



Article

Embodied well-being through two media technologies: Virtual reality and social media

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Abstract

How the body is perceived through media is key to many well-being interventions. Researchers have examined the effects of platforms on users' self-perceptions, including immersive virtual reality, nonimmersive virtual worlds, and social media such as Facebook. In this article, we use several conceptions of levels of embodiment to compare empirical work on the effects of virtual reality and social media as they relate to perceptions and conceptions of the self and body. We encourage social media researchers to utilize research on embodiment in virtual reality to help frame the effects of social media use on well-being. Similarly, researchers in immersive media should consider the opportunities and risks that may arise as embodied experiences become more social. We conclude our discussion with implications for future applications in mental health.

Keywords

Embodiment, self-presence, social media, virtual reality, well-being

Introduction

Self-representation in media environments has been a topic of great interest for media and communication scholars. As humans, we understand ourselves through our interactions with the environment; and the corporeal body is often the subject of such interactions (Riva et al., 2016). However, in technologies such as social media and virtual reality (VR), physical bodies are replaced by virtual bodies (Riva et al., 2016: 10). Self-

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representations (e.g. text, audio, images, avatars) become the subject, highlighting certain aspects of the self and concealing others.

The role of the body in mediated experiences is critical to understanding media effects on well-being (Behm-Morawitz, 2013; Vara et al., 2016). Past work has shown that discrepancies between digital representations and one's physical body can be associated with negative outcomes (e.g. social media; De Vries and Kühne, 2015). For example, a recent article published in *JAMA* reports that 55% of plastic surgeons see patients seeking surgery to improve their appearance in social media selfies (Rajanala et al., 2018). In this condition, "Snapchat Dysmorphia," individuals seek to modify their physical body in a way that is detrimental to their physical health to be rendered more favorably in digital self-representations. However, making the difference between one's physical and representative body (e.g. avatar) size salient is also a therapeutic use of immersive VR, as it can cause an update in stored representations of the body, thereby improving clinical outcomes (Serino et al., 2016). How should we understand these two contrasting effects of embodiment through media?

In this article, we explore embodiment in two increasingly ubiquitous media technologies, VR and social media. We discuss what aspects of the self these platforms make salient and how the kinds of embodiment they afford are associated with well-being in the context of mental health. We suggest utilizing previous research on embodied behaviors in VR to study the potential of social media platforms in this domain. At the same time, researchers in immersive media should consider the opportunities and risks that may arise as embodied experiences become more social. Understanding how self-representations can affect well-being in both cases can improve our ability to design for positive experiences and to anticipate effects of novel environments such as social VR. We conclude by discussing opportunities to target specific mechanisms to initiate positive well-being.

Different levels of the self and self-presence

Many models of embodiment describe the self as an integration of a social or conceptual self and a physical self (see Damasio, 1999; Riva, 2018). Damasio's (1999) neuroscientific framework characterizes embodiment at three levels: (1) *proto-self*, an unconscious sense of being and body schema; (2) *core self*, an emotional self that includes physiological reactions arising through interactions with the environment; and (3) *extended self* that refers to identity constructed from memories and social interaction. A more recent model of body memory elaborates on Damasio's framework and suggests that the self is comprised of six body representations that follow a developmental trajectory (Riva, 2018). The most basic level of self, the proto-self, is associated with minimal selfhood (sentient body) and, with the core self, provides the basis for *the phenomenological experience of the body*. The core self includes the conscious experience of the body in space (spatial body) and agentic action in the environment (active body). Interventions in VR often involve manipulations of these lower levels of embodiment. By contrast, the extended self corresponds to *reflective knowledge about the body* and consists of a whole-body representation (personal body), an objectified view of the self (objectified body), and evaluations toward one's self (social body); for

example, body satisfaction). Together, these higher level dimensions of embodiment are influenced by others' perceptions and representations of the body and form *body image*, which has been central to research on the effects of social media on well-being (Riva, 2018: 243; see Riva, 2018 for further elaboration).

