THE ROLE OF MEDIA IN THE EMERGENCE AND TREATMENT OF EATING DISORDERS

Giovanni Pennisi

Abstract

In this paper I will propose an embodied approach to eating disorders, that is, an account that describes this class of pathologies as being characterized by the predominance of a detached (third-person) perspective towards one's own body. In order to do that, I will explore the literature on the effects that visual media (such as television, magazines, and social media) have on the emergence and worsening of eating disorders symptoms and predictors. I will argue that the exposure to such kind of media produces both an "internalization" of ideal models of corporeity and an "externalization" of one's own body image, that is, a perception of one's body as an external object. This idea is pivotal for two theoretical constructs, namely, the "self-objectification theory" and the "allocentric lock hypothesis". I will rely on the first one to clarify the nature of the correlation between the use of visual media and the onset of body image concerns such as body dissatisfaction, drive for thinness, and body surveillance; then, I will show why the second one has proved extremely useful in providing a solid theoretical background to the clinical treatment of eating disorders through Virtual Reality. Finally, I will explore the literature on the use of Virtual Reality to treat eating disorders, in order to show that the positive impact that this tool has on the clinical condition of the subjects is both an index of the urgence to intervene on the embodied aspects of the pathology, and a good starting point for rethinking the role that media might have in promoting a positive experience of one's corporeity.

Keywords: eating disorders, embodiment, self-objectification theory, allocentric lock hypothesis, Virtual Reality

INTRODUCTION

In a paper eloquently titled *Feeling oneself requires embodiment* (Michael *et al.* 2020), the authors stated that «embodiment is related to the experience of one's own body in the first-person perspective» (p. 8), showing that the spontaneous sensations we normally perceive are one of the ways in which such feeling of embodiment is produced.

Conversely, the condition in which «the subject of conscious experience is localized outside the person's bodily borders» (Blanke & Metzinger 2009, p. 8) can be addressed as *disembodiment*. Disembodiment is described as one of the core features of schizophrenia (Fuchs 2005; Stanghellini 2009; De Haan & Fuchs 2010), depersonalization/derealization disorder (Tanaka 2018; Patrikelis *et al.* 2021) and out-of-body experience (Irwin 2000; Blanke & Mohr 2005). Interestingly, and consistently with the adoption of the term "disembodiment" by those feminist theories that find a correlation between «the pervasive sexualization, objectification, and devaluation of girls and women and […] the fragmentation of women's experience within themselves» (McBride 2018, p. 13; see also Fisher 2000; Young 2005), the emergence of a third-person perspective towards one's own body has been investigated also in eating disorders: to mention a few examples, Stanghellini *et al.* (2012; 2015) defined eating disorders as a class of pathologies predominated by the dimension of the «lived-body-for-others»; Fredrickson & Roberts (1997) proposed the «self-objectification theory» (see also Calogero 2012; Calogero *et al.* 2011) to account for the adoption of a detached perspective on the body as opposed to a first-person stance «such that girls and women come to place greater value on how they look to others rather than on how they feel or what they can do» (Calogero 2012, p. 575); finally, Riva (2011; 2012; Riva *et al.* 2015) claims that patients suffering from eating disorders are lock to an allocentric position with respect to their body, that is to say, they experience it as an outside observer would rather than from an egocentric standpoint. According to the allocentric lock hypothesis, in eating disorders the body is not lived as the source from which all the somatoperceptions stems or the center to which they convey, but as an external entity that can only be represented through the distorted lens of the psychopathological condition.

In this paper I will dwell both on the self-objectification theory and the allocentric lock hypothesis to show that the application of these theoretical frameworks can positively contribute to the study of the relationship between media and eating disorders. In the past three decades, a large body of literature has assessed the repercussions that media have on the onset and worsening of eating disorders symptoms and predictors (Harrison & Cantor 1997; Becker & Hamburg 1996; Derenne & Beresin 2006; Morris & Katzman 2003; Constructed 2008); however, only a few of these studies have adopted an embodied

approach to eating disorders, describing them in terms of a shift from a first- to a third-person perspective towards one's own body.

