

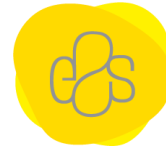


The Moderating Role of Interoception in the Association Between Social Media Usage and Body Image Satisfaction

Inês Rafaela da Silva

09/2025





Centro de Investigação em Reabilitação
Center for Rehabilitation Research



labrp |

LABORATÓRIO DE
REABILITAÇÃO PSICOSSOCIAL

The Moderating Role of Interoception in the Association Between Social Media Usage and Body Image Satisfaction

Author

Inês Rafaela da Silva

Supervisors

PhD / Artemisa Rocha Dores / E2S-P. Porto| Porto/FPCEUP

PhD/Raquel Simões de Almeida/ E2S-P. Porto|Porto

*Thesis submitted in partial fulfilment of the requirements for the degree of
Master's in Occupational Therapy – Specialisation in Rehabilitation and
Mental Health at the School of Health, Polytechnic Institute of Porto.*



Menção de apoio



Centro de Investigação em Reabilitação
Center for Rehabilitation Research





Agradecimentos

Agradeço, em primeiro lugar, à minha família, especialmente aos meus pais, pelo amor incondicional que sempre me deram, pelo apoio constante em todas as fases da minha vida, pela paciência infinita e, sobretudo, por acreditarem em mim mesmo perante todas as dificuldades. Sem o vosso exemplo de força e resiliência, nada disto teria sido possível.

Ao meu namorado, Álvaro, deixo um agradecimento profundo e cheio de carinho. Obrigada por nunca me deixares desistir, por acreditares em mim, por seres o meu maior incentivo nos dias de conquista e o meu maior amparo nos dias de fraqueza. Obrigada por me aturares com paciência, por me abraçares nos momentos de cansaço e por celebrares comigo cada pequena vitória. À tua família, estendo igualmente a minha gratidão, pelo acolhimento generoso e pelo incentivo que tanto me ajudaram a sentir-me apoiada e em casa.

Este ano foi particularmente desafiante. Houve momentos de cansaço, de exaustão e de dúvidas, mas em todos eles encontrei o apoio, a compreensão e o amor das pessoas que estiveram sempre ao meu lado, familiares e amigos. É a cada uma delas que devo um grande obrigada.

Às minhas orientadoras, Professora Doutora Artemisa Rocha Dores e Professora Doutora Raquel Simões de Almeida, deixo a minha gratidão. A vossa orientação científica, a disponibilidade, a exigência rigorosa e, ao mesmo tempo, o incentivo generoso foram fundamentais para o crescimento pessoal e académico que este trabalho me proporcionou. Obrigada por guiarem este percurso com tanto profissionalismo e dedicação.

Ao Professor Doutor Carlos Campos, expresso um agradecimento especial pelo apoio e acompanhamento prestados na reta final, cuja contribuição foi decisiva para a concretização desta dissertação.



Resumo

Introdução: O uso crescente das redes sociais tem sido apontado como fator de risco para a insatisfação corporal, devido à exposição a padrões de beleza idealizados e processos de comparação social. Este fenómeno associa-se a sintomas de ansiedade e depressão. Paralelamente, a interocepção, definida como a capacidade de perceber sinais internos do corpo, tem emergido como um mecanismo relevante na forma como os indivíduos constroem e avaliam a sua imagem corporal.

Objetivo: O presente estudo teve como objetivo testar a relação entre o uso das redes sociais e a satisfação com a imagem corporal, verificando o papel moderador da interocepção (atenção interoceptiva e precisão), e explorar se o género, a idade, a ansiedade e a depressão influenciam a relação entre as variáveis estudadas.

Métodos: Participaram 100 adultos (82% mulheres; $M = 26,5$ anos; $DP = 9,59$), que responderam a um inquérito online, constituído por: questionário sociodemográfico, *Interoceptive Attention Scale* (IATS), *Interoceptive Accuracy Scale* (IAS), *Multidimensional Facebook Intensity Scale* (MFIS), *Internet Severity and Activities Addiction Questionnaire – 10* (ISAAQ-10), *Body Image Satisfaction Questionnaire* (BISQp) e *Hospital Anxiety and Depression Scale* (HADS). Os dados foram analisados com estatística descritiva e modelos de regressão linear hierárquica com moderação.

Resultados: Não se verificaram associações significativas entre intensidade ou uso problemático das redes sociais e satisfação corporal, nem efeitos moderadores da interocepção. No entanto, a atenção interoceptiva e a depressão revelaram-se preditores negativos consistentes.

Conclusão: Os resultados sugerem que fatores internos, como a atenção interoceptiva e a depressão, têm maior impacto na perceção da imagem corporal do que o uso das redes sociais. Destaca-se a relevância de integrar estes aspetos na investigação e na prática clínica.

Palavras-chave: Redes sociais, imagem corporal, interocepção, ansiedade, depressão.



Abstract

Introduction: The growing use of social media has been identified as a risk factor for body image dissatisfaction, due to continuous exposure to idealized beauty standards and social comparison processes. This phenomenon is associated with anxiety and depressive symptoms. In parallel, interoception, defined as the ability to perceive and interpret internal bodily signals, has emerged as a relevant mechanism in understanding how individuals construct and evaluate their body image.

Objective: This study aimed to examine the relationship between social media use and body image satisfaction, testing the moderating role of interoception (interoceptive attention and accuracy), and to explore whether gender, age, anxiety, and depression influence this relationship.

Methods: The sample consisted of 100 adults (82% women; $M = 26.5$ years; $SD = 9.59$), who completed an online survey comprising a sociodemographic questionnaire, the Interoceptive Attention Scale (IATS), Interoceptive Accuracy Scale (IAS), Multidimensional Facebook Intensity Scale (MFIS), Internet Severity and Activities Addiction Questionnaire – 10 (ISAAQ-10), Body Image Satisfaction Questionnaire (BISQp), and Hospital Anxiety and Depression Scale (HADS). Data were analysed using descriptive statistics and hierarchical linear regression models with moderation.

Results: No significant associations were found between social media use (intensity or problematic) and body image satisfaction, nor moderating effects of interoception. However, interoceptive attention and depression consistently emerged as negative predictors.

Conclusion: Findings suggest that internal factors, such as interoceptive attention and depression, exert greater influence on body image perception than social media use. These results highlight the importance of integrating interoception and mental health into research and clinical practice.

Keywords: Social media, body image, interoception, anxiety, depression.



Index

1. Background.....1

1.1. Introduction.....1

1.2. Theoretical framework3

2. Methods.....6

2.1. Participants.....7

2.2. Procedure 8

2.3. Instruments..... 8

2.4. Statistical analysis11

3. Results 12

3.1. Assumption Testing for Moderation Models 12

3.2. Hierarchical Regression Models with Moderation.....14

3.2.1. Dimensions of Social Media Use Intensity And Interoception (Interoception Attention And Accuracy).....14

3.2.2. Dimensions of Problematic internet Use and Interoception (Interoception Attention And Accuracy).....16

4. Discussion18

4.1. Association Between Social Media Use and Body Image Satisfaction18

4.2. The Moderating Role of Interoception.....19

4.3. Additional Predictors of Body Image Satisfaction.....21

4.4. Limitations and Future Directions23

5. Conclusion23

6. References.....25



1. Background

1.1. Introduction

The use of social media has evolved into a pervasive and quotidian phenomenon, exerting a substantial influence on the way individuals communicate, establish relationships, and construct their identity. According to the Digital 2023 Global Overview Report (January 2024), there were approximately 7.43 million social media users across platforms such as Facebook, Instagram, LinkedIn, TikTok, Pinterest, X (formerly Twitter), and Snapchat (Kemp, 2024). This represents about 72.6% of the global population. The statistics reveal that around 65% of individuals use Facebook, 64% use Instagram, and 43% use TikTok (Kemp, 2024). The findings underscore the pervasive influence of social media in contemporary society, thereby prompting novel research inquiries concerning its psychological and social ramifications. Even though these platforms facilitate access to information, personal expression, and social integration, the extant literature has consistently highlighted the risks associated with their intensive use, particularly in terms of mental health and body image (Bozzola et al., 2022; Gonzales & Hancock, 2011).

People use social media every day, and it currently plays an important role in their lives, with both positive and negative impacts (Bozzola et al., 2022). Excessive use of social media leads to “digital overdose” and can consequently influence one’s view of oneself and others on a social, mental, and body image level (Bozzola et al., 2022). The distortion of the mental representation of body image has a significant impact, often leading to changes in self-esteem and depressive and anxiety symptoms (Bozzola et al., 2022; Bucchianeri & Neumark-Sztainer, 2014; Gonzales & Hancock, 2011). This may result in changes in lifestyle, habits, and routines, an increase in risky behaviour (e.g., substance abuse, sexual behaviour, and violence), and a distortion of body image, among other effects (Bozzola et al., 2022; Gonzales & Hancock, 2011).

Constant use of social media can contribute to body dissatisfaction (Chua & Chang, 2016). Daily, individuals are exposed to idealised body images, contributing to constantly comparing themselves and self-evaluating their own appearance (Alghamdi & Bogari, 2019; Hermans et al., 2022). Also, these platforms greatly emphasize appearance through videos and the interactivity of social networks, likes, comments, and shares. This has a significant impact on the formation of body image, which can sometimes be unrealistic (Chua & Chang, 2016) and constant comparison, creating the desire to be the same and to match social standards of beauty (Alghamdi & Bogari, 2019; Hermans et al., 2022).

Body image is the mental representation of one's own body formed by three multidimensional constructs. The behavioural, perceptual, and cognitive-affective components involve, respectively, body



related behaviours, such as measuring, weighing, and touching, body perception, and thoughts and feelings related to the body. Body image is dynamic and can change with emotions and environment (Bucchianeri & Neumark-Sztainer, 2014; Croll, 2005; Tanck et al., 2019; Thompson et al., 1999).

During development, the body goes through different phases and challenges that alter the perception of body image (Bucchianeri & Neumark-Sztainer, 2014; Croll, 2005; Rounsefell et al., 2020). Self-esteem varies, and body self-assessment is influenced by other people's perceptions, social standards, and attractiveness (Frederick et al., 2017). Body image is also influenced by comparing perceptions of the self with idealized images, often created and viewed on social media (Blackburn & Hogg, 2024).

In the domain of body image research, the predominant focus has historically been on visual perception. However, recent research highlights the necessity to integrate other sensory systems, namely interoception (Candia-Rivera et al., 2024; Naraindas & Cooney, 2023). The coherence of body perception is contingent on the integration of multisensory information; changes in one of these systems can contribute to distortions in body image (Longo et al., 2008; Preston & Ehrsson, 2014).

The importance of interoception in the formation and perception of body image has been emphasized by recent studies. Interoception is defined as the ability to perceive, interpret, and integrate physiological signals from the body, such as the heartbeat, hunger, satiety or pain (Khalsa et al., 2018). This process is fundamental to emotional regulation, physiological self-regulation and self-awareness, and is also implicated in the formation of body identity and the subjective experience of the body (Desmedt et al., 2023; Tsakiris & Critchley, 2016). The conceptual model proposed by Murphy and colleagues (2019) differentiates between two central dimensions: interoceptive attention, which corresponds to the degree to which internal signals are the focus of attention, and interoceptive accuracy, which refers to the ability to correctly identify the physiological state of the body. As demonstrated in the relevant literature, alterations in these processes have been linked to a range of clinical conditions, including but not limited to anxiety, depression, eating disorders and body image disorders (Brewer et al., 2021; Paulus & Stein, 2010; Riva & Dakanalis, 2018).

