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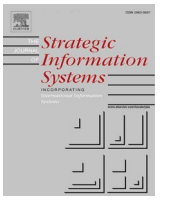

# Inclusive avatars in the Metaverse: learning from the lived experiences of people with disabilities☆

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ABSTRACT

Immersive platforms like the Metaverse have gained attention in information systems (IS) research, yet the diverse needs of people with disabilities (PWD) remain underexplored. This research examines the experiences of PWD using inclusive avatars that represent disabilities. Through an exploratory mixed-methods approach, combining qualitative interviews with an experience sampling study, we develop a framework informed by Affective Events Theory and voices of PWD to better understand how social interactions in the Metaverse impact PWD's emotions and outcomes. Findings suggest that when PWD use inclusive avatars, inclusive and exclusionary social interactions shape their emotional responses, which in turn influence engagement, avatar connection and satisfaction, and perceptions of inclusion in the Metaverse. Although adopting inclusive avatars can be challenging, especially in the face of exclusionary interactions, the benefits can outweigh the costs. The role of disability identity is critical; PWD who identify strongly with their disability experience less negative emotional impact from exclusion. This research contributes to IS literature by conceptualizing the Metaverse as a relational, emotion-driven environment shaped by social interactions as well as a platform for authentic self-representation. Practical implications include supporting avatar-based disability representation, involving PWD in co-designing virtual reality technologies, and providing training to foster inclusive interactions in the Metaverse. These strategies can help organizations build more inclusive and engaging digital workplaces for an often underrepresented workforce segment.

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## Introduction

"*Almost everyone will be temporarily or permanently impaired at some point in life.*" (World Report on Disability, 2011, p. 3)

While organizations continue to adopt hybrid and fully virtual work models (Asatiani & Norström, 2023; Choudhury et al., 2021; Erickson & Norlander, 2022; John et al., 2025), a growing number of employers are exploring immersive online workspaces and 3D virtual environments (Teng et al., 2023). These digital spaces, which are components of what is broadly referred to as the Metaverse, offer new ways to foster collaboration, connection, and inclusion beyond the constraints of physical offices (Marabelli & Newell, 2023). With organizations like GitLab, Walmart, and the United States Patent and Trademark Office leading workplaces forward into the Metaverse, traditional assumptions about where, how, and by whom work is performed continue to evolve (Teng et al., 2023). In light of these changes, we believe the Metaverse presents an opportunity to expand the labor force by tapping into the world's largest underemployed community – people with disabilities (PWD; Lengnick-Hall et al., 2008).

On the one hand, virtual immersive workspaces where PWD can collaborate in real time open new pathways for strategic work planning and design (e.g., Microsoft, 2024; Walmart Inc, 2024). Thus, the Metaverse has the potential to enhance the work and lives of PWD, while mitigating well recognized challenges of virtually connected work (Asatiani and Norström, 2023). On the other hand, workers and organizations are wary of exclusion and harassment, which prior research has found to be prevalent in both work and non-work applications of the Metaverse (Dwivedi et al., 2022; Marabelli and Lirio, 2024; Wong, 2021). These challenges place the technology at risk of undermining, rather than uplifting PWD in virtual workspaces.

In combination, the potential and the limitations of the Metaverse for PWD suggest organizations would benefit from a better understanding of the outcomes that shape PWD's work experiences in virtual spaces. Building from previous research, we identify three facets of the Metaverse experience that warrant greater attention. First, PWD's perception of their avatars, including how strongly they are connected to their avatar and how satisfied they are with their representation, is critical for self-expression in the Metaverse. Research on avatar-mediated communication shows that when users perceive their avatar as an extension of themselves, it strengthens their virtual identity and confidence (Teng et al., 2023). Second, PWD's level of task engagement and flow while using their avatar plays a critical role by enhancing focus, enjoyment, and productivity (Zhu and Yi, 2024), which are essential to employees' long-term success (Bakker, 2011). Third, PWD's perception of the Metaverse environment as a space of inclusion can influence their commitment to their jobs, well-being, and job performance (Shore et al., 2011). Understanding what drives these outcomes is critical for advancing IS research on how the Metaverse can support PWD in the evolving digital workplace.

We argue that a key, yet underexplored, driver of these outcomes is the role of social interactions within Metaverse environments. Prior research shows that the way individuals interact with others through a company's Metaverse applications significantly impacts how they feel when using the technology (Dincelli and Yala, 2022). Moreover, the tone and quality of avatar-based social interactions are critical for fostering acceptance, loyalty, and adoption of virtual reality (VR) applications (Teng et al., 2023). For PWD, social interactions take on heightened importance. When individuals encounter disparaging or dehumanizing social interactions, they may choose to conceal their disability or disengage from the platform altogether (Davis and Chansari, 2018; Zhang et al., 2023). In contrast, supportive and respectful social interactions can encourage authentic and meaningful participation, positioning social interactions as a key driver through which the Metaverse can either advance or hinder PWD in the workplace.

However, to our knowledge, IS research has yet to draw on the voices of PWD in developing a dynamic framework that explains how inclusive and exclusionary social interactions shape their experiences in the Metaverse. We propose that the way PWD are treated in these interactions triggers emotional responses that ripple outward and shape how connected and satisfied they feel with their avatar, how engaged they are, and how included they perceive the virtual environment to be. Without a clear understanding of *if, how,* and *with what consequences* inclusive and exclusionary experiences unfold for PWD in the Metaverse, organizations risk fostering a vicious rather than virtuous digitalization cycle and failing to achieve broad adoption of this promising technology (Chatterjee and Sarker, 2024). In light of these challenges, we explore the following research question: *When PWD use an avatar that visibly represents their disability in the Metaverse, how do inclusive and exclusionary social interactions shape PWDs' emotional responses, and how do these emotions, in turn, influence key outcomes, including engagement when in the Metaverse, connection to their avatar, satisfaction with their avatar, and perceptions of an inclusive environment?*

To address this question, we use a mixed-methods approach (Creswell and Plano Clark, 2018) and conduct two empirical studies investigating the lived experiences of PWD as they immerse themselves in the Metaverse using inclusive avatars, that is, avatars that display their disability. In our initial Exploratory Study, we combine qualitative interviews with qualitative social interaction records that document real-life PWD experiences in the Metaverse as they happen. The findings from this study guide our theory development and hypotheses that are tested using experience sampling methods (ESM) in our Main Study.

We advance the existing knowledge in three ways. First, we contribute to the IS literature on the Metaverse by exploring *if* and *how* PWD experience inclusion through real-time social interactions. By developing and empirically testing a person-centric framework informed by theories of emotion and inclusion, as well as the lived experiences of PWD, we advance current understanding of the Metaverse not only as a technological infrastructure but as a relational environment shaped by social exchanges. Our findings lay the foundation for more inclusive immersive environments within the Metaverse, helping organizations to realize the Metaverse's potential as an inclusive workplace for PWD. Second, by elevating the voices of PWD through a person-centered research approach, we demonstrate that disability identity moderates how exclusionary social interactions influence emotional responses of PWD. This insight advances knowledge by highlighting the role of individual identity in shaping user experience in 3D, immersive environments. Third, our findings challenge prior work that frames the Metaverse primarily as a tool for concealing disability (e.g., Davis and Chansiri, 2018). Instead, we highlight its potential as a platform for accessible work and authentic, avatar-based self-representation.

While VR holds significant promise (Dincelli and Yayla, 2022; Mott et al., 2019), it also presents barriers for PWD (Gerling and Spiel, 2021; Mott et al., 2020), and companies have been slow to adopt the VR technology due to an uncertain value proposition and high investment costs (Hadi et al., 2024; Morenne, 2022). By bringing forward the words and stories of PWD in virtual environments, our study broadens understanding of how these spaces can support accessibility and inclusion, even beyond the Metaverse.

## Theoretical background

> We are being irreversibly shaped by the continuous digital transformation that pervades all aspects of businesses and society… and there is "*increasing recognition of the interconnected and overflowing nature of the digital world*" (cf. Chaterjee and Sarker, 2024).

Once considered the realm of science fiction and video games, new technologies have made the Metaverse a reality. It is defined as "a massively scaled and interoperable network of real-time rendered 3D virtual worlds which can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity, history, entitlements, objects, communications, and payments" (Ball, 2024, p. 93). In the Metaverse, employees can enter VR workspaces from anywhere in the world to collaborate, develop, and learn in 3D simulated environments. While interest in the Metaverse has fluctuated, recent trends suggest that organizations are interested in investing in VR and Metaverse-related initiatives (Pai, 2022). For example, UPS has developed a VR training program that helps drivers practice defending against dog attacks and even stacking packages (ArborXR, 2025). Likewise, Walmart helps employees develop "soft skills," such as empathy, by practicing effective social interactions in simulated environments (Walmart Inc, 2024). Even police forces have begun using the Metaverse to rehearse and practice high-stress interactions with potentially deadly consequences in the real world (Bousquette, 2024).

As technologies like simulated worlds, artificial intelligence (AI), and immersive environments increasingly blur the boundaries between physical and virtual realities, organizations are actively exploring their strategic implications (Koohang et al., 2023; Marabelli and Lirio, 2024). This interest intensified during the COVID-19 pandemic, which brought the Metaverse into mainstream attention (Hubbard and Aguinis, 2023). Yet, as initial enthusiasm has faded, the pace of VR and Metaverse adoption has slowed due to practical implementation barriers (Dincelli and Yayla, 2022) and high-profile cases of harmful user behavior (Wong, 2021). Recent empirical findings highlight the prevalence of harassment, bullying, and exclusion on immersive platforms (Basu, 2021; Freeman et al., 2022; Zhang et al., 2023; Schulenberg et al., 2023).

At the same time, VR technologies show promise for building inclusive communities, enhancing psychological safety, and enabling identity exploration in professional settings (Acena and Freeman, 2021; Li et al., 2023). Consequently, many organizations remain cautious about the use of Metaverse applications due to a lack of compelling use cases and limited understanding about how to address critical challenges, such as safety, governance, and inclusion (Dwivedi et al., 2023; Marabelli and Lirio, 2024; Radanliev et al., 2024). This hesitation risks leaving the transformative potential of the Metaverse untapped, particularly its promise to reshape the labor force and enhance the work and lives of PWD.

### *Disabilities in the Metaverse: the digital divide*

When thoughtfully designed and implemented, information technology holds the potential to expand access, foster connection, and support the inclusion of PWD in the Metaverse (Dudley et al., 2023; Radanliev et al., 2024; Zhang et al., 2022a). Globally, over one billion people live with a disability, defined as an "umbrella term for impairments, activity limitations, or participation restrictions" (World Report on Disability, 2011, p. 3). Disability is a dynamic, complex, and multidimensional construct encompassing physical, mental, neurological, sensory, and cognitive conditions, as well as chronic illnesses and substance use disorders (World Report on Disability, 2011).

In the Metaverse context, disability has often been framed through the lens of the *digital divide,* defined as "the limitation in access to the internet and digital technologies," which is further exacerbated for PWD (Davis and Chansiri, 2018p. 493). This divide manifests in several ways. For example, the Metaverse offers limited options for representing diverse identities, particularly those of PWD (Do et al., 2023; Dudley et al., 2023; Morris et al., 2023; Mack et al, 2023). As a result, IS researchers have yet to fully understand the implications of integrating inclusive avatars that visibly represent disabilities into the Metaverse (Zhang et al., 2022b; Zhang et al., 2023). Moreover, the limited research on PWD in the Metaverse tends to emphasize two key narratives: that the Metaverse offers PWD the opportunity to reconstruct their identity through creative, non-disabled avatars (Davis and Chansiri, 2018) and that bullying and harassment are the likely consequences of avatars that signal disabilities (e.g., Zhang et al., 2023). While these concerns are valid, they risk presenting a one-sided view. The freedom to choose an avatar that reflects a user's identity is a fundamental aspect of the Metaverse experience (Davis and Chansiri, 2018; Wang et al., 2025), and limiting this freedom may exclude valuable expressions of self-representation for PWD.

Drawing from this work, along with research on users without disabilities, it is evident that the Metaverse expands the ways people can explore, connect, and express themselves through virtual avatars in ways that significantly impact their social interactions, their emotions, and other potentially variable facets of their Metaverse experience (Suh et al., 2011; Yee and Bailensen, 2007). However, for users with disabilities, the opportunities presented by virtual worlds and technology are often clouded by barriers and uncertainty. This highlights the need to amplify the voices of PWD as they navigate choices around authentic digital representation. Without deeper insight into how PWD engage in the Metaverse, organizations risk lacking the tools to fully leverage virtual workgroups and missing a key opportunity to include an underutilized talent pool of PWD (Ahuja and Galvin, 2003; Dennehy et al., 2022).