Early work on embodiment through media focused on how the body is rendered in nonimmersive (Ratan, 2013) and immersive virtual environments (Riva et al., 2017) through *avatars*—digital representations of users (Fox and Ahn, 2013; Nowak and Fox, 2018). For example, Ratan (2013) employed Damasio's (1999) framework to elucidate the effects of avatar embodiment on gamers' perceptions of self-presence, "the extent to which some aspect of a person's media use is relevant to the self" (Ratan, 2013: 323). When a user controls an avatar from the first-person perspective, the interface and representation are more closely integrated into the body schema (e.g. proto-self-presence) relative to viewing an avatar from the third person perspective (Ratan, 2013). However, modifying one's avatar through customization makes the conceptual self and identity salient (e.g. extended self-presence, Ratan, 2013, similar to self-relevance in Ratan and Sah, 2015 and Ratan and Dawson, 2016). Thus, different media affordances affect our experience of the self at different levels.

Virtual Reality (VR)

In the following section, we focus on how VR has been leveraged to induce "body illusions," or controlled changes to lower level embodiment, and how these changes may subsequently affect perceptions of the body, emotion, and identity (Gonzalez-Franco and Lanier, 2017; Riva, 2008). We follow with some specific examples of how they have been applied in the context of health and well-being. As VR becomes more accessible, and less expensive, its potential to benefit well-being further by addressing less acute conditions will increase (Plante et al., 2003).

Body ownership illusions

Body illusions manipulate one's sense of ownership of the body (self-identification), body location (self-location), or frame of reference (Blanke, 2012). This research builds on the neuroscientific view that the body is experienced through the brain's integration and encoding of multiple sensory systems (Riva et al., 2017). Body illusions are induced through creating controlled disagreement in the predicted and actual sensory inputs—usually involving conflicts in visual and tactile cues (Riva et al., 2017). In an effort to correct this induced conflict, the brain reassesses and updates sensory organization, which can result in changes to the internal or external representations of the body (Riva et al., 2017).

Rubber hand and full body illusions. One illusion that has informed much work in VR is the "rubber hand illusion" (Botvinick and Cohen, 1998; Slater et al., 2009). In this task, an individual views a fake rubber, or virtual, hand being stroked simultaneously with their own hidden hand. Synchronous visual and tactile cues conflict with the felt position of the hand and, in an effort to correct this, the brain integrates visual and tactile information at the position of the rubber hand, inducing a strong sense of ownership over the fake

hand (Slater et al., 2009). Similar visuo-tactile methods have been used to induce full body illusions (e.g. body swap or body transfer; Petkova and Ehrsson, 2008). Importantly, these illusions diminish when tactile cues are asynchronous—correlations in movement or touch are integral to the illusion’s induction (Slater et al., 2009). This work highlights how responsive our body schema is to conflicts in internal and external cues and how media can be leveraged to induce such conflicts.

Location and out-of-body illusions. Illusions can also involve changes in perceived body location. Such illusions usually include integration of multisensory inputs and manipulations to an egocentric (first-person) perspective corresponding to the felt sense of the body (e.g. proto- and core self-presence) and an allocentric (third person) perspective driven by extended self-presence (Riva, 2011: 285). Lenggenhager et al. (2007) conducted an experiment where participants saw themselves from an allocentric perspective. An experimenter touched the participant’s back while the participant observed a video feed of their back projected a few meters in front of them through the VR headset. This resulted in participants feeling like they were at the location of the touch—that is, the body and sense of touch were projected in space (Lenggenhager et al., 2007). Similar methods have been used to induce out-of-body experiences wherein a participant “disowns” his or her physical body and takes on ownership of an unseen body at a new location (Guterstam and Ehrsson, 2012). These effects are corroborated with physiological evidence, suggesting that these inductions affect the core self. When a participant’s actual (disowned) body is threatened, he or she does not experience arousal—a sign that he or she did indeed dissociate from his or her body through this illusion.