Research indicates that enhanced interoceptive accuracy may serve as a protective factor against body image distortions by fostering a more realistic perception of internal sensations (Salvato et al., 2020). Conversely, excessive or biased interoceptive attention appears to be associated with heightened vulnerability to distorted interpretations of the body and consequent dissatisfaction (Bijsterbosch et al., 2023; Murphy et al., 2017). Furthermore, variables such as gender and age appear to influence these processes: women tend to report higher levels of interoceptive attention, often associated with greater body dissatisfaction, while men perform better on precision tasks (Grabauskaitė et al., 2017).



Adolescence and early adulthood represent critical periods for the emergence of body image disorders, due to heightened vulnerability to the combined effects of social comparison and changes in interoception (Ferentzi et al., 2018; Murphy et al., 2020).

Despite these advances, the literature remains inconclusive regarding the role of interoception in the relationship between social networks and body image satisfaction (Badoud & Tsakiris, 2017; Todd et al., 2021). This gap is particularly relevant in an era in which exposure to digital content reaches unprecedented levels, but in which internal factors of body perception remain under-explored.

Thus, the central question guiding this study is how social media use relates to body image satisfaction, and the extent to which this relationship is moderated by interoceptive processes (attention and accuracy) and individual factors such as gender, age, anxiety, and depression.

In this sense, the present study aims to test the relationship between social media use and body image satisfaction, verifying the moderating role of interoception attention and accuracy, and exploring whether anxiety, depression, gender and age influence these associations.

1.2. Theoretical framework

The social comparison theory, proposed by Festinger (1954), is a seminal model employed to elucidate the influence of social networks on body image. This theory posits that individuals evaluate their characteristics and skills by comparing themselves with others, especially in areas of high personal relevance, such as appearance. In the digital context, social comparison is predominantly upward, as shared content is frequently idealised, edited, and curated to accentuate aesthetic qualities. Studies have confirmed that repeated exposure to idealised images on social media is associated with greater body dissatisfaction and the intention to modify one's appearance (Barbierik et al., 2023; Fardouly et al., 2018). Spending time on social media and constantly comparing one's own body with that of others often leads to body dissatisfaction, promoting an unrealistic ideal that leads individuals to make lifestyle changes in an attempt to close the gap between their current and desired appearance (Bucchianeri & Neumark-Sztainer, 2014; Chua & Chang, 2016; Rounsefell et al., 2020; Wynne et al., 2016). When idealised weight and muscle shape are not achieved, dissatisfaction increases (McComb & Mills, 2020; Rounsefell et al., 2020; Wynne et al., 2016). This dissatisfaction seems to increase as more time is spent on social media, potentially leading to mental health disorders and posing a significant public health concern (McComb & Mills, 2020; Rounsefell et al., 2020; Wynne et al., 2016). Constant dissatisfaction with one's body leads to mood swings, an increased risk of depressive disorders due to low self-esteem (Goldschmidt et al., 2016; Mougharbel & Goldfield, 2020; Wynne et al., 2016), an increased likelihood of suicide (Crow et al.,



2008), and an increase in uncontrolled eating behaviours, with the possible development of eating disorders (Naumann et al., 2016; Rounsefell et al., 2020; Wynne et al., 2016).

This phenomenon is inextricably linked to the internalization of body image, a process through which individuals construct their beliefs and values in response to sociocultural and environmental influences. Ideals of beauty evolve through a continuous process of internalisation (Kidd et al., 2023). In the past, a fuller body was valued, later, the ideal shifted towards extreme thinness (Bozsik et al., 2018; McComb & Mills, 2020; Spitzer et al., 1999). Today, the thin ideal persists, but it is accompanied by a more athletic and muscular appearance. For women, this includes large breasts, curvaceous hips, and a prominent buttock, for a man, a lean, muscular, V-shaped physique is preferred (Edwards et al., 2016; Flores Bravo et al., 2025; McComb & Mills, 2022; Voges et al., 2019). Young people are particularly vulnerable and tend to experience higher levels of body dissatisfaction (McComb & Mills, 2022). In this sense, the theory of internalisation of beauty ideals (Thompson et al., 1999) describes how repeated exposure to aesthetic standards leads to their incorporation as an internal reference for evaluation. The process of internalisation serves as a mediating mechanism in this context. The exposure to digital content has been shown to encourage the adoption of ideal standards. Once internalised, these standards serve to reinforce the discrepancy between real and ideal perceptions, thereby increasing the risk of dissatisfaction (Bozsik et al., 2018; Saiphoo & Vahedi, 2019).

Within this framework the literature points to the importance of the sensory system in the creation of body image and internalization, essentially vision. Vision may have a direct link between perceptual and active body representations (Longo et al., 2008; Preston & Ehrsson, 2014). Other studies address other sensory inputs, namely interoception, in a bottom-up approach, although it is still little understood and studied (Badoud & Tsakiris, 2017; Gaudio et al., 2014; Todd et al., 2019b).

Sensory processing is fundamental to various cognitive functions, "including self-perception, emotional awareness and responsiveness, memory, learning, and goal-directed behaviour's, such as eating or drinking" (Cobbaert et al., 2024, p.1467), such as self-perception, emotional awareness, learning and directed behaviour, among others (Cobbaert et al., 2024; Wolff et al., 2021). It involves eight sensory systems: visual, tactile, olfactory, gustatory, auditory, proprioceptive, vestibular (these are also called exteroception), and interoception. Among these, interoception is distinct in that it is solely concerned with internal bodily stimuli. It refers to the ability to perceive, interpret, and integrate physiological signals originating within the body, operating across both conscious and unconscious levels (Cobbaert et al., 2024; Desmedt et al., 2023; Khalsa et al., 2018; Khoury et al., 2018).



Currently, there is no consensus on the taxonomy for interoception. However, Murphy and colleagues (2019) recently proposed a 2x2 factor model to measure individual differences based on this construct. The first factor refers to the construct measured objectively: interoceptive attention, which refers to the degree to which interoceptive signals are the target of attention, and interoceptive accuracy, which refers to the degree to which the subject perceives the true state of the body. The second factor relates to how the measurement is carried out: self-reported or objective (Murphy et al., 2019). Regarding self-reported measures, the individual's beliefs about the interactive signals are used. Objective measures are obtained through experimental tasks, usually by measuring cardiac signals, although other interventional methods can be used (Murphy et al., 2019). Interoceptive modalities, generally used to measure both objectively and self-reported, focus on the cardiovascular, respiratory, gastrointestinal, and genitourinary systems; temperature; hunger and thirst; visceral, somatic, and skeletal pain; and muscle tension and fatigue (Khalsa et al., 2018).

Several authors have pointed out that the interoception has a significant importance for our well-being and balance, with the interception being associated with mental disorders, such as anxiety and depressive disorders (Brewer et al., 2021; Khalsa et al., 2018; Paulus & Stein, 2010), alexithymia (Herbert et al., 2011; Paulus & Stein, 2010), eating disorders, and body image disorders (Riva & Dakanalis, 2018; Sim & Peterson, 2021; Todd et al., 2019b). Within the spectrum of body image disorders, conditions such as anorexia nervosa, bulimia nervosa, binge eating disorder, and body dysmorphic disorder have often been associated with alterations in interoceptive processing (Cobbaert et al., 2024; Klabunde et al., 2013; Naraindas & Cooney, 2023; Pollatos et al., 2008). People with these diagnoses tend to have excessive or maladaptive interoceptive attention, marked by hypervigilance to specific sensations such as bloating, may be a central factor in the development of body dissatisfaction and compensatory behaviours (Ainley & Tsakiris, 2013; Bijsterbosch et al., 2023; Todd et al., 2019a). At the same time, some studies suggest that lower interoceptive accuracy, meaning they have more difficulty correctly identifying internal bodily signals (Khalsa et al., 2018; Klabunde et al., 2013; Pollatos et al., 2008). It has been demonstrated that this altered interoceptive functioning is not exclusive to body image disorders; both anxiety and depression, conditions that are themselves closely associated with body image disturbances, are also linked to interoceptive impairments. Individuals with these conditions may exhibit either heightened interoceptive attention and reduced accuracy, potentially contributing to emotional dysregulation and distorted self-perception (Brewer et al., 2021).

In this context, sex and age appear to influence interoceptive processes and may moderate their association with body image disturbances (Murphy et al., 2018; Naraindas & Cooney, 2023). Evidence



suggests that women tend to report higher interoceptive attention, often associated with greater body dissatisfaction and increased risk of body image-related disorders, whereas men generally perform better in tasks of interoceptive accuracy (Grabauskaitė et al., 2017). Additionally, interoceptive accuracy tends to decline with age, while adolescence and young adulthood represent particularly sensitive periods for the emergence of body image disturbances, possibly due to heightened interoceptive attention paired with low accuracy (Ferentzi et al., 2018; Grabauskaitė et al., 2017; Murphy et al., 2020). Emerging literature also suggests that social media use may play a role in shaping interoceptive functioning (Rounsefell et al., 2020; Sanzari et al., 2023; Tsakiris et al., 2011; Tsakiris & Critchley, 2016). Excessive engagement with visually driven platforms, such as Instagram or TikTok, has been linked to increased body surveillance and appearance-related self-monitoring, which may heighten interoceptive attention in maladaptive ways. This may manifest as greater focus on bodily sensations (e.g., fullness, weight, appearance-related changes) interpreted through distorted lenses influenced by idealized online content (Pedalino & Camerini, 2022). Furthermore, social comparison behaviors encouraged by social media have been associated with decreased interoceptive accuracy, potentially due to externalization of body awareness and a shift from internal cues to external validation (Jiotsa et al., 2021; Sanzari et al., 2023). These findings underscore the importance of considering interoception, particularly attention and accuracy as defined by Murphy and colleagues (2019), as potential mechanisms by which social media affects body image.

More broadly, it is also recognised that interoception plays an essential role in multiple domains of human functioning. In addition to identifying physiological signals (Craig, 2004), it seems involved in emotional regulation, decision-making, and executive functioning (Robinson et al., 2021), and body awareness, including the sense of body ownership (Tsakiris & Critchley, 2016). More recently, studies have also highlighted its relevance in the construction of self and personal identity (Campos et al., 2023; Desmedt et al., 2023; Khalsa et al., 2018; Murphy et al., 2017).

2. Methods

The study adopts a descriptive approach, and the research was conducted through a cross-sectional study, with an online survey serving as the primary data collection instrument (Creswell & Creswell, 2018). The reporting of methods and results followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Field et al., 2014).



2.1. Participants

The final sample consisted of 100 participants, aged between 18 and 62 years old ($M = 26.48$ years; $SD = 9.59$ years). Most participants were female ($n = 82$, 82%). In terms of education, 68% ($n = 68$) had a bachelor's or master's degree, while the remaining 32% ($n = 32$) had completed secondary education. Most participants spoke Portuguese as their mother tongue ($n = 99$, 99%). Table 1 shows the sociodemographic characteristics of the participants.

