shame and the risk of EDs. Although the evidence on body compassion is limited, previous research has already established significant associations between body compassion and BI (e.g., higher body flexibility, less body shame, and disordered eating patterns). However, in contrast to the direct protective effect of overall self-compassion on disordered eating and BID, as demonstrated in previous studies (Braun et al., 2016; Turk & Waller, 2020), the present findings suggest a different pathway by which body-specific compassion may mediate the reduction of ED risk.

The findings also indicate that body appreciation (e.g., fostering alternative ways of valuing oneself in the face of body-related threats) (Homan & Tylka, 2015) may be an underlying mechanism that explains the protective role of body compassion in reducing body shame and ED risk. Consistent with the results obtained in Study 5, only *internal* body shame (vs. *external* body shame) - associated with self-criticism and body concealment behaviors- was significantly correlated with the risk of developing EDs. As we previously stated, the evidence regarding the role of *internal* body shame is still limited, particularly in the Spanish context. These findings suggest that maintaining a self-judgmental view of one's

body appearance (*internal* body shame) rather than receiving negative evaluations from the social context (*external* body shame) is closely associated with the risk of developing EDs (Duarte et al., 2014; Pinto-Gouveia et al., 2014).

The findings emphasize the importance of promoting positive BI dimensions such as body appreciation as a way to decrease negative BI and foster a positive connection with one's body (e.g., Avalos et al., 2005; Tylka, 2018). This is important in protecting individuals against harmful environmental influences on BI (Halliwell, 2013). Hence, successful interventions should aim to cultivate a compassionate relationship with one's body as a means to reject unrealistic societal appearance ideals that often lead to appearance comparison and subsequent body shame. By fostering a compassionate attitude towards their bodies, individuals may develop a protective factor against the development of ED, particularly in women (Máximo et al., 2017).

In sum, the findings from both studies point out the role of compassion, both general and body-focused, in promoting positive BI and reducing BID through specific underlying mechanisms. However, further research is needed to address the emerging questions and gaps in our understanding of the body compassion construct: Will body compassion effectively promote adaptive emotional regulation of body shame in an experimental setting? When should body compassion be practiced (*before* or *after*) to effectively reduce the experience of negative body appearance evaluation? Can body compassion promote body trust in a similar way to self-compassion? Who are the specific target populations that would benefit the most from body compassion interventions? And, most importantly, in terms of implications for the clinical practice: Can body compassion serve as a potential factor to overcome the reluctance to seek help due to body shame?

To provide preliminary answers to these questions, the last study was conducted.

1.4. The body through a compassionate gaze: promoting healthy and positive body image using a body compassion micro-intervention

Given the increasing prevalence of EDs, it is crucial to develop interventions that are quick to administer, easy to disseminate, cost-effective, and not reliant on the clinician's presence (Ali et al., 2017; Treasure et al., 2020). Consequently, the last aim of this dissertation was to create an effective body compassion micro-intervention based on findings from previous studies. Specifically, the focus was on women with higher levels of body shame (as observed in Study 4 and Study 5), as they may also experience higher body dissatisfaction as a result of the self-ideal dissonance (Study 1) putting them at risk of EDs. In line with the protective factors highlighted in the previous studies, the measures of body trust, positive affect, and body satisfaction were included in the intervention. Specifically, we investigated whether engaging in a ten-minute body compassion writing task before and after induction of body shame could (1) mitigate/regulate body shame and (2) enhance body satisfaction, positive affect, and body trust. Furthermore, we examined whether the level of body shame or body compassion moderated the effects of the body compassion micro-intervention.

The preliminary findings highlight the positive impact of body compassion micro-interventions on state body shame and body trust. These initial findings suggest that the body compassion micro-interventions potentially contribute to the reduction and mitigation of body shame. It can be inferred that participants who received the micro-intervention were able to respond more adaptively to the body image-threatening situation, leading to lower levels of body shame and a greater level of trust in their bodies compared to the well-being group. These results offer preliminary support for the positive influence of the body compassion micro-intervention on participants' body perception and their capacity to effectively navigate challenges related to body image. Based on our analysis of moderation, individuals who typically lack compassionate attitudes towards their body and tend to harshly judge their body against the thin ideal may derive the greatest benefits (i.e., increase in body satisfaction and body trust) from the body

compassion micro-intervention when it comes to regulating emotions, specifically following a body image-related threatening situation. Additionally, the results indicate that the body compassion micro-intervention is specifically beneficial for individuals with low levels of body compassion or high levels of body shame. These findings suggest that individuals who lack self-compassion towards their bodies or tend to judge themselves harshly against societal standards may benefit the most from the body compassion micro-intervention. By activating the soothing system and promoting feelings of safety and security (Gilbert, 2009; Svendsen et al., 2016), such as body trust, the body compassion micro-intervention can effectively counteract the threat system associated with body shame (Gilbert & Irons, 2005; Kirby et al., 2017). In all, these findings highlight the importance of targeting emotional dysregulation (i.e., body shame) in ED prevention and intervention programs (McClure et al., 2022).

In the discussion of Study 6, it was stated that the lack of significant results between the body compassion micro-intervention and the well-being exercise before the body shame induction may be due to the unforeseen effects of prior meditation. To shed light on these findings, we hypothesized that the 2-minute meditation may have promoted the state of mindfulness, helping to regulate emotional states (i.e., induced body shame) through the shift in attention (Garland et al., 2017). Another possible explanation is that the practice of meditation allowed participants to experience themselves from a first-person perspective (focus on the body functionality and their internal bodily cues) fostering a positive connection with their bodies instead of focusing on one's appearance (self-objectification) (Tylka, 2012). However, this needs to be further explored in future studies.

Furthermore, the implementation of the body compassion micro-intervention resulted in clinically significant improvements in participants' well-being. Several participants expressed interest in keeping a copy of their written body compassion exercises, indicating that they found their responses valuable and worth revisiting. The debriefing session conducted by a clinical psychologist

facilitated further emotional regulation of experienced body shame and promoted help-seeking behaviors (e.g., "*I didn't realize how harsh I was toward my body, and I want this to change*"), aligning with self-compassion-based interventions (Finlay-Jones et al., 2015; Kelly et al., 2014). Thus, in line with Nemesure et al. (2023), the body compassion micro-intervention was also able to promote the motivation to change their BI, by generating dissonance between the usual way to treat their body and the compassionate attitude towards it (Halliwell & Diedrichs, 2019).

Overall, this study expands upon previous research on the protective role of compassionate interventions in BI (e.g., Altman et al., 2017; Atkinson & Wade, 2015) and provides additional evidence for the effectiveness of brief writing micro-interventions in addressing BI threats (Moffitt et al., 2018; Seekis et al., 2017; Stern & Engeln, 2018). Moreover, the findings indicate that digitally delivered interventions have the potential to improve BI-related experiences in young women (Mahon & Seekis, 2022).

1.5. The first approach towards incorporating a body compassionate attitude into interventions: The potential clinical implications of targeting body shame

In the previous chapters, we have highlighted the need to examine ED prevention and intervention programs from a multifactorial perspective, considering both risk and protective factors as moderators and mediators to the origin and maintenance of EDs. To address these gaps in the literature, an emerging body of research has begun to examine the positive and adaptive components of BI (Andrew et al., 2016), but there is a lack of exploration regarding the impact of body compassion and its inclusion in ED interventions. In this dissertation, we take a new approach by designing a study focused on body compassion that could be delivered online as a micro-intervention for women at risk of EDs. However, considering the rising prevalence of EDs and the limitations of existing evidence-based treatments, including mixed efficacy (Murray et al.,

2019), low recovery rates (Berends et al., 2018; Kotilahti et al., 2020), and reluctance to seek treatment (Musolino et al., 2016), it is crucial to extend the research of these constructs onto ED populations.

Promoting positive BI, instead of reaching a “neutral” BI, may enhance resilience against future BI-related threats (Tylka & Wood-Barcalow, 2015). So far, some studies have shown an increase in positive BI dimensions as an outcome of evidence-based treatments for EDs (e.g., Bluett et al., 2016; Lee et al., 2018). However, these changes were not significant or long-lasting, denoting a need to modify the aforementioned interventions by incorporating additional strategies that have been proven to cultivate a positive relationship with one's own body (Alleva et al., 2015; Cook-Cottone, 2015). In order to do so, further understanding of the embodiment continuum (e.g., body uncanny – positive embodiment; Piran, 2015; Svenaeus, 2013) in ED populations may be helpful to identify the psychological processes that facilitate these positive connections with one's body. As exemplified in the Attuned Representation Model of Self-Care (ARMS; Cook-Cottone, 2006), promoting self-care (i.e., self- and body compassion) and increasing awareness of one's internal states (Webb et al., 2015), could be effective strategies to foster positive BI.

In this dissertation, clinical ED populations have been examined in the first two studies, gaining insights into constructs such as thin-ideal interiorization or understanding the influence of depressive symptoms and affect on BID in adolescents with EDs, supporting the transdiagnostic role of the emotional regulation in EDs (Prefit et al., 2019; Thompson-Brenner et al., 2019). However, it is still necessary to adapt and explore other constructs also in these populations, such as compassion directed towards one's body, that according to the ARMS (Cook-Cottone, 2006) could promote a positive connection to one's body.

By fostering compassion, particularly towards one's body, and critically examining cultural ideals, women may resist prevailing sociocultural ideals (Duarte et al., 2015; Piran, 2012). Nonetheless, as the resistance and fear of compassion

may delay engagement in interventions and limit their positive effects on BI (Kelly et al., 2014), adjustments regarding this construct must be incorporated into future body compassion-based intervention programs. Although there is a body of evidence on the role of fears of compassion in the ED populations (Kelly et al., 2014), to our knowledge, its impact on BI and its role in the effectiveness of body compassion interventions has been not studied. Thus, it is important to examine whether the exercise of “*seeing my body through a compassionate lens*” can trigger fears of compassion leading to a “backdraft” effect (Germer, 2009, pp. 150–152; Germer & Neff, 2019) the ED populations.

As shame has been also found to prevent disclosure, leading to poorer treatment outcomes (Swan & Andrews, 2003), we consider that online compassionate writing exercises could be a suitable first approach to a BI intervention due to their anonymous nature and high accessibility and affordability (Andersson et al., 2014; Mahon & Seekis, 2022). Furthermore, as the component of debriefing in the carried-out body compassion micro-intervention has been hypothesized to be effective against the secrecy and concealment associated with shame (Gilbert, 1998), is crucial to explore its effectiveness in interventions targeting ED populations with high body shame.

In summary, this dissertation has made significant contributions to our understanding of BID and its underlying mechanisms. It has highlighted the potential of virtual reality as a tool for assessing perceptual and affective aspects of BID. The role of the “thin-fat” categorical boundary, positive affect, body shame, body compassion, and body trust in relation to BID and the risk of EDs have been explored. Moreover, the findings suggest that interventions targeting body compassion have the potential to promote positive BI and reduce the risk of EDs. However, further research is needed to test these findings for the clinical populations with EDs. Overall, this dissertation provides valuable insights as a starting point for developing future studies aiming to enhance prevention and treatment strategies for individuals with BI concerns and EDs.

2. STRENGTHS

This Doctoral Thesis has several strengths which are necessary to highlight to better understand the main findings and implications:

1. The dissertation involved research that fills an important gap in the field of BI, where several authors have called for further exploration (Smolak & Cash, 2011; Tylka, 2012). The empirical chapters of the thesis provide a novel insight into the risk and protective factors associated with the onset and maintenance of BID that could lead to more effective ED prevention and intervention programs. The carried-out studies not only provided additional evidence supporting the well-established ED protective factors (self-compassion) but also contribute to the understanding of the protective role of emerging factors (body trust) and the differentiation between the internal and external body shame, that count with scarce evidence.
2. This research project comprises six studies that meet high methodological standards, allowing us to examine associations and, more importantly, the cause-effect relationships among the studied ED risk and protective constructs. Besides this, all empirical studies complied with the ethical standards and were approved by the ethics committees of the University of Valencia (Procedure numbers H1508330529930; 1127840; 1856772) and the Doctor Peset University Hospital (Procedure numbers: 88/19; 23/21).
3. This dissertation attempted to bridge the gap between research and clinical settings. Besides gathering data from women from the general population ($n > 700$; as some participants took part in more than one study this is an approximated number), the collaboration agreements were signed between the University of Valencia ($n = 11$) and Ita PREVI Clinical Psychology Center ($n = 21$) as well as with the Eating Disorders Unit of the Psychiatry Department of the Clinical University Hospital Lozano Blesa ($n = 40$). Thus, besides gathering patients' data in the carried-out studies, we

aimed to provide clinicians from all the participating medical centers with training on the use of virtual reality as a complementary assessment tool to their clinical practice. Furthermore, the results obtained by each patient were shared with the corresponding mental health professionals to enhance the quality of the provided therapy.

4. In an attempt to address the limitations of the traditional assessment methods of the BID, a low-cost, accessible virtual reality assessment software program was developed. Besides exploring the perceptual and affective-cognitive-attitudinal dimensions of BI, we attempted to examine the effect of the ED-related risk and maintenance factors such as the affect or the automatic responses to the “thin-fat” dichotomy. The designed software was used during Study 1 and Study 2 of the present research. To our knowledge, Study 1 was the first to examine the categorical boundaries for *one’s own* (vs. other person's body).
5. Furthermore, as a result of our studies, we validated two BI-related instruments to Spanish: the Body Image Shame Scale (BISS; Duarte et al., 2015) and the Body Compassion Scale (BCS; Altman et al., 2020). The adaptation of these scales to Spanish has provided us with reliable and accurate measures for assessing both internal and external body shame as well as the levels of body compassion among women from the general Spanish population. Thus, we now count on two robust measures to be used as screening tools in both research and clinical practice.
6. To the best of our knowledge, this dissertation includes the first examination of the role of external and internal dimensions of body shame on the risk of developing EDs. Moreover, this examination was carried out through two studies (Study 4 and Study 5) that found similar results.

7. Based on the findings from the carried-out cross-sectional and experimental studies, we were able to develop an effective body compassion-based micro-intervention to be used on the effects of the appearance comparison (i.e., body shame, body mistrust, and body dissatisfaction). Considering the impact of body shame and a widely identified risk and maintenance factor of BID and EDs, this study constitutes the first approach to the development of an effective BI-protective digital tool to be used on a daily basis.

3. LIMITATIONS

Nonetheless, this dissertation is not exempt from limitations. As the specific limitations of each study have been outlined in the respective chapters, this subsection will list the common limitations shared by all the studies.

First, the sample characteristics of the populations examined in different studies are limited. As the dissertation mainly focused on promoting a healthy BI and decreasing the risk of EDs in adolescents and young women, it is unknown whether these findings may be replicated in other populations such as middle-aged or older adults.

Secondly, this dissertation incorporates novel constructs that have not been extensively studied before, such as body compassion, internal and external body image shame, and body trust. As a result, some of the research goals and hypotheses were exploratory in nature, given the limited existing evidence on these constructs. It is important to note that the validation of the instruments used in this study did not involve clinical populations. Therefore, the findings related to body compassion and body shame should be interpreted with caution.

Third, some of the studies were carried out in a laboratory context limiting the external validity of the findings. For example, Study 6 was carried out in the

Faculty of Psychology to assure the correct performance of the writing micro-intervention and provide the final debriefing after the body shame induction. Although this measure helped to increase internal validity, it constitutes a threat to the external validity requiring further analysis of its generalizability as a self-applied micro-intervention.

Sixth, it is important to note that while the constructs associated with the promotion of positive BI and positive embodiment (i.e., body trust or self- and body compassion), the specific construct of positive embodiment as measured by The Experiences of Embodiment Scale (Piran & Teall, 2020) was not included in our studies.

4. FUTURE DIRECTIONS

Moreover, besides addressing the aforementioned limitations, this dissertation highlights new potential research directions regarding the field of positive BI and positive embodiment. Some general suggestions for future research are as follows:

1. It is crucial to replicate these findings with diverse samples. Although the appearance investment may decrease with age leading to lower self-objectification or appearance comparison (Grogan, 2021; Tiggemann, 2004), the exploration of the BI-related variables in different cohorts will bring us a more comprehensive understanding of the potential vulnerability and protective variables (e.g., in the adolescent population - as they show higher self-objectification regarding social media-; Salomon & Brown, 2019). Moreover, the exploration of the constructs researched in this dissertation across a wide range of social identities and characteristics (e.g., LGBTIQ+) (Alleva et al., 2018), visible differences, or

physical disability (Atkinson & Wade, 2016; Toole & Craighead, 2016) is needed, to explore the impact of identity on the BI construct.

2. Additionally, the findings aforementioned in the previous chapters should be also checked for their use in clinical samples. Specifically, as ED populations have been characterized by low levels of self-compassion (Ferreira et al., 2013; Kelly et al., 2014) and high fears of compassion (Kelly et al., 2014), these constructs should be targeted at the early stages of treatment (Kelly et al., 2013).
3. Other aspects of positive BI (e.g., body image flexibility, appreciation of body functionality) and positive embodiment (e.g., the experience of embodiment; mindful self-care) could be explored. However, due to the lack of state-positive BI measures (Halliwell, 2015), the development of psychometrically valid instruments to capture state-positive BI dimensions is needed.
4. As stated by Bauer et al. (2019), the feasibility and acceptability of Internet-based interventions aimed at preventing EDs in young women are promising; however, the effectiveness is still limited. Thus, besides replicating Study 6 with different samples, it would be of interest to explore the possible benefits of the use of the body compassion micro-intervention outside of the lab context as a tool to be used daily (i.e., *before* or *after* confronting BI-related threat situations such as engaging in social media).
5. As studies on the long-term association between compassion and BI are scarce, future studies may incorporate longitudinal evaluations in order to explore more accurately the correlations and predictions found in this dissertation and explore the effects after 3, 6, or 12 months.