## Exploratory study

### *Setting the stage: a qualitative exploration of inclusive avatars in the Metaverse*[2]

#### *Participants*

We conducted an initial Exploratory Study via Prolific. To enroll, participants had to be at least 18 years of age and registered with Prolific as having a disability. As an additional option on Prolific, participants had to be willing to download and use the software VRChat for a period of two weeks. VRChat is a social VR platform where people can connect and interact in virtual chat rooms or worlds with VR headsets or a desktop PC. Users can choose or create their own avatars to represent themselves, and VRChat offers flexibility to customize their avatars.[3] In virtual worlds, a multitude of activities can be carried out, from talking to others in virtual pubs, dancing in virtual clubs, to meditation, games, and working.

This study included two phases of qualitative data collection. In the pilot phase, five participants designed and used custom avatars representing a disability of their choice, followed by post-experience interviews. Based on their feedback and feasibility considerations, the main phase used a predesigned set of avatars with diverse disability representations. Not including the five pilot participants, a total of 63 participants were invited to the main phase of the Exploratory Study; 26 PWD completed it, generating 138 social interaction records. Thirteen participants from the main phase of the Exploratory Study and all five from the pilot phase completed post-experience interviews, resulting in 18 interviews overall (see Fig. 1). Approximately 65.38 % of our main phase participants (17) were under 34 years old, and approximately 23.08 % (6) were 35–44 years old, with 11.54 % percent of participants (3) being aged 45 and older. One participant (3.85 %) identified as non-binary, 10 (38.46 %) identified as women, and 57.69 % identified as men. 46.15 % of participants were employed full-time, 11.52 % worked part-time, and 23.08 % were unemployed but actively looking for work. The majority of participants were White (84.62 %). 54 % of participants owned a VR headset, while 46 % did not.

#### *Procedure: the inclusive avatar experience*

Participation in the main phase of the Exploratory Study consisted of three steps. First, participants completed an onboarding survey hosted on Prolific, where they described their disability, selected a premade avatar that best represented them, and received instructions for installing and using VRChat. Figs. 2-3 display inclusive avatars participants could choose from during onboarding.[4] Second, participants were asked to spend at least three hours using their inclusive avatar in VRChat over two weeks, completing a minimum of three play sessions on different days. After each session, they completed an experience sampling survey to capture the details of their inclusive avatar experience. To ensure social interactions, participants were instructed to spend at least ten minutes during each play session interacting with other users. Third, after two weeks of avatar use, participants were invited to an online interview about their experiences. Each interview lasted between 30 and 60 min and was conducted via Zoom, recorded, and transcribed verbatim (see Appendix A for interview questions). Participants were compensated 12.00 lb per hour, with a cap on total hours. They could earn up to 98.70 lb for their time spent using the avatar, completing social interaction records, and participating in the interview.

#### *Inclusive and exclusionary social interaction records*

We captured qualitative descriptions of inclusive and exclusionary social interactions that participants encountered when using their inclusive avatar through a two-step process adapted from the Rochester Interaction Record (RIR; Reis and Wheeler, 1991; DIRO; Peters et al., 1995). First, participants indicated whether they had experienced a significant interaction as they were using their avatar that day. If a participant responded "yes," they were asked to describe the event in writing and report whether they felt it was inclusive or exclusionary.

#### *Analysis*

We conducted a qualitative content analysis of 18 interviews and 138 open-text entries captured by social interaction records (Hsieh and Shannon, 2005). Content analysis is well-established for systematically interpreting and categorizing qualitative data through coding and pattern identification (Hsieh and Shannon, 2005; Schreier, 2012). In the first step, three researchers reviewed the data multiple times to gain an understanding of the whole dataset. We then followed best practices by selecting 5 %–10 % of the sample to develop an initial coding frame (Schreier, 2012). We open-coded two interview transcripts, using participants' own words to generate a broad set of initial codes in Condens[5] (a software tool for qualitative data analysis). These initial codes were grouped into subcategories and categories, such as "Creating opportunities for inclusive interactions" and "Disability-Is-Me," to better understand the relationships between the codes. Once the initial coding frame was developed, we clarified the descriptions of each category and subcategory, providing examples and decision rules to determine when to apply a code (Schreier, 2012). Next, two researchers independently applied the initial coding frame to code two further interview transcripts. After this trial coding, we held reflexive meetings to resolve discrepancies in code usage, assess the coding accuracy, and iteratively refine the coding structure. We also

[2] An earlier version of this study has been accepted for the *25th International ACM SIGACCESS Conference*.
[3] https://hello.vrchat.com/.
[4] Avatar templates were created with ReadyPlayerMe. Disability signifiers were created using Blender and Unity.
[5] https://condens.io/.

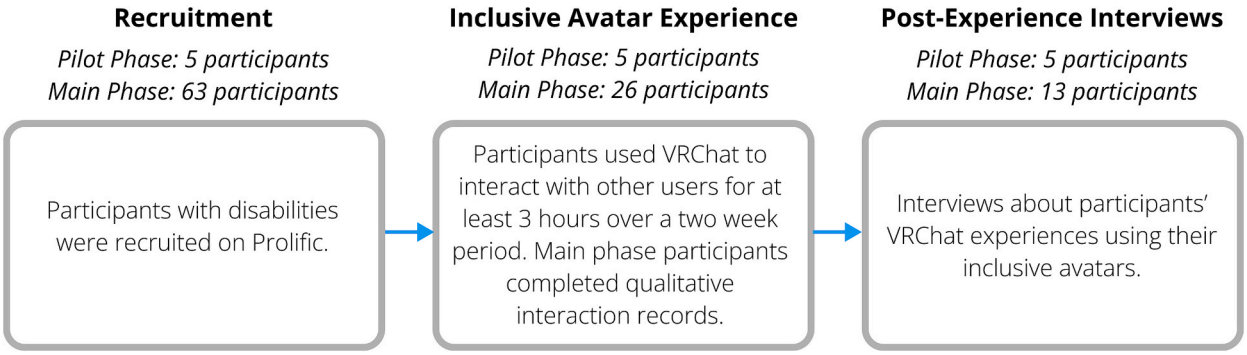


**Fig. 1.** Procedure of exploratory study.

**Fig. 2.** Base avatars offered to the participants.

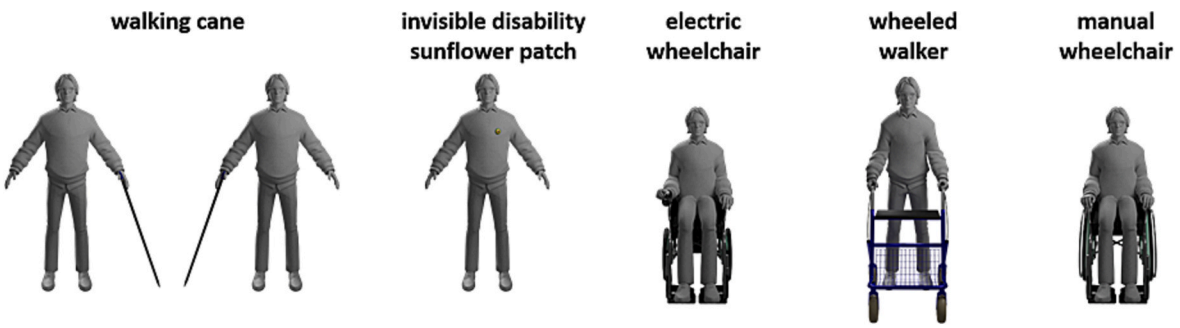


**Fig. 3.** Disability signifiers.

ensured that all subcategories were mutually exclusive and that the four main categories met the criteria of unidimensionality and exhaustiveness (Schreier, 2012). In the final step, we applied the refined coding frame to the remaining interview transcripts and open-ended text entries. Following the guidance of Gioia et al. (2013), we visualized the final coding structure in Fig. 4.

*Initial results*

In our analysis, four main categories emerged: Inclusive Interactions, Exclusionary Interactions, Emotional Reactions, and Disability Identity (see Fig. 4). The first three categories illustrate social interactions and corresponding positive and negative emotional reactions that significantly influence PWD's experiences in the Metaverse. Disability identity emerged as a key category, emphasizing that PWD's perception of and relationship towards their disability shapes the way they navigate and interpret their virtual experiences.

*Disability identity*

Disability identity, defined as how individuals see themselves in relation to their disability, influences how they engage with the Metaverse. Two distinctive subcategories emerged: participants who saw their disability as separate from their identity (Disability-Is-Not-Me) and those who saw it as an integral part of who they are (Disability-Is-Me). Those in the former group often reported masking or rejecting their disability to blend in:

"I don't necessarily consider any disabilities of mine to be an identifying trait. They're more of an attachment that's something I deal with. It's not something that I mentally would identify as a part of my personality." [P30].

In contrast, participants who identified with the Disability-Is-Me perspective were open about their disability, embraced it as an integral part of their identity, and celebrated it by highlighting disability as a source of pride and strength. Rather than hiding or rejecting their disability, they perceived it as a fundamental part of their lived experiences that shaped their worldview and personal narrative (see Appendix B for further illustrative quotes):

> *"[My disability] is what makes me me, and I want an avatar that I create to represent me as a person.*"[P22].

*Inclusive social interactions*

Inclusive social interactions in VRChat refer to the meaningful exchanges that PWD have with others, where they feel valued, respected, and able to fully participate in the social environment. This ensures that PWD are not marginalized but can engage in virtual spaces in ways that accommodate their individual needs, fostering a sense of belonging and community. Our participants reported that inclusive social interactions involve, but are not limited to, acceptance and support from others, visible representation through inclusive avatars, connection to the disabled community, and opportunities for self-growth (see Fig. 4 and Appendix B). The subcategory of *acceptance and support from others* encompasses being listened to and spoken to respectfully, feeling accepted and included, and receiving support and encouragement when needed. These interactions seem to foster a sense of belonging and empowerment, allowing PDW to engage confidently with other users:

> *"I never wore an avatar that showed people I had a disability before. I thought it [would] direct all conversations towards my disability and people would ignore me or change the topic because it was an awkward conversation topic. But while someone did change the topic after I explained it, it was because they accepted and were totally comfortable with it and continued to treat me like a regular person, like anyone else." [P14]*

Furthermore, participants mentioned receiving support from both friends and strangers when faced with uncomfortable situations. This support was essential in helping them feel included, as others stepped in to offer encouragement, stand up for them, or simply provide a comforting presence. Whether it was a virtual bystander intervening during an exclusionary interaction or a friend offering words of reassurance, these moments of support helped participants regain confidence and feel that they were not alone:

> *"One person was quite rude about my avatar having a cane which led to me turning off the cane* animation *until I finished that game, and another player supported me by saying that it was 'cool' that my character has a cane." [P9]*

For participants, having a *visual representation* through an inclusive avatar that reflected their disability was important because it created opportunities for inclusive interactions and allowed them to express themselves in a way that others could recognize and relate to. Additionally, this visual representation facilitated inclusive conversations by opening up dialogues around disabilities, raising awareness, and breaking down barriers to communication:

> *"[In] a normal setting, I'm not very approachable for some reason. But in VR it was different to have people run up and initiate that conversation [about my disability], which I normally don't get out there [in real life]." [P3]*

Another subcategory of inclusive social interactions that emerged from the data was *connection to the disabled community*, encompassing bonding with others through the disability signifier and connecting through shared experiences. 7 out of 18 participants reported that their inclusive avatars helped facilitate authentic connections with others:

> *"I was asked by someone if the sunflower meant what they thought it meant[…]. They went on to tell me they also had a hidden disability which we spoke about for a while over a few beers, which was actually really nice. I have since added them as a friend. [P17]*

In addition to bonding, participants described how inclusive avatars provided a platform for meaningful exchanges within the

