



An Avatar's worth in the metaverse workplace: Assessing predictors of avatar customization valuation

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ABSTRACT

Virtual economies with 3D assets have been studied for decades, often in the context of entertainment, but the concept of the metaverse as a workplace platform has only recently begun to take hold. This research addresses a gap in our understanding of how the enhanced ability for impression management in the metaverse workplace may relate to worker well-being and equity. We explore how demographics and previous virtual meeting (VM) experiences relate to people's valuation of self-presentation in the metaverse, reflected by willingness to pay for avatar customizations in a work context. Survey responses from a general population of adults ($n = 553$) suggest that the valuation of avatar customization in the metaverse workplace was predicted by VM fatigue, gamers' propensity to purchase virtual items, and demographics. People of color and women exhibited higher intentions to purchase avatar customization in the metaverse workplace. These results support the reasoning that the demand for impression management in the metaverse workplace will likely motivate avatar customization, and that gamers are likely to be the early adopters of paid avatar customization options in the non-game metaverse. This study contributes to an understanding of the role avatar customization has for a self-presentation strategy to meet norms in the future metaverse workplace. We discuss implications of VM fatigue and self-presentation concerns from the perspective of an equitable avatar-mediated workplace.

The *metaverse*—the internet-based network of immersive digital environments accessible through mixed reality (XR) technologies, such as virtual reality (VR) and augmented reality (AR)—is becoming an infrastructure that supports political, economic, social, and cultural activities (Barreda-Ángeles & Hartmann, 2022; Formosa, Johnson, Türkay, & Mandryk, 2022; Mystakidis, 2022; S.-M. Park & Kim, 2022; Xi & Hamari, 2021) along with entertainment. The present research contributes to the growing body of studies on the context of business and remote work (Fereydooni & Walker, 2020; Popescu, Ciurlău, Stan, & Băcănoiu, 2022; Rospigliosi, 2022; Tsappi & Papageorgiou, 2023, pp. 374–383; Šímová et al., 2023), which we refer to as the *metaverse workplace*. There is a decades-long history of scholarly interest in the practice of real-world money exchange for digital assets within online games (Bartle, 2004; Castronova, 2002, 2008; Frieling, 2013) and the metaverse economy is predicted to rival real-world counterparts at \$800 billion by 2024 (Blockworks, 2022; Bloomberg, 2021). However, research regarding the economic behaviors that will likely characterize

the metaverse workplace is in nascent stages. The present paper addresses this gap, examining the factors that influence user valuation of their metaverse workplace self-representations (i.e., avatars) (see Fig. 1).

Economic behaviors in virtual worlds follow similar patterns, motivations, and social rules as those offline and are often intertwined with real-world transactions (Cai et al., 2019, pp. 391–396; Castronova et al., 2009; Chun et al., 2018, pp. 1929–1938; Hamari et al., 2017). Players value digital items and spend billions annually to adorn their virtual selves (i.e., avatars), environments, and experiences (Clement, 2021; Hamari & Keronen, 2017). Scholars have explored motivations for virtual item purchasing in social media and gaming contexts (Khelladi, Lejealle, Vessal, & Castellano, 2021, pp. 1–5; Kim, Chan, & Kankanhalli, 2012; Marder et al., 2019; Sheng, 2023). Though these studies provide a useful foundation for understanding how virtual item adoption might manifest in the metaverse writ large, little is known about motivations for virtual item adoption in the metaverse workplace setting, as most

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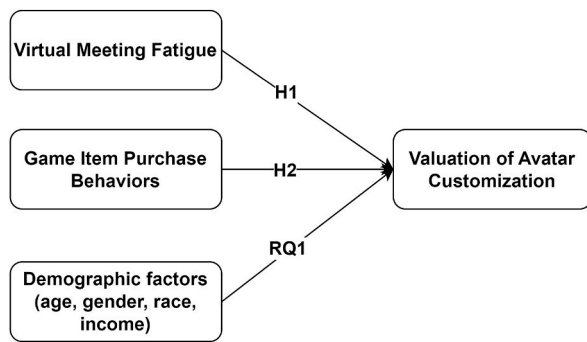


Fig. 1. Research model.

have yet to experience it firsthand. We adopt the mapping principle—“the extent to which human behaviors occur in virtual spaces in the same way they occur in real spaces” (Williams, 2010, p. 452)—to address this challenge and expect that behaviors will manifest in the metaverse workplace similarly to how they do in physical spaces. Bearing that in mind, our study builds from the idea that motivations for avatar customization in the metaverse workplace will stem from similar experiences with similar technologies (e.g., gaming) and similar contexts (e.g., virtual meetings for work).