6. It is imperative to continue investigating the underlying mechanisms of embodiment, positive BI, and compassion across diverse samples. For example, in-depth qualitative research needs to be conducted in order to explore how young women experience positive embodiment or disembodiment in situations with the social comparison of one's appearance (Tylka, 2012).
7. Taking into consideration the lack of sadness induction (study 2) and its role in the negative affect, further examination of the strategies adolescent and young adult women with EDs may use to regulate negative affect is warranted. Specifically, it would be necessary to identify the specific maladaptive regulation strategies (e.g., suppression, lack of awareness) (Espeset et al., 2012) that may be used by these populations. As poor awareness of understanding of the emotional states has been related to alexithymia (Nowakowski et al., 2013), future studies may incorporate this measure in order to identify whether the lack of significant results may be due to the difficulties in identifying and communicating these emotions to others.
8. Computer-assisted approaches (i.e., virtual reality) may be further used as an assessment tool of BID, but also as a way to measure treatment outcomes. Future studies using both the compassion approach and the virtual reality (enhanced with eye-tracking technology) may extend evidence of the effect of the kind and non-judgmental attitudes on the drive for thinness expressed as attentional bias towards the body areas more prone to negative evaluation (e.g., hips, waist, legs, etc.) as found by Hewig et al. (2008) or Lykins et al. (2014). Additionally, as virtual reality is a newly introduced technique to the intervention process, future studies have to continue assessing the acceptability and adherence to digital interventions.

5. CONCLUSIONS

In conclusion, this dissertation contributed to bringing more data to the mechanisms underlying several BI dimensions and promoting strategies that could increase the effectiveness of ED prevention and intervention programs for women. Specifically, the main findings regarding the general objectives of this dissertation are presented in the following points:

1. Virtual reality is a promising tool to assess aspects of perceptual and affective BID and their underlying mechanisms in women from clinical and non-clinical populations.
2. A restrictive perceptual “thin-fat” categorical boundary showed a negative effect on the ideal body size estimation (i.e., the affective dimension of BID). Consequently, a restrictive perceptual “thin-fat” categorical boundary for one’s own body is a risk factor due to its negative predictive role in higher body dissatisfaction and higher risk of developing EDs.
3. The induction of positive affect influenced the affective BI in female adolescents with EDs by increasing the estimation of the ideal body size. Consequently, positive affect has been identified as a protective factor of BID.
4. The Spanish version of the Body Image Shame Scale (BISS; Duarte et al., 2015) and the Body Compassion Scale (BCS; Altman et al., 2020) showed good psychometric properties as instruments to measure body shame (internal and external) and body compassion in women from the general population.
5. Self-compassion showed a direct effect on reducing body shame (internal and external) and the risk of EDs in a non-clinical sample. Moreover, body trust and internal body shame were identified as underlying mediational factors of the self-compassionate role in the risk of EDs.

6. Body compassion showed a protective role in BI by cultivating body appreciation (a dimension of the positive BI) and, in turn, decreasing internal body shame (the affective dimension of BID) and the risk of EDs.
7. A body compassion micro-intervention developed by the authors showed a tendency to be effective in buffering the role of BI-related variables (body shame and body trust) after one experimental induction of shame. Moreover, the effects of applying this intervention before or after the shame induction have been discussed. However, it is important to note that this conclusion represents an initial effort to elucidate the potential clinical implications (with some marginally significant results), as the findings from this study do not provide sufficient evidence to make definitive assertions in this regard.

In sum, the present dissertation yields novel findings on the factors underlying BID and the protective BI-related variables. In addition, it highlights the importance of cultivating compassion toward oneself and one's body as the key aspects in addressing BID and fostering a positive connection with one's body. These findings offer an encouraging focal point for future research studies and the development of effective ED prevention and intervention programs for women. Overall, this dissertation contributes to a deeper understanding of the BI construct and offers promising directions for future investigations in this field.

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CHAPTER 9

Resumen en español



1. INTRODUCCIÓN

Las alteraciones de la imagen corporal (IC) -caracterizadas por alteraciones perceptivas y/o afectivas- son factores de riesgo clave en el inicio y el mantenimiento de los trastornos alimentarios (TA) (Bruch, 1973; Glashouwer et al., 2019). Dado el impacto perjudicial de las alteraciones de la IC en la salud física y mental, especialmente para las mujeres jóvenes adultas, resulta fundamental profundizar en la comprensión de los mecanismos subyacentes a estas alteraciones con el fin de desarrollar programas de prevención e intervención más efectivos (Menzel y Levine, 2011).

Las alteraciones de la IC están influenciadas por factores socioculturales (Groesz et al., 2002) y se han relacionado con la búsqueda de la delgadez y la presencia de estados afectivos negativos (McCabe et al., 2006). Las personas, a menudo, realizan comparaciones de su apariencia para determinar si cumplen con los estándares de belleza establecidos. La búsqueda de estándares de delgadez poco realistas puede conducir a estados emocionales adversos, como la vergüenza hacia el cuerpo. La vergüenza hacia el cuerpo surge de una comparación corporal negativa, cuando las personas perciben una gran discrepancia entre su estándar de belleza internalizado y su cuerpo percibido (i.e. su forma y tamaño) (Duarte et al., 2015; Gilbert, 2003). El constante monitoreo del propio cuerpo desde la perspectiva de una tercera persona puede resultar en evaluaciones negativas de la apariencia, así como en una sensación de desconexión del propio cuerpo (*disembodiment*⁶) y una atención exclusiva en la apariencia física (vs. estados internos del cuerpo) (Fredrickson y Roberts, 1997).

Dado la limitada efectividad de los tratamientos de las alteraciones de la IC actuales (p.ej., Fairburn et al., 2003), resulta fundamental explorar los posibles factores protectores que puedan incrementar su eficacia (Braun et al., 2016;

⁶ Los términos "*embodiment*" o "*disembodiment*" hacen referencia a la conciencia de la relación corporal con el propio cuerpo. Teniendo en cuenta la falta de coherencia a la hora de emplearlo en la literatura científica publicada en castellano, a lo largo de este capítulo, emplearemos estos términos en inglés.

Cook-Cottone, 2015). En esta línea, la IC positiva se ha identificado como un potencial constructo protector que podría mitigar los factores de riesgo asociados a las alteraciones de la IC, además de mejorar la relación del individuo con su propio cuerpo (Cook-Cottone, 2015). Un constructo asociado con la IC positiva, la autocompasión (Neff, 2003) –definida como una actitud amable y no crítica hacia uno mismo– se ha erigido como un factor protector capaz de contribuir a la IC positiva. Así pues, la autocompasión se ha relacionado con la promoción de una regulación emocional más adaptativa de los estados emocionales (p.ej., la vergüenza corporal) que pueden surgir derivados de los desafíos socioculturales que las mujeres enfrentan regularmente (Turk y Waller, 2020).

A pesar de que la evidencia hasta el momento es prometedora, se requieren más estudios dirigidos a analizar el papel de estos factores protectores, examinando sus relaciones y posibles mecanismos de acción. Por ejemplo, el constructo emergente de la compasión hacia el cuerpo –que implica actitudes compasivas y de aceptación hacia propio cuerpo y sus imperfecciones–, constituye una perspectiva prometedora para abordar de manera efectiva las alteraciones de la IC y promover una IC saludable (Altman et al., 2017, 2020; Oliveira et al., 2018). Sin embargo, hasta el momento, existe una evidencia limitada en este ámbito y se requiere investigación adicional. En consecuencia, los hallazgos de esta investigación podrían tener implicaciones directas y específicas tanto para la investigación como para la prevención e intervención temprana en el abordaje de las alteraciones de la IC en mujeres jóvenes.

Considerando la evidencia previa, se han propuesto diversas recomendaciones para lograr resultados efectivos y duraderos en los programas de prevención e intervención de los TA, desde una perspectiva centrada en el cambio de la IC. En primer lugar, es crucial investigar los factores subyacentes de los TA, que están relacionados tanto con la dimensión afectiva como perceptual de la IC, lo cual requiere mejorar las herramientas de evaluación existentes. En segundo lugar, es fundamental seguir investigando los factores que pueden obstaculizar la búsqueda de ayuda (Ali et al., 2017; Linville et al., 2015),

como la vergüenza corporal, ya que, al incorporar estas variables en los programas de prevención, se pueden superar estas barreras y prevenir el desarrollo de los TA o fomentar la búsqueda de ayuda en caso de que la sintomatología alimentaria ya se haya manifestado. Por último, es importante focalizarse en la promoción de factores protectores relacionados con la IC, como la compasión, en lugar de simplemente reducir la insatisfacción corporal. Esto podría conducir a beneficios más sostenibles a largo plazo y a un mejor mantenimiento de los logros alcanzados a través de las intervenciones de TA (Alleva et al., 2015; Webb et al., 2015; Tylka y Wood-Barcalow, 2015). No obstante, es necesario investigar en profundidad los mecanismos subyacentes de la compasión, desde una perspectiva holística de la IC e incorporando el papel del constructo recientemente explorado de la compasión hacia el cuerpo.

Por lo tanto, el objetivo principal de esta tesis es realizar una contribución significativa a la mejora de los enfoques actuales de prevención y tratamiento para mujeres. Con este fin, se han establecido los siguientes objetivos específicos:

2. OBJETIVOS

1. Validar un programa de realidad virtual (RV) como una herramienta para evaluar las alteraciones perceptivas y afectivas de la IC en mujeres, tanto de poblaciones clínicas como no clínicas. Además, se analizarán las diferencias en las alteraciones de la IC entre estas poblaciones.
2. Explorar los mecanismos subyacentes (i.e., límites categóricos perceptivos asociados con el límite “gordo-delgado”, y afecto positivo y negativo) a las alteraciones perceptivas y afectivas de la IC en adolescentes y mujeres adultas jóvenes en poblaciones clínicas y no clínicas.

3. Realizar una revisión narrativa integrando el constructo de la IC, el *embodiment*, la vergüenza corporal y la compasión (autocompasión y la compasión hacia el cuerpo).
4. Validar y estudiar las propiedades psicométricas de la Escala de Vergüenza hacia el cuerpo (BISS; Duarte et al., 2015) como instrumento para evaluar la vergüenza corporal interna y externa en mujeres españolas de población general.
5. Validar y estudiar las propiedades psicométricas de la Escala de Compasión hacia el cuerpo (BCS; Altman et al., 2020) como instrumento para evaluar la compasión hacia el cuerpo en mujeres españolas de población general.
6. Analizar el papel protector de la autocompasión sobre el riesgo de TA y analizar el papel del afecto positivo, la confianza en el cuerpo y la vergüenza hacia el cuerpo como potenciales mecanismos subyacentes entre la autocompasión y el riesgo de TA.
7. Examinar el papel protector de la compasión hacia el cuerpo para promover la IC positiva (apreciación corporal) así como disminuir las alteraciones de la IC (vergüenza corporal) y el riesgo de desarrollar TA.
8. Investigar la eficacia de una micro-intervención de compasión hacia el cuerpo para amortiguar y regular las variables relacionadas con la IC (vergüenza corporal, satisfacción corporal y confianza corporal) y promover el afecto positivo.

Cabe señalar que todos los estudios fueron aprobados por el Comité de Ética de la Universidad de Valencia y que todas las participantes firmaron un consentimiento informado antes de iniciar su participación en cada estudio.

3. MÉTODO Y RESULTADOS

3.1. ESTUDIO 1. Evaluación basada en realidad virtual de los mecanismos subyacentes a las alteraciones de la imagen corporal en población no clínica y con trastornos alimentarios

Aunque las alteraciones de la IC son un síntoma central de los TA, los mecanismos subyacentes permanecen sin estar claros. Recientemente, el límite categórico del cuerpo -definido como el punto en el que pasamos de categorizar un cuerpo delgado como gordo – se ha propuesto como un posible mecanismo que puede influir en las alteraciones de la IC. Basándonos en Gledhill et al. (2017), en el presente estudio se desarrolló un método de evaluación de RV con avatares 3D con el objetivo de: (1) investigar la validez de las tareas de RV para evaluar el límite categórico para el cuerpo propio y ajeno, así como la estimación del tamaño corporal (percibido e ideal) en poblaciones clínicas y no clínicas; y (2) determinar la influencia del límite categórico para el cuerpo propio y ajeno en variables relacionadas con las alteraciones de la IC.

La muestra estuvo compuesta por 87 mujeres distribuidas en tres grupos: (1) participantes con "insatisfacción corporal baja (ICB)" sin TA ($n = 30$; Cuestionario de Forma Corporal [BSQ] < 105 ; Cooper et al., 1987; edad: $M = 21.20$; $DT = 2.28$; índice de masa corporal [IMC]: $M = 21.40$; $DT = 3.40$); (2) participantes con "insatisfacción corporal alta (ICA)" sin TA ($n = 27$; BSQ ≥ 105 ; edad: $M = 20.78$; $DT = 2.19$; IMC: $M = 22.99$; $DT = 2.91$); y (3) participantes con TA ($n = 30$; edad: $M = 26.70$; $DT = 10.44$; IMC: $M = 19.91$; $DT = 2.51$).

Se midió la insatisfacción corporal (Cuestionario de la Forma Corporal, BSQ; Raich et al., 1996), la estima corporal (Escala de Estima Corporal, BES; Jorquera et al., 2005), la sintomatología alimentaria (Inventario de Trastornos de la Conducta Alimentaria-3. Cuestionario de remisión, EDI-3-RF; Elosua et al., 2010). Asimismo, cada participante las tareas de RV en orden aleatorio: (1) el límite categórico propio; (2) el límite categórico ajeno; (3) la estimación del

tamaño corporal percibido; y (4) la estimación del tamaño corporal ideal. Además, para validar el programa de RV, las participantes evaluaron hasta qué punto los avatares eran realistas utilizando una escala Likert de 1 (*nada realista*) a 9 (*muy realista*).

Se realizaron análisis de varianza (ANOVAs), correlaciones de Pearson, análisis chi-cuadrado, análisis de covarianza (ANCOVAs), y regresiones jerárquicas múltiples. Se confirmó la validez (1) convergente (i.e., las puntuaciones de insatisfacción corporal determinadas por RV correlacionaron con todas las puntuaciones de las medidas autoinformadas (r entre .54 y -.70, $p < .001$) y el IMC ($r = -.25$, $p < .05$), (2) concurrente (i.e., las medidas de la estimación corporal percibida correlacionaron con el IMC en los tres grupos, ICB ($r = .72$, $p < .01$), ICA ($r = .63$, $p < .01$), y TA ($r = .46$, $p < .05$) y, (3) de contenido (i.e., ausencia de diferencias significativas en la medida “*realismo de los avatares*”, $F(2, 71) = 0.79$, $p = .460$, $\eta_p^2 = 0.022$) de las tareas de RV para evaluar las alteraciones de la IC. Además, se respaldó su uso en poblaciones clínicas y no clínicas, ya que los resultados principales mostraron que el límite categórico propio ($F(2, 81) = 12.55$, $p < .001$) era más restrictivo en personas con TA y con ICA. Asimismo, los resultados de las regresiones jerárquicas mostraron que el límite categórico propio predecía la estimación corporal ideal en el grupo de ICA ($F(2, 24) = 9.85$, $p < .001$, R^2 Ajustado = 41%) y TA ($F(2, 26) = 7.54$, $p = .003$, R^2 Ajustado = 32%). El modelo que incluía el límite categórico ajeno como variable predictora no fue significativo.

Teniendo en cuenta que la interiorización del ideal de delgadez es un factor de riesgo que contribuye al aumento de las alteraciones de la IC, analizar el papel predictivo del límite categórico propio en la estimación corporal ideal podría ser el primer paso para ayudar a mejorar la efectividad de los programas de prevención e intervención de los TA. Además, la tarea mostró que era una medida fiable y ecológicamente válida para evaluar las alteraciones de la IC, por lo que fue utilizada en siguiente estudio.

3.2. ESTUDIO 2. El papel del afecto en la alteración de la imagen corporal en adolescentes con trastornos alimentarios: un estudio experimental utilizando un procedimiento de inducción del estado de ánimo mediante realidad virtual

Teniendo en cuenta los problemas de regulación emocional que se encuentran con frecuencia en la población adolescente (Ahmed et al., 2015), y su papel como factor de riesgo en los TA (Haynos y Fruzzetti, 2011), la clarificación del papel de la sintomatología depresiva y el afecto en la IC -tanto positiva como negativa- podría ser de gran importancia para el diseño y la implementación de intervenciones más eficaces en esta población (Tiggemann, 2010). Por lo tanto, los objetivos del estudio fueron: (1) examinar el papel de la sintomatología depresiva en las dimensiones de la IC positiva y negativa, así como (2) analizar el efecto de dos procedimientos de Inducción del Estado de Ánimo (PIE) positivo y negativo en las alteraciones de la IC.

La muestra estuvo compuesta por 42 adolescentes con TA [Edad: $M = 15.88$, $DT = 1.40$, rango: 13-18 años; IMC: $M = 18.30$; $DT = 2.60$; rango: 14-27 kg/m^2] que completaron dos tareas de RV (para medir la estimación del tamaño del cuerpo percibido e ideal), cuestionarios relacionados con la sintomatología depresiva (Inventario de Depresión de Beck, BDI-II; Sanz et al., 2003), así como las medidas autoinforme de la IC (positiva y negativa): insatisfacción corporal (Escala de Forma Corporal, BSQ; Raich et al., 1996), apreciación corporal (Escala de Apreciación Corporal-2, BAS-2; Swami et al., 2017), estima corporal (Escala de Estima Corporal, BES; Jorquera-Rodero et al., 2005); compasión hacia el cuerpo (Escala de Compasión hacia el Cuerpo, BCS; *traducido al castellano por las autoras*), vergüenza hacia el cuerpo (Escala de Vergüenza hacia el cuerpo, BISS; *traducido al castellano por las autoras*), autoobjetivación corporal (también definida como *autocosificación*) (Escala de Conciencia de Cosificación Corporal, OBCS; Moya-Garófano et al., 2017) y sintomatología alimentaria (Inventario de

Trastornos de la Conducta Alimentaria-3. Cuestionario de remisión, EDI-3-RF; Elosua et al., 2010).