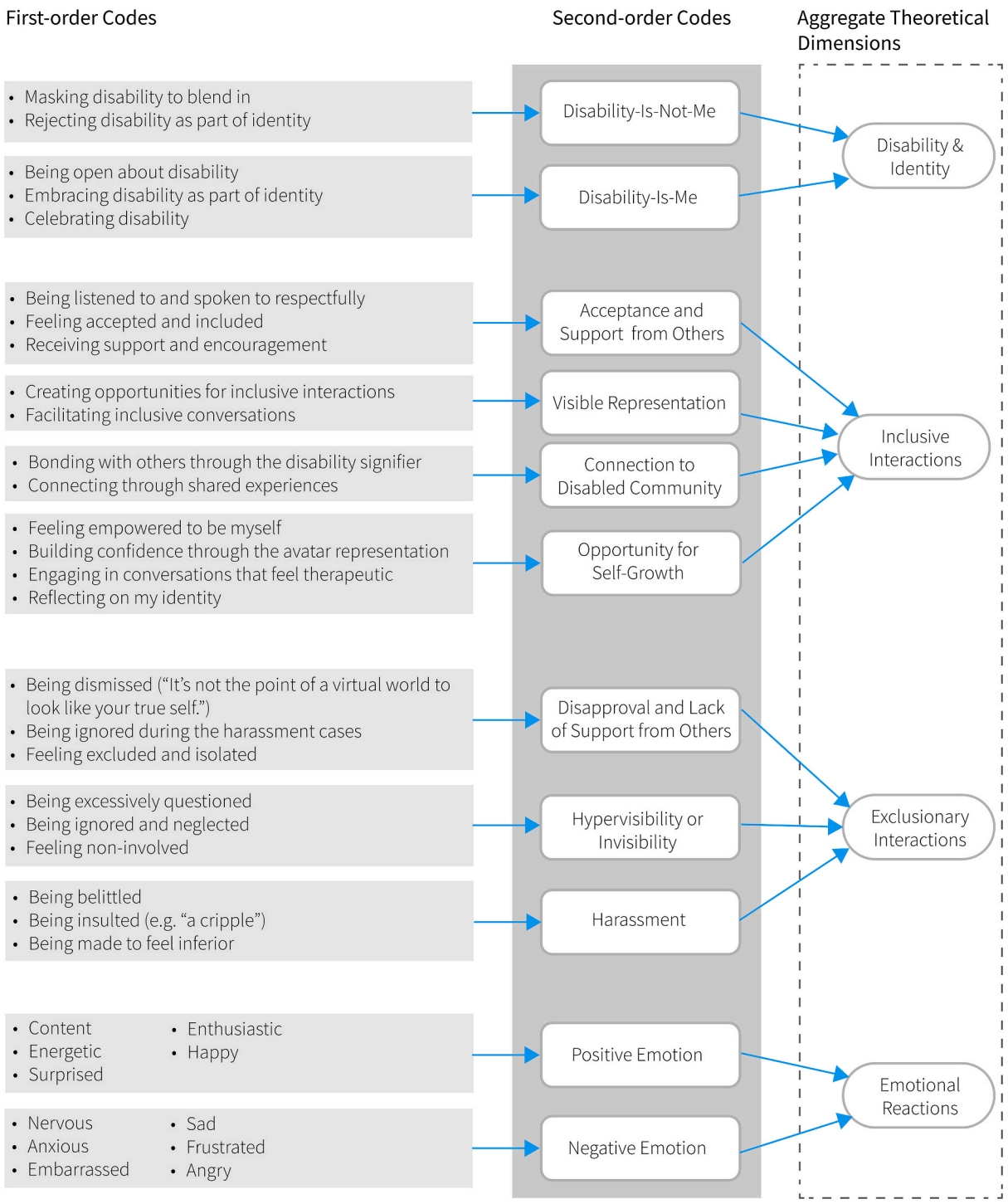


**Fig. 4.** Coding structure.

disabled community:

> *"Someone did ask about the sunflower patch to represent my hidden disability, and I replied that it was to show my autism. I was then able to explain to them in what ways my autism affects me. In fact, I found out the person I talked to had ADHD." [P11]*
> *"It [the inclusive avatar] opened up the conversation and instead of it just being a pity party, it was people understanding me. Then they would talk about their own experiences with similar conditions, and it would just be a learning experience for everyone." [P1]*

Several participants perceived inclusive interactions while using their avatars as a powerful *opportunity for self-growth*. This subcategory includes feeling empowered to be myself, building confidence through avatar representation, engaging in conversations that feel therapeutic, and reflecting on one's identity (see Fig. 4). For example, Participant 2 shared how the inclusive avatar helped them in their journey toward self-acceptance and personal development:

> *"As scary as [the inclusive avatar] was at first, now I feel like it's in a way kind of like a goofy, roundabout therapy… I noticed it wasn't hard to talk to people last time I went out after talking to people using this. So maybe it could be therapeutic for me to be able to go and talk to people…looking at myself in VRChat and then that carries over to the real world." [P2]*

Other participants emphasized the empowerment they felt in virtual social interactions because of their inclusive avatars:

> *"I was much more comfortable in my own skin when using this avatar, which made me more confident and made it easier to start conversations with others." [P17]*

These experiences indicate that inclusive avatars provide opportunities for self-reflection, healing, and confidence-building, potentially fostering personal growth both in virtual spaces and the real world (see Appendix B for further illustrative quotes).

*Exclusionary social interactions*

Exclusionary social interactions in virtual environments like VRChat refer to interactions where PWD feel marginalized, dismissed, or treated unfairly by other users. These interactions may take various forms, ranging from being ignored or excluded from conversations to more overt forms of harassment, such as bullying, mocking, or derogatory comments. To better understand these experiences, we categorized exclusionary interactions into three subcategories: disapproval and lack of support from others, hypervisibility or invisibility, and harassment (see Fig. 4 and Appendix B). The subcategory of *disapproval and a lack of support from others* describes social interactions that make PDW feel dismissed, excluded and isolated, or even ignored:

> *"[I felt] completely excluded. Felt that all the time. Well, except when I was being bullied. I was included when I was being bullied." [P31]*

The subcategory of *hypervisibility or invisibility* highlights the contrasting experiences of PWD in virtual environments, where they are either excessively noticed or completely overlooked. Some participants described being excessively questioned about their inclusive avatars, leading to discomfort and a sense of being singled out. Conversely, others complained about being excluded from conversations and feeling neglected. As Participant 29 stated, *"I know my mic is on, but I feel like I am being ignored,"* reflecting the frustration of being present in the conversation yet feeling invisible to others. This dual experience of hypervisibility and invisibility illustrates the emotional complexities PWD face in virtual spaces.

The subcategory of *harassment* emerged as the most frequently reported form of exclusionary interactions, with participants describing experiences of being belittled, insulted, and made to feel inferior. For instance, Participant 24 was derogatorily called *"a cripple,"* while Participant 7 was mockingly addressed as *"Stephen Hawking"* or *"crippled Gordon Freeman,"* reinforcing a demeaning and disrespectful view of their disability. Similarly, Participant 6 stated, *"I felt really depressed the day someone assaulted me for being on a wheelchair"* (see Appendix B for further examples of quotes). These experiences not only create a hostile environment but also deepen users' feelings of isolation, emphasizing the need for more inclusive and supportive virtual spaces.

*Emotional reactions*

Both inclusionary and exclusionary social interactions elicited strong positive or negative emotional reactions from participants. Inclusive interactions often led to feelings of contentment, energy, happiness, surprise, and enthusiasm (see Fig. 4 and Appendix B). For example, Participant 9 described the emotional impact of an avatar that reflected their identity:

> *"So I guess the primary [emotion] was content. It was the first time that I've had an avatar that represents me more than just my facial appearance." [P9]*

Participant 14 was initially nervous about others' reactions to the inclusive avatar but ended up feeling pleasantly surprised and supported. The interaction sparked enthusiasm and created space for meaningful dialogue:

> *"[The experience was] surprising because I was nervous at first and that I thought maybe, [..] people might be intrigued about the avatar and like what it was all about and that I'd have people coming up to me and questioning me. […] I didn't know how well I would respond to that or deal with that, but it was actually well, people were inquisitive. No one was like, really pushing too far for more information. […]. And it was a good experience." [P14]*

Exclusionary interactions, however, often triggered strong negative emotions in participants, such as nervousness, anxiety, embarrassment, sadness, frustration, and anger (see Fig. 4 and Appendix B). As Participant 30 shared, *"I'm self-conscious about the avatar because it's not something I'm comfortable with."* Another participant expressed frustration more broadly: *"VRChat so far is a nightmare of trolls and bad people*" (P31). While some participants were eventually able to move past these experiences, the emotional toll of exclusion remained evident. These interactions highlight the challenges PWD face in navigating virtual spaces as well as the psychological weight of being marginalized online.

*Summary of initial findings*

The findings of our Exploratory Study suggest that social interactions in the Metaverse, whether inclusive or exclusionary, evoke strong emotional responses among PWD. Notably, many participants reported experiences of bullying and harassment in virtual spaces. These encounters were often emotionally distressing and left participants feeling excluded. Such accounts are consistent with prior research showing that PWD are likely to experience exclusionary social interactions online (e.g., Zhang et al., 2023). This finding confirms that exclusionary experiences remain a significant and ongoing challenge.

Furthermore, the content analysis of interviews and social interaction records revealed the critical role of disability identity in shaping how PWD interpret and respond to their experiences in the Metaverse. Specifically, how individuals perceive and relate to their disability influences their emotional reactions to virtual encounters. Those who identify strongly with their disability may experience and respond to inclusion or exclusion differently than those who adopt a Disability-Is-Not-Me perspective. The results of the Exploratory Study set the stage for developing a theoretical framework to better understand how disability identity shapes PWDs' experiences in the Metaverse. They also highlight the need for a second empirical study to examine the interplay between disability identity, social interactions, and emotional responses of PWD in virtual environments.

## Theory and hypotheses development

*Emotions as a mediator between social interactions and PWD's experiences in the Metaverse*

Results from our Exploratory Study revealed the central role emotions play when PWD encounter inclusive and exclusionary social interactions in virtual settings. This finding aligns with previous research emphasizing emotions are at the heart of employees' daily (virtual or in-person) work lives (Weiss and Cropanzano, 1996) and are particularly shaped by social interactions and stimuli (Zhang, 2013). Despite such recognition, the study of emotions in IS research has only gained momentum in recent years, even though scholars have long called for more attention to the topic (e.g., McGrath, 2006; Ortiz de Guinea and Markus, 2009; Stein et al., 2015; Zhang, 2013). Across disciplines, including IS, scholars generally agree that emotions unfold chronologically, arising in response to a perceived stimulus (James, 1894), and leading to downstream effects on attitudes, behaviors, and cognitions (Elfenbein, 2007; Schaufeli and Bakker, 2004; Stein et al., 2015; Worrall et al., 2021).

To further interpret our initial findings, Affective Events Theory (AET) provides a valuable lens. AET explains how within-person changes in events and emotions influence employees' work lives (Beal et al., 2005). More specifically, AET predicts changes in emotions are caused by specific events (Beal and Weiss, 2003; Cropanzano et al., 2017). Thus, emotions, unlike moods, have an immediate cause, situated in (virtual) space and time, and have ripple effects that extend beyond the specific event into employees' inner worlds and their work by impacting theoretically relevant outcomes such as satisfaction, engagement, and connection.

Applying this perspective to PWD in the Metaverse, the results of the Exploratory Study suggest the presence of potentially competing emotional landscapes. On one hand, as our findings and prior research suggest (e.g., Zhang et al., 2023), the visible display of disability can expose individuals to bullying, harassment, and other exclusionary social interactions. On the other hand, inclusive social interactions, particularly those that affirm identity or foster genuine connection, can have a profound positive impact on PWD, even when disability is not the primary focus of the experience. With these competing realities, the full impact of inclusive and exclusionary social interactions on the emotions, thoughts, and attitudes of PWD in the Metaverse remains unclear. At the very least, it can be expected that inclusive and exclusionary social interactions trigger a wide range of emotional responses from negative emotions such as anger and anxiety (Zhang et al., 2023) to positive feelings like enthusiasm and joy, depending on the nature and content of the experience.

For many participants in the Exploratory Study, emotions played a defining role in their Metaverse experience. However, the underlying process through which these emotions translated into specific outcomes remained unclear, highlighting the need for further theoretical development and empirical testing. To better understand this mechanism, we turned to psychological research on emotions. Emotions influence outcomes because, when activated, they infuse a person's thoughts and change how positively or negatively they interpret their environment (Forgas and George, 2001). Thus, the activation process of emotions links the social interactions experienced by PWD and subsequent changes in their attitudes, thoughts, and behaviors (Weiss and Cropanzano, 1996). Models of emotion infusion suggest two main mechanisms for this process (Forgas and George, 2001). First, people use their current feelings as inputs when evaluating their environment. Second, emotions prime particular thoughts or associations, making them more cognitively accessible, even without a specific target in their environment.