The present study assumes that customization of an *avatar*—defined as a “digital representation of a human user that facilitates interaction” (Nowak & Fox, 2018, p. 34)—in the workplace is driven, in part, by the need for impression management (Schlenker, 1980), following the fundamentals of self-presentation theory (Goffman, 1959). Impression management motivations play an important role across organizational communication contexts (Bolino, Long, & Turnley, 2016) and thus likely manifest through a variety of workplace communication modalities, including avatars (Andrew G. Thomas, 2012; Bartsch & Subrahmanyam, 2015; Vasalou & Joinson, 2009; Westerman, Tamborini, & Bowman, 2015). As the theory (Goffman, 1959) suggests, individuals “have many motives for trying to control the impression they receive of the situation,” (p. 8) especially in the workplace, a context in which they likely feel evaluated by others. Hence, individuals are driven to selectively present better versions of the self through platforms that support avatar-mediated communication (Vasalou & Joinson, 2009). Avatar-mediated communication platforms also provide new possibilities for manipulating self-presentational cues in the workplace, such as self-values and attributes. Despite the potential of avatars in shaping impressions that are deemed desirable in the virtual workplace, research into the motivational underpinnings remains limited.

Although avatar customization is already assumed in the metaverse, the present paper extends this theorization to explain why people may ascribe value to customizing, owning, and identifying with upgraded avatar features in the non-gaming metaverse. One potential approach to understanding the motivation for avatar customization in the professional metaverse is to examine people’s experience with similar technologies in similar environments. With the rise of VMs—such as videoconferencing and sessions in virtual or mixed reality—‘VM fatigue’, commonly referred to as Zoom fatigue (Fauville et al., 2021), has emerged as a widespread issue among virtual workers. One of the primary causes of VM fatigue are associated with concerns about self-image (Ratan et al., 2022; Shockley et al., 2021). Exploring the link between VM fatigue and avatar customization valuations could offer insights into how individuals might transfer their experiences to a future metaverse workplace, where opportunities for impression management via avatar customization may be abundant. Further, while many studies have explored VM fatigue as an outcome, its role as a motivational factor remains under-researched. As a result, this study aims to examine factors that might predict the extent of people’s avatar customization valuations in the metaverse workplace, such as the extent to which an individual

tends to experience VM fatigue or is marginalized in society or workplace contexts. As such, this approach addresses a gap in our understanding of impression management in the metaverse workplace, which is an important factor in worker well-being and equity (Charbonneau, 2018; Klotz et al., 2018). We present a survey-based study which offers insights into motivations of avatar customization consumption in the metaverse, building upon the notion that impression management in the metaverse is intrinsically related to self-presentation through avatars.

1. Motivations for avatar customization in the work context

Studies which explore virtual item adoption in casual contexts (e.g., gaming, social media) commonly build upon the tri-dimensional motivation framework: hedonic, social, and utilitarian motivations (Marder et al., 2019; Sheng, 2023). There is evidence that hedonic motivations which facilitate fun, feeling, and fantasies (Holbrook & Hirschman, 1982) are an important factor in explaining non-productive virtual item adoption in casual contexts (Guitton, 2011; Hamari et al., 2015, pp. 3559–3568; Turel, Serenko, & Bontis, 2010). For example, aesthetics (e.g., changing the look of avatars) serve as hedonic motivation for younger users in virtual environments (Colliander & Marder, 2018). In contrast, social motivations to purchase non-functional items (e.g., clothes) are primarily driven by visual authority and praise from others (Khelladi et al., 2021, pp. 1–5; Lehdonvirta, 2009; B.-W. Park & Lee, 2011). For instance, users may want to feel a sense of belonging or conform to a group norm in the virtual world, which motivates their virtual item adoption (Homburg, Wieseke, & Hoyer, 2009; Lehdonvirta, 2005). Research establishing this tri-dimensional framework for online item adoption, however, has not closely examined people’s motivations for adopting virtual items when considering the professional context of the virtual workplace.

Workers in the non-virtual world have special needs for self-presentation—proffering positive information about the self to shape favorable self impressions perceived by others—to meet organizational expectations in the workplace (Goffman, 1959). Workers need to present professionalism, competency, group conformity, and favorable personalities to prove they are qualified workers (Fang, McAllister, & Duffy, 2017; Howell, Harrison, Burris, & Detert, 2015; Rollag, 2004), and those who achieve these desired impressions via strategic self-presentation often benefit professionally (Chawla et al., 2021). There is also a need to build friendships and socialize within the workplace to acquire social and implicit capital (Sias & Cahill, 1998; Van Maanen, 1978). Additionally, jobseekers and employees often hide their socially marginalized identities and conform to those of majority groups to avoid discrimination in labor markets or the workplace (Goffman, 2009; S. K. Kang, DeCelles, Tilcsik, & Jun, 2016).