En cada sesión experimental, las participantes rellenaban dos medidas pre-PIE (1) insatisfacción corporal estado (Escala de Estados de Imagen Corporal, BISS; *traducido al castellano por las autoras*) y (2) estado ánimo positivo y negativo (Escala de Afecto Positivo y Negativo, PANAS; López-Gómez et al., 2015) y dos tareas de RV (estimación corporal percibida e ideal). Posteriormente, las participantes se asignaban aleatoriamente a dos condiciones: PIE-negativo o PIE-positivo. Después del PIE, las participantes completaban las medidas post-inducción. Cada participante completó el PIE-negativo y PIE-positivo con un mínimo de 4 días de diferencia.

Se realizaron análisis de varianza (ANOVAs), correlaciones de Pearson, análisis chi-cuadrado, pruebas *t* de muestras emparejadas, y regresiones jerárquicas múltiples. Los resultados mostraron que la severidad de la sintomatología depresiva, una vez controlado el IMC, predecía una IC negativa más alta (estimación del tamaño percibido: $F(2, 38) = 28.95, p < .001, R^2$ ajustado = 58.3%; BSQ: $F(2, 38) = 6.58, p = .004, R^2$ ajustado = 22.7%; EDI-3-RF: $F(2, 38) = 14.16, p < .001, R^2$ ajustado = 39.7%; BISS-vergüenza: $F(2, 38) = 8.02, p = .001, R^2$ ajustado = 26.0%; OBCS: $F(2, 38) = 5.75, p = .007, R^2$ ajustado = 23.3%) y una IC positiva más baja (BAS-2: $F(2, 38) = 11.45, p < .001, R^2$ ajustado = 34.3%; BCS: $F(2, 38) = 6.99, p = .003, R^2$ ajustado = 23.0%]; y BES: $F(2, 38) = 11.46, p < .001, R^2$ ajustado = 34.3%). En cuanto a los PIEs, los resultados mostraron que el PIE-positivo se asoció a un aumento en la estimación del tamaño corporal ideal, $t(40) = -2.36, p < .023$, y una mayor satisfacción corporal, $t(40) = 2.47, p < .018$. No se encontraron diferencias en el papel del PIE-negativo en las alteraciones de la IC ($p > .05$).

En conclusión, los resultados de este estudio subrayan la importancia de considerar tanto la sintomatología depresiva como el afecto -en particular el positivo-, en el tratamiento de los TA en adolescentes. Además, el estudio aporta

evidencia del uso de la RV como una herramienta efectiva para evaluar las alteraciones de la IC, lo cual podría ser beneficioso para mejorar la eficacia de las intervenciones destinadas a tratar los TA.

3.3. ESTUDIO 3. Hacia una comprensión global de la imagen corporal: integrando la imagen corporal positiva, el *embodiment* y la autocompasión

A pesar de la gran cantidad de investigaciones realizadas en el campo de los TA, la eficacia de las intervenciones centradas en la IC en los TA sigue siendo limitada (Alleva et al., 2015; Ziser et al., 2018). Por tanto, surge la necesidad de considerar factores protectores de la IC en los modelos explicativos dirigidos a explicar el origen y mantenimiento de TA con el fin de mejorar los programas de prevención e intervención. Así, se han comenzado a considerar constructos como la IC positiva (Cook-Cottone, 2015; Homan y Tylka, 2014) o la autocompasión (Braun et al., 2016). Sin embargo, a pesar de que estos factores protectores han ganado relevancia en los últimos años (Braun et al., 2016), estos factores solo han sido explorados de manera independiente y su integración en modelos explicativos de las alteraciones de la IC aún es escasa. Por lo tanto, el objetivo de este artículo fue realizar una revisión narrativa de la literatura existente sobre los potenciales factores protectores (IC positiva, *embodiment* y autocompasión) y de riesgo (vergüenza corporal, *disembodiment*) cuya inclusión en los modelos explicativos podría ayudar a fomentar una IC positiva y disminuir las alteraciones de la IC.

En primer lugar, la evidencia sugiere la necesidad de considerar la dimensión positiva (y no solo la negativa) de la IC para una comprensión integral de las alteraciones de la IC y su relación con TA. Para ello, se requiere investigación adicional sobre cada uno de los componentes específicos del IC positiva (p.ej., apreciación de la apariencia corporal o de la funcionalidad corporal) para desarrollar instrumentos específicos (tanto para el IC positiva como

negativa), así como integrar los componentes positivos de la IC (e.g., apreciación corporal) en modelos teóricos que puedan explicar las asociaciones entre estas variables y las variables de IC negativa (por ejemplo, insatisfacción corporal). En segundo lugar, esta revisión también destaca un constructo que ha sido descuidado en la evaluación y tratamiento de la IC: la experiencia del *embodiment*. Aunque este aspecto está incluido en algunas de las definiciones bien conocidas de IC, como la de Cash (2004), el *embodiment* no ha sido estudiado de manera exhaustiva.

Una mejor comprensión del desarrollo del *embodiment* podría contribuir a la mejora de los programas de prevención e intervención para mejorar las alteraciones de la IC, ya que fomentaría los procesos psicológicos responsables de una relación positiva con nuestro propio cuerpo. En tercer lugar, examinamos el papel de la vergüenza corporal, una emoción autoconsciente que podría interrumpir la conexión con el propio cuerpo (i.e., *embodiment*), y que ha sido identificada como factor de riesgo de la IC negativa tanto en población clínica como no clínica (p.ej., Ferreira et al., 2013; Duarte et al., 2015). Finalmente, exploramos el papel de la autocompasión - la experiencia de comprender el propio sufrimiento de una manera amable y no crítica, aceptando dicho sufrimiento como una parte de la experiencia humana compartida-, el cual es un constructo estrechamente relacionado con la IC positiva y el *embodiment* positivo. La autocompasión ha surgido como un factor protector contra la vergüenza corporal y la falta de conexión con el propio cuerpo (i.e., *disembodiment*/autoobjetivación), demostrando su eficacia en la reducción las alteraciones de la IC.

En conclusión, esta revisión enfatiza la importancia de considerar nuevos factores protectores y de riesgo, así como la relación existente entre ellos, en la conceptualización de la IC desde una perspectiva integradora. Esta perspectiva podría mejorar no solo la comprensión teórica de las alteraciones de la IC, sino también orientar el desarrollo de estrategias terapéuticas específicas para intervenir en las alteraciones de la IC (i.e., la reducción de la vergüenza corporal

y el *disembodiment*), y garantizar resultados duraderos a través de la promoción de una conexión positiva con el propio cuerpo (mediante el aumento de la autocompasión y el *embodiment* positivo).

Esta revisión narrativa ha permitido identificar una brecha en el conocimiento que enmarca las contribuciones teóricas y clínicas descritas en los siguientes capítulos de esta tesis doctoral.

3.4. ESTUDIO 4. Mecanismos de protección asociados a la autocompasión para reducir la vergüenza corporal y el riesgo de trastornos alimentarios: Un modelo de *path analysis*

La autocompasión ha sido ampliamente reconocida como un factor protector frente a los TA (Turk y Waller, 2020), aunque las variables que podrían subyacer a esta relación apenas han sido estudiadas. Los objetivos principales del estudio fueron: (1) examinar las propiedades psicométricas de la Escala de Vergüenza hacia el cuerpo (BISS; Duarte et al., 2015); y (2) poner a prueba un *path analysis*, en el que la autocompasión tendría un papel protector en el riesgo de presentar TA, a través de su efecto en el afecto positivo, la confianza corporal y la vergüenza hacia el cuerpo.

Se reclutaron un total de 440 mujeres españolas de la población general, con edades entre los 18 y 40 años, y un IMC entre 16 y 35 kg/m². Se analizaron los datos de 440 mujeres para realizar un análisis factorial confirmatorio (AFC) de la versión española de la escala BISS (Objetivo 1); y posteriormente, se analizaron los datos de 398 mujeres para poner a prueba el *path analysis* (Objetivo 2).

Las participantes completaron medidas de insatisfacción corporal (Escala de Forma Corporal, BSQ; Raich et al., 1996), estado de ánimo (Escala de Afecto Positivo y Negativo, PANAS; López-Gómez et al., 2015), vergüenza hacia el

cuerpo (Subescala de la Vergüenza corporal de la Escala de Conciencia de Cosificación Corporal, OBCS; Moya-Garófano et al., 2017), confianza en el cuerpo (Subescala de confianza en el cuerpo de la Evaluación Multidimensional de la Conciencia Interoceptiva, MAIA; Valenzuela-Moguillansky y Reyes-Reyes, 2015), autocompasión (Escala de Autocompasión-Forma Corta, SCS-SF, García-Campayo et al., 2014), vergüenza hacia el cuerpo (Escala de Vergüenza hacia el cuerpo, BISS, *traducido al castellano por las autoras*) y sintomatología alimentaria (Inventario de Trastornos de la Conducta Alimentaria-3. Cuestionario de remisión, EDI-3-RF, Elosua et al., 2010).

Se llevó a cabo un AFC, correlaciones de Pearson y el *path analysis*. En la muestra estudiada, el AFC de la versión española del BISS mostró un ajuste adecuado con dos factores (vergüenza internalizada y externalizada), $\chi^2(76) = 987.190, p < .001$; CFI = 0.972, SRMR = 0.056, RMSEA = 0.165 [.156, .174], y una consistencia interna, tanto para la Subescala de Vergüenza Internalizada del BISS ($\alpha = 0.907, \omega = 0.907$) como para la Subescala de Vergüenza Externalizada del BISS ($\alpha = 0.886, \omega = 0.887$). Los coeficientes de correlación de Pearson mostraron una validez de constructo adecuada. Las puntuaciones de la Subescala de Vergüenza Internalizada del BISS correlacionaron positiva y significativamente con: el OBCS ($r = .72, p < .001$), el BSQ ($r = .77, p < .001$) y el EDI-3-RF ($r = .66, p < .001$). Las puntuaciones de la subescala de Vergüenza Externalizada del BISS correlacionaron positiva y significativamente con el OBCS ($r = .63, p < .001$), el BSQ ($r = .67, p < .001$) y el EDI-3-RF ($r = .56, p < .001$).

El modelo *path analysis* indicó un ajuste adecuado, $\chi^2(3) = 36.279, p < .001$; CFI = 0.972, SRMR = 0.051, RMSEA = 0.167 [.121, .218], explicando el 48.9% del riesgo de TA. En cuanto a los mecanismos subyacentes de la relación entre la autocompasión y el riesgo de desarrollar TA, se encontró que la autocompasión estaba directamente asociada con un menor riesgo de TA. El modelo también evaluó cuatro efectos indirectos, de los cuales solo uno fue significativo: a) efecto indirecto 1: SCS \rightarrow MAIA \rightarrow vergüenza internalizada BISS \rightarrow EDI-3-RF, $\beta = -0.122, SE = 0.023, p < .001, 90\% [-0.17, -0.76]$. Los demás efectos indirectos no fueron

significativos: b) efecto indirecto 2: SCS → PANAS → vergüenza internalizada BISS → EDI-3-RF, $\beta = -0.023$, SE = 0.014, $p = .114$, 90% [-0.05, .005]; c) efecto indirecto 3: SCS → MAIA → vergüenza externalizada BISS → EDI-3-RF, $\beta = 0.001$, SE = 0.012, $p = .972$, 90% [-0.024, 0.024]; d) efecto indirecto 4: SCS → PANAS → vergüenza externalizada BISS → EDI-3-RF, $\beta = 0.001$, SE = 0.004, $p = .972$, 90% [-0.007, 0.008].

Este estudio es pionero en explorar los mecanismos subyacentes que vinculan la autocompasión con la promoción de una IC positiva. El cultivo de una actitud compasiva, amable y sin juicio hacia uno mismo, podría estar relacionado con la potenciación del afecto positivo, la mayor atención a las sensaciones corporales y confianza en estos estados, lo que a su vez podría disminuir la vergüenza internalizada y disminuir el riesgo de desarrollar TA.

3.5. ESTUDIO 5. El papel de la compasión hacia el cuerpo en el riesgo de trastornos alimentarios: Efectos mediadores de la apreciación corporal y la vergüenza hacia el cuerpo

La compasión hacia el cuerpo es un factor protector reconocido en el ámbito de los TA, que está asociada a una mayor apreciación y una menor vergüenza hacia el cuerpo. Sin embargo, se necesitan más estudios para desentrañar el papel protector de la compasión hacia el cuerpo en el riesgo de TA. Los objetivos fueron (1) examinar las propiedades psicométricas de la adaptación española de la Escala de Compasión hacia el cuerpo (BCS; Altman et al., 2020) y (2) examinar el papel mediador de la apreciación y la vergüenza hacia el cuerpo entre la compasión hacia el cuerpo y el riesgo de TA.

La muestra estuvo compuesta por 288 mujeres (Edad: $M = 24.65 \pm 5.02$, rango: 18-40 años; IMC: $M = 21.93 \pm 2.88$) de la población general española, que cumplieron cuestionarios online. Posteriormente, se realizó un análisis factorial exploratorio (AFE) de la escala BCS (Objetivo 1), y se llevó a cabo un

modelo de mediación en serie-paralelo (Objetivo 2), que tuvo en cuenta los datos mujeres que completaron todas las medidas ($n = 199$).

Las participantes completaron medidas de autoobjetivación (Escala de Conciencia de Cosificación Corporal, OBCS; Moya-Garófano et al., 2017), autocompasión (Escala de Autocompasión-Forma Corta, SCS-SF; García-Campayo et al., 2014), apreciación corporal (Escala de Apreciación Corporal-2, BAS-2; Swami et al., 2017), vergüenza hacia el cuerpo (Escala de Vergüenza hacia el cuerpo, BISS, *traducido al castellano por las autoras*), compasión hacia el cuerpo (Escala de Compasión hacia el cuerpo, BCS, *traducido al castellano por las autoras*) y sintomatología alimentaria (Inventario de Trastornos de la Conducta Alimentaria-3. Cuestionario de remisión, EDI-3-RF; Elosua et al., 2010).

Se llevó a cabo un AFE, correlaciones de Pearson y un modelo de mediación en serie-paralelo (modelo 81 utilizando la función PROCESS, V3.5, en IBM SPSS, V.28 (Hayes, 2018)). Los resultados mostraron que la Escala de Compasión hacia el cuerpo (BCS; Altman et al., 2020) fue una medida fiable y válido para la muestra evaluada, con una consistencia interna adecuada para el BCS total ($\alpha = .89$), y las subescalas de Defusión ($\alpha = .89$), Humanidad compartida ($\alpha = .89$); y Aceptación ($\alpha = .93$). Además, se encontró que la compasión corporal estaba relacionada con dimensiones positivas de la IC y negativamente relacionada con la vergüenza hacia el cuerpo.

El modelo de mediación en serie-paralelo confirmó el papel protector de la compasión hacia el cuerpo y la apreciación corporal sobre la vergüenza corporal y el riesgo de TA, $F(6, 192) = 70.82, p < .001$, explicando el 68.88% de la varianza. Se encontró que la compasión hacia el cuerpo estaba directamente asociada con la vergüenza hacia el cuerpo (vergüenza internalizada, $b = -0.12, SE = 0.03, p < .001, 95\% [-0.17, -0.61]$, y vergüenza externalizada, $b = -0.14, SE = 0.03, p < .001, 95\% CI [-0.19, -0.09]$, pero no directamente asociada con un menor riesgo de TA, $b = -0.10, SE = 0.09, p = .245, 95\% [-0.27, -0.70]$. Sin embargo, el modelo indicó que el efecto de la compasión hacia el cuerpo en el riesgo de TA estuvo

totalmente mediado por la apreciación corporal y la vergüenza internalizada. Los efectos indirectos "BC → vergüenza externalizada BISS → EDI-3-RF" y "BC → BAS-2 → vergüenza externalizada BISS → EDI-3-RF" no fueron significativos ($p > .05$). El efecto total también fue significativo, $b = -0.71$, $SE = 0.08$, 95% [-0.856, -0.556].

A pesar de que se requieren estudios experimentales adicionales, estos resultados respaldan la importancia de fomentar una actitud compasiva con el cuerpo para prevenir la aparición de TA, dado sus efectos en incrementar la apreciación corporal y disminuir la vergüenza internalizada.

3.6. ESTUDIO 6. "A través de su mirada compasiva": El papel protector de la autocompasión corporal en la inducción de la vergüenza corporal en mujeres jóvenes adultas

Las intervenciones basadas en la compasión han demostrado ser eficaces para reducir los factores de riesgo de TA. Recientemente, se está dando especial énfasis al constructo de la compasión hacia el cuerpo en las variables relacionadas con la IC. Sin embargo, todavía existen pocos estudios que hayan probado su eficacia.

Los objetivos del estudio fueron: (1) analizar el efecto de una micro-intervención en compasión hacia el cuerpo (vs. bienestar en general) para amortiguar y regular la vergüenza hacia el cuerpo, la satisfacción corporal, la confianza corporal y el afecto positivo; es decir, analizar el efecto de la intervención antes y después de un procedimiento experimental de inducción del estado de ánimo de vergüenza corporal (PIE-vergüenza) en mujeres con alteraciones de la IC; y (2) analizar el papel moderador de la compasión hacia el cuerpo y la vergüenza hacia el cuerpo rasgo sobre la eficacia de la micro-intervención de compasión hacia el cuerpo en la amortiguación y regulación de las variables antes mencionadas.