The paper will be divided in two parts: first, I will focus on those studies that proved the correlation between the diffusion of media based on visual representation (such as television, magazines, music videos and, more recently, social networks) and the emergence and worsening of eating disorders symptoms and predictors, arguing that this is due both to an «internalization» of some models of corporeity and a process of «externalization» of one's body image. Then, I will explore the literature on the use of Virtual Reality (VR hereafter) to treat eating disorders, in order to show that the positive impact that this tool has on the clinical condition of the subjects is both an index of the urgency to intervene on the embodied aspects of the pathology and a good starting point for rethinking the role that media might have in promoting a positive experience of one's corporeity.

SELF-OBJECTIFICATION THEORY AND THE IMPACT OF VISUAL MEDIA

The self-objectification theory put forward by Fredrickson & Roberts (1997) posits that women in Western society are under the constant pressure of a sexually objectifying gaze. According to the authors, who draw from the background of feminist theories on socio-cultural disparities between the sexes (Bordo 1993; Smuts 1994), women and young girls are subject to a series of cultural practices and experiences that make them perceive their body not as the expression of their own identity, but rather as an object that must be evaluated only in terms of attractiveness and acceptability. The shift from the body-as-subject to the body-as-(sexual) object «is one of many cultural practices indicative of patriarchy» (Fredrickson & Roberts 1997, p. 281), and is a phenomenon that is deeply interrelated with the diffusion of certain kinds of ideal corporeity (usually, an ultra-thin one for females and a muscular one for males) fostered by the media.

Over the last three decades, a lot of studies addressed the role of media in promoting the emergence of body image concerns (for a review, see Hogan & Strasburger 2008), showing that the latter often lead to and precede abnormal eating behaviors. One of the most investigated forms of body image concern is body dissatisfaction, which is

proven to be a good predictor of eating disorders (Rohde *et al.* 2015) and associated with the development of depressive symptoms and binge eating (Dunkley *et al.* 2010). Many studies have demonstrated that the relationship between body dissatisfaction and eating disorders is mediated by the exposure to models of ideal corporeity that can be found in a huge variety of forms of entertainment: for example, Shaw (1995) and Tiggermann & McGill (2004) showed that adolescent girls are particularly sensitive to the images of thin and attractive women spread in fashion magazines, reporting negative feelings such as anxiety, an excessive tendency towards comparison, and an overall feeling of uneasiness about their body; Tiggerman & Slater (2004) and Bell *et al.* (2007) investigated the role that music videos featuring thin idealized women have in enhancing negative attitudes towards one's own body. They found out that this peculiar kind of entertainment is positively correlated with the drive for thinness – which is one of the primary indicators for anorexia nervosa – and that «adolescent girls exposed to thin models in music videos show a significantly larger increase in body dissatisfaction from pre- to post-exposure in comparison to girls who had listened to the songs without visual input» (p. 143); finally, Tiggermann & Pickering (1996) and Lavine *et al.* (1999) addressed the impact that TV shows and commercials have on body image concerns, i.e. indicating that the time spent watching soap operas and movies starring women in stereotyped roles is positively correlated to body dissatisfaction and that women exposed to sexually objectifying ads tend to judge their body sizes as larger than they actually are.

There are at least two interesting aspects shared by the above studies. The first is that they are all consistent with the self-objectification theory. What clearly emerges from this line of research, in fact, is that negative attitudes and feelings towards the body such as body dissatisfaction or drive for thinness are the outcome of an overall perception of the body as an object that must be evaluated and presented according to certain standards of visual attractiveness. However, it is important to highlight that the objectifying power of the ideal bodies displayed by mass media does not lie only in their sexual desirability, but also (and, perhaps, most importantly) in their being a form of representation that is completely detached from the identity of the subject. When the body of a model or an actress is "used" for advertising purposes or for perpetuating a stereotype of beauty, in fact, it ceases to be the bearer of one's identity and turns into a representation of a

status quo, an empty image that gets easily internalized by the most sensitive and susceptible subjects, such as children and adolescents[1]. As Calogero *et al.* (2005) put it,

> the viewing of sexually objectifying images of women in visual media (e.g., magazines, music videos, television shows) may be a contributing factor to the chronic viewing of *oneself* as a sexual object if those images become integrated into one's self-perception (p. 47, emphasis added).

I will come back to this issue below.