Table 1 Sociodemographic Characteristics of the Participants (including descriptive statistics of questionnaire scores).

| Variable | <i>n</i> (%) | | |
|-------------------------------|--------------|------------------------|-------------------------|
| Gender | | | |
| Women | 82 (82%) | | |
| Men | 18 (19%) | | |
| Educational level | | | |
| Basic (5th–9th grade) | 2 (2%) | | |
| Secondary (10th–12th grade) | 30 (30%) | | |
| Undergraduate Degree | 46 (46%) | | |
| Master's Degree | 19 (19%) | | |
| Doctorate Degree | 3 (3%) | | |
| Nationality | | | |
| Portuguese | 93 (93%) | | |
| Other | 7 (7%) | | |
| Mother tongue | | | |
| Mother tongue portuguese | 99 (99%) | | |
| Other mother tongue | 1 (1%) | | |
| | <i>n</i> | <i>M</i> (<i>SD</i>) | <i>Min</i> – <i>Max</i> |
| Age | 100 | 26.48 (9.59) | 18 – 62 |
| IAS (Interceptive Accuracy) | 100 | 87.61 (10.34) | 60.0 – 105.0 |
| IATS (Interceptive Attention) | 100 | 43.16 (14.95) | 21.0 – 105.0 |
| MFIS Total | 95 | 32.93 (0.64) | 31.31 – 34.69 |
| BISQp (Body Image) | 96 | 79.04 (14.53) | 33.0 – 114.0 |
| HADS – A | 96 | 8.13 (4.49) | 1.0 – 21.0 |



| | | | |
|-------------------------------------|----|--------------|------------|
| HADS - D | 96 | 6.26 (2.36) | 2.0 - 12.0 |
| ISAAQ-10 (Problematic Internet Use) | 96 | 17.98 (7.85) | 3.0 - 38.0 |

Note 1 IAS = Interoceptive Accuracy Scale; IATS = Interoceptive Attention Scale; MFIS = Multidimensional Facebook Intensity Scale; BISQp = Body Image Satisfaction Questionnaire Portuguese version; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression; ISAAQ-10 = The Internet Severity and Activities Addiction Questionnaire – 10 items.

2.2. Procedure

The study was approved by the Ethics Committee of the E2S – Polytechnic of Porto and complied with the principles of the Declaration of Helsinki and the European General Data Protection Regulation (CEA114E).

The presentation of the study included a description and the objectives of the project, followed by a digital informed consent form available on the LimeSurvey v6.10.6 platform. After agreeing to participate, individuals were redirected to the questionnaire.

Data collection took place between February 2025 and June 2025, and the data were stored on a secure server at the E2S-P. Porto. Participant recruitment followed a non-probabilistic snowball sampling method, with the questionnaires being disseminated primarily via social media through partnerships with the E2S-P. Porto, its Student Association, and the Psychological Rehabilitation Laboratory of the Rehabilitation Research Centre (LabRP-CIR).

The sample comprised participants who met all defined inclusion and exclusion criteria. Inclusion criteria were age ≥ 18 years and active social media use. Exclusion criteria were a pre-existing psychiatric illness other than anxiety or depression and difficulty comprehending the Interoceptive Accuracy Scale (IAS) and Interoceptive Attention Scale (IATS) scales.

2.3. Instruments

Data were collected using an online questionnaire developed on the LimeSurvey platform. This questionnaire included a section for sociodemographic information and a set of validated self-assessment scales. The sociodemographic section gathered participant data on age, gender, nationality, residence, education, employment, and history of psychiatric or neurological conditions.

The Multidimensional Facebook Intensity Scale (MFIS) (Orosz et al., 2016) is a measurement tool designed to assess the intensity of Facebook use across four key domains: persistence, boredom, excessive use, and self-expression. In this study, it was adapted to cover social media use in order to reflect the main construct of interest. The scale under consideration consists of 13 items, with participants indicating their level of agreement on a five-point Likert scale (1 = strongly disagree; 2 =



disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree) (Orosz et al., 2016). Scoring is calculated by summing the responses across all items to obtain a total score. Furthermore, subscale scores can be calculated by summing the items corresponding to each dimension: persistence, boredom, excessive use, and self-expression. Scores on this scale are positively correlated with the intensity of Facebook use, both in general and in specific dimensions (Orosz et al., 2016). The MFIS has demonstrated good internal reliability across all factors ($\alpha_{persistence} = .79$; $\alpha_{self-expression} = .74$; $\alpha_{boredom} = .85$; $\alpha_{excessive\ use} = .76$; $\alpha_{total} = .88$) (Orosz et al., 2016).

As a secondary, complementary and indirect component of our assessment of social media use, we administered the Internet Severity and Activities Addiction Questionnaire–10 items (ISAAQ-10) (Dores et al., 2025; Ioannidis et al., 2023). The purpose of the ISAAQ-10 is to assess the intensity of problematic internet use. The questionnaire is divided into two main sections. Section A, which is concerned with the evaluation of severity, consists of 10 items that are to be rated on a six-point Likert scale ranging from 0 ("this never happens to me") to 5 ("this always happens to me"). This section employs a metric to quantify the frequency with which the individual engages in behaviours related to internet use, thereby providing an assessment of the level of involvement (Dores et al., 2025; Ioannidis et al., 2023). Section B focuses on online activities that may be associated with problematic use. The study investigates the extent to which individuals have engaged with various online behaviours during the preceding six-month period. These include general web browsing, online gaming (including massively multiplayer online role-playing games), casual or time-wasting games, online shopping, internet gambling, use of social media, searching for health-related information (linked to cyberchondria), viewing online pornography, media streaming, and cyberbullying. This section employs a six-point Likert scale (0–5) (Dores et al., 2025; Ioannidis et al., 2023). The translated and culturally adapted version of the ISAAQ-10 showed excellent internal consistency, with a Cronbach's alpha of .92 (Dores et al., 2025). It is worth noting that, in the statistical analysis, only Section A and Question 6 from Section B were used, with the aim of confirming that the sample consisted of individuals who use social media.

Interoception was assessed using two scales. The Interoceptive Attention Scale (IATS) (Gabriele et al., 2022) was designed to assess self-reported interoceptive attention, defined as an individual's dispositional tendency to allocate attentional resources to interoceptive signals. The scale consists of 21 items, rated on a 5-point Likert scale (from 1 = totally disagree to 5 = totally agree), which specifically target the same interoceptive signals measured by the IAS. The total score is calculated by summing all item responses, with higher scores indicating greater interoceptive attention. Consequently, administering both scales together allows for a clear distinction between self-reported interoceptive



attention and accuracy. After completion, participants answered a control question to identify individuals who may not have fully understood the concept of interoceptive attention, as recommended by (Gabriele et al., 2022). In its original English version, the IATS demonstrated excellent internal consistency ($\alpha = .905$) and adequate test-retest reliability ($r = .709$) (Gabriele et al., 2022).

The Interoceptive Accuracy Scale (IAS) (Campos et al., 2021; Murphy et al., 2020) is a self-report instrument designed to assess trait-based beliefs regarding an individual's ability to accurately perceive interoceptive signals. It consists of 21 items, each rated on a 5-point Likert scale (ranging from 1 = totally disagree to 5 = totally agree), where higher scores indicate greater interoceptive accuracy (Murphy et al., 2020). The total score is obtained by summing the responses to all items. Our team recently validated the European Portuguese version of the IAS (Campos et al., 2021), demonstrating excellent internal consistency ($\omega_{categorical} = .970$) and good test-retest reliability ($ICC = .756$). After completing this scale, participants answered a control question designed to identify individuals who may not have fully understood the concept of interoceptive accuracy, as recommended by Gabriele et al., 2022.

Body image satisfaction was assessed using the Portuguese version of the BISQ (Flores et al., 2020). The questionnaire consists of 23 items covering facial features (e.g. teeth, hair, eyes, nose), body parts (e.g. buttocks, arms, chest), and general appearance (e.g. physical fitness, height, vitality, body shape). Participants are asked to indicate the number that best represents their level of satisfaction with each body part on a five-point Likert scale, ranging from 1 ("I don't like it and would like it to be different") to 5 ("I consider myself fortunate"). The BISQ demonstrated satisfactory to excellent internal consistency, with composite reliability coefficients ranging from .77 to .90 across the five factors, and $\omega_{coefficients}$ ranging from .83 to .96 in the bifactor model (Rodrigues et al., 2021). The total score is calculated by computing the mean of all items. The questionnaire is further divided into five domains: face, upper trunk, lower trunk, lower limbs, and appearance. Mean scores can be calculated for each domain to provide a more nuanced understanding of body satisfaction. Higher mean scores indicate greater satisfaction with one's body, while lower scores reflect greater dissatisfaction. A mean score below 3 suggests body dissatisfaction, a score around 3 is considered neutral, and scores above 3 indicate moderate to high satisfaction (Flores et al., 2020; Rodrigues et al., 2021).

Finally, to assess psychological symptoms, the Hospital Anxiety and Depression Scale (HADS) (Pais-Ribeiro et al., 2007; Zigmond & Snaith, 1983) was used. It is a self-report questionnaire originally developed by Zigmond & Snaith (1983) to assess symptoms of anxiety and depression in individuals receiving care in hospital outpatient settings, while excluding somatic symptoms that might be attributed to physical illness. The scale consists of 14 items, divided into two subscales: anxiety (HADS-A) and



depression (HADS-D), each with 7 items (Zigmond & Snaith, 1983). Participants rate each item based on how they have felt over the previous week, using a 4-point Likert scale (ranging from 0 to 3), leading to subscale scores between 0 and 21. Higher scores indicate greater symptom severity. Scores between 8 and 10 suggest possible (borderline) cases, and scores of 11 or above are considered indicative of probable clinical anxiety or depression. In the present study, individuals scoring in the clinical range on either subscale were excluded (Pais-Ribeiro et al., 2007; Zigmond & Snaith, 1983). The Portuguese version of the HADS, validated by Pais-Ribeiro et al. (2007), demonstrated adequate psychometric properties, including satisfactory internal consistency (Cronbach's $\alpha = .76$ for anxiety and $.81$ for depression).

For the purposes of the present study, analyses focused exclusively on the instruments described above. The participant questionnaire also included additional assessment measures, as data collection formed part of a larger study. These supplementary measures addressed objectives specific to the parent project and are not considered further in this manuscript.

2.4. Statistical analysis

All statistical analyses were conducted using IBM SPSS Statistics (version 29). In a first step, descriptive statistics were computed for the sample and the core study variables. For continuous variables, measures of central tendency and dispersion were calculated, namely the mean, standard deviation, median, interquartile range (IQR), minimum and maximum values, as well as skewness and kurtosis coefficients. For the categorical variable gender, absolute and relative frequencies (n and $\%$) were reported. Normality of continuous variables was assessed based on absolute skewness ($< |2.0|$) and kurtosis ($< |9.0|$) values, following the criteria suggested by Gignac (2023b).

The MFIS was defined as the primary outcome measure of social media use, reflecting the central construct under investigation in this study. In addition, the ISAAQ-10 was considered a secondary and indirect measure of social media use, providing complementary information on the intensity of online engagement. This analytic decision was supported by an independent samples t -test conducted on item 6 of Part B of the ISAAQ-10, which directly asks participants whether they spend time on social media. Beyond reinforcing the validity of this choice, the ISAAQ also offers an additional perspective on problematic social media use, given that its assessment framework specifically targets problematic patterns of internet use.