La muestra estuvo compuesta por 58 mujeres con alteraciones de la IC ($21,66 \pm 2,46$ años de edad; IMC: $22,60 \pm 3,01$ kg/m²), que completaron medidas rasgo de insatisfacción corporal (Cuestionario de la Forma Corporal, BSQ, Raich et al., 1996), miedo hacia la compasión (Escala de Miedos a la Compasión, FCS; *traducido al castellano por las autoras*), apreciación corporal (Escala de Apreciación Corporal-2, BAS-2; Swami et al., 2017), vergüenza hacia el cuerpo (Escala de Vergüenza hacia el cuerpo, BISS, *traducido al castellano por las autoras*), compasión hacia el cuerpo (Escala de Compasión hacia el cuerpo, BCS; *traducido al castellano por las autoras*), sintomatología alimentaria (Cuestionario de Trastornos de la Conducta Alimentaria, EDE-Q; Pélaez-Fernández et al., 2012). Asimismo, durante la sesión experimental se completaron medidas autoinformadas “estado” de confianza hacia el cuerpo (Subescala de confianza en el cuerpo de la Evaluación Multidimensional de la Conciencia Interoceptiva, MAIA-2; Desdentado et al., 2022, *adaptado por las autoras*), insatisfacción corporal (Escala de Estados de Imagen Corporal, BISS; *traducido al castellano por las autoras*), estado ánimo positivo (Escala de Afecto Positivo y Negativo-versión corta, I-PANAS; *traducido al castellano por las autoras*) y la vergüenza hacia el cuerpo (Subescala de la Vergüenza corporal de la Escala de Conciencia de Cosificación Corporal, OBCS; Moya-Garófano et al., 2017, *adaptado por las autoras*).

Las participantes se asignaron aleatoriamente a la condición de compasión hacia el cuerpo o bienestar. Después de la micro-intervención de compasión hacia el cuerpo (basada en Stern y Engeln, 2018 y disponible en <https://osf.io/fvgcp/>) o, un ejercicio de reflexión en el grupo de bienestar (i.e., escribir sobre un evento positivo que ocurrió el día anterior), todos los participantes fueron sometidos a un PIE-vergüenza (adaptada de una Tarea de Memoria Emocional Autobiográfica; Prkachin et al., 1999; Mills y D'Mello, 2014). Como último paso, todas las participantes recibieron una micro-intervención de compasión hacia el cuerpo.

Se llevaron a cabo correlaciones de Pearson, ANOVAs de medidas repetidas 2 (condición) x 4 (tiempo: T1 o línea base, T2 o después del ejercicio de cada condición; T3 o después del PIE-vergüenza; T4 o después de recibir la micro-intervención en ambos grupos), pruebas *t* para muestras independientes, y análisis de moderación (modelo 1 utilizando la función PROCESS, V3.5, en IBM SPSS, V.28 (Hayes, 2018)). Los ANOVAs mostraron un efecto significativo del tiempo entre todos los puntos temporales para el afecto positivo (I-PANAS-SF), confianza en el cuerpo (MAIA-2), insatisfacción corporal (BISS) y vergüenza corporal (OBCS) ($p < .001$). Los resultados principales indicaron que de (a) T1 a T2, las puntuaciones (i.e., afecto positivo, satisfacción corporal y confianza hacia el cuerpo) aumentaron; (b) T2 a T3, las puntuaciones disminuyeron; y, por último, (c) T3 a T4, las puntuaciones aumentaron de nuevo. Las puntuaciones medias en afecto positivo no tuvieron un cambio significativo de T3 a T4 ($p = .108$). Como esperado, las puntuaciones medias de la vergüenza corporal aumentaron de T2 a T3 y disminuyeron de T3 a T4.

Los ANOVAs no mostraron un efecto significativo en la interacción Tiempo x Condición para el afecto positivo (I-PANAS-SF) y la insatisfacción corporal (BISS) ($p > .05$). No obstante, hubo un efecto de interacción marginalmente significativo para la confianza hacia el cuerpo (MAIA-2) ($p = .074$) y la vergüenza corporal inducida (OBCS) ($p = .077$). Con respecto a la confianza hacia el cuerpo, las comparaciones post hoc por pares utilizando la corrección de Bonferroni mostraron que las participantes en la condición de compasión hacia el cuerpo (vs. condición de bienestar) mostraron niveles más altos de confianza corporal estado después de recibir el PIE-vergüenza (T3) (3.40 ± 0.23 vs. 2.55 ± 0.23 , $p < .001$). Además, los análisis de contrastes tiempo x condición simples indicaron que las puntuaciones medias de confianza corporal en el T3 fueron significativamente diferentes de T1 ($F(1, 56) = 5.53$, $p = .022$, $\eta_p^2 = 0,90$) y de T4 ($F(1, 56) = 5.29$, $p = .025$, $\eta_p^2 = 0,86$) entre ambas condiciones. En concreto, la disminución de las puntuaciones medias en el T3 fue significativamente mayor para la condición de compasión hacia el cuerpo. Por el contrario, el aumento de

las puntuaciones medias en el T4 (frente al T1) fue significativamente mayor en la condición de bienestar. En cuanto a la vergüenza corporal (OBCS), los contrastes simples tiempo x condición indicaron que las puntuaciones medias de vergüenza hacia el cuerpo en el T3 fueron significativamente más altas que en el T4 ($F(1, 56) = 4.73, p = .034, \eta_p^2 = 0.78$) para la condición de bienestar.

Los modelos de moderación indicaron que la vergüenza hacia el cuerpo "rasgo" ($F(5, 52) = 6.07, p < .001$) fue un moderador significativo del efecto de la condición sobre la regulación de la confianza corporal "estado" (T3-T4), explicando el 36.87% del cambio. Los análisis de pendientes simples mostraron que este efecto era significativo en mujeres con puntuaciones "medias" ($b = 0.44, SE = 0.17, t = 2.55, p = .014 [0.09, 0.79]$) o "altas" ($b = 0.87, SE = 0.25, t = 3.48, p = .001 [0.37, 1.36]$) de vergüenza hacia el cuerpo rasgo. En lo que respecta al cambio en la satisfacción corporal "estado" (T3-T4), los modelos de moderación probados mostraron que tanto la compasión hacia el cuerpo ($F(5, 52) = 5.28, p < .001$) como el rasgo vergüenza corporal "rasgo" ($F(5, 52) = 5.47, p < .001$) fueron moderadores significativos del efecto de la condición sobre la regulación de la satisfacción corporal "estado", explicando el 33.69% y el 34.45% del cambio en la satisfacción corporal, respectivamente. Los análisis de pendientes simples mostraron que este efecto fue significativo en mujeres con puntuaciones "bajas" en compasión hacia el cuerpo "rasgo" ($b = 0.95, SE = 0.31, t = 3.04, p = .004 [0.32, 1.58]$) y "altas" en vergüenza hacia el cuerpo "rasgo" ($b = 1.05, SE = 0.32, t = 3.28, p = .002 [0.41, 1.70]$). El resto de los modelos de moderación probados no fueron estadísticamente significativos ($p > .05$).

Estos resultados, aunque marginalmente significativos, indicaron que el grupo de compasión hacia el cuerpo (vs. bienestar) amortiguó la vergüenza corporal inducida y sus consecuencias en los niveles de confianza corporal. Sin embargo, el grupo de bienestar experimentó mayores beneficios en la confianza corporal y la vergüenza corporal después de recibir la micro-intervención de compasión hacia el cuerpo. Además, los análisis de moderación revelaron que los individuos del grupo de bienestar con alta vergüenza corporal y baja compasión

hacia el cuerpo “rasgo” se beneficiaron en mayor medida de la micro-intervención de compasión hacia el cuerpo. En resumen, los hallazgos preliminares muestran que una breve micro-intervención de compasión hacia el cuerpo puede mitigar la vergüenza corporal y sus efectos sobre las variables relacionadas con el cuerpo (i.e., la confianza en el cuerpo) entre las mujeres jóvenes españolas.

4. CONCLUSIONES Y DISCUSIÓN

Esta tesis consiste en seis estudios, en los cuales se han detallado sus marcos teóricos, objetivos e hipótesis, metodologías discusiones específicas. La recopilación de los hallazgos de los seis artículos contribuyó a aportar evidencia sobre los mecanismos subyacentes a varias dimensiones de la IC y a promover estrategias que podrían aumentar la efectividad de los programas de prevención e intervención de los TA. Los principales hallazgos relacionados con los objetivos generales de esta tesis se presentan en los siguientes puntos.

4.1. CONCLUSIONES GENERALES

- (1) La RV es una herramienta prometedora para evaluar aspectos de la IC (dimensión perceptiva y afectiva) así como sus mecanismos subyacentes en mujeres de poblaciones clínicas y no clínicas.
- (2) Un límite perceptivo restrictivo "delgado-gordo" tuvo un efecto negativo en la estimación del tamaño corporal ideal (i.e., dimensión afectiva de la IC). Por consiguiente, un límite perceptivo restrictivo "delgado-gordo" para el propio cuerpo podría considerarse un factor de riesgo debido a su papel predictivo negativo en una mayor insatisfacción corporal y un mayor riesgo de desarrollar TA.

- (3) En adolescentes con TA, la inducción de afecto positivo se asoció con el aumento la estimación del tamaño corporal ideal (i.e., dimensión afectiva de IC).
- (4) La versión española de la Escala de Vergüenza hacia el Cuerpo (BISS; Duarte et al., 2015) y la Escala de Compasión Hacia el Cuerpo (BCS; Altman et al., 2020) mostraron adecuadas propiedades psicométricas como instrumentos para medir la vergüenza hacia el cuerpo (internalizada y externalizada) y la compasión hacia el cuerpo en mujeres de la población general.
- (5) La autocompasión mostró un efecto directo en la reducción de la vergüenza corporal (internalizada y externalizada) y el riesgo de TA en una muestra no clínica. Además, la confianza en el cuerpo y la vergüenza interna hacia el cuerpo fueron factores mediadores subyacentes al papel de la autocompasión el riesgo de TA.
- (6) La compasión hacia el cuerpo mostró un papel protector en la IC al cultivar la apreciación corporal (i.e., dimensión de la IC positiva) y, a su vez, disminuir la vergüenza corporal internalizada (la dimensión afectiva de la IC) y el riesgo de TA.
- (7) Una micro-intervención en compasión hacia el cuerpo mostró una tendencia a ser efectiva en amortiguar los efectos de una inducción experimental de vergüenza en variables relacionadas con la IC (vergüenza hacia el cuerpo y confianza en el cuerpo). Además, esta micro-intervención podría presentar dichos efectos tanto antes como después de una inducción de la vergüenza. Sin embargo, es importante destacar que esta conclusión es tentativa, ya que los hallazgos de este estudio no proporcionan evidencia suficiente para hacer afirmaciones definitivas al respecto.

4.2. FORTALEZAS DE LA TESIS DOCTORAL

- (1) Aborda una brecha importante en el campo de la IC, proporcionando mayor evidencia sobre los riesgos de riesgo y protectores, así como sus relaciones y mecanismos subyacentes, asociados a las alteraciones de la IC y el riesgo de desarrollar TA.
- (2) Los seis estudios de esta tesis cumplen con adecuados estándares metodológicos y éticos, y nos han permitido examinar las asociaciones y las relaciones causa-efecto entre los factores de riesgo y protección relacionados con TA.
- (3) Ha permitido el acercamiento entre la práctica clínica y la investigación por medio de establecimiento de acuerdos de colaboración entre la Universitat de València y centros médicos (Hospital Universitario Doctor Peset; Hospital Universitario Lozano Blesa y el centro ITA Previ). Así, los psicólogos clínicos, además de recibir una formación en el uso del programa de RV validado (Estudios 1 y 2), tuvieron acceso a los datos de sus pacientes recogidos en cada uno de los pases experimentales.
- (4) El *software* de RV validado se presenta como una herramienta de evaluación e intervención de alteraciones de la IC accesible y bajo coste, solventando las limitaciones de los métodos de evaluación tradicionalmente empleados (i.e., falta de precisión a la hora de evaluar las distorsiones corporales).
- (5) Se han adaptado al español dos nuevos instrumentos que nos permitirán medir el constructo de la vergüenza (interna y externa) hacia el cuerpo, así como la compasión dirigida específicamente al cuerpo.
- (6) Se ha examinamos la contribución de las dimensiones de la vergüenza corporal hacia el cuerpo internalizada y externalizada en el riesgo de desarrollar TA
- (7) Basándonos en los hallazgos de los estudios transversales y experimentales que llevamos a cabo, se pudo desarrollar una micro-

intervención basada en la compasión corporal para ser utilizada sobre las dimensiones alteradas de la IC (i.e., vergüenza corporal, desconfianza corporal e insatisfacción corporal). Teniendo en cuenta que la vergüenza corporal es un factor de riesgo y mantenimiento ampliamente identificado en las alteraciones de la IC y TA, este estudio constituye la primera aproximación al desarrollo de una herramienta digital eficaz de protección de la IC para ser utilizada a diario.

4.3. LIMITACIONES DE LA TESIS DOCTORAL

- (1) Limitación en la heterogeneidad de la muestra (i.e., la mayor parte de la muestra está conformada por mujeres jóvenes).
- (2) Los instrumentos de vergüenza hacia el cuerpo y la compasión hacia el cuerpo aún no han sido validados en población clínica con diagnóstico de TA, por lo que la interpretación de dichos resultados ha de hacerse con precaución.
- (3) Parte de los estudios se realizaron en el contexto de laboratorio, limitando así la validez externa de los hallazgos (i.e., Estudio 6).
- (4) Aunque los constructos asociados al *embodiment* positivo (i.e., confianza en el cuerpo, compasión hacia el cuerpo) fueron evaluados, los estudios no incluyeron la medida específica de *embodiment* positivo (i.e. The Experiences of Embodiment Scale; Piran y Teall, 2020).

4.4. FUTURAS DIRECCIONES

- (1) Replicación de los hallazgos en diferentes muestras, teniendo en cuenta diferentes cohortes de edad, sexo, identidad y orientación sexual, diferencias visibles o discapacidad física (Atkinson y Wade, 2016; Salomon y Brown, 2019; Toole y Craighead, 2016); además, los resultados han de ser replicados en muestras clínicas (Ferreira et al., 2013; Kelly et al., 2013).
- (2) Explorar otras dimensiones de la IC positiva (como la flexibilidad de la IC o la apreciación de la funcionalidad del cuerpo), así como el constructo del *embodiment* (*embodiment* positivo y *disembodiment*) y el autocuidado con atención plena (en inglés: *mindful self-care*).
- (3) Promover el desarrollo y posterior adaptación a diferentes culturas de medidas psicométricamente validas de dimensiones de la IC positiva estado (Halliwell, 2015).
- (4) Fomentar el desarrollo de intervenciones basadas en Tecnologías de Información y Comunicación como forma de prevenir TA en población en riesgo. Por ejemplo, llevar a cabo la replicación del diseño del Estudio 6 con diferentes muestras tanto dentro como fuera del contexto del laboratorio.
- (5) Incorporar evaluaciones longitudinales (i.e., explorar los efectos protectores de las dimensiones de la IC positiva o el *embodiment* tras 3, 6 o 12 meses tras la intervención).
- (6) Llevar a cabo diseños cualitativos para explorar los mecanismos subyacentes a la IC positiva y compasión, así como la experiencia de *embodiment/disembodiment* en situaciones sociales de comparación de la apariencia (Tylka, 2012).
- (7) Examinar el papel del afecto negativo en la población adolescente y joven adulta con diagnóstico o riesgo de desarrollar TA. Es esencial identificar estrategias de regulación emocional adaptativas (p.ej., supresión, falta de conciencia; Espeset et al., 2012) empleadas por

estas poblaciones para abordarlas desde los nuevos diseños de prevención e intervención de TA.

- (8) Explorar los beneficios de la RV como una herramienta de evaluación de las alteraciones de la IC. Futuros diseños deben seguir analizando los mecanismos de riesgo (sesgos perceptivos) y protectores (autocompasión o la compasión hacia el cuerpo) subyacentes de dichas alteraciones, incorporando otras herramientas como el seguimiento ocular. Además, dado que la RV es una técnica recientemente introducida en el proceso de intervención, los estudios deberían continuar evaluando la aceptabilidad y adherencia a las intervenciones digitales.

4.5. CONCLUSIÓN

La presente tesis proporciona hallazgos novedosos sobre los factores de riesgo y protectores asociados a la IC. Se destaca la importancia de cultivar la compasión hacia uno mismo y hacia el propio cuerpo como aspectos clave para abordar las alteraciones de la IC y fomentar una conexión positiva con el propio cuerpo. Estos hallazgos ofrecen un enfoque alentador para futuras investigaciones y el desarrollo de programas de prevención e intervención de TA más efectivos. En términos generales, esta tesis contribuye a una mejor comprensión del constructo de la IC y abre nuevas preguntas para seguir investigando en este campo.

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Appendices

Appendix A. Ethics committee approval for non-clinical sample (Study 1)

D. José María Montiel Company, Profesor Contratado Doctor Interino del departamento de Estomatología, y Secretario del Comité Ético de Investigación en Humanos de la Comisión de Ética en Investigación Experimental de la Universitat de València,

CERTIFICA:

Que el Comité Ético de Investigación en Humanos, en la reunión celebrada el día 6 de noviembre de 2017, una vez estudiado el proyecto de investigación titulado:

"Anorexia nerviosa y cuerpo: evaluación y modificación mediante realidad virtual de las representaciones mentales del cuerpo (VRAN-BODIMENT)", número de procedimiento HI508330529930,

cuya responsable es Dña. Rosa M^a Baños Rivera, ha acordado informar favorablemente el mismo dado que se respetan los principios fundamentales establecidos en la Declaración de Helsinki, en el Convenio del Consejo de Europa relativo a los derechos humanos y cumple los requisitos establecidos en la legislación española en el ámbito de la investigación biomédica, la protección de datos de carácter personal y la bioética.

Y para que conste, se firma el presente certificado en Valencia, a quince de noviembre de dos mil diecisiete.



Appendix B. Ethics committee approval for the clinical sample (Study 1)



**A/A.: Rosa María Baños
Psicología**

Dña. Pilar Codoñer Franch, Presidenta del Comité Ético de Investigación con Medicamentos del Hospital Universitario Dr. Peset.