Drawing on these insights, we theorize that emotions serve as the bridge between social interactions and key user outcomes in the Metaverse. Specifically, we propose that emotions link inclusive and exclusionary interactions to outcomes that shape the strategic potential of the Metaverse for organizations (Dincelli and Yayla, 2022; Nowak and Fox, 2018; Teng et al., 2023). Prior research in avatar-mediated communication suggests that psychological connection, understood as the extent to which users perceive their avatar as an authentic extension of themselves, fosters a sense of ownership and enhances overall platform loyalty (Nowak and Fox, 2018; Teng et al., 2023). For PWD, we argue that emotions evoked by inclusive or exclusionary social interactions will influence how connected they feel to their avatar, which is relevant to organizations given its impact on sustained use of VR technology (e.g., Teng et al., 2023). When interactions are affirming and inclusive, positive emotional responses can deepen the sense of connection with the avatar representation. Conversely, exclusionary interactions may produce negative emotions that undermine the psychological connection between user and avatar, diminishing the users' ability to feel represented by their avatar in the virtual environment (Davis and Chansari, 2018, Zhang et al., 2023). Thus, based on the findings from the Exploratory Study and this theoretical logic, we

hypothesize that users' emotional responses to social interactions will shape their psychological connection to inclusive avatars.

*H1a: Inclusive social interactions will have a positive indirect effect on PWDs' psychological connection with their inclusive avatar by increasing their positive emotions and decreasing their negative emotions.*
*H1b: Exclusionary social interactions will have a negative indirect effect on PWDs' psychological connection with their inclusive avatar by decreasing their positive emotions and increasing their negative emotions.*

In addition to avatar connection, users' satisfaction with their avatar's appearance and functionality shapes their loyalty and enjoyment of Metaverse technologies (Trepte and Reinecke, 2010). Avatar satisfaction refers to the extent to which users feel content or satisfied with their avatar's visual representation and alignment with their self-image (Barta et al., 2024; Suh et al., 2011). Existing research illustrates how emotions people feel are central to their satisfaction judgments (Weiss and Cropanzano, 1996). When PWD experience inclusive social interactions, they are more likely to perceive their avatar's representation as affirming, thereby enhancing satisfaction (Nowak and Fox, 2018; Zhang et al., 2023). On the contrary, exclusionary social interactions that evoke negative emotions can diminish users' satisfaction with their avatar, leading them to view it as inadequate (Zhang et al., 2023). Thus, we predict the following:

*H2a: Inclusive social interactions will have a positive indirect effect on PWDs' satisfaction with their inclusive avatar by increasing their positive emotions and decreasing their negative emotions.*
*H2b: Exclusionary social interactions will have a negative indirect effect on PWDs' satisfaction with their inclusive avatar by decreasing their positive emotions and increasing their negative emotions.*

Given that social interactions and emotional processes are well-established predictors of human cognition and behavior (Forgas and George, 2001), it is reasonable to expect that inclusive and exclusionary experiences in the Metaverse will influence more than just PWDs' connection and satisfaction with their avatars. Specifically, we argue that emotional responses through both the emotion-as-information mechanism and the emotion priming effect will also shape users' immersion in their (virtual) tasks and experiences, referred to as state engagement (Schaufeli and Bakker, 2004). Previous research has linked engagement to design features such as avatar customization and attractiveness, both of which predict users' loyalty to virtual technologies (Liao et al., 2019). This makes engagement an important consideration for organizations seeking to strategically leverage the Metaverse. Recently, Wang and colleagues (2025) emphasized that user engagement is central to the integration of virtual technologies into daily life, referring to this as the "everyday Metaverse." Building on this, we suggest that when faced with social interactions, PWD will experience greater immersion and focus in their virtual tasks during inclusive, emotion-laden encounters, and reduced engagement during exclusionary ones.

*H3a: Inclusive social interactions will have a positive indirect effect on PWDs' engagement when using their inclusive avatar by increasing their positive emotions and decreasing their negative emotions.*
*H3b: Exclusionary social interactions will have a negative indirect effect on PWDs' engagement when using their inclusive avatar by decreasing their positive emotions and increasing their negative emotions.*

Inclusive and exclusionary interactions are also likely to influence PWD's perceptions of the technology as they are required to navigate and cope with the emotional consequences of these encounters (Salo et al., 2019; Stein et al., 2015; Venkatesh et al., 2003; Zhang, 2013). For PWD, the belief that the Metaverse is a safe and inclusive space that offers a sense of belonging is closely tied to the emotional tone of their experiences. As seen in the Exploratory Study, some participants who experienced harassment in VR, reported feeling excluded, with several choosing to reduce or discontinue their engagement with the technology. For example, Participant 9 reflected: *"After [the verbal harassment] happened and I noticed that no one was really going to help stand up for me, I kind of just stopped playing multiplayer games for the day."* These experiences are in line with previous research about negative encounters for PWD in VR (e.g., Zhang et al., 2023).

Inclusion, defined as the degree to which employees feel valued and recognized within their work group (Shore et al., 2011), is a cornerstone for productive workplaces, fostering loyalty, motivation, and trust in both technology and colleagues (Downey et al., 2015; Tarafdar et al., 2023). According to optimal distinctiveness theory (Brewer, 1991) and research on inclusion climates (e.g., Chung et al., 2020; Shore et al., 2011), individuals experience inclusion along two dimensions of authentic uniqueness and belongingness, both of which are central to the strategic implications of diversity (Shore et al., 2018). To experience full validation, individuals need to perceive both a sense of belonging within a social context and recognition of their unique attributes. Belonging ensures that individuals feel accepted as part of the group, while recognition of uniqueness affirms their distinct qualities rather than requiring them to conform. These two elements represent distinct dimensions of inclusion known as *inclusion as belonging* and *inclusion as authenticity* (Jansen et al., 2014). Together, they form the core components of the broader construct, inclusion (Shore et al., 2011). Social environments, whether in traditional workspaces or virtual worlds, have been shown to impact the extent to which individuals are able to establish both their authentic uniqueness and their sense of belonging (Baumeister et al., 2007; Nishii, 2013). When social interactions trigger emotional responses, the emotion-as-information effect and the emotion priming effect define PWD's perceptions of the Metaverse community. These emotional processes make it easier (or more difficult) for PWD to recognize which components of the technology foster inclusion and belonging in the Metaverse community. Based on this reasoning, we predict the following:

*H4a: Inclusive social interactions will have a positive indirect effect on PWDs' perceptions of the Metaverse community's inclusion climate (specifically, inclusion as belonging and inclusion a authenticity) by increasing their positive emotions and decreasing their negative emotions.*

*H4b: Exclusionary social interactions will have a negative indirect effect on PWDs' perceptions of the Metaverse community's inclusion climate (specifically, inclusion as belonging and inclusion a authenticity) by decreasing their positive emotions and increasing their negative emotions.*

*The impact of disability identity*

The Exploratory Study illustrates an important finding that existing theories of emotion and inclusion cannot explain. Specifically, our qualitative results suggest that beyond the social and emotional impact of inclusive avatars, some PWD actively expressed and reflected on aspects of their disability identity when recalling their experience with inclusive avatars. In some cases, participants expressed positive feelings linked to their disability identity that were inspired by their experience using inclusive avatars. Participant 16 explained, "*I believe it [inclusive avatar] has helped to be more accepting and open to using mobility aids in public settings.*" We see this finding as a potentially valuable development in the literature, which has often focused primarily on barriers and negative experiences for PWD in the Metaverse.

Building on these findings, we propose a complementary perspective: customizing avatars to include disability signifiers may foster positive emotions and reduce negative emotions, particularly when a PWD strongly identifies with their disability. This perspective aligns with emerging research suggesting that PWD sometimes use avatars to signal and disclose current abilities and access needs and raise awareness (Mack et al., 2023). These practices may, in turn, contribute to enhanced self-perception.

More broadly, social identification refers to the extent to which an individual sees themselves as a member of a community or social category and feels a connection to other members of the group (Ashforth and Mael, 1989; Ashforth et al., 2024). Although disability identity has received less attention than other social identities, it represents the extent to which individuals a) believe they are a member of the disabled community and b) perceive value from that membership (Luhtanen and Crocker, 1992; Santuzzi and Waltz, 2016). Thus, a strong disability identity reflects not only an individual's recognition of themselves as a member of the disabled community but also the value and pride they associate with that membership. Such positive appraisals of one's identity can translate into more frequent and intense experience of positive emotions, especially in situations where their identity is expressed and authentic selves represented (Przybylski et al., 2012). Building off this logic, we suggest that when a PWD is high in disability identity, they will experience more positive emotions when they use an inclusive avatar.

*H5a: Disability identity will be positively related to positive emotions above and beyond the impact of social interactions.*

While disability identity is theorized to enhance positive emotional experiences, it may also serve as a buffer against negative emotional responses in virtual environments. Individuals with a strong disability identity are more likely to view barriers and challenges through the lens of empowerment and resilience, rather than as personal shortcomings (Santuzzi and Waltz, 2016). Furthermore, previous research suggests that the sense of solidarity individuals feel with other members of their community, a key element of disability identity, can moderate the emotional impact of identity-threatening experiences by reducing their effects (Johnson et al., 2025). Moreover, when individuals feel secure and validated in their identity, they are less susceptible to negative emotional reactions in challenging or difficult situations (Bogart, 2015). Therefore, a strong disability identity can lower the likelihood that PWD

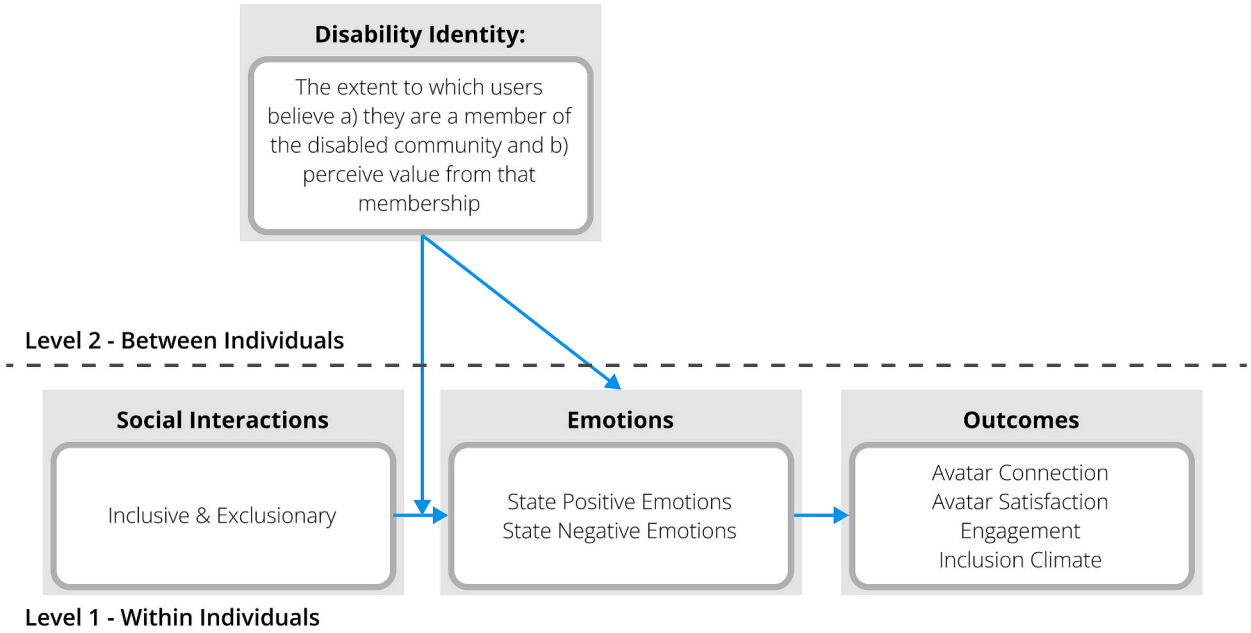


**Fig. 5.** Theoretical framework.

experience negative emotions when using inclusive avatars in the Metaverse:

*H5b: Disability identity will be negatively related to negative emotions above and beyond the impact of social interactions.*

Taking the above logic one step further, we suggest that when a PWD uses a customized avatar that reflects their disability identity, inclusive social interactions may activate stronger positive emotions via the emotion-as-information and emotion priming processes, as a central part of PWD's identity is acknowledged and affirmed (Santuzzi and Waltz, 2016). Conversely, exclusionary social interactions may have a less negative emotional impact on PWD with a strong disability identity. Critically, a strong disability identity can act as a buffer against the adverse effects of exclusion, as individuals are more likely to attribute exclusionary behaviors to external biases rather than internalizing them (Dirth and Branscombe, 2018; Santuzzi and Waltz, 2016). We hypothesize that individuals with a strong disability identity are better equipped to navigate difficult social interactions:

*H5c: Disability identity will moderate the impact of inclusive social interactions on positive emotions, such that inclusive interactions lead to higher levels of positive emotions when disability identity is high versus when it is low.*
*H5d: Disability identity will moderate the impact of exclusionary social interactions on negative emotions, such that exclusionary interactions lead to lower negative emotions when disability identity is high versus when it is low.*

Fig. 5 presents the person-centric framework developed from the lived experiences of PWD and theories of emotion and inclusion. It illustrates how social interactions in the Metaverse shape emotional responses, which in turn influence key outcomes, with disability identity moderating the link between social interactions and emotions of PWD. The following study tests this framework.