Subsequently, hierarchical multiple regression models with moderation were conducted to test whether interoception moderated the relationship between social media use and body image satisfaction. The



dependent variable in all models was body image (BISQ total score), while the independent variable was social media use, assessed separately through the MFIS and the ISAAQ. The moderator variables were interoceptive attention (IATS) and interoceptive accuracy (IAS). Accordingly, four distinct models were tested: (1) MFIS \times IATS, (2) MFIS \times IAS, (3) ISAAQ \times IATS, and (4) ISAAQ \times IAS. Age, gender, and levels of anxiety and depression (HADS) were included as covariates. bivariate correlation analyses were performed among the main study variables: social media use, body image, interoceptive attention, and interoceptive accuracy. The assumption of normality supported the use of Pearson's correlation coefficient.

The assumptions of linear regression were evaluated following the recommendations of Gignac (2023b). Linearity was assessed through graphical inspection of residuals. Normality of residuals was confirmed based on skewness and kurtosis values of standardised residuals. Homoscedasticity was tested with as evaluated through graphical inspection of residuals and the assumption was met (Gignac, 2023a). Collinearity among predictors was examined using Pearson's correlation matrix, computed among the main study variables (social media use, body image, interoceptive attention, and interoceptive accuracy). These preliminary analyses also confirmed the suitability of applying Pearson's correlation coefficient, given that the normality assumption was satisfied. Multicollinearity was evaluated through variance inflation factor (VIF) values, and although this assumption was violated for the interaction terms, such an occurrence is expected in moderation models, since interaction terms are derived from the product of predictor variables. It is important to note that this violation does not compromise the validity of moderation effects, as their significance depends on the incremental contribution of the interaction term to the explained variance, rather than on its isolated variance (Gignac, 2023b). The independence of residuals was not assessed, as the data were cross-sectional and not temporal. All analyses were conducted using a significance threshold of $p < .05$.

3. Results

3.1. Assumption Testing for Moderation Models

Preliminary verification of the statistical assumptions indicated that most were adequately met. The residuals showed an approximately normal distribution, as confirmed by Pearson's test (skewness $< |2.0|$ and kurtosis $< |9.0|$). No influential cases were identified (Cook's Distance < 1), and homoscedasticity of the residuals was confirmed. In addition, no excessively high correlations were observed among the independent variables ($r < 0.95$), ensuring linear independence between predictors.



However, a violation of the multicollinearity assumption was observed in some moderation models, reflected in VIF values well above the recommended threshold (< 10). Specifically, VIF values of 80.464 were recorded in the model including the MFIS \times IAS interaction, 31.874 in the MFIS \times IATS model, 72.858 in the ISAAQ \times IAS model, and 17.142 in the ISAAQ \times IATS model. Despite this violation, it is important to note that, as highlighted in the statistical analysis, this result did not compromise the validity of the moderation effects (Gignac, 2023b).

To confirm the appropriateness of using the ISAAQ-10 as a complementary measure of social media use, an independent samples *t*-test was conducted based on Item 6 of Part B. The results indicated that the majority of participants reported being active users of social media, supporting the inclusion of the ISAAQ-10 as a complementary measure.

When examining Pearson correlations (Table 2), several noteworthy results emerged. Body image satisfaction showed negative and statistically significant correlations with anxiety symptoms (HADS-A; $r = -.357, p < .001$) and depressive symptoms (HADS-D; $r = -.383, p < .001$), indicating that higher levels of anxiety and depressive symptomatology were associated with lower body image satisfaction.

With respect to social media use, as measured by the MFIS, no significant correlations were found with either anxiety ($r = -.002, p = .981$) or depression ($r = -.067, p = .521$). In contrast, the ISAAQ-10 showed positive and significant correlations with anxiety ($r = .264, p = .010$) and depression ($r = .289, p = .005$).

Regarding interoception, interoceptive attention correlated negatively with body image satisfaction ($r = -.311, p = .002$), indicating that higher interoceptive attention was associated with lower body image satisfaction. In contrast, interoceptive accuracy correlated positively with body image satisfaction ($r = .300, p = .003$), indicating that greater interoceptive accuracy was associated with higher body image satisfaction. A positive and significant correlation was also found between interoceptive accuracy and the ISAAQ-10 ($r = .593, p < .001$), indicating that higher levels of interoceptive accuracy are associated with greater intensity of problematic internet use. By contrast, no significant association was observed between interoceptive attention and interoceptive accuracy ($r = .165, p = .108$).



Table 2 Pearson Correlations Among Study Variables (N = 100)

| Variable | 1. BISQp | 2. IAS | 3. IATS | 4. MFIS | 5. ISAAQ-10 | 6. HADS-A | 7. HADS-D | 8. Age |
|-------------|----------|--------|---------|---------|-------------|-----------|-----------|--------|
| 1. BISQp | – | 0.198 | -0.306 | 0.028 | -0.067 | -0.357 | -0.383 | -0.017 |
| 2. IAS | 0.054 | – | -0.039 | 0.035 | -0.279 | -0.253 | -0.177 | 0.217 |
| 3. IATS | 0.002 | 0.704 | – | 0.063 | 0.165 | 0.304 | 0.300 | -0.008 |
| 4. MFIS | 0.790 | 0.734 | 0.546 | – | 0.593 | -0.002 | -0.067 | -0.427 |
| 5. ISAAQ-10 | 0.514 | 0.006 | 0.108 | 0.000 | – | 0.264 | 0.289 | -0.399 |
| 6. HADS-A | 0.000 | 0.013 | 0.003 | 0.981 | 0.010 | – | 0.469 | -0.192 |
| 7. HADS-D | 0.000 | 0.085 | 0.003 | 0.521 | 0.005 | 0.000 | – | 0.124 |
| 8. Age | 0.871 | 0.030 | 0.935 | 0.000 | 0.000 | 0.060 | 0.227 | – |

Note 2 Values above the diagonal represent Pearson's correlation coefficients (r), while values below the diagonal represent significance levels (p). IAS = Interoceptive Accuracy Scale; IATS = Interoceptive Attention Scale; MFIS = Multidimensional Facebook Internet; BISQp = Body Image Satisfaction Questionnaire – Portuguese version; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression; ISAAQ-10 = The Internet Severity and Activities Addiction Questionnaire – 10 items. $p < .05$.

3.2. Hierarchical Regression Models with Moderation

Four hierarchical regression models were tested to examine the moderating role of interoception (attention and accuracy) in the association between social media use and body image satisfaction, controlling for age, gender, anxiety and depression, as well as the relationship between problematic internet intensity and body image satisfaction, controlling for the same variables.

3.2.1. Dimensions of Social Media Use Intensity And Interoception (Interoception Attention And Accuracy)

Table 3 presents the detailed statistics for the regression models (Models 1–2). In the first model, in the first model (MFIS \times IATS), Block 1, which included age and gender, did not account for significant variance in body image satisfaction ($\Delta R^2 = .002$, $p = .904$). The addition of anxiety and depression in Block 2 substantially increased the explained variance to 18.5% ($\Delta R^2 = .183$, $p < .001$). In Block 3, the inclusion of social media use (MFIS) and interoceptive attention (IATS) raised the explained variance to 23.1%, although this change did not reach statistical significance ($\Delta R^2 = .046$, $p = .082$). Nevertheless, interoceptive attention emerged as a significant negative predictor ($p = .026$, 95% CI [-.452, -.028]).



Finally, the introduction of the MFIS \times IATS interaction term in Block 4 did not explain additional variance ($\Delta R^2 = .000, p = .865$), providing no evidence for a moderating role of interoceptive attention.

In the second model (MFIS \times IAS), Block 1, including age and gender, accounted for only 0.2% of the variance, with no significant effects ($\Delta R^2 = .002, p = .904$). Block 2, with the inclusion of anxiety and depression, significantly improved the model, raising the explained variance to 18.5% ($\Delta R^2 = .183, p < .001$). The addition of social media use (MFIS) and interoceptive accuracy (IAS) in Block 3 further increased the explained variance to 19.8%, though this change was not statistically significant ($\Delta R^2 = .013, p = .498$). Neither of these predictors was significant (MFIS: $p = .862$; IAS: $p = .240$), although depression remained a significant negative predictor ($p = .029, 95\% CI [-.471, -.026]$). Finally, Block 4, which added the MFIS \times IAS interaction, did not explain additional variance ($\Delta R^2 = .000, p = .977$), providing no support for the moderating effect of interoceptive accuracy.

Table 3 Hierarchical Regression Analyses Predicting Body Image Satisfaction (BISQp): Models 1–2.

| Independent variables / Blocks | Model 1: MFIS \times IATS | Model 2: MFIS \times IAS |
|--|-----------------------------|----------------------------|
| Block 1: Demographics | | |
| Age | $\beta = .011, p = .915$ | $\beta = -.037, p = .713$ |
| Gender | $\beta = -.046, p = .665$ | $\beta = .014, p = .888$ |
| R^2 | .002 | .002 |
| ΔR^2 | .002 | .002 |
| F-change | 0.101 | 0.101 |
| Sig. ΔF | .904 | .904 |
| Block 2: Anxiety & Depression | | |
| HADS-A | $\beta = -.240, p = .037$ | $\beta = -.240, p = .037$ |
| HADS-D | $\beta = -.266, p = .018$ | $\beta = -.266, p = .018$ |
| R^2 | .185 | .185 |
| ΔR^2 | .183 | .183 |
| F-change | 9.861 | 9.861 |
| Sig. ΔF | < .001 | < .001 |



| Independent variables / Blocks | Model 1: MFIS × IATS | Model 2: MFIS × IAS |
|--|---|---------------------------|
| Block 3: Social Media + Interoception | | |
| MFIS | $\beta = -.007, p = .950$ | $\beta = -.019, p = .862$ |
| IATS | $\beta = -.229, p = .026, CI[-.452, -.028]$ | |
| IAS | — | $\beta = .124, p = .240$ |
| R^2 | .231 | .198 |
| ΔR^2 | .046 | .013 |
| F-change | 2.570 | 0.703 |
| Sig. ΔF | .082 | .498 |
| Block 4: Interaction Term | | |
| MFIS × IATS | $\beta = .092, p = .865$ | — |
| MFIS × IAS | — | $\beta = .025, p = .977$ |
| R^2 | .231 | .198 |
| ΔR^2 | .000 | .000 |
| F-change | 0.029 | 0.001 |
| Sig. ΔF | .865 | .977 |

Note 3 Standardised beta weights (β), p -values, and 95% confidence interval (CI) for significant predictors are reported. R^2 = explained variance; ΔR^2 = change in explained variance; MFIS = Multidimensional Facebook Intensity Scale; IATS = Interoceptive Attention Scale; IAS = Interoceptive Accuracy Scale; BISQp = Body Image Satisfaction Questionnaire (Portuguese version); HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression. $p < .05$.

3.2.2. Dimensions of Problematic internet Use and Interoception (Interoception Attention And Accuracy)

Table 4 presents the detailed statistics for the regression models (Models 3–4). In Model 3, the moderating role of interoceptive accuracy (IAS) in the association between problematic internet use (ISAAQ-10) and body image satisfaction was tested. The demographic variables in Block 1 did not significantly account for variance ($\Delta R^2 = .004, p = .843$). The inclusion of anxiety and depression in Block 2 significantly increased the explained variance to 18.9% ($\Delta R^2 = .185, p < .001$). In Block 3, the addition of problematic social media use and interoceptive accuracy explained 21.1% of the variance, but this increase was not statistically significant ($\Delta R^2 = .023, p = .290$). Depression remained a significant negative predictor of body image satisfaction. Finally, in Block 4, the ISAAQ-10 × IAS interaction did not



explain additional variance ($\Delta R^2 = .013, p = .237$), indicating that interoceptive accuracy did not moderate the relationship.