Though still nascent, we expect that the metaverse workplace will be realized through immersive technologies which foster the feeling of being together with colleagues by virtually emulating many face-to-face interaction cues (Barreda-Ángeles & Hartmann, 2022; Panda et al., 2022). This vision of the metaverse suggests that communication on such platforms will inherently be mediated by an avatar, which we define as a *mediated self-representation that an intelligent user controls during synchronous interactions*. People’s desire to enhance their self-image (i.e., through their avatar) to elicit positive impressions may manifest in the metaverse. Prior literature has adopted the impression management perspective or theory to understand avatar-mediated communication (Andrew G. Thomas, 2012; Bartsch & Subrahmanyam, 2015; Choi, Yun, & Kim, 2009; Vasalou & Joinson, 2009; Won & Davis, 2023). Recent scholarship has found that when individuals are allowed to control self-image via avatar customization they are more likely to enjoy social interactions in a virtual environment (Lee, Chang, Uhm, & Owiro, 2023). The extent to which users engage in avatar customization is also an effective way to measure their impression management behavior, and it eliminates any social desirability bias that may be present when asking explicit questions about motivations and

behavioral intentions (Thomas & Johansen, 2012). Considering the importance of self-presentation tactics in the face-to-face workplace, we expect that avatar customization may serve as a useful impression management tool (Bartsch & Subrahmanyam, 2015) in metaverse workplaces as well. Existing research supports this expectation, albeit among casual contexts, showing that individuals who purchase decorative items are driven by the motivation to create positive self-images in virtual social environments (Shang, Chen, & Huang, 2012). As such, the drive to personalize one's appearance in the virtual world through avatar customization (Kim et al., 2012) may extend to the metaverse workplace, facilitating impression management among workers.

Clothing in the workplace is another vital component of impression management, impacting how workers perceive each other (Peluchette & Karl, 2007). Workers may strategically select workplace attire to foster professional and credible self-presentations (O'Neal & Lapitsky, 1991), influencing impressions of each other and themselves (Karl, Hall, & Peluchette, 2013). People perceive themselves and behave differently depending on fashion style (e.g., attire, hair style, accessories, facial make-up), potentially enhancing feelings of competency, sociability, and credibility about oneself (Johnson, Nagasawa, & Peters, 1977; Kwon, 1994; O'Neal & Lapitsky, 1991). Therefore, impression management through workplace fashion has the potential to reduce the stress induced by self-presentation pressure.

This notion can be applied to avatar customization in the metaverse workplace context. While a common feature in virtual worlds, avatar customization manifests in different ways (Ducheneaut, Wen, Yee, & Wadley, 2009). Further, people tend to act and perceive themselves in accordance with their avatars' characteristics in the virtual environment. Referred to as the *Proteus effect*, evidence suggests that avatars influence a user's self-concept and subsequent behaviors (Beyea et al., 2023, pp. 1–30; Yee & Bailenson, 2007). For example, avatars customized to represent the 'ought self'—how you perceive the way others believe you ought to behave (Higgins, 1987; Markus & Nurius, 1986)—have been found to motivate healthier eating behaviors than avatars customized to represent the actual self (Sah, Ratan, Sandy Tsai, Peng, & Sarinopoulos, 2016). There is evidence that communication through more attractive avatars increases extrovertedness and risk-taking behaviors (Messinger, Ge, Smirnov, Stroulia, & Lyons, 2019). In this vein, avatar customization in the metaverse workplace may help manage workers' concerns for self-presentation by offering opportunities to control and enhance self-image. Such opportunities may afford workers to represent variations of possible selves (Bargh, McKenna, & Fitzsimons, 2002; Higgins, 1987; Markus & Nurius, 1986), such as the actual self (characteristics an individual actually expresses), ideal self (desired traits that an individual aspires to possess), ought self (facets deemed necessary by workplace norms), or the true self (traits possessed but not typically shown). Given that individuals are expected to behave and express themselves based on workplace roles and responsibilities, we assume that avatar customization should reflect a blend of the ideal and ought self, aligning with workplace expectations, rather than merely showcasing an individual's actual or true self.