CERTIFICA:

Que este comité en su reunión celebrada el día 27 de noviembre de 2019 ha evaluado y ha aprobado el estudio titulado: Anorexia nerviosa y cuerpo: evaluación y modificación mediante realidad virtual de las representaciones mentales del cuerpo.

Tesis doctoral PSI2017-85063-R.

Código CEIm: 88/19

Valencia 5 de diciembre de 2019

Fdo.: Dra. Pilar Codoñer Franch



Appendix C. Consent Form for Non-clinical sample (Study 1)

HOJA DE CONSENTIMIENTO INFORMADO

1.- INFORMACIÓN AL PARTICIPANTE

Ha mostrado interés en participar en un estudio **“ANOREXIA NERVIOSA Y CUERPO: EVALUACIÓN Y MODIFICACION MEDIANTE REALIDAD VIRTUAL DE LAS REPRESENTACIONES MENTALES DEL CUERPO”**, desarrollado por la Universidad de Valencia y aprobado por su Comité de Ética (H1508330529930).

Este estudio tiene como objetivo general es evaluar la categorización y la estimación del tamaño corporal que realizamos de nuestro propio cuerpo y de los demás a través de un sistema de realidad virtual.

La primera frase del estudio tiene una duración aproximada de 5 minutos y consiste en rellenar una serie de preguntas, que nos ayudarán a determinar si cumple los criterios de inclusión/exclusión de nuestro estudio. No podemos comunicarle dichos criterios en estos momentos para evitar sesgos en los resultados del estudio. Si cumple los criterios de inclusión, podrá continuar en el estudio, y un/a investigador/a del grupo de Investigación Labpsitec se pondrá en contacto con usted para explicarle la segunda fase del estudio.

La segunda fase del estudio consiste en venir al centro PREVI o al laboratorio del grupo de investigación Labpsitec de la Facultad de Psicología (UV), y realizar un pase experimental que tiene una duración aproximada de 60 minutos. En esta fase: (1) contestará algunos cuestionarios relacionados con la imagen corporal y las emociones; y (2) realizará una tarea en realidad virtual utilizando unas Oculus Rift.

Por último, cabe mencionar que no le comunicaremos las hipótesis del estudio y/o los resultados derivados del experimento hasta que la muestra del experimento no se haya completado en su totalidad.

A continuación, le pediremos que nos proporcione su consentimiento, de forma escrita, para participar en este estudio. Por favor, lea el siguiente texto con detenimiento y no dude en hacer cualquier pregunta. La información básica que debe conocer es la siguiente:

a) Los resultados de este proyecto de investigación ayudarán a comprender un grupo de trastornos psicológicos que tiene como una de las manifestaciones clave las disfunciones en la experiencia corporal, y abrirán la posibilidad de mejorar los tratamientos existentes para estos problemas. No obstante, cabe resaltar que usted no recibirá ninguna intervención psicológica.

b) De acuerdo con el conocimiento existente, el protocolo de evaluación e intervención psicológica utilizados en este estudio no implica un riesgo para su salud.

c) No percibirá una compensación económica por participar en esta investigación. La información no será vendida o distribuida a terceros con fines comerciales.

d) La participación en este proyecto de investigación es voluntaria y puede cancelarse en cualquier momento. Si rechaza participar, no habrá consecuencias negativas para usted. Si se retira del proyecto, puede decidir si los datos utilizados hasta ese momento, deben borrarse o si se pueden seguir utilizando tras haberlos convertido en anónimos (p. ej., eliminando los datos de la información identificativa, incluido el código, para que resulte imposible volver a identificarlos). Pueden solicitar a los investigadores que les proporcionen los datos almacenados en el registro y que corrijan los errores en ellos en cualquier momento.

e) Los datos que se deriven de la participación pueden ser utilizados con fines de investigación, estudio y publicación, salvaguardado siempre el derecho a la intimidad y el anonimato.

f) El proyecto se realizará siguiendo los criterios éticos internacionales recogidos en la Declaración de Helsinki.

Si necesita cualquier aclaración, contacte con la investigadora principal del proyecto, Rosa M^a Baños Rivera, en el teléfono 96 386 XXXX o en la dirección de correo electrónico banos@uv.es.

2. COMPROMISO DE CONFIDENCIALIDAD. Los datos serán tratados de forma confidencial, siguiendo para ello las medidas y niveles de seguridad de protección de los datos personales exigidos por la Ley Orgánica 15/1999, de 13 de diciembre, de Protección de Datos de Carácter Personal y su normativa de desarrollo.

3. CONSENTIMIENTO.

Doña _____,
mayor de edad, titular del DNI: _____, por el presente documento manifiesto que:

He sido informado/a de las características del Proyecto de Investigación titulado: **“ANOREXIA NERVIOSA Y CUERPO: EVALUACIÓN Y MODIFICACION MEDIANTE REALIDAD VIRTUAL DE LAS REPRESENTACIONES MENTALES DEL CUERPO”**.

He leído tanto el apartado 1 del presente documento titulado “información al participante”, como el apartado 2 titulado “compromiso de confidencialidad”, y he podido formular las dudas que me han surgido al respecto. Considero que he entendido dicha información.

Estoy informada de la posibilidad de retirarme en cualquier momento del estudio. En virtud de tales condiciones, consiento participar en este estudio.

Y en prueba de conformidad, firmo el presente documento en el lugar y fecha que se indican a continuación.

Valencia, _____ de _____ de 20__.

| | | | |
|----------------------------------|---|--|----------------------------------|
| Nombre y firma del participante: | Nombre y firma de la madre, padre o tutor (en caso de menores): | | Nombre y firma del investigador: |
| | | | |
| Fecha: ____/____/20__ | Fecha: ____/____/20__ | | Fecha: ____/____/20__ |

REVOCACIÓN DEL CONSENTIMIENTO (si es el caso)

Revoco el consentimiento prestado en fecha _____ para participar en el Proyecto de Investigación titulado **“ANOREXIA NERVIOSA Y CUERPO: EVALUACIÓN Y MODIFICACION MEDIANTE REALIDAD VIRTUAL DE LAS REPRESENTACIONES MENTALES DEL CUERPO”** y, para que así conste, firmo la presente revocación.

Valencia, _____ de _____ de 20__.

| | | | |
|----------------------------------|---|--|----------------------------------|
| Nombre y firma del participante: | Nombre y firma de la madre, padre o tutor (en caso de menores): | | Nombre y firma del investigador: |
| | | | |
| Fecha: ____/____/20__ | Fecha: ____/____/20__ | | Fecha: ____/____/20__ |

Appendix D. Consent form for Clinical Sample (Study 1)



HOJA DE INFORMACIÓN AL PACIENTE

| | |
|-------------------------------|---|
| Título | Anorexia nerviosa y cuerpo: evaluación y modificación mediante realidad virtual de las representaciones mentales del cuerpo |
| Promotor | Grupo de investigación Labpsitec – Valencia (GIUV2017-380) |
| Investigador principal | Rosa María Baños Rivera |
| Centro | HOSPITAL UNIVERSITARIO DR. PESET DE VALENCIA |
| Teléfono de contacto | 963 864 4XX |

1. INTRODUCCIÓN

Nos dirigimos a ti para informarte sobre un *estudio de investigación* en el que se te invita a participar. El estudio ha sido aprobado por el Comité de Ética de la Investigación con medicamentos (CEIm) del Hospital Universitari Dr. Peset de València, de acuerdo a la legislación vigente y las normas de buena práctica clínica.

Nuestra intención es que recibas la información correcta y suficiente para que puedas decidir si acepta o no participar en este estudio. Para ello lee esta hoja informativa con atención y nosotros te aclararemos las dudas que te puedan surgir. Además, puedes consultar con las personas que considere oportuno.

2. PARTICIPACIÓN VOLUNTARIA

Debes saber que tu participación en este estudio es voluntaria y que puedes decidir no participar. Si decides participar, puedes cambiar tu decisión y retirar el consentimiento en cualquier momento sin que por ello se altere la relación con tu médico ni que se produzca perjuicio alguno en tu atención sanitaria.

3. OBJETIVO DEL ESTUDIO

El objetivo del estudio es analizar, en personas con trastornos de la conducta alimentaria y en población general, las representaciones mentales del cuerpo mediante realidad virtual (con ayuda de avatares). Además, queremos estudiar variables relacionadas con trastornos alimentarios y compararlas con las medidas obtenidas en la realidad virtual.

4. DESCRIPCIÓN DEL ESTUDIO

El estudio solo abarca el UTCA del Hospital Universitario Doctor Peset. Buscamos la colaboración de mujeres entre los 14 y los 40 años. Necesitamos contar con la participación de 50 pacientes, todas ellas con diagnóstico de TCA que se encuentren recibiendo el tratamiento psicológico y/o psiquiátrico desde UTCA.

Por las características del estudio, no podrían participar en el mismo mujeres embarazadas o aquellas que presenten una enfermedad física/mental que les impida realizar tareas de Realidad virtual.

5. ACTIVIDADES DEL ESTUDIO

El pase experimental del estudio se llevará a cabo en la UTCA y tendrá una duración aproximada de una hora y media. Se tratará de alinear los pases del estudio con las visitas que tienen planificadas por los profesionales de la salud mental/UTCA en caso de que cumplas los criterios del estudio. Así, los pases de realidad virtual se realizarán en el UTCA.

El pase del estudio consistirá en completar una serie de cuestionarios que se rellenarán en papel u online en la plataforma Lime Survey (<https://encuestas.uv.es/admin>) operada desde la cuenta de la Universidad de Valencia mediante una contraseña secreta protegiendo tu confidencialidad. Por otro lado, se realizarán unas tareas de realidad virtual con ayuda de la investigadora.

La información plasmada en los cuestionarios será anónima y al igual que todos los datos se introducirán en las bases de datos.

6. RIESGOS Y MOLESTIAS DERIVADOS DE SU PARTICIPACIÓN

En línea de los estudios ya realizados por el grupo, no se espera ningún riesgo para tu salud durante la realización del estudio. Sin embargo, en caso de aparición de cualquier cambio adverso a nivel psicológico dicha información será proporcionada a tus profesionales de referencia de la UTCA con el fin de trabajarla en las posteriores sesiones. No habrá interferencia con el desarrollo de un proceso terapéutico habitual, es decir, el número y la frecuencia de tus sesiones no cambiará por participar o no en este estudio.

7. POSIBLES BENEFICIOS

No se espera que obtengas un beneficio directo por tu participación en el estudio, sin embargo, **tus resultados serán comunicados a tu psicóloga y/o psiquiatra de la UTCA que te estén atendiendo con el fin de mejorar tu tratamiento.**

Por otro lado, los conocimientos obtenidos gracias al estudio pueden ayudar al avance científico ya que el objetivo final de este estudio es crear de una intervención cuyo fin consistirá en trabajar las representaciones alteradas del cuerpo.

8. CONFIDENCIALIDAD

El tratamiento, la comunicación y la cesión de los datos de carácter personal de todas las participantes se ajustará a lo dispuesto en la Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos Personales y garantía de los derechos digitales.

De acuerdo a lo que establece la legislación de protección de datos, puedes ejercer los derechos de acceso, modificación, oposición y cancelación de datos, para lo cual deberá dirigirse a tu psicóloga del estudio.

Además de los derechos anteriormente citados, y en aplicación del Reglamento (UE) 2016/679 de Parlamento europeo y del Consejo, de 27 de abril de 2016 de Protección de Datos, ahora también puedes limitar el

tratamiento de datos que sean incorrectos solicitar una copia o que se trasladen a un tercero (portabilidad) los datos que usted ha facilitado para el estudio.

Si deja de participar en el estudio, los datos obtenidos no se pueden eliminar para así garantizar la validez de la investigación. Así mismo, tienes derecho a dirigirte a la Agencia de Protección de Datos si no quedara satisfecho.

Tanto el Centro, como el Promotor, son responsables respectivamente del tratamiento de sus datos y se comprometen a cumplir con la normativa de protección de datos en vigor. Los datos recogidos para el estudio estarán identificados mediante un código, de manera que no se incluya información que pueda identificarte, y sólo tu psicóloga y/o psiquiatra del estudio/colaboradores podrá relacionar dichos datos contigo y con tu historia clínica. Por lo tanto, su identidad no será revelada a ninguna otra persona salvo a las autoridades sanitarias, cuando así lo requieran o en casos de urgencia médica. Los Comités de Ética de la Investigación, los representantes de la Autoridad Sanitaria en materia de inspección y el personal autorizado por el Promotor, únicamente podrán acceder para comprobar los datos personales, los procedimientos del estudio clínico y el cumplimiento de las normas de buena práctica clínica (siempre manteniendo la confidencialidad de la información).

El Investigador y el Promotor están obligados a conservar los datos recogidos para el estudio al menos hasta 25 años tras su finalización. Posteriormente, tu información personal solo se conservará por el centro para el cuidado de su salud y por el promotor para otros fines de investigación científica si usted hubiera otorgado su consentimiento para ello, y si así lo permite la ley y requisitos éticos aplicables.

Si realizáramos transferencia de tus datos codificados fuera de la Unión Europea, los datos de la participante quedarán protegidos con salvaguardas tales como contratos u otros mecanismos por las autoridades de protección de datos.

9. COMPENSACIÓN ECONÓMICA

No se contempla ningún tipo de compensación económica para las participantes en el estudio, ni para el equipo de investigación y el centro.

Al firmar la hoja de consentimiento adjunta, te comprometes a cumplir con los procedimientos del estudio que se le han expuesto.

10. DATOS DE CONTACTO

Investigadora principal:

Rosa María Baños Rivera
rosa.banos@uv.es teléfono: 96 386 44 XX

Investigadora/Estudiante de Doctorado:

Diana Burychka
diana.burychka@uv.es teléfono: 697 486 5XX

CONSENTIMIENTO INFORMADO

(copia para la paciente)

| | |
|---------------|---|
| Título | Anorexia nerviosa y cuerpo: evaluación y modificación mediante realidad virtual de las representaciones mentales del cuerpo |
|---------------|---|

Yo, _____

- He leído la hoja de información que se me ha entregado sobre el estudio
- He podido hacer preguntas sobre el estudio
- He recibido suficiente información sobre el estudio

He hablado con Nuria López Vilaplana y/o Diana Burychka

Comprendo que mi participación es voluntaria

Comprendo que puedo retirarme del estudio:

- Cuando quiera

- Sin tener que dar explicaciones

- Sin que esto repercuta en mis cuidados médicos

Recibiré una copia firmada y fechada de este documento de consentimiento informado. Presto libremente mi conformidad para participar en el estudio.

(Nombre, firma y fecha de puño y letra por el paciente)

| | | |
|--------------------------------------|---|---|
| Firma del participante: _____ | Firma de la madre, padre o tutor (en caso de menores): _____ | Firma del investigador: _____ |
| | | |
| Fecha: ____/____/20__ | Fecha: ____/____/____ | Fecha: ____/____/20__ |

En caso de los menores de edad (marcar **una**):

La autorización proviene de AMBOS progenitores

En el supuesto de que autorizase solo UNO de los progenitores, el progenitor que autoriza habrá de declarar una de las siguientes:

Confirmando con la presente que el otro progenitor no se opone a la participación de nuestra hija en el estudio

El firmante es el único tutor legal

Appendix E. Ethics committee approval for Non-clinical sample (Studies 3, 4 and 5)

VNIVERSITAT
DE VALÈNCIA Vicerectorat
d'Investigació

D. José María Montiel Company, Profesor Contratado Doctor del departamento de Estomatología, y Secretario del Comité Ético de Investigación en Humanos de la Comisión de Ética en Investigación Experimental de la Universitat de València,

CERTIFICA:

Que el Comité Ético de Investigación en Humanos, en la reunión celebrada el día 18 de julio de 2019, una vez estudiado el proyecto de investigación titulado:

“El efecto de la inducción emocional de tristeza (vs. Alegría) y el papel de la vergüenza hacia el cuerpo en la representación mental de la imagen corporal a través de la realidad virtual”, número de procedimiento 1127840, cuya responsable es Dña. Rosa María Baños Rivera, ha acordado informar favorablemente el mismo dado que se respetan los principios fundamentales establecidos en la Declaración de Helsinki, en el Convenio del Consejo de Europa relativo a los derechos humanos y cumple los requisitos establecidos en la legislación española en el ámbito de la investigación biomédica, la protección de datos de carácter personal y la bioética.

Y para que conste, se firma el presente certificado en Valencia, a veinticuatro de julio de dos mil diecinueve.



A handwritten signature in black ink, appearing to be 'J.M. Montiel Company', written over the seal.

Appendix F. Consent form for Clinical and Non-clinical Sample (Study 3)

DOCUMENTO DE CONSENTIMIENTO INFORMADO Y COMPROMISO DE CONFIDENCIALIDAD

1. INFORMACIÓN AL PARTICIPANTE

El proyecto de investigación para el cual te pedimos su participación se titula: “**EMOCIONES E IMAGEN CORPORAL A TRAVÉS DE LA REALIDAD VIRTUAL**”, desarrollado por la Universidad de Valencia y aprobado por su Comité de Ética (1127840).

La información básica que debes conocer es la siguiente:

- a. **Contribución al estudio.** Los resultados de este proyecto de investigación pueden contribuir a comprender mejor la relación de las emociones con las dimensiones de la imagen corporal con ayuda de la realidad virtual.

El estudio tiene una duración aproximada de dos horas y se realizará en el Hospital Universitario Lozano Blesa. El pase experimental consistirá en venir dos veces al laboratorio y, en cada una de ellas, (1) rellenar una serie de cuestionarios relacionados con la imagen corporal y las emociones, así como (2) unas tareas de realidad virtual utilizando Oculus Rift. Cabe mencionar que no te comunicaremos las hipótesis del estudio y/o los resultados derivados del experimento hasta que la muestra del experimento no se haya completado en su totalidad.