In Model 4, the moderating role of interoceptive attention (IATS) was examined. As in Model 3, Block 1 did not significantly account for variance ($\Delta R^2 = .004, p = .843$), while the inclusion of anxiety and depression in Block 2 significantly increased the explained variance to 18.9% ($\Delta R^2 = .185, p < .001$). In Block 3, problematic social media use and interoceptive attention explained 23.2% of the variance, although this change was not statistically significant ($\Delta R^2 = .044, p = .091$). In this step, interoceptive attention emerged as a significant negative predictor, and depression also remained significant. Finally, the inclusion of the ISAAQ-10 \times IATS interaction term in Block 4 did not result in any significant increase in explained variance ($\Delta R^2 = .008, p = .336$), indicating no moderating effect of interoceptive attention.

Table 4 Hierarchical Regression Analyses Predicting Body Image Satisfaction (Models 3–4)

| Independent variables / Blocks | Model 3 (IAS) | Model 4 (IATS) |
|--|---------------------------|---------------------------|
| Block 1: Demographics | | |
| Age | $\beta = -.014, p = .902$ | $\beta = .031, p = .782$ |
| Gender | $\beta = .032, p = .748$ | $\beta = .004, p = .971$ |
| R^2 | .004 | .004 |
| ΔR^2 | .004 | .004 |
| <i>F-change</i> | .171 | .171 |
| <i>Sig. ΔF</i> | .843 | .843 |
| Block 2: Anxiety, Depression | | |
| Anxiety (HADS-A) | $\beta = -.225, p = .051$ | $\beta = -.198, p = .084$ |
| Depression (HADS-D) | $\beta = -.294, p = .014$ | $\beta = -.290, p = .017$ |
| R^2 | .189 | .189 |
| ΔR^2 | .185 | .185 |
| <i>F-change</i> | 10.140 | 10.140 |
| <i>Sig. ΔF</i> | <.001 | <.001 |
| Block 3: ISAAQ-10 + Interoception | | |



| Independent variables / Blocks | Model 3 (IAS) | Model 4 (IATS) |
|----------------------------------|--------------------------|---------------------------|
| ISAAQ-10 | $\beta = .117, p = .305$ | $\beta = .114, p = .308$ |
| IAS | $\beta = .138, p = .187$ | — |
| IATS | — | $\beta = -.205, p = .044$ |
| R^2 | .211 | .232 |
| ΔR^2 | .023 | .044 |
| <i>F</i> -change | 1.256 | 2.468 |
| Sig. ΔF | .290 | .091 |
| Block 4: Interaction term | | |
| ISAAQ-10 \times IAS | $\beta = .965, p = .237$ | — |
| ISAAQ-10 \times IATS | — | $\beta = -.377, p = .336$ |
| R^2 | .224 | .240 |
| ΔR^2 | .013 | .008 |
| <i>F</i> -change | 1.417 | .937 |
| Sig. ΔF | .237 | .336 |

Note 4 Standardized beta weights (β) and *p*-values are reported for each predictor. R^2 = explained variance; ΔR^2 = change in explained variance; *F*-change = *F* statistic for R^2 change; ISAAQ-10 = The Internet Severity and Activities Addiction Questionnaire – 10 items; IATS = Interoceptive Attention Scale; IAS = Interoceptive Accuracy Scale; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression.

4. Discussion

4.1. Association Between Social Media Use and Body Image Satisfaction

The present study aimed to test the relationship between social media use and body image satisfaction, verifying the moderating role of self-reported interoceptive attention and accuracy. Overall, the results showed that no significant associations were found between social media usage and body image satisfaction. Neither the intensity of social media usage (MFIS) nor the intensity problematic internet usage (ISAAQ-10), when combined with interoceptive measures (attention and accuracy), significantly contributed to the explained variance of body image satisfaction. In addition, no moderation effects were



found. By contrast, interoceptive attention (IATS), depressive symptoms and emerged as relevant predictors, highlighting the central role of mental health in body perception.

In Models 1 and 2, the inclusion of the intensity of social media use (MFIS) and interoceptive variables (IATS and IAS) did not significantly increase the explained variance of body image satisfaction, even after controlling for anxiety and depression symptoms. This result differs from several studies that have associated intensive involvement in social media with lower body satisfaction, through mechanisms of social comparison and repeated exposure to unrealistic beauty ideals (for example, exposure to images and 'fitspiration' filters has been associated with negative mood and body dissatisfaction) (Bucchianeri & Neumark-Sztainer, 2014; Jerónimo & Carraça, 2022; Rounsefell et al., 2020). Furthermore, other studies have shown that the usage of social media platforms, such as Instagram, promotes appearance-based comparisons that result in lower body satisfaction and more negative mood, particularly among young women (Blackburn & Hogg, 2024; Bucchianeri & Neumark-Sztainer, 2014; Rounsefell et al., 2020).

Similarly, Models 3 and 4, which integrated the intensity of social media use (MFIS), problematic internet usage (ISAAQ-10), and dimensions of interoception, did not yield significant gains in explained variance. Nevertheless, the literature provides consistent evidence that both intensive and problematic internet use can contribute to greater body dissatisfaction, particularly in younger populations exposed to high levels of social comparison and external validation. Studies have shown that frequency of use (intensity) is associated with lower body satisfaction, especially when such use involves appearance comparisons or exposure to body-focused content (Fardouly et al., 2018). A meta-analysis found that the intensity of social media use is a significant predictor of body image disturbances, with greater impact among young women and in visually oriented platforms such as Instagram (Saiphoo & Vahedi, 2019).

In the case of problematic internet use, evidence suggests that the impact on body image may be even more pronounced, as the addictive pattern of use tends to reinforce processes of social comparison and self-objectification (Chen et al., 2022; Sarda et al., 2025). Boniel-Nissim and colleagues (2024) also identified associations between problematic patterns of social media use and distorted body perceptions, whether through overestimation or underestimation of body dimensions, in both female and male adolescents.

4.2. The Moderating Role of Interoception

A second main finding relates to interoception. Regarding the moderation analyses, no significant moderation effects were found between interoceptive variables (attention or accuracy) and social media use indicators in predicting body image satisfaction. This result contradicts theoretical perspectives and



prior research suggesting that interoception may function as a moderator in the relationship between body perceptions and external factors, including social media content. Badoud and Tsakiris (2017) argue that interoception, particularly accuracy and awareness, is fundamental for integrating interoceptive signals with external body representations, influencing both the formation and distortion of body image, especially in contexts such as eating disorders. The authors found that low attention to satiety cues was associated with a more positive body image (Todd et al., 2021; Van Dyck et al., 2016). Other studies have also showed that the type of social media content consumed is associated with body image and eating disturbances (Saiphoo & Vahedi, 2019; Sanzari et al., 2023).

Despite the absence of significant moderation, interoceptive attention emerged as a significant negative of body image satisfaction, some predictors emerged in the tested models. In particular, depressive symptoms (HADS-D) stood out as negative predictors of body satisfaction. This suggests that higher levels of focus on internal sensations are associated with lower body satisfaction. This aligns with the literature, as in clinical contexts such as anxiety and depression, an exacerbated attention to bodily sensations more readily translates into biased interpretations, which can intensify depressive or anxious concerns about the body (Murphy et al., 2017; Raimo et al., 2022). Although interoceptive accuracy did not emerge as a predictor in this study, Salvato and colleagues (2020) associated deficits in interoceptive accuracy with body dissatisfaction and body perception distortions, especially in contexts of visual exposure or social comparison.

Thus, the results obtained in this study contradict the literature, by showing that neither intensity of social media use nor interoceptive attention and accuracy explain relevant variations in body satisfaction, within a model that already includes anxiety and depression. However, other explanations should also be considered. Interoception is a multidimensional construct, and the measures used in this study (attention and accuracy) may not adequately capture dimensions such as interoceptive awareness, which has been associated with lower levels of body dissatisfaction and greater resilience to social comparison (Bijsterbosch et al., 2023; Desmedt et al., 2023; Murphy et al., 2020; Naraindas et al., 2024). According to the 2x2 factor model proposed by Murphy and colleagues (2019) interoception can be understood through the intersection of what is measured (attention vs accuracy) and how it is measured (self-reported vs. objective). Within this framework, interoceptive awareness has been increasingly discussed as a distinct dimension that refers to the conscious appraisal and interpretation of internal bodily signals, going beyond the mere detection of signals (accuracy) or the simple focus on them (attention). While attention and accuracy can be assessed either objectively or through self-report, awareness reflects a higher-order, metacognitive component, often measured through self-reported instruments. This



distinction is particularly relevant, as interoceptive awareness has been linked to protective effects such as lower body dissatisfaction and greater emotional resilience, which may not be fully captured when focusing exclusively on attention and accuracy (Murphy et al., 2019; Todd et al., 2019b). In addition, cultural factors shape the relationship between social media use and body image, as aesthetic norms and social pressures vary across populations, influencing both body perception and interoceptive processes (Croll, 2005; Penkal & Kurdek, 2007).

4.3. Additional Predictors of Body Image Satisfaction

The third main finding concerns additional predictors that emerged from the regression models. In particular, depressive symptoms (HADS-D) stood out as consistent negative predictors of body image satisfaction. This result is consistent with the literature, with studies in different cultural contexts, in adolescents and young adults from India and Denmark, confirming a consistent negative association between body dissatisfaction and depressive symptoms (Diengdoh & Ali, 2022; Thorup et al., 2024). Furthermore, Bornioli and colleagues (2021) demonstrated that body dissatisfaction predicts depressive mood and low self-esteem in adolescents, reinforcing that body dissatisfaction predicts higher levels of depression and anxiety. Not only is depression associated with negative body perception, but body distortion can also exacerbate emotional problems, evidencing a bidirectional link (Bornioli et al., 2021; Sharpe et al., 2018).

Regarding anxiety, despite being included as a control variable, it did not emerge as a significant predictor in this study. This differs from evidence suggesting that anxiety is often associated with heightened body concerns, particularly when combined with intensive social media use (Rodgers et al., 2016). It is possible that depressive symptoms exerted a stronger influence in this sample, attenuating the role of anxiety in predicting body satisfaction.

As for the sociodemographic variables controlled for in the models, gender and age did not emerge as significant predictors of body satisfaction in this sample. Nevertheless, the literature has shown that both gender and age play a relevant role in body perceptions. Concerning gender, several studies indicate that women report higher levels of body dissatisfaction compared to men, largely due to greater sociocultural pressure to conform to aesthetic ideals (Bozsik et al., 2018; Frederick et al., 2017; McComb & Mills, 2020). However, research suggests that men are also increasingly exposed to body-related standards, leading to a rise in body dissatisfaction in males, particularly among adolescents and young adults (Bozsik et al., 2018; Frederick et al., 2017; Quittkat et al., 2019). The absence of gender effects in the present study may be due to the sample size and balanced composition between genders or to the fact that body



dissatisfaction is now a cross-cutting concern, not limited to females, reflecting recent sociocultural changes.