Applications to health and well-being. Historically, VR interventions have been limited to specific severe conditions, including posttraumatic stress disorder (Rizzo et al., 2010), substance abuse disorder (Bordnick et al., 2008), anxiety (Oprış et al., 2012), and phobias (Botella et al., 2017). While many of these uses involve exposing the user to content-simulating external realities, other interventions focus chiefly on altering internal perceptions of the body. We discuss how VR has been leveraged to induce controlled changes to the body and some effects relevant to well-being below.

Mirror therapy. A noted application of VR for health is mirror visual feedback therapy (MVF). While initially executed with a mirror box for individuals who experience a painful “phantom” limb after amputation (Ramachandran and Altschuler, 2009), recent studies have used VR for more flexible interventions (Barton et al., 2014; Eng et al., 2007). Patients are instructed to move both their uninjured and phantom limb while the movements of their actual limb are visually mirrored to the location of the phantom limb. Incorporating the mirrored limb into their body schema, and regaining apparent control over the limb, may prompt a reorganization of somatosensory pathways, leading to decreased pain (Ramachandran and Altschuler, 2009). Mirror therapy has been used to treat other chronic pain conditions including complex regional pain syndrome (Boesch et al., 2016), and preliminary work suggests MVF may also be therapeutic for fibromyalgia (Ramachandran and Seckel, 2010) and restoring motor function from stroke (Sutbeyaz et al., 2007).

Body image and body rescripting. VR is also used in the treatment of body image distortions and eating disorders (see Ferrer-Garcia et al., 2013). In this research, an individual's point of view is manipulated to elicit changes in both the perceptual self, at the level of the body schema, and the conceptual self, at the level of the body image (Riva, 2008).

Some scholars suggest that the etiology of eating disorders includes changes in hippocampal activity due to trauma, which result in an inability to integrate egocentric and allocentric perspectives of the body (Riva, 2011; Serino et al., 2016). Essentially, a person becomes locked into viewing his or her body from an observer's perspective. In a study by Serino et al. (2016), individuals with eating disorders were embodied in an avatar and viewed a thin stomach in place of their actual stomach. Seeing the thin stomach caused a violation in the stored memory of the body, such that participants experienced a significant correction in their distorted body image (Serino et al., 2016). This inconsistency opened the opportunity for a therapeutic protocol called body rescripting, a cognitive therapy framework developed for eating disorders (Riva, 2008) wherein an individual is guided through triggering experiences in VR and confronts negative emotions toward the body while switching between egocentric and allocentric perspectives (Riva, 2011). This protocol has been associated with increased body satisfaction, self-efficacy, motivation to change, reduced bingeing behaviors, and improved coping strategies (Serino et al., 2016).

Notably, all of the aforementioned inductions begin with lower level body representations highlighting proto- and core self-presence to alter or rearrange how one perceives and feels toward the body. We now discuss how social media impact affect toward the self and how one perceives bodily sensations through extended self-presence.

There are important differences between social media and VR as they are currently experienced. First, in contrast to VR, traditional social media sites do not generally allow for full embodiment (though this is changing; see discussion) and thus users' experiences of the self are often from an observer's, or third-person, perspective. Second, social media are inherently *social*, so additional effects are generated by the presence of, and feedback from, others. Finally, much work in VR has sought to change one's relation with the body through experimental manipulations. In contrast, while social media sites have generated a great deal of attention for their impact on social and emotional well-being (Toseeb and Inkster, 2015; Verduyn et al., 2017), research more commonly attends to latent qualities that impact body image and affect.

Social media

Social media allow individuals to construct a profile within a given platform, connect with other users, and examine the connections they and others make in that platform (Boyd and Ellison, 2007: 211). The research that most explicitly addresses the body in this context focuses on interactions between the core and extended selves, or emotions and assessments of one's identity and body image. Social media brings heightened salience and criticism to the body (Meier and Gray, 2014). Time spent on social media has been associated with body dissatisfaction, internalization of body ideals, and self-objectification across age groups and genders (Fardouly and Vartanian, 2016; Meier and Gray, 2014). It is also independently linked to body surveillance, heightened focus on the body, and frequent body checking offline (Vandenbosch and Eggermont, 2012). In what

follows, we will discuss three dominant lines of research that relate to how we perceive or conceive of the body through social media use and how these relate to well-being. These are self-presentation, social comparison, and self-objectification.