- b. **Riesgos asociados.** De acuerdo con el conocimiento existente, tu participación en este estudio NO implica un riesgo para su salud.
- c. **Participación voluntaria.** La participación en este proyecto de investigación es voluntaria y puede cancelarse en cualquier momento. Si rechazas participar, no habrá consecuencias negativas para ti.
- d. **Retirada del estudio.** Si te retiras del proyecto, puede decidir si los datos utilizados hasta ese momento deben borrarse o si se pueden seguir utilizando

tras haberlos convertido en anónimos (p. ej., eliminando los datos de la información identificativa, incluido el código, para que resulte imposible volver a identificarlos). Puedes solicitar a los investigadores que te proporcionen los datos almacenados en el registro y que corrijan los errores en ellos en cualquier momento.

- e. **Criterios éticos.** El proyecto se realizará siguiendo los criterios éticos internacionales recogidos en la Declaración de Helsinki.
- f. **Manejo de datos.** Los datos que se deriven de la participación pueden ser utilizados con fines de investigación, estudio y publicación, salvaguardado siempre el derecho a la intimidad y el anonimato.

El tratamiento de los datos se realizará mediante el siguiente procedimiento:

- Los datos serán almacenados durante todo el tiempo que este proyecto esté activo.
- Los datos serán tratados de forma anónima y utilizados con el objetivo de realizar los análisis científicos pertinentes.
- Todos los datos que no sean científicamente útiles serán eliminados inmediatamente.

El presente estudio llevará a cabo el tratamiento de los datos personales de acuerdo con el Reglamento general de protección de datos (UE) 2016/679.

De conformidad con el artículo 13 del Reglamento relativo a la protección de las personas físicas en lo que respecta al tratamiento de datos personales y a la libre circulación de estos datos y por el que se deroga la Directiva 95/46/CE (Reglamento general de protección de datos o GDPR), a continuación, se ofrece información sobre la recogida de datos:

Todas las personas involucradas en este estudio deberán cumplir con la normativa de protección de datos. Le garantizamos que todos sus datos – sin ninguna restricción – serán tratados confidencialmente. Se entiende que los datos personales recogidos durante el estudio serán confidenciales y que solo los

miembros del equipo de investigación identificados a continuación tendrán acceso a estos datos:

- Dra. Rosa Baños Rivera, investigadora responsable del estudio
 - Dra. Marta Miragall, investigadora responsable del estudio
 - Diana Burychka, investigadora responsable del estudio
- El tratamiento de datos personales en el marco de la UVEG debe declararse al RPD de la UVEG.
 - Tus datos se conservarán durante un máximo de 10 años.
 - Para ejercer estos derechos o para cualquier pregunta sobre el tratamiento de tus datos, puede ponerse en contacto con:

Responsable de protección de datos:

Javier Plaza Penadés

Edificio del Rectorado. Avda. Blasco Ibáñez, 13. 46010. Valencia.

Teléfono: 96 162 54 31 / lopd@uv.es

- g. **Información adicional del estudio.** Si tienes alguna pregunta adicional sobre el proyecto o y tus derechos como participante en esta investigación, no dudes en ponerse en contacto con el contacto que se indica a continuación:

Investigadora principal del proyecto (para cualquier duda relacionada con el estudio):

Rosa M^a Baños Rivera

Facultad de Psicología. Avda. Blasco Ibáñez, 21, 46010. Valencia.

Teléfono: 96 386 XXXX / banos@uv.es

1. **COMPROMISO DE CONFIDENCIALIDAD.** El presente estudio llevará a cabo el tratamiento de los datos personales de acuerdo con el **Reglamento general de protección de datos (UE) 2016/679**. Para más información: <https://www.uv.es/uvweb/universidad/es/universitat/delegacion-proteccion-datos-lpd-/delegacion-1286042855523.html>.

3. CONSENTIMIENTO INFORMADO

(copia para la paciente)

| | |
|---------------|--|
| Título | “EMOCIONES E IMAGEN CORPORAL A TRAVÉS DE LA REALIDAD VIRTUAL” |
|---------------|--|

Yo, _____

- He leído la hoja de información que se me ha entregado sobre el estudio
- He podido hacer preguntas sobre el estudio
- He recibido suficiente información sobre el estudio
- He hablado con mi terapeuta y/o Diana Burychka
- Comprendo que mi participación es voluntaria
- Comprendo que puedo retirarme del estudio:
 - Cuando quiera
 - Sin tener que dar explicaciones
 - Sin que esto repercuta en mis cuidados médicos

Recibiré una copia firmada y fechada de este documento de consentimiento informado.

Presto libremente mi conformidad para participar en el estudio.

(Nombre, firma y fecha de puño y letra por el paciente)

| | | |
|---|--|---|
| Firma del participante: _____ Fecha: ____/____/20__ | Firma de la madre, padre o tutor (en caso de menores): _____ Fecha: ____/____/____ | Firma del investigador: _____ Fecha: ____/____/20__ |
|---|--|---|

En caso de los menores de edad (marcar **una**):

La autorización proviene de AMBOS progenitores

En el supuesto de que autorizase solo UNO de los progenitores, el progenitor que autoriza habrá de declarar una de las siguientes:

Confirmando con la presente que el otro progenitor no se opone a la participación de nuestra hija en el estudio

El firmante es el único tutor legal

Appendix G. Consent Form for the clinical samples (Study 2 and 3)



HOJA DE INFORMACIÓN AL PACIENTE

| | |
|-------------------------------|---|
| Título | Anorexia nerviosa y cuerpo: evaluación y modificación mediante realidad virtual de las representaciones mentales del cuerpo |
| Promotor | Grupo de investigación Labpsitec – Valencia (GIUV2017-380) |
| Investigador principal | Rosa María Baños Rivera |
| Centro | HOSPITAL UNIVERSITARIO DR. PESET DE VALENCIA |
| Teléfono de contacto | 697 486 5XX |

1. INTRODUCCIÓN

Nos dirigimos a ti para informarte sobre un *estudio de investigación* en el que se te invita a participar. El estudio ha sido aprobado por el Comité de Ética de la Investigación con medicamentos (CEIm) del Hospital Universitari Dr. Peset de València, de acuerdo a la legislación vigente y las normas de buena práctica clínica.

Nuestra intención es que recibas la información correcta y suficiente para que puedas decidir si acepta o no participar en este estudio. Para ello lee esta hoja informativa con atención y nosotros te aclararemos las dudas que te puedan surgir. Además, puedes consultar con las personas que considere oportuno.

2. PARTICIPACIÓN VOLUNTARIA

Debes saber que tu participación en este estudio es voluntaria y que puedes decidir no participar. Si decides participar, puedes cambiar tu decisión y retirar

el consentimiento en cualquier momento sin que por ello se altere la relación con tu médico ni que se produzca perjuicio alguno en tu atención sanitaria.

3. OBJETIVO DEL ESTUDIO

El objetivo del estudio es analizar, en personas con trastornos de la conducta alimentaria y en población general, las representaciones mentales del cuerpo mediante realidad virtual (con ayuda de avatares). Además, queremos estudiar variables relacionadas con trastornos alimentarios y compararlas con las medidas obtenidas en la realidad virtual.

4. DESCRIPCIÓN DEL ESTUDIO

El estudio solo abarca el UTCA del Hospital Universitario Doctor Peset. Buscamos la colaboración de mujeres entre los 14 y los 40 años. Para el estudio 1 necesitamos contar con la participación de 50 pacientes y para el estudio 2 necesitamos la participación de 66 pacientes, todas ellas con diagnóstico de TCA que se encuentren recibiendo el tratamiento psicológico y/o psiquiátrico desde UTCA.

Por las características del estudio, no podrían participar en el mismo mujeres embarazadas o aquellas que presenten una enfermedad física/mental que les impida realizar tareas de Realidad virtual.

5. ACTIVIDADES DEL ESTUDIO

El pase experimental del estudio se llevará a cabo en un día y tendrá una duración aproximada de una hora y media. Se tratará de alinear los pases del estudio con las visitas que tienes planificadas por los profesionales de la salud mental/UTCA en caso de que cumplas los criterios del estudio.

El pase del estudio consistirá en completar una serie de cuestionarios que se rellenarán online en la plataforma Lime Survey (<https://encuestas.uv.es/admin>) operada desde la cuenta de la Universidad de Valencia mediante una contraseña secreta protegiendo tu confidencialidad. Por otro lado, se realizarán unas tareas de realidad virtual con ayuda de la investigadora.

La información plasmada en los cuestionarios será anónima y al igual que todos los datos se introducirán en las bases de datos.

6. RIESGOS Y MOLESTIAS DERIVADOS DE SU PARTICIPACIÓN

En línea de los estudios ya realizados por el grupo, no se espera ningún riesgo para tu salud durante la realización del estudio. Sin embargo, en caso de aparición de cualquier cambio adverso a nivel psicológico dicha información será proporcionada a tus profesionales de referencia de la UTCA con el fin de trabajarla en las posteriores sesiones. No habrá interferencia con el desarrollo de un proceso terapéutico habitual, es decir, el número y la frecuencia de tus sesiones no cambiará por participar o no en este estudio.

7. POSIBLES BENEFICIOS

No se espera que obtengas un beneficio directo por tu participación en el estudio, sin embargo, tus resultados serán comunicados a tu psicóloga y/o psiquiatra de la UTCA que te estén atendiendo con el fin de mejorar tu tratamiento.

Por otro lado, los conocimientos obtenidos gracias al estudio pueden ayudar al avance científico ya que el objetivo final de este estudio es crear de una intervención cuyo fin consistirá en trabajar las representaciones alteradas del cuerpo.

8. CONFIDENCIALIDAD

El tratamiento, la comunicación y la cesión de los datos de carácter personal de todas las participantes se ajustará a lo dispuesto en la Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos Personales y garantía de los derechos digitales.

De acuerdo a lo que establece la legislación de protección de datos, puedes ejercer los derechos de acceso, modificación, oposición y cancelación de datos, para lo cual deberá dirigirse a tu psicóloga del estudio.

Además de los derechos anteriormente citados, y en aplicación del Reglamento (UE) 2016/679 de Parlamento europeo y del Consejo, de 27 de abril de 2016 de Protección de Datos, ahora también puedes limitar el

tratamiento de datos que sean incorrectos solicitar una copia o que se trasladen a un tercero (portabilidad) los datos que usted ha facilitado para el estudio.

Si deja de participar en el estudio, los datos obtenidos no se pueden eliminar para así garantizar la validez de la investigación. Así mismo, tienes derecho a dirigirte a la Agencia de Protección de Datos si no quedara satisfecho.

Tanto el Centro, como el Promotor, son responsables respectivamente del tratamiento de sus datos y se comprometen a cumplir con la normativa de protección de datos en vigor. Los datos recogidos para el estudio estarán identificados mediante un código, de manera que no se incluya información que pueda identificarte, y sólo tu psicóloga y/o psiquiatra del estudio/colaboradores podrá relacionar dichos datos contigo y con tu historia clínica. Por lo tanto, su identidad no será revelada a ninguna otra persona salvo a las autoridades sanitarias, cuando así lo requieran o en casos de urgencia médica. Los Comités de Ética de la Investigación, los representantes de la Autoridad Sanitaria en materia de inspección y el personal autorizado por el Promotor, únicamente podrán acceder para comprobar los datos personales, los procedimientos del estudio clínico y el cumplimiento de las normas de buena práctica clínica (siempre manteniendo la confidencialidad de la información).

El Investigador y el Promotor están obligados a conservar los datos recogidos para el estudio al menos hasta 25 años tras su finalización. Posteriormente, tu información personal solo se conservará por el centro para el cuidado de su salud y por el promotor para otros fines de investigación científica si usted hubiera otorgado su consentimiento para ello, y si así lo permite la ley y requisitos éticos aplicables.

Si realizáramos transferencia de tus datos codificados fuera de la Unión Europea, los datos de la participante quedarán protegidos con salvaguardas tales como contratos u otros mecanismos por las autoridades de protección de datos.

9. COMPENSACIÓN ECONÓMICA

No se contempla ningún tipo de compensación económica para las participantes en el estudio, ni para el equipo de investigación y el centro.

Al firmar la hoja de consentimiento adjunta, te comprometes a cumplir con los procedimientos del estudio que se le han expuesto.

10. DATOS DE CONTACTO

Investigadora principal:

Rosa María Baños Rivera
rosa.banos@uv.es teléfono: 96 386 44 XX

Investigadora/Estudiante de Doctorado:

Diana Burychka
diana.burychka@uv.es teléfono: 697 486 5XX

CONSENTIMIENTO INFORMADO

(copia para la paciente)

| | |
|---------------|---|
| Título | Anorexia nerviosa y cuerpo: evaluación y modificación mediante realidad virtual de las representaciones mentales del cuerpo |
|---------------|---|

Yo, _____

- He leído la hoja de información que se me ha entregado sobre el estudio
- He podido hacer preguntas sobre el estudio
- He recibido suficiente información sobre el estudio
- He hablado con Nuria López Vilaplana y/o Diana Burychka
- Comprendo que mi participación es voluntaria
- Comprendo que puedo retirarme del estudio:
 - Cuando quiera
 - Sin tener que dar explicaciones
 - Sin que esto repercuta en mis cuidados médicos

Recibiré una copia firmada y fechada de este documento de consentimiento informado.

Presto libremente mi conformidad para participar en el estudio.

(Nombre, firma y fecha de puño y letra por el paciente)

| | | |
|--------------------------------------|--|--------------------------------------|
| Firma del participante: _____ | Firma de la madre, padre o tutor (en caso de menores): _____ _____ | Firma del investigador: _____ |
| Fecha: ___/___/20__ | Fecha: ___/___/___ | Fecha: ___/___/20__ |

En caso de los menores de edad (marcar **una**):

Los progenitores (ambos)

En el supuesto de que autorizase solo uno de los progenitores, el progenitor que autoriza habrá de declarar una de las siguientes:

Confirmo con la presente que el otro progenitor no se opone a la participación de nuestra hija en el estudio

El firmante es el único tutor legal

Appendix H. Body Image State Scale translated to Spanish (Studies 2 and 6)

IMAGEN CORPORAL ESTADO (BISS; Cash, 2002)

Marca la casilla al lado de la afirmación que mejor describe cómo te sientes **EN ESTE MOMENTO**. Lee cada afirmación cuidadosamente para asegurarte de que estás eligiendo, con precisión y honestidad, la respuesta que mejor describe cómo te sientes en este momento.

1. Ahora mismo me siento...

- Extremadamente insatisfecha** con mi apariencia física.
- Bastante insatisfecha** con mi apariencia física.
- Moderadamente insatisfecha** con mi apariencia física.
- Ligeramente insatisfecha** con mi apariencia física.
- Ni satisfecha ni insatisfecha** con mi apariencia física.
- Ligeramente satisfecha** con mi apariencia física.
- Moderadamente satisfecha** con mi apariencia física.
- Bastante satisfecha** con mi apariencia física.
- Extremadamente satisfecha** con mi apariencia física.

2. Ahora mismo me siento...

- Extremadamente satisfecha** con mi tamaño y forma corporal.
- Bastante satisfecha** con mi tamaño y forma corporal.
- Moderadamente satisfecha** con mi tamaño y forma corporal.
- Ligeramente satisfecha** con mi tamaño y forma corporal.
- Ni satisfecha ni insatisfecha** con mi tamaño y forma corporal.
- Ligeramente insatisfecha** con mi tamaño y forma corporal.
- Moderadamente insatisfecha** con mi tamaño y forma corporal.
- Bastante insatisfecha** con mi tamaño y forma corporal.
- Extremadamente insatisfecha** con mi tamaño y forma corporal.

3. Ahora mismo me siento...

- Extremadamente satisfecha** con mi peso.
- Bastante satisfecha** con mi peso.
- Moderadamente satisfecha** con mi peso.
- Ligeramente satisfecha** con mi peso.
- Ni satisfecha ni insatisfecha** con mi peso.
- Ligeramente insatisfecha** con mi peso.
- Moderadamente insatisfecha** con mi peso.

- Bastante insatisfecha** con mi peso.
- Extremadamente insatisfecha** con mi peso.

4. Ahora mismo me siento...

- Extremadamente atractiva** físicamente.
- Bastante atractiva** físicamente.
- Moderadamente atractiva** físicamente.
- Ligeramente atractiva** físicamente.
- Ni atractiva ni no atractiva** físicamente.
- Ligeramente no atractiva** físicamente.
- Moderadamente no atractiva** físicamente.
- Bastante no atractiva** físicamente.
- Extremadamente no atractiva** físicamente.

5. Ahora mismo me siento...

- Muchísimo peor** con mi apariencia de lo que normalmente me siento.
- Mucho peor** con mi apariencia de lo que normalmente me siento.
- Algo peor** con mi apariencia de lo que normalmente me siento.
- Ligeramente peor** con mi apariencia de lo que normalmente me siento.
- Aproximadamente igual** con mi apariencia de lo que normalmente me siento.
- Ligeramente mejor** con mi apariencia de lo que normalmente me siento.
- Algo mejor** con mi apariencia de lo que normalmente me siento.
- Mucho mejor** con mi apariencia de lo que normalmente me siento.
- Muchísimo mejor** con mi apariencia de lo que normalmente me siento.

6. Ahora mismo siento que mi apariencia es...

- Muchísimo mejor** que la apariencia media de las personas.
- Mucho mejor** que la de la apariencia media de las personas.
- Algo mejor** que la de la apariencia media de las personas.
- Ligeramente mejor** que la apariencia media de las personas.
- Aproximadamente igual** que la apariencia media de las personas.
- Ligeramente peor** que la apariencia media de las personas.
- Algo peor** que la apariencia media de las personas.
- Mucho peor** que la apariencia media de las personas.
- Muchísimo peor** que la apariencia media de las personas.

Appendix I. Validated to Spanish the Body Image Shame Scale (BISS)

ESCALA DE LA VERGÜENZA HACIA EL CUERPO (BISS)

A continuación, encontrarás frases que comprenden sentimientos o experiencias de vergüenza relacionada con el cuerpo. Cualquiera puede haber sentido, en algún momento, alguno de estos sentimientos o haber pasado por dichas experiencias. Por favor, lee cada frase detenidamente e indique el número que mejor expresa la frecuencia con la que experimentas lo que es que se describe en cada pregunta.