The second aspect underlying the studies that I mentioned is that they agree in describing the internalization of the others' body representations as one of the main causes behind body dissatisfaction. The internalization of the idealized images portrayed by the media is the process through which a subject embodies certain salient features of those images (such as the thinness or the overall shape of the model's body) and involuntarily recalls them during everyday life, letting them become a benchmark for the evaluation of one's own bodily appearance. This exacerbated tendency towards the (often unconscious) comparison with the images of the others' bodies is a distinctive hallmark of the relationship between young girls and the most influential form of mass media of our days, that is, social networks.

The first studies that addressed the correlation among the use of social networks, body image concerns, and the reinforcing of abnormal eating behaviors focused their attention on Facebook. In a study carried out by Mabe *et al.* (2014), the authors found that

> women with greater eating pathology not only reported spending more time on Facebook […], but also reported engaging in appearance-focused behaviors, such as comparing their appearance to friends' pictures and untagging photographs of themselves (p. 520).

The results of this study have been replicated and extended over the years. Fardouly & Vartanian (2015) showed not only that the relationship between Facebook usage and body image concerns is mediated by the tendency to compare one's look to the others' appearance, but also that the comparison with distant peers has a stronger influence on body image concerns than the comparison with models or celebrities. According to the authors, «this difference may be due to the appearance of distant peers being seen as more attainable than the

appearance of celebrities» (p. 86). Meier & Gray (2014) highlighted the importance of considering the differences between Facebook and traditional media, suggesting that the peculiar kinds of interaction allowed by Facebook (i.e. sharing and posting photos of oneself and friends, social grooming etc.) are linked to the emergence of body image disturbances more significantly than the total time spent navigating on it. Lastly, Kim & Chock (2015) not only replicated Meier's and Gray's results, showing that using Facebook for photo-based activities is associated with body image concerns more strongly than overall Facebook exposure, but also demonstrated a positive correlation between social grooming on Facebook and the drive for thinness, confirming that «social media tend to influence body image concerns via appearance comparison» (p. 337).

Consistently with the outcomes of the research carried out on Facebook usage, many authors found an association among the use of Instagram, body image disturbances and the emergence of eating disorders predictors. Unlike Facebook, Instagram is a social platform that is based exclusively on the production and the consumption of representational material, such as photos, videos, and "stories" (brief videos during which the user shares moments and events of his/her everyday life). Giving the peculiar nature and the success of Instagram, researchers wondered whether this social network could be related to the spread of maladaptive eating attitudes among young girls in Western societies and to the diffusion of body image concerns, such as body dissatisfaction and body surveillance. For example, Brown & Tiggermann (2016) examined the impact of the exposure to images of attractive celebrities in comparison to equally attractive unknown peers photos and travel images, showing that whereas the former two strongly correlated with the onset of negative mood and body dissatisfaction, the latter did not. These results proved not only the detrimental effects of a social comparison based exclusively on appearance, but also that the self-objectification theory is correct when it states that images in which the female body is the "product" generate body uneasiness more easily than images in which the body finds itself in a context that tells us something about the identity of the subject. In similar fashion, a study carried out by Cohen *et al.* (2017) demonstrated that following appearance-focused or "health and fitness" accounts on Instagram is associated with great levels of thin-ideal internalization, body surveillance and drive for thinness, stressing that these forms of body image

concerns are established risk factors for disordered eating (see p. 186). A research that goes in the same direction is the one by Fardouly *et al.* (2018), who found that "the internalization of the beauty ideal mediated the association between Instagram usage and self-objectification" (p. 1390), and claimed that, since

> the images posted on Instagram can be carefully selected, edited, enhanced and may contain idealized representations of women's physical appearance […] viewing images on Instagram might enhance the salience of the societal beauty ideal ultimately, thereby increasing the extent to which women internalize that beauty ideal (p. 1390).

Finally, Butkowski *et al.* (2019) showed that young girls who are particularly involved in selfie-sharing activities and attitudes such as investment in photo selection and editing are more likely to develop both disordered eating behaviors and an exacerbated tendency towards body surveillance, that is, a preoccupation with scrutinizing one's own appearance.