Self-presentation

Computer-mediated communication through platforms such as social media allows presentation of ideal versions of the self (Walther, 1996). Although individuals typically present themselves truthfully (Back et al., 2010), they often emphasize certain characteristics and conceal others in an effort to manage their impressions on others (Chou and Edge, 2012). Self-presentations not only affect how one is perceived by his or her audience, but also how one perceives oneself (Valkenburg, 2017). In fact, exposure to one's social media profile can have an affirmative function (Toma and Hancock, 2013). Gonzales and Hancock (2011) found that viewing one's own Facebook profile boosted self-esteem, while viewing one's own reflection in a mirror did not. Moreover, among Facebook viewers, positive effects were enhanced for those who stayed on their page or made active changes to their own profile (Gonzales and Hancock, 2011). These findings highlight a potentially unique, and positive, effect of reflecting on, or constructing, one's own self-presentation.

As social media platforms evolve, additional affordances such as filters, wherein users can modify their image before sharing, increase the flexibility of self-presentation. A popular form of self-presentation on social media sites is the "selfie" (McLean et al., 2015; Murray, 2015). In contrast to the Gonzales and Hancock study cited above, Mills et al. (2018) found that posting selfies can have harmful effects on mood and body image. The researchers asked participants to take a selfie and upload it to their preferred social media site. Compared with a control group who did not take, or upload, a selfie, all other participants reported increases in anxiety and decreases in confidence and perceived physical attractiveness. Thus, even when media environments are augmented for ideal presentation, common self-presentation strategies can have aversive effects on well-being.

Online self-presentation can also aid self-understanding (Tucker and Goodings, 2014). By curating social media profiles, individuals can test new identities that consequently influence how they understand themselves offline. Research suggests that these public self-presentations can amplify commitment to expressed attributes (Carr and Foreman, 2016; Gonzales and Hancock, 2008) and confirmatory feedback from peers can augment effects (Valkenburg, 2017). For example, Gonzales and Hancock (2008) found evidence for offline "identity shifts" due to enacted behaviors on social media. In their study, participants were asked to present themselves as either extroverted or introverted, and in a public (social media) or private condition. Findings revealed that participants in the public condition internalized the traits that they were asked to emphasize, potentially leading to more perceived introversion and extroversion outside of social media (Gonzales and Hancock, 2008).

Social comparison processes

Social media presentations are visible to a large audience, making the role of others highly salient (Valkenburg and Peter, 2011). Thus, mechanisms such as behavioral confirmation and social comparison are key to the effects of social media use on well-being.

Indeed, much of the time spent on these sites consists of consuming other's content (Pempek et al., 2009) and the presence of others heightens self-awareness and concerns for others' perceptions (Leary and Kowalski, 1990).

Social media provide fertile grounds for self-relevant social comparisons—one mechanism through which social media affects well-being (De Vries and Kühne, 2015; Vogel et al., 2014). For example, upward social comparisons have been associated with diminished self-esteem (Vogel et al., 2014), increased negative affect (Wang et al., 2017), and envy (Appel et al., 2015). In one study, Hafèrkamp and Krämer (2011) found large discrepancies in perceptions of ideal and actual bodies after women viewed an attractive social media profile.

Appearance-based comparisons, wherein an individual compares his or her appearance with a peer's on social media, can directly affect body satisfaction (Fardouly and Vartanian, 2016). However, not all work has found this effect (Ferguson et al., 2014) and other work shows that the effect occurs over time, not with one exposure (De Vries et al., 2016). Moreover, individuals with preexisting vulnerabilities to body image disturbance (e.g. low body esteem) are likely most susceptible to negative consequences of comparison on these sites (Perloff, 2014).