As for age, no significant associations with body satisfaction were found. However, this result is not consistent with the literature, which has highlighted age as a key factor in the way body image is experienced. Studies show that adolescents and young adults present higher levels of body dissatisfaction, largely due to greater vulnerability to social comparison and the pressure exerted by social media (Fardouly et al., 2018). Frequent exposure to body-focused content on visual platforms such as Instagram has been associated with stronger negative impact in younger age groups, whereas older individuals tend to demonstrate greater resilience to these stimuli (Rounsefell et al., 2020; Saiphoo & Vahedi, 2019). The fact that age did not emerge as a significant predictor in the present study may be related to the relative age homogeneity of the sample, composed mainly of young adults, reducing the variability necessary to detect such effects. Thus, although no statistically significant effects of gender and age were found, it is important to consider these factors as potential modulators in the relationship between social media use, interoception and body image interoception, there is growing evidence that high interoceptive accuracy may protect against negative body perceptions, with an inverse relationship between low accuracy and body image distortion (Badoud & Tsakiris, 2017; Naraindas et al., 2024). The fact that such effects were not found in our sample may again be due to the relatively limited sample size, which reduces the power to detect associations of small magnitude .

Taken together, the results of this study indicate that interoceptive attention emerge as a significant negative predictor of body image dissatisfaction, followed by depressive symptoms, which also consistently predicted lower satisfactions. In contrast, anxiety, age and gender did not significantly contribute to the models. These findings highlight the central role of heightened interoceptive attention and depressive symptomatology in shaping body perceptions, whereas other variables showed limited or no explanatory power in this sample. Evidence indicates that depressive and anxious symptoms are strongly associated with reduced quality of life and daily functioning, affecting occupational performance and motivation to maintain balanced routines (Wilmer et al., 2021; World Health Organization, 2022). Body dissatisfaction, in turn, has been linked to lower well-being, low self-esteem and increased risk of social isolation, with direct consequences for participation in meaningful activities (Griffiths et al., 2017; Rodgers et al., 2016). Likewise, interoceptive dysfunction has been identified as a factor interfering with emotional regulation and health habits, compromising both the subjective experience of the body and engagement in daily practices related to self-care and leisure (Murphy et al., 2019; Raimo et al., 2022). Thus, these variables may compromise well-being, quality of life and interfere with daily habits and



routines, reducing motivation and participation in meaningful occupations. The way the body is perceived and experienced is therefore important in the relationship individuals establish with their occupations and social contexts (Jiotsa et al., 2021; Tsakiris & Critchley, 2016). In this sense, although the statistical models did not identify robust moderation effects, the results underline the importance of understanding these variables in their functional and occupational impact, aspects central to fields such as Occupational Therapy, which value the articulation between mental health, body and participation in daily life.

4.4. Limitations and Future Directions

This study has some limitations that should be considered when interpreting the results. Firstly, the sample size may limit statistical power to detect small effects, particularly with regard to interactions or moderation effects. Larger samples would allow for more robust analyses (Gignac, 2023b). Another limitation concerns the composition of the sample, which consisted predominantly of young adults. The relative age homogeneity may have reduced the variability needed to detect age effects and limited the generalizability of the findings to other age groups, such as adolescents or older adults. In addition, the measures used to assess interoception focused only on attention and accuracy, without including dimensions such as interoceptive awareness, which has been highlighted as particularly relevant for body perception and for the integration of internal signals with external representations.

Future research should further explore the influence of psychopathology (e.g., social anxiety, eating disorders, obsessive-compulsive symptoms) on the relationship between social media, interoception, and body image. It will also be important to consider clinical samples, since individuals with emotional or eating disorders tend to present greater interoceptive deficits and body image distortions. Moreover, the use of instruments that capture multiple dimensions of interoception, such as interoceptive awareness and sensibility, would allow for a more comprehensive understanding of these processes. Finally, longitudinal designs are needed to clarify the causal direction of these associations and to identify potential mechanisms of mediation or moderation over time.

5. Conclusion

The present study aimed to examine the moderating role of interoceptive attention and accuracy in the association between social media usage and body image satisfaction. Overall, no significant moderating effects of interoception were found in the relationship between social media use intensity or problematic use and body satisfaction. However, interoceptive attention and depressive symptoms emerged as



consistent predictors, emphasising the central role of mental health and the way individuals direct their attention to internal sensations in the perception of body image.

These results suggest that, more than the frequency or problematic nature of internet and especially social media use, it is psychological variables, namely attention interoceptive and depression, that appear to influence how the body is experienced and evaluated. This evidence reinforces the importance of considering mental health and emotional self-regulation as fundamental dimensions in understanding and addressing body dissatisfaction. Within the field of Occupational Therapy, these findings underline the relevance of integrating body perception, interoception, and emotional factors into assessment and intervention processes, recognising their direct impact on well-being, quality of life, and participation in meaningful occupations.

Despite the limitations identified, namely the sample size and reliance on self-report measures, this study contributes to advancing knowledge on the complex interaction between social media, the body and interoception, highlighting the pertinence of an integrated approach. Future research should draw on larger and more diverse samples, as well as objective measures of interoception, to deepen the understanding of these phenomena and strengthen the available evidence.

In summary, the findings suggest that the impact of social media on body image cannot be understood in isolation but must be considered alongside interoceptive processes and, above all, mental health conditions. By emphasising these dimensions, this study contributes to grounding prevention and intervention strategies that promote a more balanced relationship with the body and foster full participation in everyday life.



6. References

- Ainley, V., & Tsakiris, M. (2013). Body conscious? Interoceptive awareness, measured by heartbeat perception, is negatively correlated with self-objectification. *PLoS ONE*, *8*(2), e55568. <https://doi.org/10.1371/journal.pone.0055568>
- Alghamdi, E. A., & Bogari, N. (2019). The impact of social media platforms “Instagram” and “Snapchat” on the purchasing decision – structural equation modelling approach. *International Journal of Online Marketing*, *10*(1), 72–94. <https://doi.org/10.4018/ijom.2020010105>
- Badoud, D., & Tsakiris, M. (2017). From the body's viscera to the body's image: Is there a link between interoception and body image concerns? *Neuroscience & Biobehavioral Reviews*, *77*, 237–246. <https://doi.org/10.1016/j.neubiorev.2017.03.017>
- Barbierik, L., Bacikova-Sleskova, M., & Petrovova, V. (2023). The role of social appearance comparison in body dissatisfaction of adolescent boys and girls. *Europe's Journal of Psychology*, *19*(3), 244–258. <https://doi.org/10.5964/ejop.6443>
- Bijsterbosch, J. M., Hasenack, B., van Rooijen, B., Sternheim, L. C., Boelen, P. A., Dijkerman, H. C., & Keizer, A. (2023). Intolerable feelings of uncertainty within the body: Associations between interoceptive awareness, intolerance of uncertainty, and body dissatisfaction. *Journal of Adolescence*, *95*, 1678–1688. <https://doi.org/10.1002/jad.12237>
- Blackburn, M. R., & Hogg, R. C. (2024). ForYou? the impact of pro-ana Tiktok content on body image dissatisfaction and internalisation of societal beauty standards. *PLoS ONE*, *19*(8). <https://doi.org/10.1371/journal.pone.0307597>
- Boniell-Nissim, M., Bersia, M., Canale, N., Lahti, H., Ojala, K., Ercan, O., Dzielska, A., Inchley, J., & Dalmaso, P. (2024). Different categories of social media use and their association with body image among adolescents in 42 countries. *International Journal of Public Health*, *69*, 1606944. <https://doi.org/10.3389/ijph.2024.1606944>
- Bornioli, A., Lewis-Smith, H., Slater, A., & Bray, I. (2021). Body dissatisfaction predicts the onset of depression among adolescent females and males: A prospective study. *Journal of Epidemiology and Community Health*, *75*(4), 343–348. <https://doi.org/10.1136/jech-2019-213033>
- Bozsik, F., Whisenhunt, B. L., Hudson, D. L., Bennett, B., & Lundgren, J. D. (2018). Thin is in? Think again: The rising importance of muscularity in the thin ideal female body. *Sex Roles*, *79*(9–10), 609–615. <https://doi.org/10.1007/s11199-017-0886-0>
- Bozzola, E., Spina, G., Agostiniani, R., Barni, S., Russo, R., Scarpato, E., Di Mauro, A., Di Stefano, A. V., Caruso, C., Corsello, G., & Staiano, A. (2022). The use of social media in children and adolescents: Scoping



- review on the potential risks. *International Journal of Environmental Research and Public Health*, 19(16), 9960. <https://doi.org/10.3390/ijerph19169960>
- Brewer, R., Murphy, J., & Bird, G. (2021). Atypical interoception as a common risk factor for psychopathology: A review. *Neuroscience & Biobehavioral Reviews*, 130, 470–508. <https://doi.org/10.1016/j.neubiorev.2021.07.036>
- Bucchianeri, M. M., & Neumark-Sztainer, D. (2014). Body dissatisfaction: An overlooked public health concern. *Journal of Public Mental Health*, 13(2), 64–69. <https://doi.org/10.1108/JPMH-11-2013-0071>
- Campos, C., Rocha, N. B., & Barbosa, F. (2021). *Self-reported interoceptive attention and accuracy: Evidence from the european portuguese validation of the body perception questionnaire and the interoceptive accuracy scale [Preprint]*. <https://doi.org/https://doi.org/10.31234/osf.io/a7wdj>
- Campos, C., Sá, C., Pasion, R., Garcez, H., Paiva, T. O., Rocha, N. B., & Barbosa, F. (2023). *Cardiac interoceptive processing across psychopathy dimensions: Evidence from the heartbeat tapping task and the attentional modulation of heartbeat-evoked potentials*. [Unpublished Manuscript]
- Candia-Rivera, D., Engelen, T., Babo-Rebelo, M., & Salamone, P. C. (2024). Interoception, network physiology and the emergence of bodily self-awareness. In *Neuroscience and Biobehavioral Reviews* (Vol. 165). Elsevier Ltd. <https://doi.org/10.1016/j.neubiorev.2024.105864>
- Chen, S., van Tilburg, W. A. P., & Leman, P. J. (2022). Self-objectification in women predicts approval motivation in online self-presentation. *British Journal of Social Psychology*, 61(1), 366–388. <https://doi.org/10.1111/bjso.12485>
- Chua, T. H. H., & Chang, L. (2016). Follow me and like my beautiful selfies: Singapore teenage girls' engagement in self-presentation and peer comparison on social media. *Computers in Human Behavior*, 55, 190–197. <https://doi.org/10.1016/j.chb.2015.09.011>
- Cobbaert, L., Hay, P., Mitchell, P. B., Roza, S. J., & Perkes, I. (2024). Sensory processing across eating disorders: A systematic review and meta-analysis of self-report inventories. *International Journal of Eating Disorders*, 57(7), 1465–1488. <https://doi.org/10.1002/eat.24184>
- Craig, A. D. (2004). Human feelings: Why are some more aware than others? *Trends in Cognitive Sciences*, 8(6), 239–241. <https://doi.org/10.1016/j.tics.2004.04.004>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative and methods approaches* (5th ed.). Sage Publications.
- Croll, J. (2005). Body image and adolescents. In Stang J. (Ed.), *Guidelines for Adolescent Nutrition Services* (pp. 155–165). http://www.epi.umn.edu/let/pubs/adol_book.shtm