What emerges from the above studies, and especially the last one, is that the impact that social networks have on the emergence of body image disturbances and eating disorders predictors seems to be strictly related to the use that the subject makes of such platforms. In particular, it looks like being engaged in activities such as selfie sharing and editing is more strongly associated to the onset of an exaggerated proclivity towards body surveillance and self-monitoring. This last consideration allows to understand why it is important to apply the self-objectification theory to the field of social media. Compared to traditional media, in fact, social networks enable not only to internalize certain models of corporeity, but also to produce a huge amount of external images of oneself. The twofold internalization/externalization function of social networks accounts for the relationship between the objectification of the others' body and self-objectification as it is described by Calogero *et al.* (2012): it is likely that the more girls and women become accustomed to seeing the others' body as an object or a sexually connotated image, the more they will engage in appearance-based behavior and activities, thereby increasing the tendency towards the compulsive monitoring of their own look and self-distance. This point is perfectly consistent with the observations coming from some feminist theories on the body image (Young 1992; Bordo 1993; Weiss 1999) according to which the embodiment of an observer's gaze within

the perception of one's body is the fundamental issue underlying the condition of women in Western society. Against this background, it seems that social media do not play a positive role, since they push people towards the adoption of a third-person perspective, often fueling that sense of disembodiment that is both a typical trait of women's condition and a core symptom of eating disorders (Stanghellini *et al.* 2012; 2015).

VR AND THE ALLOCENTRIC LOCK HYPOTHESIS: RE-GAINING THE FIRST-PERSON PERSPECTIVE

The self-objectification theory is complementary to another hypothesis, put forward by Riva (2011; 2012; Riva *et al.* 2015), that is, the allocentric lock hypothesis. Both the theories posit that many body image disturbances and related psychopathologies such as eating disorders are rooted in an initial impairment in the perception of one's body, which can be described in terms of a shift from a first- to a third-person perspective towards it. However, whereas the self-objectification theory focuses especially on the sociocultural causes behind such a shift, the allocentric lock hypothesis addresses the cognitive mechanisms underlying it. Specifically, Riva claims that pathologies like eating disorders are marked by the predominance of an allocentric stance over an egocentric one.

According to Riva (2011; 2012; Riva *et al.* 2015), thus, there are two different frames of reference with respect to the body:

– The *egocentric frame* (or *field mode*): when we find ourselves in the egocentric frame, the body is lived as the source from which all the somatoperceptions stem and the center to which they convey. The egocentric frame corresponds to what I have referred to as the first-person perspective; in this modality, in fact, the way in which we gather sensorial inputs from the environment depends on the position of our body with respect to the surrounding and changes according to our movements. In the egocentric frame the body is experienced as a the "transparent medium of our being-in-the-world" (Fuchs 2018, p. 72).

– The *allocentric frame* (or *observer mode*): in the allocentric frame, the body is perceived as an object in the world, something that

is external to the self. This modality, in fact, accounts for the ways in which we conceptualize, judge, or mentally represent our own body, as if we were an outside observer. Importantly, the allocentric frame also involves the long-term memory about one's body: for example, an early trauma such as having been bullied during childhood could lead me to put myself in a position from which I judge my body to be fat, no matter what my physical appearance is. According to Riva, this is precisely what happens in eating disorders. Due to sociocultural pressure or traumatic experiences, in fact, at some point patients with eating disorders are «locked to an allocentric negative representation of their body that their sensory inputs are no more able to update even after a demanding diet and a significant weight loss» (Riva *et al.* 2015, p. 35). In a nutshell, a person who suffers from an eating disorder fails in estimating her body size and shape despite the changes that occur due to behaviors such as starvation and vomiting, because she finds herself stuck in a distorted representation of her body that can no longer be adjusted via the egocentric reference.

The allocentric lock hypothesis proved extremely useful in providing a solid theoretical background to the clinical treatment of eating disorders through VR (Perpiña *et al.* 2003; Riva *et al.* 2002; Riva 2011; Gutiérrez-Maldonado *et al.* 2016; Serino *et al.* 2016). VR is a virtual experience that "uses computer technology to create a simulated world that individuals can manipulate and explore as if they were in it" (Riva 2019, p. 7). VR has shown good efficacy for both relieving the symptoms of many pathologies, from anxiety disorders (Wiederhold & Wiederhold 2005; Carl *et al.* 2019; Freeman *et al.* 2017) to post-traumatic stress disorder (Difede & Hoffman 2002), and treating impairing phobias such as acrophobia (Opdyke *et al.* 1995) and flying phobia (Baños *et al.* 2002). The reasons behind the clinical success of such tool are to be found in its specific characteristics, which allow the subject to live an extremely immersive experience. VR, in fact, consists of a system made up by sensors (which register the position and movements of the subject's body), effectors (which stimulate the subject's senses) and a reality simulator – i.e. a head-mounted display with a small screen in front of the eyes – that, working together, are capable of recreating environments and situations that would be otherwise inaccessible or distressing for the individual (Zheng *et al.*, 1998). The reassuring aspect of VR is particularly relevant for its clinical usage.