When coupled with the idealism of online presentations, comparisons with peers can lead to striving toward unattainable standards (Manago et al., 2015). It is not surprising, then, that many individuals report feeling worse off after having visited social media (Chou and Edge, 2012; Vogel et al., 2014). For example, a survey issued by De Vries and Kühne (2015) revealed a relationship between negative social comparisons and perceived social competence and physical attractiveness. When individuals felt worse off relative to their peers, their perceptions about their body's attractiveness and social skills were also quite low.

The aforementioned research suggests that self-presentation purposes underlie social media use and individuals often engage in social comparison processes to understand themselves and evaluate their bodies in relation to others. More traditional research on media has sought to intervene in the social comparative process to mitigate harmful effects on body image (Posavac et al., 2001); however, we are not aware of similar interventions through social media at this time.

Self-objectification

Self-objectification theory (Fredrickson and Roberts, 1997) states that "individuals who experience or observe instances of the body predominantly being valued for its use to others may begin observing their own bodies from the perspective of an observer" (Vandenbosch and Eggermont, 2016: 1118). This observer perspective, in combination with viewing the body as an object, has been linked to diminished sensitivity to internal bodily cues, poor body image, and body shame (Moradi and Huang, 2008; Roberts and Waters, 2004).

While self-objectification has been studied extensively in traditional media formats (e.g. magazines, music videos), recent attention has turned to social media. The very nature of social media—predominantly an image and text-based platform—requires a specific type of self-focus that may encourage individuals to see themselves as objects or

enhance disembodiment where the body “is experienced from the outside looking in” (Manago et al., 2015: 10). Indeed, higher objectified body consciousness has been associated with Facebook use, for both men and women (Manago et al., 2015).

In one study, young women who believed they were portraying themselves to others online (particularly after being primed with objectifying content) experienced higher levels of self-objectification (De Vries, 2014). Vandenbosch and Eggermont (2012) similarly found that exposure to sexually objectifying content through Facebook’s newsfeed was linked to increased body surveillance and prioritizing appearance among adolescent girls. An objectified perspective of the body is particularly detrimental for individuals who have internalized an ideal body. For example, a longitudinal study found that the internalization of body image predicted self-objectification and body surveillance (Vandenbosch and Eggermont, 2016). Summarily, social media use may contribute to an objectified self-view that can lead to negative affect and concerns about the body and body image. Positive effects associated with objectification are underresearched at this point.

Applications to health and well-being

As the foregoing review highlights, social media can have a profound impact on one’s self-esteem, body regard, and identity. Unlike VR, social media is not currently being used to directly modify self-representation for therapeutic ends. Indeed, there is a notable dearth in research aiming to elicit or encourage positive self-body relations using social media. We will briefly discuss existing work related to social media and well-being, and then discuss new opportunities that may arise as social media and VR merge.

Social media interventions for well-being

Areas for interventions through social media for well-being include social support (Ali et al., 2015), delivering health information (Kim et al., 2017), and identifying at-risk individuals (De Choudhury et al., 2014). Existing interventions capture behavioral traces from social media from which to infer health status and prompt action. While these areas of research are important and shed light on how we can leverage social media sites for more positive health outcomes, they do not focus explicitly on harnessing various levels of self-presence to encourage positive understanding of the body/self. However, a careful consideration of how embodiment is occurring through social media and affecting well-being could inform future designs and interventions.

Merging environments

In addition to the merit of understanding these two technologies independently through the lens of embodiment, we must also consider how these platforms are converging. Some examples of embodied VR platforms, such as High Fidelity and Sansar, are related to older nonimmersive social virtual worlds, like Second Life. Other mainstream social media platforms (e.g. Facebook *Spaces*, Altspace VR) are beginning to incorporate embodied VR into the overall experience, allowing users to experience their social network from an immersive first-person perspective.