- Crow, S., Eisenberg, M. E., Story, M., & Neumark-Sztainer, D. (2008). Suicidal behavior in adolescents: Relationship to weight status, weight control behaviors, and body dissatisfaction. *International Journal of Eating Disorders, 41*(1), 82–87. <https://doi.org/10.1002/eat.20466>
- Desmedt, O., Luminet, O., Maurage, P., & Corneille, O. (2023). Discrepancies in the definition and measurement of human interoception: A comprehensive discussion and suggested ways forward. *Perspectives on Psychological Science, 20*. <https://doi.org/10.1177/17456916231191537>
- Diengdoh, I., & Ali, A. (2022). Body image and its association with depression, anxiety, and self-esteem among college going students: A study from Northeast India. *Indian Journal of Community Medicine, 47*(2), 218–222. https://doi.org/10.4103/ijcm.ijcm_881_21
- Dores, A. R., Antunes, C., Geraldo, A., Carvalho, I. P., Marques, A., Pereira, I., Chamberlain, S. R., Lochner, C., & Ioannidis, K. (2025). Translation and validation of the Portuguese version of the internet severity and activities addiction questionnaire (ISAAQ-10) towards the identification of problematic social media use: A population study. *Comprehensive Psychiatry, 139*. <https://doi.org/10.1016/j.comppsy.2025.152585>
- Edwards, C., Tod, D., Molnar, G., & Markland, D. (2016). Perceived social pressures and the internalization of the mesomorphic ideal: The role of drive for muscularity and autonomy in physically active men. *Body Image, 16*, 63–69. <https://doi.org/https://doi.org/10.1016/j.bodyim.2015.11.003>
- Fardouly, J., Willburger, B. K., & Vartanian, L. R. (2018). Instagram use and young women's body image concerns and self-objectification: Testing mediational pathways. *New Media & Society, 20*(4), 1380–1395. <https://doi.org/10.1177/1461444817694499>
- Ferentzi, E., Drew, R., Tihanyi, B. T., & Köteles, F. (2018). Interoceptive accuracy and body awareness – temporal and longitudinal associations in a non-clinical sample. *Physiology and Behavior, 184*, 100–107. <https://doi.org/10.1016/j.physbeh.2017.11.015>
- Festinger, L. (1954). A Theory of Social Comparison Processes. *Human Relations, 7*(2), 117–140. <https://doi.org/10.1177/001872675400700202>
- Field, N., Cohen, T., Struelens, M. J., Palm, D., Cookson, B., Glynn, J. R., Gallo, V., Ramsay, M., Sonnenberg, P., MacCannell, D., Charlett, A., Egger, M., Green, J., Vineis, P., & Abubakar, I. (2014). Strengthening the reporting of molecular epidemiology for infectious diseases (STROME-ID): An extension of the STROBE statement. In *The Lancet Infectious Diseases* (Vol. 14, Issue 4, pp. 341–352). Lancet Publishing Group. [https://doi.org/10.1016/S1473-3099\(13\)70324-4](https://doi.org/10.1016/S1473-3099(13)70324-4)



- Flores Bravo, I. M., Saux, G., Speranza, T. B., & Ramenzoni, V. C. (2025). Beauty ideals modulate recognition of filtered images. *Body Image, 52*, 101819. <https://doi.org/10.1016/j.bodyim.2024.101819>
- Flores, P., Forte, P. M., Ferreira, L., Soares, C., Moreira, C., & Alves, E. (2020). The influence of physical activity in body perception. *Motricidade, 16*(3), 265–273. <https://doi.org/10.6063/motricidade.19171>
- Frederick, D. A., Daniels, E. A., Bates, M. E., & Tylka, T. L. (2017). Exposure to thin-ideal media affect most, but not all, women: Results from the perceived effects of media exposure scale and open-ended responses. *Body Image, 23*, 188–205. <https://doi.org/10.1016/j.bodyim.2017.10.006>
- Gabriele, E., Spooner, R., Brewer, R., & Murphy, J. (2022). Dissociations between self-reported interoceptive accuracy and attention: Evidence from the Interoceptive Attention Scale. *Biological Psychology, 168*. <https://doi.org/10.1016/j.biopsycho.2021.108243>
- Gaudio, S., Brooks, S. J., & Riva, G. (2014). Nonvisual multisensory impairment of body perception in anorexia nervosa: A systematic review of neuropsychological studies. In *PLoS ONE* (Vol. 9, Issue 10). Public Library of Science. <https://doi.org/10.1371/journal.pone.0110087>
- Gignac, G. E. (2023a). Chapter 12: Bivariate regression. In *How2statsbook* (Online Edition 2). https://www.how2statsbook.com/*chapter12
- Gignac, G. E. (2023b). Chapter 14: Multiple Regression. In *How2statsbook* (Online Edition 2). www.how2statsbook.com
- Goldschmidt, A. B., Wall, M., Choo, T. H. J., Becker, C., & Neumark-Sztainer, D. (2016). Shared risk factors for mood-, eating-, and weight-related health outcomes. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association, 35*(3), 245–252. <https://doi.org/10.1037/HEA0000283>
- Gonzales, A. L., & Hancock, J. T. (2011). Mirror, mirror on my facebook wall: Effects of exposure to Facebook on self-esteem. *Cyberpsychology, Behavior, and Social Networking, 14*(1–2), 79–83. <https://doi.org/10.1089/cyber.2009.0411>
- Grabauskaitė, A., Baranauskas, M., & Griškova-Bulanova, I. (2017). Interoception and gender: What aspects should we pay attention to? *Consciousness and Cognition, 48*, 129–137. <https://doi.org/10.1016/j.concog.2016.11.002>
- Griffiths, S., Murray, S. B., Bentley, C., Gratwick-Sarll, K., Harrison, C., & Mond, J. M. (2017). Sex differences in quality of life impairment associated with body dissatisfaction in adolescents. *Journal of Adolescent Health, 61*(1), 77–82. <https://doi.org/10.1016/j.jadohealth.2017.01.016>



- Herbert, B. M., Herbert, C., & Pollatos, O. (2011). On the relationship between interoceptive awareness and alexithymia: Is interoceptive awareness related to emotional awareness? *Journal of Personality, 79*(5), 1149–1175. <https://doi.org/10.1111/j.1467-6494.2011.00717.x>
- Hermans, A. M., Boerman, S. C., & Veldhuis, J. (2022). Follow, filter, filler? Social media usage and cosmetic procedure intention, acceptance, and normalization among young adults. *Body Image, 43*, 440–449. <https://doi.org/10.1016/j.bodyim.2022.10.004>
- Ioannidis, K., Tiego, J., Lutz, N., Omrawo, C., Yücel, M., Grant, J. E., Lochner, C., & Chamberlain, S. R. (2023). Internet severity and activities addiction questionnaire (ISAAQ): Psychometrics of item response theory and clustering of online activities. *Comprehensive Psychiatry, 122*. <https://doi.org/10.1016/j.comppsy.2023.152366>
- Jerónimo, F., & Carraça, E. V. (2022). Effects of fitspiration content on body image: a systematic review. In *Eating and Weight Disorders* (Vol. 27, Issue 8, pp. 3017–3035). Springer Science and Business Media Deutschland GmbH. <https://doi.org/10.1007/s40519-022-01505-4>
- Jiotsa, B., Naccache, B., Duval, M., Rocher, B., & Grall-Bronnec, M. (2021). Social media use and body image disorders: Association between frequency of comparing one's own physical appearance to that of people being followed on social media and body dissatisfaction and drive for thinness. *International Journal of Environmental Research and Public Health, 18*(6), 1–14. <https://doi.org/10.3390/ijerph18062880>
- Kemp, S. (2024, February 23). *Digital 2024: Portugal – data reportal – global digital insights*. <https://datareportal.com/reports/digital-2024-portugal>
- Khalsa, S. S., Adolphs, R., Cameron, O. G., Critchley, H. D., Davenport, P. W., Feinstein, J. S., Feusner, J. D., Garfinkel, S. N., Lane, R. D., Mehling, W. E., Meuret, A. E., Nemeroff, C. B., Oppenheimer, S., Petzschner, F. H., Pollatos, O., Rhudy, J. L., Schramm, L. P., Simmons, W. K., Stein, M. B., ... Zucker, N. (2018). Interoception and mental health: A roadmap. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 3*(6), 501–513. <https://doi.org/10.1016/j.bpsc.2017.12.004>
- Khoury, N. M., Lutz, J., & Schuman-Olivier, Z. (2018). Interoception in psychiatric disorders: A review of randomized, controlled trials with interoception-based interventions. In *Harvard Review of Psychiatry* (Vol. 26, Issue 5, pp. 250–263). Lippincott Williams and Wilkins. <https://doi.org/10.1097/HRP.0000000000000170>
- Kidd, C., Loxton, N. J., Uhlmann, L. R., Seeto, C. J., & Donovan, C. L. (2023). Thin ideal internalization assessment (THIINA): Development and psychometric validation of a new measure of female body image. *Body Image, 46*, 395–405. <https://doi.org/10.1016/j.bodyim.2023.07.007>



- Klabunde, M., Acheson, D. T., Boutelle, K. N., Matthews, S. C., & Kaye, W. H. (2013). Interoceptive sensitivity deficits in women recovered from bulimia nervosa. *Eating Behaviors, 14*(4), 488–492. <https://doi.org/10.1016/j.eatbeh.2013.08.002>
- Longo, M. R., Cardozo, S., & Haggard, P. (2008). Visual enhancement of touch and the bodily self. *Consciousness and Cognition, 17*(4), 1181–1191. <https://doi.org/10.1016/j.concog.2008.01.001>
- McComb, S. E., & Mills, J. S. (2020). A systematic review on the effects of media disclaimers on young women's body image and mood. *Body Image, 32*, 34–52. <https://doi.org/10.1016/j.bodyim.2019.10.010>
- McComb, S. E., & Mills, J. S. (2022). The effect of physical appearance perfectionism and social comparison to thin-, slim-thick-, and fit-ideal Instagram imagery on young women's body image. *Body Image, 40*, 165–175. <https://doi.org/https://doi.org/10.1016/j.bodyim.2021.12.003>
- Mougharbel, F., & Goldfield, G. S. (2020). Psychological correlates of sedentary screen time behaviour among children and adolescents: a narrative review. In *Current Obesity Reports* (Vol. 9, Issue 4, pp. 493–511). Springer. <https://doi.org/10.1007/s13679-020-00401-1>
- Murphy, J., Brewer, R., Catmur, C., & Bird, G. (2017). Interoception and psychopathology: A developmental neuroscience perspective. *Developmental Cognitive Neuroscience, 23*, 45–56. <https://doi.org/10.1016/j.DCN.2016.12.006>
- Murphy, J., Brewer, R., Plans, D., Khalsa, S. S., Catmur, C., & Bird, G. (2020). Testing the independence of self-reported interoceptive accuracy and attention. *Quarterly Journal of Experimental Psychology, 73*(1), 115–133. <https://doi.org/10.1177/1747021819879826>
- Murphy, J., Catmur, C., & Bird, G. (2019). Classifying individual differences in interoception: Implications for the measurement of interoceptive awareness. In *Psychonomic Bulletin and Review* (Vol. 26, Issue 5, pp. 1467–1471). Springer Science and Business Media, LLC. <https://doi.org/10.3758/s13423-019-01632-7>
- Murphy, J., Geary, H., Millgate, E., Catmur, C., & Bird, G. (2018). Direct and indirect effects of age on interoceptive accuracy and awareness across the adult lifespan. *Psychonomic Bulletin and Review, 25*(3), 1193–1202. <https://doi.org/10.3758/s13423-017-1339-z>
- Naraindas, A. M., & Cooney, S. M. (2023). Body image disturbance, interoceptive sensibility and the body schema across female adulthood: a pre-registered study. *Frontiers in Psychology, 14*. <https://doi.org/10.3389/fpsyg.2023.1285216>