According to Perpiña *et al.* (2003), the greatest advantage in relying on such a technology lies in the fact that it constitutes a "safe space" that the patients can explore and in which they are free to express actions, feelings and thoughts without fearing the consequences that they would suffer (or that they think they would suffer) in the real world. This sense of relief and protection, together with the interactivity of a context in which the patient has to actually move his/her body in order to achieve his/her goals, facilitates the emergence of

> the sensation of being present, surrounded by a reality whose perceptive indications are recognized by us, are found believable […], impact us emotionally, and get us to feel present (to be there) in a world that responds to our interaction with it (Botella *et al.* 1998, p. 77).

As I will state below, letting the patient regain the first-person perspective and the sense of being-there is a crucial step for the treatment of eating disorders.

Going back to the allocentric lock hypothesis, consistently with the observations coming from it, VR has been used to treat eating disorders by "adjusting" the wrong representation of the body through different strategies, such as recreating avatars that had sides and shapes similar to the ones of the subject, or recurring to the "body swapping", a method in which VR induces the illusory sensation of being the owner of a body with a different shape and/or size.

An example of the first strategy can be found in a study by Perpiña *et al.* (2003), in which the authors designed a virtual environment consisting of a kitchen where an avatar with proportions similar to those of the experimental subject could simulate actions such as eating healthy or fat foods. The purpose of the study was to help the participants (girls suffering from anorexia nervosa and bulimia nervosa) not to overestimate their weight after eating. The eighteen patients were randomly assigned to two different treatment conditions, only one of which involved the use of VR. After the participants completed the treatment, "those who had been treated with the VR component showed a significantly greater improvement in general psychopathology, eating disorders psychopathology, and specific BI variables" (p. 267). Among the several reasons given by the authors to explain the success of VR usage (see pp. 268-269), the one that is more consistent with the premises of the allocentric lock hypothesis is that VR allows the patient "to 'embody' her body image" (p. 268), that is to say, it rec-

reates a relatable first-person perspective and lets the patients experience the effects of their behavior from an egocentric and undetached point of view.

An example of the body swapping strategy can be found in a study by Serino *et al.* (2016), in which the authors asked the participants (21 female subjects) to retrieve the memory of their body (allocentric) representation and to estimate the width and circumference of different body parts – such as abdomen and hips – on the basis of the recalled memory; then, the authors asked the subjects to wear a head-mounted VR display that showed a virtual body with a skinny belly, inviting them to estimate the measures of shoulders, abdomen and hips of the body they were experiencing from an egocentric stance. Finally, the authors asked the participant to repeat the estimate of the measures of the retrieved body, in order to assess whether the embodiment of a body perceived from a first-person perspective changed the allocentric representation of the subject's actual body or not. The results showed that

> after participants embodied a virtual body with a skinny belly [...] there was an update of their «remembered body». Specifically, participants reported a decrease in the ratio between estimated and actual body measures for most of the body parts considered (p. 131).

Also in this case, the experimental outcomes prove the accuracy of the allocentric lock hypothesis, since they demonstrate how important it is to feel one with the body (even if this is just a virtual one) in order to reduce body uneasiness and self-distance.

CONCLUSION

The literature on the usage of VR to treat eating disorders shows how pointless it is to demonize the role that media play in Western society, rather emphasizing the urgency to analyze the impact that the different functions of media have on our cognition. The effectiveness that VR has in medical context is a perfect example of that, since it has implications that go beyond this field of research and sheds light on what a truly embodied approach to cognition should be all about: identifying the heterogenous conditions in which the discrepancy between body, consciousness and environment occurs, and providing theoretical and

empirical frameworks useful for preventing or mitigating the effects of such a phenomenon.

ENDNOTES

[1] In this respect, it is important to highlight that "although most people are aware of societal standards of beauty, not everyone internalizes those standards to the same degree, and it is those who do internalize the societal standards who are at greatest risk of body dissatisfaction and eating disorders" (Fardouly et al. 2018, p. 1381; see also Stice 2002).