2. Virtual meeting fatigue and self-presentation in the workplace

Given that avatars are malleable manifestations of identity that influence users' self-concept, individuals are likely to strategically self-present their avatars in the workplace to mitigate stress about impression management. Conversely, dedicating thought and effort to impression management may contribute to workplace stress. For example, there is evidence that people who are more concerned about impression management in social media contexts also tend to experience heightened fatigue (Al-Shatti, Ohana, Odou, & Zaitouni, 2022; Yang & Zhang, 2022; Zhu & Bao, 2018). Impression management concerns in the virtual workplace context may also be related to fatigue associated with workplace activities, such as VMs.

Zoom fatigue—or virtual meeting (VM) fatigue—is the phenomenon of physical and psychological exhaustion induced by videoconferencing (or other virtual) meetings (Deniz, Satıcı, Doeniyas, & Griffiths, 2022; Fauville, Luo, Queiroz, et al., 2021). One underlying mechanism and a positive predictor of VM fatigue is mirror anxiety; a negative psychological effect caused by the excessive monitoring of a user's self-video (Bailenson, 2021; Fauville et al., 2021; Oducado, Dequilla, & Villaruz, 2022; Queiroz et al., 2021). This phenomenon relates to impression management given that people who feel more negatively about their own physical appearance may experience increased cognitive and emotional demands (Klotz et al., 2018) and thus become more fatigued during VMs (Ratan et al., 2022). For example, when people can see themselves (i.e., 'self-view' camera is on) in VMs, they may be more likely to feel self-conscious, which has been associated with VM fatigue (Shockley et al., 2021).

Taken together in the context of the metaverse workplace, avatar customization may help workers manage the stress and fatigue of impression management. We would expect that people who tend to experience greater VM fatigue may have increased benefit from tools that give them more control over their self-presentation in virtual workplace contexts; therefore, attributing great valuation to avatar customization in the metaverse workplace. As a result, we hypothesize the following.

H1. People who tend to experience more fatigue in videoconferencing meetings ascribe higher avatar customization valuation in the workplace context.

3. Individual differences in valuation of avatar customization options

Adoption of avatar customization in the metaverse may differ by individual characteristics. Basic demographics like age, gender, or race may predict experiences with and willingness to adopt different technologies (Hauk, Hüffmeier, & Krumm, 2018; Padilla-Meléndez et al., 2013; Ratan et al., 2022; Venkatesh, Morris, & Ackerman, 2000). These demographic characteristics play a role in aesthetic labor and the effort put into enhancing one's physical appearance (Mears, 2014; Edmonds, 2010). For instance, women tend to confront complex pressures regarding physical appearance in the workplace (Jackson, 1992) and are more likely to wear makeup to present health and confidence at work (Dellinger & Williams, 1997).

Other characteristics such as income level and gaming experience may also impact avatar customization adoption. Income level may influence valuation of virtual items simply based on affordability. This may be a barrier to both use and familiarity; therefore, impacting use of customization in the metaverse workplace. Additionally, those who tend to play more video games may be more familiar with in-game currencies (Asadi & Hemadi, 2018, pp. 109–117), the ability to purchase avatar skins or other exclusive items (Begy & Consalvo, 2011), and even 'pay-to-play' service models which require payment to advance in games (Nieborg, 2015). Thus, dedicated gamers may hold more positive attitudes about purchasing virtual items, may be drawn in by network effects, and may more easily navigate how to make a virtual purchase (Hamari & Keronen, 2017).

Considering that different demographic groups have unique needs and expectations regarding self-presentation, we pose the following research question and hypothesis with respect to how individual differences may relate to varying valuations of avatar customization in the metaverse workplace.

RQ1. Do demographic factors (age, race, gender, and income) predict valuation of avatar customization in the workplace context?

H2. People who are more likely to purchase game items ascribe higher avatar customization valuations in the workplace context.

4. Method

4.1. Procedure and sample

A total of 604 participants who reported living in the United States were recruited via Prolific, a high-quality survey panel platform which has been found to offer engaged research participants (Albert & Smilek, 2023), to participate in an IRB-approved survey in March 2022. All participants were willing to complete the 15-min survey for \$3.10 (i.e., a rate of \$12.40 per hour, which was 70% higher than the federal minimum wage at the time of the study). Participants were told that they should be somewhat familiar with the concept of the metaverse to participate in the study. Participants ranged from 18 to 77 years old ($M = 33.18$, $SD = 11.16$). The sample was intentionally stratified by gender (285 women, 296 men, 16 non-binary, and 7 prefer not to say) and race/ethnicity (183 White, 200 Black or African origin, 188 Asian, 12 Hispanic or Latino, 1 Caribbean, 2 Middle Eastern, and 18 Other/Prefer not to answer).