- 0 = Nunca
- 1 = Raramente
- 2 = A veces
- 3 = Frecuentemente
- 4 = Casi siempre

| | 0 | 1 | 2 | 3 | 4 |
|--|---|---|---|---|---|
| 1. Evito llevar ropa ajustada que ponga al descubierto mi figura | | | | | |
| 2. Evito situaciones sociales (salir de fiesta, etc.) por mi apariencia física | | | | | |
| 3. Me molesta ver mi cuerpo desvestido | | | | | |
| 4. Cuando veo mi cuerpo en el espejo siento que soy una persona defectuosa | | | | | |
| 5. Escojo ropa que esconda partes de mi cuerpo que considero feas o desproporcionadas | | | | | |
| 6. La relación que tengo con mi cuerpo me impide tener una relación cercana con alguien | | | | | |
| 7. Presto mucha atención a los movimientos y postura de mi cuerpo con el fin de ocultar partes del cuerpo que no me gustan | | | | | |
| 8. Me siento mal conmigo mismo/a cuando llevo ropa que enseña mi figura | | | | | |
| 9. Evito mover mi cuerpo (por ejemplo, bailar) en sitios públicos porque siento que así expongo mi apariencia física a ser criticada por los demás | | | | | |
| 10. Me siento mal cuando llevo ropa que enseña mi figura | | | | | |
| 11. Hay partes de mi cuerpo que prefiero esconder | | | | | |
| 12. Mi apariencia física me hace sentir inferior en comparación con los demás | | | | | |
| 13. No me gusta hacer ejercicio frente a los demás ya que me da miedo cómo puedan evaluar mi cuerpo | | | | | |
| 14. Mi apariencia física me hace difícil sentirme cómoda en situaciones sociales | | | | | |

Appendix J. Validated to Spanish the Body Compassion Scale (BCS)

ESCALA DE COMPASIÓN HACIA EL CUERPO (BCS)

Por favor, contesta las siguientes preguntas pensando en tu cuerpo con la siguiente escala:

- 1 = Casi nunca
- 2 = Raramente
- 3 = Alguna vez
- 4 = A menudo
- 5 = Casi siempre

| | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| 1. Cuando me siento frustrada con la falta de habilidad de mi cuerpo para hacer algo, tiendo a sentirme alejada y aislada de los demás. | | | | | |
| 2. Cuando pienso en las limitaciones/defectos de mi cuerpo, tiendo a sentirme alejada y aislada de los demás. | | | | | |
| 3. Cuando fracaso en la realización de actividad física que es importante para mí, tiendo a sentirme sola en mi fracaso. | | | | | |
| 4. Cuando mi cuerpo fracasa en algo importante para mí, me consumen los sentimientos de inutilidad. | | | | | |
| 5. Cuando mi cuerpo no responde de la forma que quiero, tiendo a ser dura conmigo misma. | | | | | |
| 6. Cuando deseo que algún aspecto de mi cuerpo se vea diferente, siento que nadie más entiende mi lucha interna. | | | | | |
| 7. Cuando tengo molestias físicas, enfermedades o lesiones, esto hace sentirme más alejada y aislada de otras personas. | | | | | |
| 8. Cuando me doy cuenta de los aspectos de mi cuerpo que no me gustan, soy dura conmigo misma. | | | | | |
| 9. Cuando me siento físicamente incómoda, tiendo a obsesionarme y fijarme en todo lo que está mal. | | | | | |
| 10. Cuando estoy frustrada con algún aspecto de mi apariencia, trato de recordarme que la mayoría de la gente se siente así todo el tiempo. | | | | | |
| 11. Cuando dudo de mi habilidad para practicar una nueva modalidad de actividad física, trato de recordarme que la mayoría de la gente también se siente así en algún momento. | | | | | |

| | | | | | |
|---|--|--|--|--|--|
| 12. Cuando no me siento en forma, intento recordarme que la mayoría de la gente también se siente así en algún momento. | | | | | |
| 13. Intento ver las limitaciones/defectos de mi cuerpo como algo que cualquiera experimenta de una forma u otra | | | | | |
| 14. Cuando estoy lesionada, enferma o tengo molestias físicas, me recuerdo a mí misma que hay muchas otras personas en el mundo que se sienten como yo. | | | | | |
| 15. Cuando me siento frustrada con mi cuerpo por su incapacidad para hacer algo, intento recordarme que la mayoría de las personas en mi situación se sienten así en algún momento. | | | | | |
| 16. Cuando siento que mi cuerpo es inadecuado de algún modo, trato de recordarme que el sentimiento de inadecuación es compartido por la mayoría de la gente. | | | | | |
| 17. Cuando estoy en mis peores momentos de molestias físicas, enfermedad o lesión, sé que no estoy sola sintiéndome de esa manera. | | | | | |
| 18. Cuando estoy preocupada por si la gente me considerara atractiva, me recuerdo a mí misma que casi todos tienen la misma preocupación. | | | | | |
| 19. Estoy aceptando mi aspecto tal y como es. | | | | | |
| 20. Estoy aceptando la forma en la que me veo sin ropa. | | | | | |
| 21. Me siento bien en mi cuerpo. | | | | | |
| 22. Soy tolerante con mis limitaciones y defectos corporales. | | | | | |
| 23. Soy tolerante con la forma en la que me queda la ropa. | | | | | |

Appendix K. Ethics Committee Approval (Study 6)

El comité Ético de Investigación en Humanos de la Comisión de Ética en Investigación Experimental de la Universitat de València,

CERTIFICA:

Que el Comité d'Ètica d'Investigació en Humans , en la reunió celebrada el dia 02 de Junio de 2022 , una vez estudiado el proyecto de tesis doctoral : *"El papel compasión hacia el cuerpo en las alteraciones de la imagen corporal en una población de mujeres adultas"* , con número de registro 1856772 .

Cuyo/a responsable es D/Dña.

ROSA MARIA BAÑOS RIVERA , dirigida por D/Dña. ROSA MARIA BAÑOS RIVERA

ha acordado informar favorablemente el mismo.

Y para que conste, se firma el presente certificado

Av. Blasco Ibáñez, 13 tel: 963864109 vicerec.investigacio@uv.es
Valencia 46010 fax: 963983221 www.uv.es/serinves

Firmado digitalmente por
PEDRO JESUS PEREZ ZAFRILLA
Fecha: 08/06/2022 21:53:16 CEST



Appendix L. Consent form (Study 6)

DOCUMENTO DE CONSENTIMIENTO INFORMADO Y COMPROMISO DE CONFIDENCIALIDAD

1. INFORMACIÓN AL PARTICIPANTE

El proyecto de investigación para el cual le pedimos su participación se titula: “**Bienestar e Imagen Corporal**”.

Para que usted pueda participar en este estudio es necesario contar con su consentimiento, y que conozca la información básica necesaria para que dicho consentimiento pueda considerarse verdaderamente informado. Por ello, le ruego que lea detenidamente la siguiente información. Si tuviera alguna duda exprésela, antes de firmar este documento, al investigador principal del proyecto, bien personalmente, bien a través del teléfono o por correo electrónico. Los datos del investigador principal del proyecto aparecen también en el presente documento.

La información básica que debe conocer es la siguiente:

Objetivo del estudio: El objetivo final del estudio consiste en mejorar las intervenciones terapéuticas disponibles para promover bienestar psicológico y la imagen corporal.

Metodología a utilizar para el estudio, tipo de colaboración que se espera de usted y duración de dicha colaboración: La participación consistirá en rellenar unos cuestionarios iniciales relacionados con la imagen corporal y afecto (10 min) y, aquellas personas que cumplan los criterios de inclusión/exclusión serán contactadas para (1) rellenar unos cuestionarios online sobre la imagen corporal y bienestar psicológico (20 minutos) y (3) realizar un pase experimental en la Facultad de Psicología (aproximadamente 60 min de duración).

Posibles molestias y riesgos de su participación en el estudio: De acuerdo con el conocimiento existente, la participación en este estudio no implica un riesgo para su salud.

Medidas para responder a los acontecimientos adversos: El protocolo de evaluación se compone de instrumentos estandarizados y validados que no suponen ningún riesgo para los/as participantes y serán aplicados y supervisados por personal experto. Sin embargo, en caso de que alguna parte o la totalidad del pase experimental suponga algún tipo de peligro para las participantes, esto supondrá su salida del estudio ofreciéndole la posibilidad de atención psicológica en caso de que la situación lo requiera.

Beneficios que se espera obtener con la investigación: Los resultados de esta investigación nos proporcionarán información valiosa en relación a la imagen corporal y el bienestar psicológico, sus factores protectores y de riesgo en población general. Los resultados obtenidos en este estudio podrán utilizarse en futuras investigaciones.

Consecuencias de la no participación: Si prefiere no participar, no habrá ninguna consecuencia negativa para usted. La relación con las personas que le propusieron participar será igual de cordial y dedicada con los que rechacen participar que con los que sí participen.

Posibilidad de retirada en cualquier momento y consecuencias: Usted puede retirarse del proyecto en cualquier momento firmando la revocación del consentimiento que se incluye al final del documento. Su retirada no tendrá ninguna consecuencia negativa para usted, y será aceptada sin problemas por el equipo investigador.

¿Qué institución lo realiza?: Se realiza en la Universitat de València.

Gratuidad por la participación: Las participantes participarán en el sorteo de 3 dispositivos electrónicos de Amazon valorados en 30 euros.

Previsión de uso posterior de los resultados: Los datos que se deriven de la participación pueden ser utilizados con fines de investigación, estudio y publicación, salvaguardando siempre el derecho a la intimidad y el anonimato.

Equipo investigador: Dra. Rosa M. Baños Rivera, Dra. Marta Miragall Montilla y Diana Burychka.

El proyecto se realizará siguiendo los criterios éticos internacionales recogidos en la Declaración de Helsinki.

Datos de contacto del investigador principal para aclaraciones o consultas:

Rosa María Baños Rivera

Dpto. Personalidad, Evaluación y Tratamientos Psicológicos, Facultad de Psicología (Universitat de València)

Dirección: Avda. Blasco Ibáñez, 21, 46010-Valencia (Spain)

Teléfono: +34 96 386 44 XX

Correo electrónico: banos@uv.es

2. COMPROMISO DE CONFIDENCIALIDAD

Medidas para asegurar el respeto a la vida privada y a la confidencialidad de los datos personales: Se han adoptado las medidas oportunas para garantizar la completa confidencialidad de los datos personales de los sujetos de experimentación que participen en este estudio, de acuerdo con la Ley De Protección de Datos de Carácter Personal (LOPD) 3/2018, de 5 de diciembre. Todas las personas involucradas en el estudio tienen la obligación de cumplir con las leyes de protección de datos vigentes. Nos aseguraremos de que toda tu información - sin restricciones - sea tratada de manera confidencial. El presente estudio llevará a cabo el tratamiento de los datos personales de acuerdo con el **Reglamento general de protección de datos (UE) 2016/679**. Para más información: <https://www.uv.es/uvweb/universidad/es/universitat/delegacion-proteccion-datos-lpd-/delegacion-1286042855523.html>.

Medidas para acceder a la información relevante para usted que surjan de la investigación o de los resultados totales: Sepa que tiene derecho a acceder a la información generada sobre usted en el estudio. Puede solicitar a los investigadores que les proporcionen sus datos almacenados en el registro y, en su caso, que corrijan los errores en ellos en cualquier momento. Los datos de contacto de la investigadora principal se han especificado en el apartado 1.1 del presente documento.

Medidas tomadas por tratarse de un estudio anonimizado: Se ha establecido un sistema de seudonimización efectivo para que los datos personales no puedan atribuirse a la información recogida con fines de investigación del estudio de cada participante sin utilizar información adicional. Para ello, no se juntarán los consentimientos otorgados, donde sí se identifica al sujeto, con los cuestionarios utilizados en el estudio. Los datos de contacto de los participantes (correo electrónico) se sustituirán por códigos aleatorios de 4 cifras en la base de datos que contenga las variables de interés del estudio, de manera que no se pueda atribuir este código a ninguna persona en particular. Se generará otra base de datos protegida en la que se relacione cada código generado con el correo electrónico por el que ha sido sustituido en la base de datos con las variables de interés para el estudio con el objetivo de poder re-identificar a los sujetos de experimentación si se da alguna (o ambas) de las siguientes condiciones: en caso de que el participante solicite el acceso, rectificación, cancelación u oposición de sus propios datos y (2) en el caso excepcional en el que se encuentre algún tipo de error en las respuestas de algún participante (p.ej. hojas de los cuestionarios en blanco). En todo caso, en el uso que se realice de los resultados del estudio, con fines de docencia, investigación y/o publicación, se respetará siempre la debida anonimización de los datos de carácter personal, de modo que los sujetos de la investigación no resultarán identificados o identificables. Todos los datos y los consentimientos informados serán custodiados por la investigadora principal del proyecto: Rosa María Baños Rivera (banos@uv.es).

3. CONSENTIMIENTO INFORMADO

(copia para la participante)

Doña

_____ ,

mayor de edad, titular del DNI: _____, por el presente documento manifiesto que:

He sido informada de las características del Proyecto de Investigación titulado: “Bienestar e Imagen Corporal”.

He leído tanto el apartado 1 del presente documento titulado “información al participante”, como el apartado 2 titulado “compromiso de confidencialidad”, y he podido formular las dudas que me han surgido al respecto. Considero que he entendido dicha información.

Estoy informada de la posibilidad de retirarme en cualquier momento del estudio.

En virtud de tales condiciones, consiento participar en este estudio.

Y en prueba de conformidad, firmo el presente documento en el lugar y fecha que se indican a continuación.

Valencia, _____ de _____ de 20__.

| | |
|--|---|
| Nombre y apellidos de la participante: | Nombre y apellidos de la investigadora principal: |
| Firma: | Firma: |



REVOCACIÓN DEL CONSENTIMIENTO

Revoco el consentimiento prestado en fecha _____ para participar en el proyecto titulado “Bienestar e Imagen Corporal” y, para que así conste, firmo la presente revocación.

En Valencia, a _____ de _____ de 20__.

| | |
|--|--|
| Nombre y apellidos de la participante: Firma: | Nombre y apellidos del investigador principal: Firma: |
|--|--|

Appendix M. Adapted to Spanish Scales (Study 6)

FCS (Gilbert et al., 2010; *traducida por las autoras del estudio*).

Las personas tienen diferentes puntos de vista sobre la compasión y la bondad. Mientras que algunas personas creen que es importante mostrar compasión y amabilidad en todas las situaciones y contextos, otros creen que debemos ser más cautelosos y preocuparnos por mostrarlo demasiado a nosotros mismos y a los demás. A continuación, marca el grado de acuerdo con las siguientes afirmaciones de acuerdo a la siguiente escala:

0= Completamente en desacuerdo

1

2 = Algo de acuerdo

3

4= Completamente de acuerdo

Escala 2: Respondiendo a la compasión de los demás

| | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 1. Querer que los demás sean amables conmigo es una debilidad. | | | | | |
| 2. Temo que cuando necesite que las personas sean amables y comprensivas, no lo sean. | | | | | |
| 3. Temo volverme dependiente del cuidado de los demás porque es posible que no siempre estén ahí para dármelo. | | | | | |
| 4. A menudo me pregunto si las demostraciones de calidez y amabilidad de los demás son genuinas. | | | | | |
| 5. Los sentimientos de amabilidad de los demás son de alguna manera alarmantes. | | | | | |
| 6. Cuando las personas son amables y compasivas conmigo, me siento ansioso o avergonzado. | | | | | |
| 7. Si la gente es simpática y amable, me preocupa que descubran algo malo acerca de mí que cambie su forma de pensar. | | | | | |
| 8. Me preocupa que la gente solo sea amable y compasiva conmigo cuando quiere algo. | | | | | |
| 9. Cuando la gente es amable y compasiva conmigo, me siento vacío/a y triste. | | | | | |

| | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 10. Si las personas son amables, siento que se están acercando demasiado. | | | | | |
| 11. A pesar de que otras personas son amables conmigo, rara vez he sentido calidez en mis relaciones con los demás. | | | | | |
| 12. Trato de mantenerme a distancia de los demás incluso si sé que son amables. | | | | | |
| 13. Si creo que alguien está siendo amable y afectuoso conmigo, "pongo una barrera". | | | | | |

Escala 3: Expresando amabilidad y compasión hacia ti mismo

| | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 1. Siento que no merezco ser amable conmigo mismo y perdonarme. | | | | | |
| 2. Plantearme ser amable y cariñoso conmigo mismo me entristece. | | | | | |
| 3. Salir adelante en la vida va más con ser duro que compasivo con uno mismo. | | | | | |
| 4. Preferiría no saber lo que se siente al ser amable y compasivo conmigo mismo. | | | | | |
| 5. Cuando trato de ser amable y cordial conmigo mismo, me siento algo vacío. | | | | | |
| 6. Temo que, si empiezo a sentir compasión y calidez hacia mí mismo, me sentiré abrumado por un sentimiento de pérdida/dolor. | | | | | |
| 7. Temo que, si me vuelvo más amable conmigo mismo y menos autocrítico, mis estándares caerán. | | | | | |
| 8. Temo que si soy más compasivo conmigo mismo me convertiré en una persona débil. | | | | | |
| 9. Nunca he sentido compasión hacia mí mismo, así que no sabría por dónde empezar a desarrollar este sentimiento. | | | | | |
| 10. Me preocupa que si empiezo a desarrollar compasión hacia mí mismo, me volveré dependiente de ella. | | | | | |
| 11. Temo que si me vuelvo demasiado compasivo conmigo mismo perderé mi autocrítica y mis defectos saldrán a la luz. | | | | | |

| | 0 | 1 | 2 | 3 | 4 |
|--|---|---|---|---|---|
| 12. Temo que si desarrollo compasión hacía mí mismo, me convertiré en alguien que no quiero ser. | | | | | |
| 13. Temo que, si me vuelvo demasiado compasivo conmigo mismo, otros me rechazarán. | | | | | |
| 14. Me resulta más fácil ser autocrítico que compasivo conmigo mismo. | | | | | |
| 15. Temo que, si soy demasiado compasivo conmigo mismo, sucederán cosas malas. | | | | | |

I-PANAS (Karim et al., 2011; traducida por las autoras del estudio)

Marca con una cruz la opción que refleje mejor cómo te sientes en este momento:

1 = nada o muy ligeramente

2 = un poco

3 = moderadamente

4 = bastante

5 = mucho

| | 1 | 2 | 3 | 4 | 5 |
|-----------------------|---|---|---|---|---|
| 1. Despierta | | | | | |
| 2. Inspirada | | | | | |
| 3. Decidida | | | | | |
| 4. Concentrada/atenta | | | | | |
| 5. Activa | | | | | |

MAIA-2 Trusting (Desdentado et al., 2022;

adaptada por las autoras del estudio)

Por favor, contesta las siguientes preguntas sobre ti misma:

0 = nada

1 =

2 =

3 =

4 =

5 = mucho

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. En este momento, siento que, en mi cuerpo, estoy en casa | | | | | | |
| 2. En este momento, siento que mi cuerpo es un lugar seguro | | | | | | |
| 3. En este momento, confío en mis sensaciones corporales | | | | | | |

OBCS-Shame state (McKinley y Hyde et al., 1996;

adaptada por las autoras del estudio)

A continuación, te pedimos que marques con una 'X' el número que se corresponda con el grado en que estás de acuerdo con cada una de las afirmaciones.