REFERENCES

Baños, R.M., Botella, C., Perpiñá, C., Alcañiz, M., Lozano, J.A., Osma, J., Gallardo, M. (2002), *Virtual reality treatment of flying phobia*, in «IEEE Transactions on Information Technology in Biomedicine», 6(3), 206-212.

Becker, A.E., Hamburg, P. (1996), *Culture, the media, and eating disorders*, in «Harvard Review of Psychiatry», 4(3), 163-167.

Bell, B.T., Lawton, R., Dittmar, H. (2007), *The impact of thin models in music videos on adolescent girls' body dissatisfaction*, in «Body image», 4(2), 137-145.

Blanke, O., Metzinger, T. (2009), *Full-body illusions and minimal phenomenal selfhood*, in «Trends in cognitive sciences», 13(1), 7-13.

Blanke, O., Mohr, C. (2005), *Out-of-body experience, heautoscopy, and autoscopic hallucination of neurological origin: Implications for neurocognitive mechanisms of corporeal awareness and self-consciousness*, in «Brain research reviews», 50(1), 184-199.

Bordo, S. (1993), *Unbearable weight: Feminism, Western culture and the body*. Berkeley: Univ. of California Press.Fine modulo

Botella, C., Perpiña , C., Baños, R., Garcia-Palacios, A. (1998), *Virtual reality: A new clinical setting lab*, in G. Riva, B.K. Wiederhold, E. Molinari (eds),*Virtual environments in clinical psychology and neuroscience*, Amsterdam, IOS Press, pp. 73-81.

Brown, Z., Tiggemann, M. (2016), *Attractive celebrity and peer images on Instagram: Effect on women's mood and body image*, in «Body image», 19, 37-43.

Butkowski, C.P., Dixon, T.L., Weeks, K. (2019), *Body surveillance on Instagram: examining the role of selfie feedback investment in young adult women's body image concerns*, in «Sex Roles», 81(5-6), 385-397.

Calogero, R.M. (2012), *Objectification theory, self-objectification, and body image*, in T. Cash (ed.), *Encyclopedia of Body Image and Human Appearance*, Ox-

ford, Academic Press, pp. 574-580.

Calogero, R.M., Davis, W.N., Thompson, J.K. (2005), *The role of self-objectification in the experience of women with eating disorders*, in «Sex roles», 52(1-2), 43-50.

Calogero, R.M., Tantleff-Dunn, S., Thompson, J.K. (2011), *Objectification theory: An introduction*, in R. Calogero, S. Tantleff-Dunn, J.K. Thompson (eds.), *Self-objectification in women: Causes, consequences, and counteractions*, Washington, DC, American Psychological Association, pp. 3-21.

Carl, E., Stein, A.T., Levihn-Coon, A., Pogue, J.R., Rothbaum, B., Emmelkamp, P., Powers, M.B. (2019), *Virtual reality exposure therapy for anxiety and related disorders: A meta-analysis of randomized controlled trials*, in «Journal of anxiety disorders», 61, 27-36.

Cohen, R., Newton-John, T., Slater, A. (2017), *The relationship between Facebook and Instagram appearance-focused activities and body image concerns in young women*, in «Body Image», 23, 183-187.

Constructed, H. (2008), *Body image, eating disorders, and the media*, in «Adolesc. Med.», 19, 521-546.

De Haan, S., Fuchs, T. (2010), *The ghost in the machine: disembodiment in schizophrenia. Two case studies*, in «Psychopathology», 43(5), 327-333.

Derenne, J.L., Beresin, E.V. (2006), *Body image, media, and eating disorders*, in «Academic psychiatry», 30(3), 257-261.

Difede, J., Hoffman, H.G. (2002), *Virtual reality exposure therapy for World Trade Center post-traumatic stress disorder: A case report*, in «Cyberpsychology & behavior», 5(6), 529-535.

Dunkley, D.M., Masheb, R.M., Grilo, C.M. (2010), *Childhood maltreatment, depressive symptoms, and body dissatisfaction in patients with binge eating disorder: The mediating role of self-criticism*, in «International Journal of Eating Disorders», 43(3), 274-281.

Fardouly, J., Vartanian, L.R. (2015), *Negative comparisons about one's appearance mediate the relationship between Facebook usage and body image concerns*, in «Body image», 12, 82-88.