## Main study

### *Participants*

The study was conducted via Prolific with participants who were at least 18 years old, self-identified as having a disability, and agreed to download and use VRChat for two weeks. Ultimately, 125 participants were invited to participate in the study and completed the pretest. Of those, 50 fully completed the experiment, resulting in 527 diary responses included in our analysis. Fourteen participants were aged 18–24, sixteen were 25–34 (28 %), thirteen were 35–44 (32 %), four were 45–54 (8 %), two were 55–64 (4 %), and one was over 65 (2 %). Approximately 40 % of participants identified as women and 2 % identified as non-binary. Furthermore, 44 % of participants identified as White, 44 % identified as Black, 6 % identified as Asian, 2 % identified as Hispanic, and 4 % declined to report their race/ethnicity. Additionally, 74.57 % of participants were employed full-time. Finally, a total of 18 participants (36 %) did not have a VR headset and 32 (64 %) did own a headset. To be included in the analysis, participants needed to complete a minimum of five play sessions and ESM surveys.

### *Procedure and measures*

The procedures in the Main Study were the same as in our Exploratory Study with three exceptions. First, participants' disability identity was measured in a pretest and a posttest. Second, instead of completing an interaction record at the end of each day's play session, participants were asked to complete a short survey after every 30 min of avatar use during each play session. To be included in the study, they had to complete at least five surveys. Third, participants were instructed to include their disability in their profile description in addition to using an inclusive avatar with a disability signifier. Following a similar procedure as the Exploratory Study, participants reported information about their social interactions before completing the quantitative survey measures.

In addition to the social interaction records collected using the same measure as in the Exploratory Study, within-person measures were collected at the end of each 30-minute play session using ESM surveys. Specifically, we measured participants' positive and negative emotions, psychological connection to their avatar, satisfaction with their avatar, engagement, and inclusion climate perceptions. Additionally, we measured participants' disability identity at the between-participant level. A detailed explanation of the study measures, including items, references, and reliabilities, can be found in Appendix C.

### *Results*

Means, standard deviations, and correlations are presented in Table 1. When inclusive or exclusionary social interactions occurred during inclusive avatar use, corresponding shifts were observed in PWD's emotions, attitudes, and perceptions of inclusion. Importantly, not every session using an inclusive avatar was tied to a social interaction that participants deemed to be significant. Of the 538 avatar sessions reported in the data, 39 % (208) included a significant social interaction. One hundred and sixty-three of those events were inclusive, and 45 were exclusionary. Before reporting results, we ran a null model to examine the within-person variation inherent to each daily measure. The variance accounted for by the within-person component of our variables was 50 % for state positive emotions and 62 % for state negative emotions, 27 % for psychological connection to avatar, 33 % for avatar satisfaction, 30 % for engagement, 50 % for inclusion as belonging, and 46 % for inclusion as authenticity.

Hypothesis tests can be seen in Tables 2 and 3. Results show that positive emotions were significantly impacted by inclusive social interactions ($\gamma = 0.46$, $p = 0.000$, 95 % CI = 0.23, 0.69). Likewise, when exclusionary social interactions took place, there was a statistically significant decrease in positive emotions ($\gamma = -1.28$, $p < 0.001$, 95 % CI = −1.62, −0.93). Exclusionary social interactions significantly increased the level of reported negative emotions ($\gamma = 2.02$, $p < 0.001$, 95 % CI = 1.70, 2.34). Finally, inclusive social

**Table 1**
Main study means, standard deviations, and correlations.

| | Variable | Mean | Std. Dev. | Min | Max | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Disability Identity | 4.59 | 1.12 | 2.5 | 7 | 1.00 | | | | | | | | | |
| 2 | Inclusive Social Interaction | 0.31 | 0.46 | 0 | 1 | 0.21 | 1.00 | | | | | | | | |
| 3 | Exclusionary Social Interaction | 0.08 | 0.27 | 0 | 1 | −0.04 | −0.20 | 1.00 | | | | | | | |
| 4 | Positive Emotions | 5.48 | 1.47 | 1 | 7 | 0.28 | 0.31 | −0.33 | 1.00 | | | | | | |
| 5 | Negative Emotions | 2.27 | 1.34 | 1 | 7 | −0.34 | −0.28 | 0.43 | −0.66 | 1.00 | | | | | |
| 6 | Engagement | 5.13 | 1.31 | 1 | 7 | 0.25 | 0.19 | −0.28 | 0.66 | −0.44 | 1.00 | | | | |
| 7 | Avatar Satisfaction | 5.72 | 1.40 | 1 | 7 | 0.40 | 0.21 | −0.24 | 0.44 | −0.47 | 0.45 | 1.00 | | | |
| 8 | Psychological Connection to the Avatar | 4.76 | 2.14 | 1 | 7 | 0.49 | 0.22 | −0.18 | 0.44 | −0.40 | 0.51 | 0.70 | 1.00 | | |
| 9 | Inclusion as Belonging | 3.94 | 0.85 | 1 | 5 | 0.32 | 0.33 | −0.38 | 0.65 | −0.55 | 0.63 | 0.54 | 0.51 | 1.00 | |
| 10 | Inclusion as Authenticity | 4.04 | 0.83 | 1 | 5 | 0.34 | 0.32 | −0.34 | 0.59 | −0.48 | 0.62 | 0.57 | 0.53 | 0.83 | 1.00 |

Note. N Level 1 = 527. N Level 2 = 50.

**Table 2**
Main Study results of hypothesis testing.

| Predictor | Positive emotion | | Negative emotion | | Psychological connection to avatar | | Avatar satisfaction | | Engagement | | Inclusion as belonging | | Inclusion as authenticity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* |
| Intercept | 3.43*** | 0.48 | 3.57*** | 0.43 | 0.51 | 0.46 | 2.76*** | 0.47 | 3.53*** | 0.59 | 2.67*** | 0.28 | 2.53*** | 0.27 |
| Inclusive Social Interaction | 0.46*** | 0.12 | −0.32** | 0.11 | 0.25* | 0.13 | 0.12 | 0.09 | 0.25** | 0.09 | 0.35*** | 0.07 | 0.30*** | 0.06 |
| Exclusionary Social Interaction | −1.28*** | 0.18 | 2.02*** | 0.16 | −0.69*** | 0.19 | −0.89*** | 0.13 | −0.67*** | 0.13 | −0.81*** | 0.1 | −0.76*** | 0.1 |
| Disability Identity | 0.25* | 0.1 | −0.33*** | 0.09 | 0.44*** | 0.1 | 0.37*** | 0.1 | 0.27* | 0.12 | 0.18** | 0.06 | 0.18*** | 0.05 |
| Lag (Dependent Variable) | 0.16*** | 0.04 | 0.05 | 0.04 | 0.48*** | 0.04 | 0.24*** | 0.04 | 0.07 | 0.04 | 0.10** | 0.04 | 0.16*** | 0.04 |
| Positive Emotion | | | | | | | | | | | | | | |
| Negative Emotion | | | | | | | | | | | | | | |
| Var (Intercept) | 0.48 | | 0.38 | | 0.48 | | 0.53 | | 0.88 | | 0.16 | | 0.15 | |
| Var (Residual) | 0.90 | | 0.77 | | 1.05 | | 0.49 | | 0.47 | | 0.28 | | 0.27 | |

*Note. N Level 1 = 527. N Level 2 = 50.* *** = p < 0.001; ** = p < 0.01; * = p < 0.05; † = p < 0.1.

| Predictor | Positive Emotion | | Negative Emotion | | Psychological Connection to Avatar | | Avatar Satisfaction | | State Engagement | | Inclusion − Belonging | | Inclusion − Authenticity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* | *γ* | *SE* |
| Intercept | 3.43 | 0.51 | 3.60 | 0.47 | 0.27 | 0.56 | 2.63*** | 0.51 | 2.00*** | 0.51 | 1.96*** | 0.28 | 1.85*** | 0.29 |
| Inclusive Social Interaction | 0.59 | 0.45 | −0.65 | 0.41 | 0.12 | 0.12 | 0.03 | 0.09 | 0.11 | 0.08 | 0.22*** | 0.06 | 0.20*** | 0.06 |
| Exclusionary Social Interaction | −1.95* | 0.08 | 3.48*** | 0.74 | −0.16 | 0.21 | −0.52*** | 0.15 | −0.28* | 0.14 | −0.41*** | 0.1 | −0.45*** | 0.1 |
| Disability Identity | 0.25* | 0.10 | 3.34*** | 0.09 | 0.32*** | 0.1 | 0.28** | 0.09 | 0.16 | 0.09 | 0.08 | 0.04 | 0.11* | 0.04 |
| Inclusive X Identity | −0.02 | 0.09 | 0.07 | 0.08 | | | | | | | | | | |
| Exclusionary X Identity | 0.15 | 0.17 | −0.33* | 0.16 | | | | | | | | | | |
| Lag (Dependent Variable) | 0.16*** | 0.04 | 0.05 | 0.04 | 0.50*** | 0.04 | 0.25*** | 0.04 | 0.12** | 0.04 | 0.14*** | 0.03 | 0.17*** | 0.04 |
| Positive Emotion | | | | | 0.19*** | 0.05 | 0.13** | 0.04 | 0.32*** | 0.04 | 0.22*** | 0.03 | 0.19*** | 0.03 |
| Negative Emotion | | | | | −0.14* | 0.06 | −0.11* | 0.04 | 0.01 | 0.04 | −0.07* | 0.03 | −0.03 | 0.03 |
| Var (Intercept) | 0.48 | | 0.38 | | 0.37 | | 0.44 | | 0.47 | | 0.07 | | 0.09 | |
| Var (Residual) | 0.90 | | 0.75 | | 1.00 | | 0.47 | | 0.41 | | 0.23 | | 0.24 | |

**Table 3**
Main study results for hypothesis testing – bootstrapped indirect effects.

| Social interaction | Mediator | Dependent variable | Indirect effect | 95 % confidence interval |
|---|---|---|---|---|
| Inclusive | Positive Emotion | Psychological Connection to Avatar | **0.0877** | **0.0307, 0.1627** |
| | Negative Emotion | | **0.0455** | **0.0053, 0.1021** |
| Exclusionary | Positive Emotion | | **−0.2431** | **−0.4006, −0.1060** |
| | Negative Emotion | | **−0.2870** | **−0.537, −0.0561** |
| Inclusive | Positive Emotion | Avatar Satisfaction | **0.0577** | **0.0181, 0.1093** |
| | Negative Emotion | | **0.0343** | **0.0048, 0.0761** |
| Exclusionary | Positive Emotion | | **−0.1597** | **−0.2721, −0.0620** |
| | Negative Emotion | | **−0.2167** | **−0.3930, −0.0518** |
| Inclusive | Positive Emotion | State Engagement | **0.1473** | **0.0706, 0.2329** |
| | Negative Emotion | | −0.0030 | −0.0314, 0.0229 |
| Exclusionary | Positive Emotion | | **−0.4082** | **−0.5636, −0.2714** |
| | Negative Emotion | | 0.0190 | −0.1370, 0.1769 |
| Inclusive | Positive Emotion | Inclusion – Belonging | **0.1000** | **0.0473, 0.1582** |
| | Negative Emotion | | **0.0212** | **0.0020, 0.0484** |
| Exclusionary | Positive Emotion | | **−0.2772** | **−0.3812, −0.1283** |
| | Negative Emotion | | **−0.1335** | **−0.2503, −0.0203** |
| Inclusive | Positive Emotion | Inclusion – Authenticity | **0.0875** | **0.0417, 0.1415** |
| | Negative Emotion | | 0.0102 | −0.0018, 0.0337 |
| Exclusionary | Positive Emotion | | **−0.2425** | **−0.3421, −0.1560** |
| | Negative Emotion | | −0.0646 | −0.1822, 0.0509 |

Note. Significant indirect effects are in bold. 95% confidence intervals were bootstrapped using Monte Carlo simulation with 20,000 repetition.

interactions significantly decreased negative emotions ($\gamma = -0.32$, $p = 0.003$, 95 % CI $= -0.53, -0.11$).

Bootstrapped mediation tests showed that inclusive and exclusionary social interactions had significant indirect effects on the dependent variables (psychological connection to avatar, avatar satisfaction, engagement, inclusion as authenticity, and inclusion as belonging) through positive and negative emotions, with four exceptions. Specifically, the negative emotion pathways produced nonsignificant indirect effects for both inclusive and exclusionary social interactions when predicting engagement and inclusion as authenticity. As described in Table 4, these results provide overall support for H1ab and H2ab, as well as partial support for H3ab and H4ab. In general, results show that social interactions significantly impacted all study variables through state emotion, though positive emotions were the more consistent mediator.