1 = Totalmente en desacuerdo

2 =

3 =

4 = Ni de acuerdo ni en desacuerdo

5 =

6 =

7 = Totalmente de acuerdo

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. En este momento, siento que algo va mal en mi porque no puedo controlar mi peso | | | | | | | |
| 2. Ahora mismo, me siento avergonzada de mí misma al considerar que no me esfuerzo por tener el mejor aspecto posible | | | | | | | |
| 3. Ahora mismo, me siento mal ya que mi apariencia no es tan buena como podría ser | | | | | | | |
| 4. Ahora mismo, me da vergüenza que la gente sepa cuánto peso | | | | | | | |
| 5. Ahora mismo pienso que soy una persona valiosa, aunque no pueda controlar mi peso | | | | | | | |
| 6. Ahora mismo, aunque no haga todo el ejercicio que debería, no pienso que esté haciéndolo mal | | | | | | | |
| 7. Ahora mismo, me estoy cuestionando si soy una persona suficientemente valiosa por no hacer suficiente ejercicio | | | | | | | |
| 8. Ahora mismo, me siento avergonzada al no tener la talla de ropa que debería | | | | | | | |

Appendix N. Adapted to Spanish Script for the Soles of the Feet Meditation (Study 6)

Traducido de Neff, K. (2021). *Fierce self-compassion: How women can harness kindness to speak up, claim their power, and thrive*. Penguin.

Adaptado de Singh et al, 2003 ([https://doi.org/10.1016/S0891-4222\(03\)00026-X](https://doi.org/10.1016/S0891-4222(03)00026-X))

Para esta práctica necesitarás ponerte de pie. Estando de pie comienza a prestar atención a las sensaciones –especialmente en la sensación de tacto – de la planta de tus pies tocando el suelo.

Para experimentar mejor esta sensación en la planta de tus pies, trata de mecerte suavemente sobre tus pies, adelante y atrás, o de un lado a otro.

Ahora intenta trazar pequeños círculos con tus rodillas, sintiendo en todo momento la sensación cambiante que experimentas en la planta de los pies.

Siente cómo el suelo está sosteniendo todo tu cuerpo.

Si tu mente comienza a divagar, vuelve a llevar tu atención a la planta de los pies.

Ahora empieza a caminar, despacio, notando los cambios en las sensaciones de la planta de cada uno de tus pies. Nota la sensación de experimentas cuando levantas un pie, lo desplazas en el aire hacia delante y a continuación lo pones en el suelo. Ahora haz lo mismo con el otro pie. Y luego con un pie tras otro.

A medida que caminas, nota lo pequeña que es el área que cada pie ocupa en el suelo y cómo tus pies sostienen todo tu cuerpo.

Si te apetece, tómate un momento para experimentar la gratitud y apreciación por todo el trabajo duro que tus pies hacen por ti, un trabajo que normalmente pasamos por alto.

Continúa caminando, despacio, sintiendo la planta de tus pies.

Puedes imaginar que el suelo se eleva para sostenerte con cada paso que das.

Ahora vuelve a pararte y lleva la atención a todo tu cuerpo – déjate experimentar todo lo que estás sintiendo en este momento y permítete ser tal como eres.

Appendix O. Adapted to Spanish in Spanish for the Video on Body Compassion (Study 6)

ENLACE AL VIDEO DE COMPASIÓN HACIA EL CUERPO:

<https://youtu.be/PnOmdZm2hyU>



GUIÓN VÍDEO SOBRE LA COMPASIÓN HACIA EL CUERPO

¿Has oído hablar de la compasión?

En ocasiones la compasión se define como “un sentimiento de lástima por aquellos que sufren penalidades”. Esta definición tiene una connotación negativa, ya que implica el sentimiento de pena o de lástima. Esto implica que la persona que siente compasión se posiciona en un rango superior respecto a la persona que sufre.

Esta definición es diferente a la que se entiende desde un punto de vista científico y terapéutico. La compasión que vamos a enseñarte en esta práctica implica un sentimiento entre iguales que surge cuando presenciamos el sufrimiento en la otra persona y experimentamos el deseo de ayudar a que ese sufrimiento disminuya.

Cuando la compasión la dirigimos hacia nosotras mismas, hablamos de **AUTOCOMPASIÓN**, es decir, el deseo de querer reducir nuestro propio sufrimiento.

Practicar la autocompasión puede ayudarnos a fomentar nuestro bienestar. Por ejemplo, puede ayudarnos a afrontar con amabilidad hacia nosotras mismas los errores que cometemos, así como nuestras críticas y conflictos internos.

Pero ¿cómo podemos cultivarla? A través de 3 ingredientes:

- la **autoamabilidad**, que es el hecho de ser amables y bondadosas hacia nosotras mismas, en lugar de ser hostiles y autocríticas. Por ejemplo, tratar de ser comprensivas con nosotras mismas cuando cometemos un error.
- la **humanidad compartida**, que hace referencia al hecho de comprender que todos los seres humanos sufrimos o tenemos experiencia insatisfactorias y dolorosas. Es una sensación opuesta a sentirnos aisladas y solas dentro de la sociedad. Por ejemplo, cuando cometo un error entiendo que equivocarse forma parte de la condición de ser humano.
- y, por último, el **mindfulness/atención plena**, que se define como la capacidad de estar atentas a nuestros propios pensamientos, sentimientos o sensaciones corporales, aceptándolos sin realizar juicios sobre si los pensamientos son buenos o malos. Es decir, la atención plena nos permite no quedarnos atrapadas en el círculo vicioso de nuestros pensamientos, pero, sin negar que estamos sufriendo.

Vamos a reflexionar un momento sobre cómo te relacionas con tu propio cuerpo. ¿Cuál es la primera palabra, pensamiento, sensación física, sentimiento o recuerdo que te viene a la mente cuando nombras tu cuerpo? ¿Sueles ser crítica con tu cuerpo o, por el contrario, te sientes a gusto y se te ocurren cosas amables cuando lo mencionas?

El sentimiento de compasión que podemos sentir hacia el propio cuerpo nos permite comprender cómo experimentamos nuestra imagen corporal. Una mayor compasión hacia el cuerpo implica:

- **Auto-amabilidad** hacia todos los aspectos del propio cuerpo. Por ejemplo, aceptando y no criticando aquellas partes del cuerpo que puedan resultar feas o no atractivas.
- **Atención plena, atendiendo sin juzgar** nuestra propia experiencia en torno a nuestro cuerpo. Por ejemplo, aceptar nuestro cuerpo tal y como es, teniendo en mente que nuestros pensamientos no son la realidad y tomando distancia de los pensamientos negativos que surgen cuando no vemos bien a nuestro cuerpo.
- Y, por último, el componente de la **humanidad compartida** nos ayuda a sentirnos comprendidas al darnos cuenta de que todas las personas tenemos en algún momento experiencias insatisfactorias respecto a nuestro propio cuerpo en cuanto a su tamaño, su forma, etc. Por ejemplo, todas las personas, en algún momento, cuando nos miramos al espejo, encontramos parte del cuerpo que no nos gustan, y por tanto, no es algo que te ocurre solamente a ti.

Como puedes observar, la compasión hacia el cuerpo implica una nueva forma de relacionarte contigo misma, y con tu cuerpo. **¿Te apetece practicarla con un ejercicio?**

Appendix P. Adapted to Spanish Script for the Video on Well-being (Study 6)

ENLACE AL VIDEO DE BIENESTAR:

<https://youtu.be/cVHI69bmLvY>



GUION VÍDEO DE BIENESTAR:

El bienestar psicológico está relacionado con la experiencia de estar bien con una misma, mantener relaciones satisfactorias, tener un propósito en la vida y afrontar satisfactoriamente los retos que nos presentan en el día a día. Se trata de un concepto complejo, pero aquí te vamos a contar algunos hábitos que podrías poner en práctica para mejorar tu propio bienestar:

1. **Quiérete a ti misma.** Para promover el bienestar psicológico a largo plazo hemos de aprender a querernos a nosotras mismas y a aceptarnos tal y como somos. Este proceso comienza por conocernos a nosotras mismas sin máscaras, tratando de aceptar nuestro yo más auténtico.
2. **Dedica tiempo a lo que más te gusta.** Trata de fomentar aquellas actividades que te hacen competente y feliz. Esto tiene que ver tanto con el trabajo como con los hobbies. Puede ser algo simple como leer un libro, escuchar música que te guste o salir a dar un paseo.

3. **Encuentra tiempo para practicar deporte.** La práctica de deporte ya sea individual o en grupo, además de conllevar beneficios físicos, tiene un efecto en nuestro bienestar psicológico. El deporte promueve la liberación de sustancias químicas en el cerebro que nos hacen sentir bien y mejorar nuestra percepción de la vida.
4. **Mantén una buena higiene de sueño.** Dormir poco o no tener un sueño reparador puede tener estragos en nuestra calidad de vida. Para evitarlo, trata de cuidar tu entorno de descanso, manteniendo un ritual para dormir (ejemplo, escuchando música o tomando una infusión antes de irte a dormir). Un buen descanso incrementa nuestra capacidad de ser productivas. Recuerda que una persona adulta necesita entre 7 y 9 horas de sueño reparador.
5. **Cuida tu dieta.** ¿Te ha pasado que cuando estás estresada tus hábitos alimentarios cambian? Esto podría afectar la forma en la que nos sentimos a lo largo del día, hacernos sentir culpables o incluso avergonzadas. Por otro lado, una buena dieta contribuye directamente a mejorar nuestro estado de ánimo ayudando a nuestro cuerpo a segregar sustancias químicas que fomentan nuestra sensación de felicidad y bienestar al igual que ocurre en el deporte.
6. **Practica nuevas maneras de relajarte.** Pon a prueba diferentes técnicas de relajación que tienen como objetivo lidiar con tu estrés del día a día al ser capaces de disminuir tu ritmo cardíaco o tu presión sanguínea. Encuentra y practica la actividad con la que te sientes más cómoda ya sea yoga, taichí, respiraciones profundas, etc.
7. **Mantén relaciones sociales positivas.** Tener relaciones satisfactorias con los demás fomenta la pertenencia al grupo en el que podremos ser escuchadas y valoradas. Asimismo, entre muchos otros beneficios, las relaciones sociales ayudan disminuir nuestros niveles de estrés al permitir compartir con los demás nuestras preocupaciones.
8. **Pasa tiempo en la naturaleza.** Estudios científicos muestran que pasar tiempo al aire libre podría incrementar nuestra función cognitiva,

reduciendo el estrés y mejorando nuestra capacidad de concentración. Trata de encontrar tiempo para dar un paseo por el parque, ir a la playa o hacer deporte fuera de la ciudad.

La práctica de estos hábitos podría ayudar a fomentar nuestro bienestar. Sin embargo, hemos de recordar que las circunstancias del día a día cambian y, por tanto, habrá días que nos resultará más difícil o fácil ponerlos en práctica.

Appendix Q. Body Compassion micro-intervention writing exercise (Study 6)

Ahora vamos a pedirte que escribas varias frases sobre tu cuerpo. Tras finalizar el proceso de redacción, te pediremos que vuelvas a leer tus frases.

Las frases han de referirse a ti, pero adoptando la postura de una amiga o amigo imaginario que te quiere y aprecia incondicionalmente. Piensa en ti desde la perspectiva de esa amiga o amigo que se preocupa por ti.

Piensa en esa amiga/o imaginario que es incondicionalmente afectuoso, que te acepta, que es amable y compasivo. Imagina que esta amiga/o puede ver todos los puntos fuertes y todos los puntos débiles de tu cuerpo, incluyendo cualquier aspecto de tu cuerpo que puedas ver como defectuoso o imperfecto.

Reflexiona sobre lo que esta amiga/o diría de tu cuerpo, sabiendo que eres apreciada y aceptada tal y como eres, con todas las imperfecciones de tu cuerpo. Esta amiga/o reconoce los límites e imperfecciones del ser humano y es amable y compasiva/o contigo.

Esta amiga/o entiende la historia de tu vida y los millones de cosas que han contribuido a que tengas el cuerpo que tienes en este momento.

Cuando te escribas frases a ti misma desde la perspectiva de esta amiga/o imaginario, intenta plasmar en tus frases un sentimiento fuerte de aceptación, de cuidado y de deseo de que estés sana y feliz.

Por encima de todo, sé amable, comprensiva y compasiva con tu cuerpo. Siente la compasión y la aceptación hacia ti misma y como estas te alivian y reconfortan.

Escribe una frase que destaque algo que tu amiga/o diría de tu cuerpo desde la perspectiva de la compasión sin límites.

¿Qué otra frase te diría esa amiga/o desde esta perspectiva?

Ahora escribe una frase que transmita la profunda compasión que esta amiga/o siente por ti, especialmente por el dolor que sientes si tiendes a juzgar con dureza los defectos e imperfecciones de tu cuerpo.

¿Qué otra frase transmitiría este mismo tipo de compasión hacia tu cuerpo?

Ahora, por favor, escribe una frase que recoja lo que esta amiga/o escribiría para recordarte que tan sólo eres humana, que todos los cuerpos tienen puntos fuertes y débiles.

Escribe una frase más que transmita esta idea de que solo eres humana y que todos los cuerpos tienen puntos fuertes y débiles.

Escribe una última frase que resuma todo lo que esta amiga/o con compasión ilimitada querría que supieras sobre tu cuerpo.

Ahora, tómate un momento para releer y reflexionar sobre las frases que has escrito.

Appendix R. Well-being writing exercise (Study 6)

Piensa en un **acontecimiento positivo del día de ayer**. Escribe aquello que te ha gustado del día de ayer. Escribe **frases** sobre lo que hiciste, los pensamientos que tuviste y cómo te sentiste durante esos momentos. Cuando termines el ejercicio de redacción, te pediremos que vuelvas a leer tus frases.

Escribe una frase que **describa un acontecimiento** de ayer.

¿Qué **otra frase** describe este acontecimiento?

¿Cuáles son algunos de los **pensamientos que tuviste durante este evento**?

Escribe otra frase sobre **cualquier otro pensamiento** que hayas experimentado durante este evento.

Ahora, escribe una frase sobre **cómo te sentiste durante este acontecimiento**.

Escribe otra frase sobre **cualquier otro tipo de sentimiento** que hayas tenido durante este evento.

Escribe una última frase que destaque tu **experiencia general de este acontecimiento**.

Ahora, tómate un momento para **releer y reflexionar** sobre las frases que has escrito.

Appendix S. Body Shame induction writing exercise (Study 6)

Ahora vamos a pedirte que recuerdes y describas con detalle una de las últimas situaciones que te hayan causado más vergüenza hacia tu propio cuerpo.

La vergüenza hacia el cuerpo o la vergüenza hacia la imagen corporal es una emoción sobre cómo es tu cuerpo (por ejemplo, cuando te fijas o tratas de esconder tus michelines o la piel de naranja, el miedo que sientes de poder ser rechazada o juzgada por tu peso o tus proporciones corporales, o la constante comparación con las modelos y chicas con cuerpos más delgados o en forma).

Antes de ponerte a describir esta experiencia de gran vergüenza hacia tu propio cuerpo recuerda que muchas veces, solemos recordar las vivencias pasadas desde "fuera", como si estuviéramos viendo una película de nosotras mismas. Sin embargo, en este ejercicio, necesitamos que describas y recuerdes la situación que te ha generado esta sensación de vergüenza hacia tu imagen corporal como si la estuvieras viendo a través de tus propios ojos, como si estuviera sucediendo de nuevo, es decir, como si estuvieras viviendo activamente la situación en este momento. Por ejemplo, puedes utilizar frases como "en este momento, estoy sintiendo como mis manos se van tensando y tengo ganas de desaparecer."

Tomate tu tiempo mientras te sumerges en una experiencia que te haya causado más vergüenza hacia tu imagen corporal.

Si te ayuda, puedes ir cerrando los ojos e ir imaginándote a ti misma estando activamente involucrada y formando parte de esta situación, describiendo lo que viviste a través de tus propios ojos como si lo estuvieses experimentando en este momento.

Otra forma de hacerlo es cerrando los ojos durante unos minutos para revivir de la forma más vívida posible la experiencia como si la estuvieses experimentando en este momento. Tras ello, describe tu experiencia sin dejar de sentir cómo te sentiste en ese momento de mayor vergüenza hacia tu propio cuerpo.

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