Fardouly, J., Willburger, B.K., Vartanian, L.R. (2018), *Instagram use and young women's body image concerns and self-objectification: Testing mediational pathways*, in «New Media & Society», 20(4), 1380-1395.

Fisher, L. (2000), *Phenomenology and feminism: Perspectives on their relation*, in L. Fisher, L. Embree (eds.), *Feminist Phenomenology,* Dordrecht, Kluwer Academic Publishers, pp. 17-38.

Fredrickson, B.L., Roberts, T., Noll, S.M., Quinn, D.M., Twenge, J.M. (1998), *That swimsuit becomes you: Sex differences in self-objectification, restrained eating, and math performance*, in «Journal of Personality and Social Psychology», 75(1), 269-284.

Freeman, D., Reeve, S., Robinson, A., Ehlers, A., Clark, D., Spanlang, B., Slater, M. (2017), *Virtual reality in the assessment, understanding, and treatment of mental health disorders*, in «Psychological medicine», 47(14), 2393-2400.

Fuchs, T. (2005), *Corporealized and disembodied minds: a phenomenological view of the body in melancholia and schizophrenia*, in «Philosophy, Psychiatry, & Psychology», 12(2), 95-107.

Fuchs, T. (2018), *Ecology of the brain: The phenomenology and biology of the embodied mind*, Oxford, Oxford University Press.

Gutiérrez-Maldonado, J., Wiederhold, B.K., Riva, G. (2016), *Future directions: How virtual reality can further improve the assessment and treatment of eating disorders and obesity*, in «Cyberpsychology, Behavior, and Social Networking», 19(2), 148-153.

Harrison, K., Cantor, J. (1997), *The relationship between media consumption and eating disorders*, in «Journal of communication», 47(1), 40-67.

Irwin, H.J. (2000), *The disembodied self: An empirical study of dissociation and the out-of-body experience*, in «The Journal of Parapsychology», 64(3), 261-276.

Kim, J.W., Chock, T.M. (2015), *Body image 2.0: Associations between social grooming on Facebook and body image concerns*, in «Computers in Human Behavior», 48, 331-339.

Lavine, H., Sweeney, D., Wagner, S.H. (1999), *Depicting women as sex objects in television advertising: Effects on body dissatisfaction*, «Personality and social psychology bulletin», 25(8), 1049-1058.

Mabe, A.G., Forney, K.J., Keel, P.K. (2014), *Do you "like" my photo? Facebook use maintains eating disorder risk*, in «International Journal of Eating Disorders», 47(5), 516-523.

McBride, H.L. (2018), *Embodiment and Body Image: Relating and Exploring Constructs*, in H.L. McBride, J.L. Kwee (eds.), *Embodiment and Eating Disorders*, New York, Routledge, pp. 6-16.

Meier, E.P., Gray, J. (2014), *Facebook photo activity associated with body image disturbance in adolescent girls*, in «Cyberpsychology, Behavior, and Social Networking», 17(4), 199-206.

Michael, G. A., Guyot, D., Tarroux, E., Comte, M., Salgues, S. (2020), *Feeling oneself requires embodiment: insights from the relationship between own-body transformations, schizotypal personality traits, and spontaneous bodily sensations*, in «Frontiers in psychology», 11.

Morris, A.M., Katzman, D.K. (2003), *The impact of the media on eating disorders in children and adolescents*, in «Paediatrics & child health», 8(5), 287-289.

Opdyke, D., Williford, J.S., North, M. (1995), *Effectiveness of computer-generated (virtual reality) graded exposure in the treatment of acrophobia*, in «Am. J. psychiatry», 1(152), 626-628.

Patrikelis, P., Konstantakopoulos, G., Messinis, L., Alexoudi, A., Stefanatou, M., Nasios, G., Gatzonis, S. (2021), *Adaptive immersive Virtual Environments as a treatment for depersonalization disorder*, in «Psychiatrike=Psychiatriki», 32(4), 317-327.

Perpiñá, C., Botella, C., Baños, R.M. (2003), *Virtual reality in eating disorders*, in «European Eating Disorders Review: The Professional Journal of the Eating Disorders Association», 11(3), 261-278.

Riva, G. (2011), *The Key to Unlocking the Virtual Body: Virtual Reality in the Treatment of Obesity and Eating Disorders*, in «Journal of Diabetes Science and Technology», 5(2), 283-292.