There is a noted dearth of literature on social VR because the technology is currently under development and fully immersive systems have not yet become mainstream. At the time of writing, a search of related terms returned under 60 articles mostly focused on user experience, privacy, and ethical concerns (e.g. Tromp et al., 2018). Thus, few articles have considered the psychological impact of social VR on well-being. However, early versions of social VR are already being employed in treatment settings (Loiacono et al., 2018), making it important to examine its potential effects.

Existing work on precursors to these embodied social virtual worlds, collaborative virtual environments (CVEs), and nonimmersive environments such as Second Life, can shed light on what we might expect as these two mediums merge. As on traditional social media platforms, users of nonimmersive virtual worlds have access to peers with whom they communicate and, similar to VR, users are often embodied in an avatar that allows them to interact with the environment, including other people. Unlike VR, however, these environments are not sensorially immersive, and users generally navigate them by keyboard.

As an early example of research on embodiment in a social context, the Proteus effect has been observed in both immersive (Yee and Bailenson, 2009) and nonimmersive virtual environments (Ratan and Dawson, 2016). In this case, individuals use their preconceptions about their assigned avatars' appearance to infer their expected dispositions, and then conform to these expectations (Yee and Bailenson, 2007). For example, participants behaved in a more social manner when embodied in a more attractive avatar body (Yee and Bailenson, 2009). This effect of avatar representation has been leveraged in behavior change interventions including increasing levels of physical activity (Peña et al., 2016) and assertiveness (Yee et al., 2009). In some cases, these changes in behavior appear to extend beyond the virtual environment (Yee et al., 2009).

The strength of such avatar effects can be moderated by factors related to self-presence. Ratan and Dawson (2016) described how embodiment and avatar customization influence avatar self-relevance, or "the extent to which the avatar user perceives the avatar as relevant to the self" (Ratan and Dawson, 2016: 1067). Specifically, extended self-presence is enhanced through avatar customization, which in turn strengthens avatar self-relevance and amplifies postavatar effects such as stereotype threat (Ratan and Sah, 2015) and physiological reactions to viewing one's avatar in different situations after game play (Ratan and Dawson, 2016). In contrast, feelings of embodiment (i.e. proto-self-presence) during game play can diminish postavatar effects because it highlights the contrast between the avatar-body connection in the virtual environment, and disconnection outside of the environment (Ratan and Dawson, 2016).

In the context of well-being interventions, a nuanced understanding of self-presence is needed as targeted outcomes can be affected differently (Behm-Morawitz, 2013; Behm-Morawitz et al., 2016). In a study on health self-efficacy and weight management, researchers found that embodying a physically active avatar, versus a no-avatar control, was associated with improved exercise self-efficacy and modest weight reduction, while making nutritional changes depended on the degree to which an individual felt that the avatar was an extension of himself or herself (Behm-Morawitz et al., 2016). More research is needed to understand necessary antecedents for avatar-driven effects for behavior change—particularly in social environments.

New ways to represent the self bring new possibilities. Bailenson et al. (2004) described three channels that can be leveraged to transform social interactions including (1) self-representation, (2) sensory capabilities, and (3) contextual situations (Bailenson et al., 2004). Research has shown that, when used effectively, manipulations of these channels can improve a user's experience of a social interaction (e.g. Bailenson et al., 2005; Bailenson and Yee, 2005). We may similarly consider how different manipulations in social VR might affect well-being.

Discussion and future directions

A number of interesting areas for future research on the relationship between social presence, embodiment through technology, and well-being have surfaced from this review. We outline a few of these areas below.

Augmented sensory information. Individuals share and shape narratives about the body through media environments (Lupton, 2017). Research suggests that social media can be useful when individuals are distressed (Tucker and Goodings, 2016) or seeking practical advice or support in regard to chronic illnesses (Gonzalez-Polledo and Tarr, 2016) or mental health (De Choudhury et al., 2014). However, social media's ability to make controlled changes to user's perceptions of their bodies is underexplored and future work should examine how these environments allow users to tune into their bodies in a more experiential manner (Tucker and Goodings, 2014).