- Naraindas, A. M., Moreno, M., & Cooney, S. M. (2024). Beyond gender: Interoceptive sensibility as a key predictor of body image disturbances. *Behavioral Sciences*, *14*(1). <https://doi.org/10.3390/bs14010025>
- Naumann, E., Tuschen-Caffier, B., Voderholzer, U., Schäfer, J., & Svaldi, J. (2016). Effects of emotional acceptance and rumination on media-induced body dissatisfaction in anorexia and bulimia nervosa. *Journal of Psychiatric Research*, *82*, 119–125. <https://doi.org/10.1016/j.jpsychires.2016.07.021>
- Orosz, G., Tóth-Király, I., & Bóthe, B. (2016). Four facets of Facebook intensity – the development of the multidimensional facebook intensity scale. *Personality and Individual Differences*, *100*, 95–104. <https://doi.org/10.1016/j.paid.2015.11.038>
- Pais-Ribeiro, J., Silva, I., Ferreira, T., Martins, A., Meneses, R., & Baltar, M. (2007). Validation study of a portuguese version of the hospital anxiety and depression scale. *Psychology, Health & Medicine*, *12*(2), 225–237. <https://doi.org/10.1080/13548500500524088>
- Paulus, M. P., & Stein, M. B. (2010). Interoception in anxiety and depression. In *Brain structure & function* (Vol. 214, Issues 5–6, pp. 451–463). <https://doi.org/10.1007/s00429-010-0258-9>
- Pedalino, F., & Camerini, A. L. (2022). Instagram use and body dissatisfaction: The mediating role of upward social comparison with peers and influencers among Young females. *International Journal of Environmental Research and Public Health*, *19*(3). <https://doi.org/10.3390/ijerph19031543>
- Penkal, J. L., & Kurdek, L. A. (2007). Gender and race differences in young adults' body dissatisfaction. *Personality and Individual Differences*, *43*(8), 2270–2281. <https://doi.org/10.1016/j.paid.2007.07.005>
- Pollatos, O., Kurz, A. L., Albrecht, J., Schreder, T., Kleemann, A. M., Schöpf, V., Kopietz, R., Wiesmann, M., & Schandry, R. (2008). Reduced perception of bodily signals in anorexia nervosa. *Eating Behaviors*, *9*(4), 381–388. <https://doi.org/10.1016/j.eatbeh.2008.02.001>
- Preston, C., & Ehrsson, H. H. (2014). Illusory changes in body size modulate body satisfaction in a way that is related to non-clinical eating disorder psychopathology. *PLoS ONE*, *9*(1). <https://doi.org/10.1371/journal.pone.0085773>
- Quittkat, H. L., Hartmann, A. S., Düsing, R., Buhlmann, U., & Vocks, S. (2019). Body dissatisfaction, importance of appearance, and body appreciation in men and women over the lifespan. *Frontiers in Psychiatry*, *10*. <https://doi.org/10.3389/fpsy.2019.00864>
- Raimo, S., Martini, M., Guariglia, C., Santangelo, G., Trojano, L., & Palermo, L. (2022). Editorial: Body representation and interoceptive awareness: Cognitive, affective, and social implications. In



<https://doi.org/10.3389/fpsyg.2022.928952>

- Riva, G., & Dakanalis, A. (2018). Altered processing and integration of multisensory bodily representations and signals in eating disorders: A possible path toward the understanding of their underlying causes. *Frontiers in Human Neuroscience*, 12. <https://doi.org/10.3389/fnhum.2018.00049>
- Robinson, E., Marty, L., Higgs, S., & Jones, A. (2021). Interoception, eating behaviour and body weight. *Physiology and Behavior*, 237. <https://doi.org/10.1016/j.physbeh.2021.113434>
- Rodgers, R. F., Lowy, A. S., Halperin, D. M., & Franko, D. L. (2016). A meta-analysis examining the influence of pro-eating disorder websites on body image and eating pathology. In *European Eating Disorders Review* (Vol. 24, Issue 1, pp. 3–8). John Wiley and Sons Ltd. <https://doi.org/10.1002/erv.2390>
- Rodrigues, F., Monteiro, D., Flores, P., & Forte, P. (2021). On redefining the body image satisfaction questionnaire: A preliminary test of multidimensionality. *Healthcare (Switzerland)*, 9(7). <https://doi.org/10.3390/healthcare9070876>
- Rounsefell, K., Gibson, S., McLean, S., Blair, M., Molenaar, A., Brennan, L., Truby, H., & McCaffrey, T. A. (2020). Social media, body image and food choices in healthy young adults: A mixed methods systematic review. In *Nutrition and Dietetics* (Vol. 77, Issue 1, pp. 19–40). Blackwell Publishing Ltd. <https://doi.org/10.1111/1747-0080.12581>
- Saiphoo, A. N., & Vahedi, Z. (2019). A meta-analytic review of the relationship between social media use and body image disturbance. In *Computers in Human Behavior* (Vol. 101, pp. 259–275). Elsevier Ltd. <https://doi.org/10.1016/j.chb.2019.07.028>
- Salvato, G., Romano, D., De Maio, G., & Bottini, G. (2020). Implicit mechanisms of body image alterations: The covert attention exposure effect. *Attention, Perception, and Psychophysics*, 82(4), 1808–1817. <https://doi.org/10.3758/s13414-019-01921-2>
- Sanzari, C. M., Gorrell, S., Anderson, L. M., Reilly, E. E., Niemiec, M. A., Orloff, N. C., Anderson, D. A., & Hormes, J. M. (2023). The impact of social media use on body image and disordered eating behaviors: Content matters more than duration of exposure. *Eating Behaviors*, 49. <https://doi.org/10.1016/j.eatbeh.2023.101722>
- Sarda, E., El-Jor, C., Shankland, R., Hallez, Q., Patiram, D., Nguyen, C., Duflos, N., Durand, Y., Pozo, G. Del, Ezan, P., Dechelotte, P., Rodgers, R., & Flaudias, V. (2025). Social media use and roles of self-objectification, self-compassion and body image concerns: a systematic review. *Journal of Eating Disorders*, 13(1), 192. <https://doi.org/10.1186/s40337-025-01353-4>



- Sharpe, H., Patalay, P., Choo, T. H., Wall, M., Mason, S. M., Goldschmidt, A. B., & Neumark-Sztainer, D. (2018). Bidirectional associations between body dissatisfaction and depressive symptoms from adolescence through early adulthood. *Development and Psychopathology, 30*(4), 1447–1458. <https://doi.org/10.1017/S0954579417001663>
- Sim, L., & Peterson, C. B. (2021). The peril and promise of sensitivity in eating disorders. *International Journal of Eating Disorders, 54*(11), 2046–2056. <https://doi.org/10.1002/EAT.23606>
- Spitzer, B. L., Henderson, K. A., & Zivian, M. T. (1999). Gender differences in population versus media body sizes: A comparison over four decades. *Sex Roles, 40*, 545–565. <https://doi.org/10.1023/a:1018836029738>
- Tanck, J. A., Vocks, S., Riesselmann, B., & Waldorf, M. (2019). Gender differences in affective and evaluative responses to experimentally induced body checking of positively and negatively valenced body parts. *Frontiers in Psychology, 10*(MAY). <https://doi.org/10.3389/fpsyg.2019.01058>
- Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Theory, assessment, and treatment of body image disturbance*. America Psychological Association.
- Thorup, L., Zulfikari, M., Sørensen, C. L. B., & Biering, K. (2024). Body image and depressive symptoms in danish adolescents: A cross-sectional national study. *Journal of Affective Disorders, 365*, 65–72. <https://doi.org/10.1016/j.jad.2024.08.016>
- Todd, J., Aspell, J. E., Barron, D., & Swami, V. (2019a). An exploration of the associations between facets of interoceptive awareness and body image in adolescents. *Body Image, 31*, 171–180. <https://doi.org/10.1016/j.bodyim.2019.10.004>
- Todd, J., Aspell, J. E., Barron, D., & Swami, V. (2019b). Multiple dimensions of interoceptive awareness are associated with facets of body image in British adults. *Body Image, 29*, 6–16. <https://doi.org/10.1016/j.bodyim.2019.02.003>
- Todd, J., Cardelicchio, P., Swami, V., Cardini, F., & Aspell, J. E. (2021). Weaker implicit interoception is associated with more negative body image: Evidence from gastric-alpha phase amplitude coupling and the heartbeat evoked potential. *Cortex, 143*, 254–266. <https://doi.org/10.1016/j.cortex.2021.07.006>
- Tsakiris, M., & Critchley, H. (2016). Interoception beyond homeostasis: Affect, cognition and mental health. *Philosophical Transactions of the Royal Society B: Biological Sciences, 371*(1708). <https://doi.org/10.1098/rstb.2016.0002>



- Tsakiris, M., Tajadura-Jiménez, A., & Costantini, M. (2011). Just a heartbeat away from one's body: Interoceptive sensitivity predicts malleability of body-representations. *Proceedings of the Royal Society B: Biological Sciences*, 278(1717), 2470–2476. <https://doi.org/10.1098/rspb.2010.2547>
- Van Dyck, Z., Vögele, C., Blechert, J., Lutz, A. P. C., Schulz, A., & Herbert, B. M. (2016). The water load test as a measure of gastric interoception: Development of a two-stage protocol and application to a healthy female population. *PLoS ONE*, 11(9). <https://doi.org/10.1371/journal.pone.0163574>
- Voges, M. M., Giabbiconi, C. M., Schöne, B., Waldorf, M., Hartmann, A. S., & Vocks, S. (2019). Gender differences in body evaluation: Do men show more self-serving double standards than women? *Frontiers in Psychology*, 10(MAR). <https://doi.org/10.3389/fpsyg.2019.00544>
- Wilmer, M. T., Anderson, K., & Reynolds, M. (2021). Correlates of quality of life in anxiety disorders: Review of recent research. In *Current Psychiatry Reports* (Vol. 23, Issue 11). Springer. <https://doi.org/10.1007/s11920-021-01290-4>
- Wolff, M., Morceau, S., Folkard, R., Martin-Cortecero, J., & Groh, A. (2021). A thalamic bridge from sensory perception to cognition. *Neuroscience and Biobehavioral Reviews*, 120, 222–235. <https://doi.org/10.1016/j.neubiorev.2020.11.013>
- World Health Organization. (2022). *World mental health report: Transforming mental health for all*. <https://www.who.int/publications/i/item/9789240049338>
- Wynne, C., Comiskey, C., & McGilloway, S. (2016). The role of body mass index, weight change desires and depressive symptoms in the health-related quality of life of children living in urban disadvantage: Testing mediation models. *Psychology and Health*, 31(2), 147–165. <https://doi.org/10.1080/08870446.2015.1082560>
- Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatr. Scand*, 67, 361–370. [https://doi.org/https://doi.org/10.1111/j.1600-0447.1983.tb09716.x](https://doi.org/10.1111/j.1600-0447.1983.tb09716.x)

P.PORTO

ESCOLA
SUPERIOR
DE SAÚDE



M

MESTRADO

TERAPIA OCUPACIONAL