Riva, G. (2012), *Neuroscience and eating disorders: The allocentric lock hypothesis*, in «Medical Hypotheses», 78(2), 254-257.

Riva, G., Wiederhold, B. K., Mantovani, F. (2019), *Neuroscience of virtual reality: from virtual exposure to embodied medicine*, in «Cyberpsychology, Behavior, and Social Networking», 22(1), 82-96.

Riva, G., Bacchetta, M., Baruffi, M., Molinari, E. (2002), *Virtual-reality-based multidimensional therapy for the treatment of body image disturbances in binge eating disorders: a preliminary controlled study*, in «IEEE Transactions on Information Technology in Biomedicine», 6 (3), 224-234.

Riva, G., Gaudio, S., Dakanalis, A. (2015), *The neuropsychology of self-objectification*, in «European Psychologist», 34-43.

Rohde, P., Stice, E., Marti, C.N. (2015), *Development and predictive effects of eating disorder risk factors during adolescence: Implications for prevention efforts*, in «International Journal of Eating Disorders», 48(2), 187-198.

Serino, S., Pedroli, E., Keizer, A., Triberti, S., Dakanalis, A., Pallavicini, F., Riva, G. (2016), *Virtual reality body swapping: a tool for modifying the allocentric memory of the body*, in «Cyberpsychology, Behavior, and Social Networking», 19(2), 127-133.

Shaw, J. (1995), *Effects of fashion magazines on body dissatisfaction and eating psychopathology in adolescent and adult females*, in «European Eating Disorders Review», 3(1), 15-23.

Smuts, B. (1995), *The evolutionary origins of patriarchy*, in «Human Nature», 6(1), 1-32.

Stanghellini, G. (2009), *Embodiment and schizophrenia*, in «World Psychiatry: Official Journal of the World Psychiatric Association» (WPA), 8(1), 56-59.

Stanghellini, G., Castellini, G., Brogna, P., Faravelli, C., Ricca, V. (2012), *Identity and eating disorders (IDEA): a questionnaire evaluating identity and embodiment in eating disorder patients*, in «Psychopathology», 45(3), 147-158.

Stanghellini, G., Trisolini, F., Castellini, G., Ambrosini, A., Faravelli, C., Ricca, V. (2015), *Is feeling extraneous from one's own body a core vulnerability feature in eating disorders?*, in «Psychopathology», 48(1), 18-24.

Stice, E. (2002), *Risk and maintenance factors for eating pathology: a meta-analytic review*, in «Psychological bulletin», 128(5), 825-848.

Tanaka, S. (2018), What is it like to be disconnected from the body?: A phenomenological account of disembodiment in depersonalization/derealization disorder, in *Journal of Consciousness Studies*, 25(5-6), 239-262.

Tiggemann, M., McGill, B. (2004), *The role of social comparison in the effect of magazine advertisements on women's mood and body dissatisfaction*, in «Journal of Social and Clinical Psychology», 23(1), 23-44.

Tiggemann, M., Pickering, A.S. (1996), *Role of television in adolescent women's body dissatisfaction and drive for thinness*, in «International Journal of Eating Disorders», 20(2), 199-203.

Tiggemann, M., Slater, A. (2004), *Thin ideals in music television: A source of social comparison and body dissatisfaction*, in «International Journal of Eating Disorders», 35(1), 48-58.

Weiss, G. (1999), *Body images: Embodiment as intercorporeality*, New York: Routledge.

Wiederhold, B.K., Wiederhold, M.D. (2005), *Virtual reality therapy for anxiety disorders: Advances in evaluation and treatment*, Washington, DC, American Psychological Association.

Young, I.M. (1992), *Breasted experience: The look and the feeling*, in D. Leder (ed.), *The body in medical thought and practice*, Dordrecht, Kluwer Academic Publishers, pp. 215-230.

Young, I.M. (2005), *On female body experience: "Throwing like a girl" and other essays*, New York, Oxford University Press.

Zheng, J.M., Chan, K.W., Gibson, I. (1998), *Virtual reality*, in «Ieee Potentials», 17(2), 20-23.

Giovanni Pennisi
University of Turin
Department of Philosophy and Education Sciences
Palazzo Nuovo, Via Sant'Ottavio, 20 - 10124, Turin, Italy
g.pennisi@unito.it