As an example, recent work has integrated bio-sensing technologies into more traditional social media landscapes (Liu et al., 2017; Lupton, 2013). In so doing, one's understanding of the body becomes numerical, and more easily shared, allowing individuals to mediate, and make sense of, bodily experiences outside of the norm. While rendering these somatic experiences in numbers may not be ideal in all cases, it can be a way for individuals dissociated from their bodies to regain a sense of bodily awareness.

Making physiological signals more salient through VR is another way to integrate these channels of information into the body (Gradl et al., 2018; Gromala et al., 2015). VR experiences, for instance, have integrated physiological sensing with olfactory, audio, and sonic feedback for therapeutic purposes and to promote relaxation and reduce anxiety levels (Gromala et al., 2015).

Including other forms of sensory experience into social media might similarly reengage the physical body, through proto- and core self-presence, and potentially reduce negative outcomes associated primarily with the social self, similar to objectification or comparison. Rather than providing additional opportunities to be reflective about, and modify, one's self-representation, efforts to emphasize the phenomenological experience of the body and lower level embodiment may benefit well-being.

Perspective changing. Interactions between the physical body and social self are likely to be complex in social VR. For example, in High Fidelity, individuals can experience self-representations from a first-person perspective, in a fully embodied avatar, and they can reflect on 2D images of themselves in a mirror, from a third-person perspective. However, users can also feel embodied in a body seen from the third-person perspective, as discussed above. Oscillation between the first- and third-person perspective is a critical

mechanism in the body-rescripting paradigm used to treat body image disturbance; however, it relies on highly controlled environments (Riva, 2008). How perspective changing would affect individuals in a more natural and highly social environment is unknown. Future research should explore how this affordance of social VR affects one's understanding of, and attitudes toward, the body.

Self-relevance. The degree to which individuals feel connected to their self-representations should also be considered, especially in the context of designing avatars for a diverse population. As described above, avatar self-relevance moderates posture effects; however, research on VR often focuses on embodying an avatar that an individual did not himself or herself design. Like work on avatar customization, curating the self through social media may establish a high degree of self-relevance. Similarly, the self-relevance of novel avatars—those that do not conform to the normal human template—should be considered as they have been noted as a potential target for health interventions (Won et al., 2015). Understanding what conditions contribute to, or detract from, self-relevance in social media and new social VR environments will be critical to understanding effects on well-being and designing interventions.

Interventions. A number of common mental health conditions (e.g. eating disorders, depression, self-injury, anxiety) include distorted associations with the body (Muehlenkamp et al., 2012) and a robust body of literature emphasizes the importance of working through “bodily realities and subjective body experiences” (Röhrlich et al., 2014: 11). VR has proven to be useful clinically, precisely because of its ability to bring presence to the body (Riva et al., 2018). In addition to social media aiding risk-monitoring and information dissemination, these platforms could be more therapeutic. As environments become immersive, existing empirical work on therapeutic VR may offer clues for potential change mechanisms. Some common conditions with ties to the body, or body experience, are underexplored (e.g. depression, self-injury). Future research should address how common mental health concerns can be affected through virtual experiences such as body illusions or perspective taking. Building on this knowledge, researchers can then explore the feasibility, and ethics, of modified embodiment experiences on naturalistic social media sites that could offer another channel for users to choose to positively affect their well-being.

Conclusion

Both VR and social media have the potential to significantly affect how people relate to, experience, and understand the body. While the literature on social media has focused on the high-level, affectual, and conceptual dimensions of the body, research on VR has focused largely on how perceptions of the body change through multisensory illusions and how this leads to downstream affectual and conceptual shifts. Both technologies depend on how the self is represented—in the first case, by rendering the self as a social being and, in the second case, by rendering the self through the senses. We have argued that researchers in immersive media should consider the opportunities and risks that may arise as embodied experiences become more social and conversely that research on

embodiment in VR may help frame the effects of social media use. As these media converge, we call for research on how this integration can be leveraged for well-being.

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