Hypotheses 5a and 5b stated that disability identity will be positively related to positive emotions (H5a) and negatively related to negative emotions (H5b) above and beyond the impact of social interactions. Results show that individuals with a higher disability identity experienced more positive emotions ($\gamma = 0.25$, $p = 0.11$, 95 % CI $= 0.06, 0.44$) and less negative emotions ($\gamma = -0.33$, $p < 0.001$, 95 % CI $= -0.50, -0.16$) while using inclusive avatars that displayed their disability, supporting Hypotheses 5a and 5b. When exploring moderation effects, Hypothesis 5c predicted that the effect of inclusive social interactions on positive emotions would be enhanced when participants were higher in disability identity. In contrast, Hypothesis 5d predicted that the impact of exclusionary social interactions on negative emotions would be attenuated when participants were higher in disability identity. Results showed no significant interaction between inclusive social interactions and disability identity on positive emotion ($\gamma = -0.06$, $p = 0.503$, 95 % CI $= -0.25, 0.12$), failing to support Hypothesis 5c. For exclusionary events, however, disability identity significantly reduced the impact of exclusionary social interactions on negative emotion ($\gamma = -0.35$, $p = 0.028$, 95 % CI $= -0.66, -0.03$), supporting Hypothesis 5d. Additionally, we analyzed social interaction records using the same coding scheme as the Exploratory Study (see Appendix B for illustrative quotes).

*Quantitative findings of the Main Study build on and empirically validate the qualitative insights from the Exploratory Study. They reinforce the idea that social interactions in the Metaverse can be either inclusive or exclusionary for PWD using inclusive avatars. Interestingly, the majority of PWD's user sessions did not involve notably inclusive or exclusionary interactions, and participants generally reported a positive and satisfying baseline experience. Supporting Hypotheses 5a, 5b, and 5d, disability identity significantly shaped the emotional responses of PWD in the Metaverse. Notably, when exclusionary interactions did occur, those with a stronger disability identity experienced fewer negative emotions than those with a weaker disability identity. This suggests that identifying as part of a valued disabled community may help buffer the emotional impact of exclusion in virtual environments.*

## Discussion

The world of business is increasingly digitizing work processes, and the Metaverse is emerging as a technology with the potential to support new forms of collaboration and production (Dolata and Schwab, 2023; Marabelli and Lirio, 2024). While the Metaverse offers benefits in terms of social presence and immersion, understanding the experiences of one of the largest underemployed segments of the global workforce—PWD—can enhance the strategic potential of this technology. Motivated by this opportunity, we examined how inclusive and exclusionary social interactions in the Metaverse influence PWD's emotional responses, and how these emotions can, in turn, impact their engagement, connection to and satisfaction with their avatars, and perceptions of inclusion.

We developed and tested a framework that amplifies the voices of PWD while drawing on theories of emotion and inclusion to better understand the nature and consequences of social interactions they experience in the Metaverse. After conducting a mixed-

**Table 4**
Summary of results across both studies.

| Hypotheses | Qualitative findings | Quantitative findings |
|---|---|---|
| H1a: Inclusive social interactions will have a positive indirect effect on PWDs' psychological connection with their inclusive avatar by increasing their positive emotions and decreasing their negative emotions. | "[…] everyone was very understanding and nice to me [inclusive interaction] which has now encouraged me [positive emotions] to continue using it [inclusive avatar] [psychological connection to the avatar]." [P17, Exploratory Study] | H1a: Fully supported: Inclusive social interactions enhanced users' psychological connection to their avatars through increased positive emotions and decreased negative emotions. |
| H1b: Exclusionary social interactions will have a negative indirect effect on PWDs' psychological connection with their inclusive avatar by decreasing their positive emotions and increasing their negative emotions. | "I felt uncomfortable [negative emotions] for the most part and took it off in places I felt most judged or insecure [psychological connection to the avatar]." [P23, Exploratory Study] | H1b: Fully supported: Exclusionary social interactions diminished users' psychological connection to their avatars through decreased positive emotions and increased negative emotions. |
| H2a: Inclusive social interactions will have a positive indirect effect on PWDs' satisfaction with their inclusive avatar by increasing their positive emotions and decreasing their negative emotions. | "[…] one of the days where someone was extremely saucy [exclusionary interaction] and yeah, it really turned me off [negative emotions]. On that very day, I almost wanted to quit [avatar satisfaction]." [P6, Exploratory Study] | H2a: Fully supported: Inclusive social interactions enhanced avatar satisfaction through increased positive emotions and decreased negative emotions. |
| H2b: Exclusionary social interactions will have a negative indirect effect on PWDs' satisfaction with their inclusive avatar by decreasing their positive emotions and increasing their negative emotions. | "[..] if a kid brought up my avatar [exclusionary interaction], I'd usually switch it for the rest of my time in that world. I felt like I drew attention to myself, much like in the real world [avatar satisfaction]. [P23, Exploratory Study] | H2b: Fully supported: Exclusionary social interactions diminished avatar satisfaction through decreased positive emotions and increased negative emotions. |
| H3a: Inclusive social interactions will have a positive indirect effect on PWDs' engagement when using their inclusive avatar by increasing their positive emotions and decreasing their negative emotions.<br>H3b: Exclusionary social interactions will have a negative indirect effect on PWDs' engagement when using their inclusive avatar by decreasing their positive emotions and increasing their negative emotions. | "There was someone negative towards my disability [exclusionary interaction]. I felt out of place and out of touch [engagement] with what I was doing at that moment. "[P7, Exploratory Study]"Nonetheless, I was happy that some other players came to the rescue [positive emotion]." [P28, Main Study] | H3a: Partially supported: Inclusive social interactions enhanced engagement through increased positive emotions; the indirect effect via negative emotions was not significant.H3b: Partially supported: Exclusionary social interactions diminished engagement through increased positive emotions; the indirect effect via negative emotions was not significant. |
| H4a: Inclusive social interactions will have a positive indirect effect on PWDs' perceptions of the Metaverse community's inclusion climate (belonging and authenticity) by increasing their positive emotions and decreasing their negative emotions. | "And when I have those positive experiences and conversations [inclusive interactions], they make me feel fulfilled [positive emotions]. I am a huge advocate of inclusivity [inclusion as belonging and authenticity]." [P9, Exploratory Study] | H4a: Fully supported: Inclusive social interactions enhanced perceived *inclusion as belonging* through increased positive emotions and decreased negative emotions. |
| s' perceptions of the Metaverse community's inclusion climate (belonging and authenticity) by decreasing their positive emotions and increasing their negative emotions. | "Someone made fun of my avatar having a cane because it looks stupid [exclusionary interaction]. My negative experiences today in VR Chat has made me feel quite bad [negative emotions] about inclusivity in games [inclusion as belonging]." [P9, Exploratory Study] | H4a: Partially supported: Inclusive social interactions enhanced perceived *inclusion as authenticity* through increased positive emotions; the indirect effect via negative emotions was not significant. |
| | "In the Black Cat I witnessed abuse towards people who had wheelchairs depicted on their avatars [exclusionary interaction]. I did not feel happy, [positive emotions],comfortable or safe [inclusion as belonging], within that space so I left." [P48, Main Study] | H4b: Fully supported: Exclusionary social interactions diminished perceived *inclusion as belonging* through decreased positive emotions and increased negative emotions.<br>H4b: Partially supported: Exclusionary social interactions diminished perceived *inclusion as authenticity* through increased positive emotions; the indirect effect via negative emotions was not significant. |
| H5a: Disability identity will be positively related to positive emotions above and beyond the impact of social interactions. | "I wouldn't make my disability disappear [high disability identity] because I'm enjoying [positive emotions] being this character." [P15, Main Study] | H5a: Fully supported: Individuals with a higher disability identity experienced more positive emotions while using inclusive avatars. |
| H5b: Disability identity will be negatively related to negative emotions above and beyond the impact of social interactions. | "I would never change who I am no matter what [high disability identity]. Today I […] encountered some terrible people [exclusionary interaction] but I really didn't care [negative emotions]." [P45, Main Study] | H5b: Fully supported: Individuals with a higher disability identity experienced less negative emotions while using inclusive avatars. |
| H5c: Disability identity will moderate the impact of inclusive social interactions on positive emotions such that inclusive interactions lead to higher levels of positive emotions when disability identity is high versus when it is low. | | H5c: Not supported: There was no significant interaction between inclusive social interactions and disability identity on positive emotions. |
| H5d: Disability identity will moderate the impact of exclusionary social interactions on negative emotions such that exclusionary interactions lead to lower negative emotions when disability identity is high versus when it is low. | | H5d: Fully supported: The interaction between exclusionary social interactions and disability identity was significant for negative emotions. This indicates that as disability identity increases, the negative emotional impact of exclusionary interactions decreases. |

methods study, we found that the use of inclusive avatars with disability signifiers was associated with both inclusive and exclusionary social interactions, which in turn shaped PWDs' engagement, perceptions of their avatars, and perceptions of the virtual climate through emotions. Critically, our results highlight how disability identity serves as a key factor shaping PWDs' responses to social interactions in the Metaverse. Our research extends previous work (e.g., Suh et al., 2011) by showing that resemblance between an avatar and its user is important for avatar satisfaction and connection, while also enriching our understanding of the lived experiences of PWD and the untapped potential of the Metaverse for employees with disabilities (Davis and Chansari, 2018). Table 4 summarizes the results of both studies.

*Implications for research and practice*

This work makes several contributions to research and practice. First, we contribute to a small but growing body of research that sheds light on the lived experiences and the voices of PWD in the Metaverse. In line with prior studies, we document the negative experiences of PWD when they use their inclusive avatars, including incidents of bullying and harassment (e.g., Zhang et al., 2023). However, we go beyond merely replicating these findings by showing that positive experiences are not only more frequent but also potentially more influential in predicting PWDs' engagement in the Metaverse, their connection to and satisfaction with their avatars, and their perceptions of inclusion in virtual environments. Moreover, to our knowledge, this research is among the first to systematically amplify PWD voices by identifying and testing the impact of inclusive and exclusionary social interactions in the Metaverse. Rather than categorizing events as good or bad, we demonstrate how interactions can carry deeper meanings of inclusion or exclusion that extend beyond the immediate encounter.

In addition, we integrate these insights into a theoretical framework informed by the lived experiences of PWD and established theories of emotion and inclusion. Importantly, the reflexive process in the Exploratory Study that linked participant narratives to established theories clarified how social interactions affect various aspects of PWDs' Metaverse experiences through emotions. Ultimately, we extend prior work by showing how these emotional ripple effects extend to several strategically relevant dimensions of the technology, including PWDs' engagement when they are using the technology (Roh et al., 2024), PWDs' connection (Teng et al., 2023) and satisfaction (Trepte and Reinecke, 2010) with the avatar that represents them in the virtual environment, and finally, PWDs' sense of whether the Metaverse itself is an inclusive and safe space (Zhang et al., 2025).

Second, through a person-centric approach to our research that informs theorizing by PWDs' lived experiences and voices, we reveal that disability identity moderates the relationship between exclusionary social interactions and negative emotions. In doing so, we show that disability identity can buffer against the harms of exclusionary social interactions in the Metaverse identified in previous research (e.g., Zhang et al., 2023). This insight underscores the importance of accounting for individual identity when studying user experiences in immersive virtual environments (Park and Kim, 2022). It also highlights the need to move beyond generalized accounts of accessibility toward more nuanced understandings of how identity shapes the Meateverse for PWD (Mack et al., 2023).

Third, our findings call into question prior work that framed the Metaverse primarily as a space for masking or reconstructing disability (e.g., Davis and Chansari, 2018). Specifically, we highlight how, for many PWD, the Metaverse can serve as a platform for accessibility and authentic, avatar-based self-expression. Participants who used inclusive avatars often reported feeling more empowered and connected, suggesting that when designed with intentionality and inclusion in mind, virtual environments can foster positive identity affirmation. These findings shift the narrative from escapism to visibility and meaningful participation in virtual worlds for PWD.

This research also offers actionable insights for organizations. Companies interested in harnessing the potential of the Metaverse for engaging PDW should consider investing in avatar customization features that support identity expression, including disability signifiers. In doing so, they should actively involve PWD in the co-design and testing of virtual workplace technologies to ensure their accessibility, relevance, and emotional impact. Including PWD voices from the start can improve adoption rates and demonstrate a serious commitment to workplace equity (Schloemer-Jarvis et al., 2022). Additionally, training programs for virtual conduct and inclusive interactions may help prevent exclusionary experiences and maximize the benefits of inclusive avatars in virtual environments. Organizations can also use inclusive avatar usage data as a diagnostic tool to assess the inclusivity of their virtual platforms and technologies. Tracking patterns of interaction and feedback can help identify exclusionary dynamics early and inform targeted interventions. In sum, while essential challenges remain, our research emphasizes the potential of the Metaverse to positively impact both the work and lives of PWD, offering organizations a promising pathway to engage an often underutilized segment of the workforce.

*Limitations and future directions*

Any research project must be interpreted in light of its limitations. First, accessing participants with disabilities was a difficult task. While our studies generated numerous observations at the within-person level of analysis, our overall number of participants was smaller than we would have liked. Second, not all participants used a headset at all times (or at all). In the Main Study, headset use was associated with increased positive emotion and decreased negative emotion ($\gamma_{\text{positive emotion}} = 0.40$, $p = 0.009$; $\gamma_{\text{negatvie emotion}} = -0.35$, $p = 0.011$) as well as a stronger sense of inclusion as belonging ($\gamma_{\text{inclusion as belonging}} = 0.18$, $p = 0.011$). However, no significant effects were found on psychological connection to the avatar ($\gamma$connection $= 0.02$, $p = 0.900$), avatar satisfaction ($\gamma_{\text{satisfaction}} = 0.11$, $p = 0.369$), engagement ($_{\text{engagement}} = 0.18$, $p = 0.127$), or inclusion as authenticity($\gamma_{\text{inclusion as authenticity}} = 0.12$, $p = 0.118$). Future research should rigorously test the potential direct and moderating effects of headset use in the Metaverse.

Third, our work focuses on a single action organizations can take, namely, enabling PWD to represent themselves in the Metaverse

through avatars with disability signifiers. However, the Metaverse is flexible in allowing users to try various avatars. For some PWD, an avatar with a disability signifier may not align with their identity or preferences. Future research should investigate the situational and contextual factors that may influence PWD's desire to use inclusive avatars.

Fourth, our research did not capture long-term behavioral or attitudinal changes following the use of inclusive avatars. This limits our ability to speak to the sustained impact of inclusive avatar use on psychological outcomes or career-related behaviors. Longitudinal studies are needed to examine whether the use of inclusive avatars has lasting effects on inclusion and engagement over time. Moreover, future research should explore how people without disabilities feel, think, and behave when they have a social interaction with someone using an inclusive avatar. Our qualitative findings suggest that the majority of other users were pleased to encounter someone with an inclusive avatar. By examining social interactions from multiple perspectives, including individuals with and without disabilities, those who choose to use avatars with disability signifiers, and those who interact with such avatars, organizations can gain deeper insight into the training and support needed to foster inclusion in the Metaverse and create virtuous cycles that benefit all actors involved.

Furthermore, it may be that gender, race, or age influences the type and frequency of inclusive and exclusionary social interactions in the Metaverse. We urge future researchers to take the key elements of our framework and use them to elevate more voices that reflect how interactions in the Metaverse impact other employee characteristics apart from disabilities. We believe research should also explore vicarious, or second-hand experiences of social interactions. In some cases, our participants reported vicarious experiences in the Metaverse that were deeply unsettling. Future studies should examine the differential impact of direct versus vicarious exposure to inclusive and exclusionary interactions on emotions, identity, and engagement. Such work could illuminate how indirect experiences shape climate perceptions and coping strategies for PWD and their allies.

## Conclusion

This research deepens understanding of how PWD navigate social interactions in the Metaverse when using avatars with disability signifiers. Drawing on theories of emotion and inclusion and amplifying the voices of PWD, we developed and empirically tested a person-centric framework using a mixed-methods design. Our Exploratory Study revealed that social interactions elicited emotional responses, both positive and negative, that shaped user experiences. Moreover, disability identity emerged as a potentially important factor that changed how PWD interpreted and responded to these experiences. Our Main Study extended these findings through an experience sampling study, showing that emotions mediate the link between social interactions and outcomes such as engagement, avatar connection, and perceived inclusion. Our findings also position disability identity as a critical buffer that mitigates the emotional strain of exclusion in virtual environments. By framing the Metaverse as a relational and emotion-driven space, we offer theoretical and practical insights to help organizations design inclusive virtual workplaces that unlock the potential of the Metaverse to engage PWD, an underutilized yet highly capable segment of the workforce.

## CRediT authorship contribution statement

**Katrin Angerbauer:** Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **H. Phoenix Van Wagoner:** Writing – original draft, Validation, Supervision, Software, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Ksenia Keplinger:** Supervision, Resources, Conceptualization. **Tim Halach:** Visualization, Software. **Jonas Vogelsang:** Writing – review & editing, Investigation, Formal analysis. **Natalie Hube:** Visualization, Conceptualization. **Andria Smith:** Conceptualization. **Michael Sedlmair:** Writing – review & editing, Supervision, Resources, Conceptualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Interview questions

- Thank you for taking out time from your schedule for this interview! We will be spending the next 45–60 min together. My name is [blinded for peer review], I am [blinded for peer review]. We investigate inclusive avatar use in virtual reality environments. This is a very personal/relevant topic for me as I also have a disability. This was the main reason for me to focus on this topic in my PhD studies. Thank you again for your support! We look forward to hearing about your experiences and thoughts. This study has been approved by the Internal Review Board at the [blinded for peer review] and we will follow all guidelines to protect your privacy and confidentiality.

  –The purpose of this interview is to gain insight into the experience of using an inclusive avatar in virtual social interactions.

*Obtaining verbal consent*

- A couple of things before we get started. First, this interview is voluntary. You have the right not to answer any questions, and to stop the interview at any time or for any reason. If you cancel, we cannot compensate you.
- Second, the questions I will ask are very open-ended. There is no correct answer – I just want to hear what you have to say and learn from you. It's your opinion that counts.
- Third, all of your answers are completely confidential (meaning only our research team will see your individual responses). We will remove all personally identifiable information that can connect you to your responses (e.g., name, email address, location, etc.).
- Fourth, with your permission, I will be recording your answers during the interview. Again, what you share with me today will be held in confidence. You also have the right to revoke recording permission and/or end the interview at any time.
- Does all of that sound okay? Do you have any questions now?

START RECORDING
Do you consent to participate in this study?
To begin with, let's talk about your demographics and background. While we have some information about you from our initial survey, these questions are meant as a warm-up.

- How old are you?
- How do you identify in terms of gender?
- Where do you live/ reside?
- As this a study about inclusive avatars, tell me about your disability (whatever you like to share)

Thank you for your answers so far! Next, we would like to hear about your personal experience as you were using your inclusive avatar and interacting with others in the VRChat.

- How would you describe your overall experience with having an avatar that represents your disability?
- What do you think most shaped your experience in this way?
  - Was your experience more positive or more negative? Why?
- How did you feel when using your inclusive avatar?
  - Were there specific emotions that arose? If so, which ones?
- In which situations did you use the inclusive avatar?
  - Were you using it with close friends or strangers, playing games, chatting, etc?
  - What communities did you interact with?
  - What topics did you discuss?
  - In which situations did you not use the avatar?
- Did you have any conversations with others about your inclusive avatar? Did others comment on your avatar?
- Would you use this avatar in a workplace context vs a purely social context? Why or why not?
- How represented do you feel by this avatar? How did using this avatar make you feel in the VR space?
  - Follow-up if comfort doesn't come up: Did you feel more comfortable in the VR space using the avatar?
- How included (in the VR community) did you feel when you were using your avatar? Why do you think you felt this way?
- Please describe how you felt about your virtual body
  - Did you feel as if your virtual avatar belonged to you?
  - Did you feel that your virtual body was your own body?
  - Did you feel that your virtual body/device resembled your own (real) body?

[questions about events or comments people mentioned in the surveys]
You mentioned xyz, how did it make you feel?
Could you provide details on xyz?

- One of the things we are also interested in are feelings of authenticity, the feeling of being one's true self. How authentic did you feel using the avatar?
  - On a related note, did your inclusive avatar represent other elements of your identity (gender/ ethnicity…)
  - How important is it to you that different aspects of identity are represented?
  - Especially for disability?
- Will you continue using your avatar moving forward? Why or why not?

Thank you so much for taking the time to meet with us. We really appreciate hearing about your experience. That is all we have in the way of questions. Is there anything else you would like to tell us that you think might be important regarding your experience?

## Appendix B. Illustrative examples of quotes

*Category 1: Disability & Identity*

| Subcategories | First-Order codes | Illustrative Examples (Raw Data) |
|---|---|---|
| ***Disability-Is-Not-Me*** | Masking disability to blend in | "I wanted to mask my disability." [P22, Exploratory Study]"I do not like to be disabled, and would act as everybody else." [P3, Main Study]"I feel like on good days it is like my disability isn't visible or noticed by others." [P22, Main Study] |
| | Rejecting disability as part of identity | "Always had a problem seeing myself like that [disabled]. Every time I think of myself, I actually think of myself in the future, walking again. Normally. I know that's weird, but even after all these years accepting that I'm well and truly disabled, it's been a difficult thing." [P31, Exploratory Study]"I don't hide from [my disability] if somebody asks me or if it comes up, but I don't define myself by it at all." [P20, Exploratory Study]"I really dislike my disability. It keeps me from truly enjoying life and I would love for it to disappear." [P35, Main Study] |
| ***Disability-Is-Me*** | Being open about disability | "I don't have a problem with people knowing I have a disability. So, there was no kind of negative connotations for me. […] I don't mind if people know. I actually think it's a good thing that people are more aware." [P29, Exploratory Study]"It's my body, my issues. But with time, you get used to [your disability] and explaining it." [P7, Exploratory Study]"[…] for once, I'm happy to be disabled in this form. It led to lots of good conversations, and I felt a lot of love today." [P35, Main Study] |
| | Embracing disability as part of identity | "I'm quite happy with the representation it [inclusive avatar] brings me, not only with the fact that it [inclusive avatar] has the mobility aid, but that it matches how I feel. I present myself outwardly appearance and my identity." [P9, Exploratory Study]"Because my disability has been my identity and it [disability] has become part of me." [P47, Main Study]"I don't know what it is like to be someone else. I don't know how to be without my disability." [P50, Main Study] |
| | Celebrating disability | "For me personally, I want people to see it [disability]. […], you can be yourself in virtual reality so you don't have to hide behind a big giant monster or whatever. They [the avatars] should want to represent ourselves, but not give too much away. And for people who are disabled, it should be something out there in a good light for them." [P3, Exploratory Study]"[I] would never want to make my disabilities go away, they help me connect to people like me." [P6, Main Study]"We discuss about showcasing and celebrating avatars that represent diverse disabilities thereby promoting inclusive representation." [P27, Main Study] |
| ***Category 2: Inclusive Interactions*** | | |
| ***Acceptance and Support from Others*** | Being listened to and spoken to respectfully | "Everybody was very nice and kind. They didn't, […] make jokes or anything like that. I felt it was very welcoming." [P22, Exploratory Study]"[…] I felt seen and people treated me with more patience when talking and explaining things" [P17, Exploratory Study]"A person asked me about my avatar, and I told him about my knees/hip. He told me he had some problems with his shoulder when he was using a regular mouse. So, he was respectful."[P20, Main Study] |
| | Feeling accepted and included | "I felt a great sense of belonging when I started talking to other people, they made me feel less of how any other people make me feel which is small." [P8, Main Study]"I was never judged for my disability. I had a sense of belonging. It was so refreshing not having to explain myself as to what happened." [P44, Main Study] |
| | Receiving support and encouragement | "It was basically just a game where you had to try escape a room. And there were some positive people that said, hey, we're not going to leave you behind […] like that they're actually there to assist." [P7, Exploratory Study]"I made a friend who seemingly understood I was feeling nervous and offered me a literal shelter [by putting up a tent for me]." [P40, Main Study]"Someone was laughing at me for being disabled then tried to get the room to laugh at me and got made fun of themselves […]" [P35, Main Study] |
| ***Visible Representation*** | Creating opportunities for inclusive interactions | "After a while they asked me about my avatar, specifically the sunflower badge.[…]. We had a long talk about lots of things" [P21, Exploratory Study]"I interacted with someone who has the same disability as me but did not express [it] on their bio and they found courage after they saw that I displayed it on my bio without the problem or fear of being judged." [P14, Main Study]"[…] someone actually approached me specifically asking about my avatar and what the sunflower meant and we had a positive uplifting conversation about disability, particularly invisible ones and raising awareness." [P6, Main Study]"[…] lots of people said my avatar was cool. A few people wanted to ride on it […], [I] also had multiple conversations about why I use the wheeled walker." [P36, Main Study] |
| | Facilitating inclusive conversations | "I was explaining how I'm trying to navigate schooling and there's some attention issues and various health problems I'm dealing with. And that was about an hour-long conversation." [P30, Exploratory Study]"We chatted about how disabilities have advantages and disadvantages in the work environment. It was eye-opening to know that people from all over the world are experiencing similar situations." [P31, Main Study]"Getting to speak to a doctor who works in hospitals and hear his perspective on certain things was eye-opening. I felt as if I was talking to somebody who also truly understood my disability, so it was nice not to have to explain myself much as he already understood the nature of my disability, so I could elaborate on the other things like my avatar and sunflower badge [P11, Main Study] |

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| *Category 1: Disability & Identity* | | |
|---|---|---|
| Subcategories | First-Order codes | Illustrative Examples (Raw Data) |
| ***Connection to the Disabled Community*** | Bonding with others through the disability signifier | "I would use [the inclusive avatar] in situations where it is required to be empathetic and humane. Many people might be struggling with either physical or mental disabilities. They might hide it. But seeing somebody expressing [their disability] comfortably might trigger the other people to come out of their shell. Open up." [P21, Exploratory Study]"[I] had a meaningful conversation with a fellow player about our shared experiences with disabilities. We both have avatars with mobility aids, mine has a walking cane, and we bonded over the importance of representation and accessibility in virtual spaces." [P47, Main Study] |
| | Connecting through shared experiences | "[…] we ended up talking about an hour about all different mental health problems and they were telling me theirs." [P20, Exploratory Study]"It felt good being in a conversation with people who have the same disability as you." [P31, Main Study]"The person I was talking to was also autistic, and we had a discussion about how we cope with life, strategies that we have found useful and struggles that we have in common." [P48, Main Study]"Met a few with hearing disabilities like me. We chatted about the challenges faced when we are around people who do not have hearing challenges." [P31, Main Study] |
| ***Opportunity for Self-Growth*** | Feeling empowered to be myself | "[I liked] how comfortable I felt talking about myself and my experiences" [P15, Exploratory Study]"It's nice to be me in the world and not [having] to hide behind a shell or a mask because that's how I feel in the real world anyway. It's like in [the] real world I normally have to hide behind a mask to be my true self." [P2, Exploratory Study]"I was free enough to share about my funny experiences as a person living with a disability. I did not feel ashamed." [P46, Main Study]"[…] I feel more comfortable having an avatar which reflects me." [P48, Main Study] |
| | Building confidence through the avatar representation | "I felt very represented by the avatar and it gave a new found boost of confidence to go out of my way and push myself to meet and talk to strangers all on my own. I felt a lot more comfortable when speaking to others especially the people who knew what the sunflower meant and represented." [P17, Exploratory Study]"[…] if I used [the inclusive avatar] for a month of just a couple nights a week just talking to strangers, […] maybe I could actually go back to before me being social, how I used to be before I developed the PTSD and the social anxiety related to it." [P2, Exploratory Study]"I feel very confident when I use my avatar because I feel very welcome and accepted by people who know me a lot and even outsiders." [P43, Main Study] |
| | Engaging in conversations that feel therapeutic | "Today's conversation was almost like a mini therapy session. I am not used to doing that with people I just met. It was a good experience and I want to do it again." [P14, Exploratory Study]"We talked about disabilities and how the inclusive avatars make us feel like human and not different from others. We also mentioned that these avatars are a self-healing ability to us." [P15, Main Study]"We basically just had a group therapy session almost. We talked about our different disabilities and how to live with them." [P1, Main Study] |
| | Reflecting on my identity | "This past week has really opened my eyes on how people see me as a person, when knowing what I suffer with. It's made me feel a completely different way on my illness, and how I'm going to progress with my life, and change how I go about things." [P39, Main Study]"Talking to the people […] made me realize that I am a great person and should love myself often and not care what other people say about me." [P44, Main Study] |
| **Category 3: Exclusionary Interactions** | | |
| ***Disapproval and Lack of Support from Others*** | Being dismissed | "Another [person] thought [the inclusive avatar] was dumb and not the point of a virtual world to look like myself." [P32, Exploratory Study]"[…] I told them it [inclusive avatar] represents me in my real life that I have some issues with my joints. But they didn't understand why I choose to show them my weakness though. The would instead hide it." [P20, Main Study] |
| | Being ignored during the harassment cases | "[…] just after that [the harassment] happened and I noticed that no one was really going to help stand up for me, I just stopped playing multiplayer games for the day." [P9, Exploratory Study]"[…] there were a few people around, but they weren't paying much attention to the [negative] interaction" [P6, Exploratory Study] |
| | Feeling excluded and isolated | "[…] the first time I went [to the home world of VRChat], people were making a lot of comments and it made me quite uneasy." [P19]"Some people hated my avatar and called me old father. That made me feel old and outside the group." [P20, Main Study] |
| ***Hypervisibility or Invisibility*** | Being excessively questioned | "A rude young boy kept asking why I had a stick, and where I'd got my avatar and what was wrong with me. I didn't stay more than 10 mins there as I felt so awkward." [P24, Exploratory Study]"[…] as soon as I approached someone with my avatar being in a wheelchair, people started questioning me and asking why I was in a wheeler chair and I told them I had a disability. They then started to laugh at me, and tell me to go away." [P41, Main Study]"As long as people don't bother me [with questions] during the session and remind me the whole time of my disability, I can be fine for a moment." [P20, Main Study] |
| | Being ignored and neglected | "Some people don't want to talk to me because I was using an avatar that it's different from every other person" [P6, Exploratory Study]"I tried to use the 'match up' feature, |

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(*continued*)

| *Category 1: Disability & Identity* | | |
|---|---|---|
| Subcategories | First-Order codes | Illustrative Examples (Raw Data) |
| | | but the one avatar I matched up with only kept shouting 'Not you!' when they arrived in the room." [P37, Main Study]"I said it's an inclusive avatar because I have a disability, and my next sentence I started was, 'So I was born with…,' and that's as far as I got. And he just turned away and left the door. Then, the next two people I interacted with, I started the convo by taking notice of their avatars and then, as soon as I mention my avatar being about my disability, they just left without saying anything more."[P18, Main Study] |
| | Feeling non-involved | "Few people were […] making me feel very non-involved." [P24, Exploratory Study]"The majority of the people there didn't seemed interested in talking with me or even almost [not] noticed I was there, they were too much busy talking to each other and then moved to other worlds" [P34, Main Study] |
| | Being belittled | "There were a few comments about how I should be on the guards [duty] as my cane would slow the escape down [in a prison escape game]" [P7, Exploratory Study]"[…] I think people kind of questioned your intelligence a little bit more, […] people kind of were a little bit less likely to have me on their team" [P19, Exploratory Study] |
| ***Harassmen*t** | Being insulted | "[…] one person trolled/bullied me about the wheelchair" [P31, Exploratory Study]"It was more [..] mocking […] insults being thrown towards my direction. General things like 'Here's a cripple,' 'How can you do this?,' 'Stephen Hawking is here.' There [were] a couple […] sort of low blows." [P7, Exploratory Study]"One guy […] said they [people with disabilities] are detrimental to society and all need to kill themselves." [P35, Main Study] |
| | Being made to feel inferior | "[I had a] bad time on [VRChat,] negative comments made me feel unworthy" [P24, Exploratory Study]"Someone read my bio and told me to go kill myself. So that was fun. My bio says I have a mental illness." [P33, Main Study]"So, I did ask people what they thought about my avatar […], they tried to take me to the doctor to get me fixed." [P35, Main Study] |
| **Category 4: Emotional Reactions** | | |
| ***Positive Emotions*** | Content, energetic, enthusiastic, surprised, and happy | "I felt pretty calm and chill [while using the inclusive avatar in an exclusionary interaction]." [P45, Main Study]"I had a good night's sleep, woke up full of energy and logged on to VRChat. The experience was very enjoyable and interesting." [P10, Exploratory Study]"[It]was so amazing to see the avatar, how it was something that never happened to me. I never had an avatar like that and [it] was really moving […]." [P4, Exploratory Study]"I was actually shocked at the level of inclusivity people were willing to give instantly to strangers, and I am quite a guarded person in real life. […]. So, the fact that people would just come up to you and just talk to you like they've been talking to you for 10 years, it was quite impressive." [P26, Exploratory Study]"I'm very happy. It [inclusive avatar] made me feel like myself, and it helps bring that the whole VR experience personal." [P3, Exploratory Study]"Every time I enter this world, someone comments positively on my avatar and I absolutely love it." [P1, Main Study] |
| ***Negative Emotions*** | Nervous, anxious, embarrassed, sad, frustrated, and angry | **"**I think I was both happy to be able to share myself, been myself. But at the same time, it also came with a certain level of nervousness." [P19, Exploratory Study]"There was some anxiety, you don't know exactly what's going to happen, what's going to be discussed, if you're going to be rejected. [Anxiety] went down as I spent more time in [VRChat]." [P28, Exploratory Study]"Having the disability avatar on and also having that fact shown on my profile bio make this whole experience even worse and stranger, and shameful for me." [P30, Main Study]"I think out of the hundreds and hundreds of people I spoke to and I didn't mention it [my disability] to people, I think there were two and they both got it [the meaning of the sunflower] wrong as well." [P20, Exploratory Study]"Someone was laughing about what I wrote in my bio. They thought it was funny and weird. It made me a little angry, but I was calm and polite and told them that it is what it is, and that I'm open about my problems and don't feel ashamed." [P20, Main Study] |

## Appendix C. Main Study measures

**Inclusive and Exclusionary Social Interactions.** Inclusive and Exclusionary interaction records were captured using the same method as in Exploratory Study. Analyses are conducted using two dummy variables. In the exclusionary interaction dummy, 1 indicates that an exclusionary social interaction took place and 0 indicated no event took place. In the inclusive interaction dummy, 1 indicates that an inclusive event took place and 0 indicated no event took place.

**Emotions.** We measured positive and negative emotions using the five item Lebender PANAVA scale (Schreiber and Jenny, 2020). This measure of emotions uses emoticons to capture participant's emotions and was designed specifically for ESM studies. The measure was phrased to capture participants' emotions, "right now, in the current moment." Two items captured participants' positive emotions (Spearman-Brown reliability = 0.78), two captured participants' negative emotions (Spearman-Brown reliability = 0.69), and a final item captured valence.

**Psychological Connection to Avatar.** Psychological connection to the inclusive avatar was measured using a single item measure adapted from Aron et al. (1991). For our study, participants saw an image containing pairs of circles that ranged from barely touching

to almost completely overlapping. One circle in each pair referred to the inclusive avatar players just used, while the other circle was labeled "real self." Participants selected the pair they felt best represented their current level of connection with their inclusive avatar.

**Engagement.** Engagement was measured using three items from Schaufeli and Bakker' Utrecht Work Engagement Scale (2004). The items were "When using VRChat, I felt bursting with energy", "I am enthusiastic about VRChat," and, "I get carried away when using VRChat." Cronbach's $\alpha$ was 0.74.

**Avatar Satisfaction.** Inclusive avatar satisfaction was measured using an adapted three-item scale developed by Seashore and colleagues (1982) to capture the affective component of job satisfaction. Participants were instructed to report their agreement to items "right now, in this moment." Items include, "Right now, I am satisfied with my avatar" and "Right now, I like using my avatar," and "I do not like my avatar right now" (reverse coded). The items ranged on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). Cronbach's $\alpha$ was 0.89.

**Inclusion Climate.** Inclusion climate was measured using 16 items developed by Jansen and colleagues (2014). The measure includes two 8-item sub dimensions, belonging and authenticity. For each item, participants indicated the extent to which they agree or disagree with each statement based on their experiences using VRChat that day. Items include, "The people in VRChat I interacted with today give me the feeling that I belong.", "The people in VRChat I interacted with today gave me the feeling that I fit in.", and "The people in VRChat I interacted with today allow me to be who I am." Items ranged from 1 (strongly disagree) to 5 (strongly agree). For the subdimension of belonging, Cronbach's $\alpha$ was 0.95 and for authenticity it was 0.96.

**Disability Identity.** Disability identity was measured using the Identity dimension of the Collective Self-Esteem Scale developed by Luhtanen and Crocker (1992). Participants were instructed to consider their membership to the group of people with a disability, and respond to the statements on the basis of how they feel about this group and their membership in it. The scale consisted of four items "Overall, my group membership has very little to do with how I feel about myself (reverse coded)", "The social group I belong to is an important reflection of who I am", "The social group I belong to is unimportant to my sense of what kind of person I am (reverse coded)", and "In general, belonging to this social group is an important part of my self-image". Cronbach's $\alpha$ was 0.68.

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