We recognize that gender is a non-binary social construct. However, to facilitate this study's comparison by the predominant man and woman gender categories, non-binary and non-disclosure cases were excluded from the analysis. Further, to test a comparison by race/ethnicity group, only cases in which participants reported identifying as Black or African origin, Asian, or White were included in the analysis due to low representation of other groups on the Prolific platform. In addition to these inclusion criteria (i.e., women and men who identified as Asian, White, or Black or African), we noticed that one participant did not respond to our main dependent variable of interest (i.e., willingness to pay avatar customization options) and thus was excluded. Hence, our primary sample included a total of 553 participants ($n = 553$; 274 Women; 279 Men; 173 White; 184 Asian, 196 Black).

Additionally, 67 of the participants reported employment status as 'not currently employed.' Because income is a main variable of interest in predicting valuation of avatar customization in the workplace, we conducted a secondary analysis on a sample that excluded these unemployed participants ($n = 486$; 235 Women as coded 1; 251 Men as coded 2; 156 White as coded 0; 154 Asian as coded 1; 176 Black as coded 2).

4.2. Measures

Valuation of Avatar Customizations in the Workplace was measured from participants' reported willingness to pay for a number of different avatar customization types. We derived this operationalization from research on consumers' purchase behaviors, which suggests that willingness to pay is a representation of valuation of products, with higher valuation resulting in greater willingness to pay (Demirgüneş, 2015; Ligos & Chaudhuri, 2012; Muturi, Wadawi, & Owino, 2014; Netemeyer et al., 2004). Thus, we asked how much actual money participants were willing to spend on avatar customizations as a proxy for participants' avatar customization valuation. We prompted participants, "Imagine that you regularly attend work meetings in the metaverse (i.e., in virtual environments) using an avatar. How much would you be willing to pay for the following types of only-purchasable (not free) avatar customizations [in dollars]?" Participants were then given the following list of six avatar characteristics and asked to enter a dollar amount for each of them: *Facial features, Hairstyle, Clothing - Top, Clothing - Bottom, Shoes, Accessories* (e.g., bag). One outlier reported a willingness to pay for avatar customization as \$100,000 or \$10,000 across all items, which was three standard deviations away from the mean and was excluded from analysis.

Game Item Purchase Behaviors reflect the extent to which participants tend to spend real money to purchase virtual items in a gaming context. Our 3-item measure was adapted from previous measures of in-game purchase behaviors (Guo & Barnes, 2007, 2011) and included the following items: (a) *I often use real money to buy virtual items in video*

games or virtual worlds; (b) *I like to play 'pay-to-win' games—where purchased items give the player an advantage*; (c) *I like to play games that allow people to use real money to buy virtual items that do NOT give the player an advantage* (e.g., skins). Participants responded on a 5-point scale of agreement from 'not at all' to 'extremely,' with responses averaged into a composite metric with Cronbach's α of 0.68, which we deemed to be sufficiently reliable (Shi, Mo, & Sun, 2012).

VM Fatigue was measured using a validated 15-item scale for Zoom Fatigue (Fauville, Luo, Queiroz, et al., 2021). This scale has been widely adopted to measure fatigue during and after virtual meetings. Example items include: (a) *How tired do you tend to feel after your Zoom (or other video conferencing) meetings*; (b) *How mentally drained do you tend to feel after your Zoom (or other video conferencing) meetings*; (c) *How irritable do you tend to feel after your Zoom (or other video conferencing) meetings*? Participants responded on a 5-point scale from 'not at all' to 'extremely.' The composite metric was highly reliable (Cronbach's $\alpha = 0.97$). Please see Table 1 for descriptive statistics of these measures. All items are displayed in Appendix Table A1.

4.3. Data analysis

164 (50.93%) out of the smaller sample with the exclusion and 188 (51.51%) participants out of the larger sample without the exclusion, reported willingness to pay \$0 for all avatar customization options. To account for the large number of participants who reported \$0 on all options, we utilized the double-hurdle model (Cragg, 1971; Heilbron, 1994; Mullahy, 1986) to explore predictors of valuation of avatar customization in the workplace via the *multcomp* package in R (Bretz, Hothorn, & Westfall, 2016). Double-hurdle models view data as "a two-component mixture model" (Feng, 2021, p. 3), composed of a zero mass (i.e., those who do not want to spend money to purchase avatar customization) and a positive-observations component (i.e., those who value avatar customization over zero dollars). The double-hurdle model provided information explaining what factors are associated with zero valuations of workplace avatar customizations and what factors are related to the extent of positive valuations of workplace avatar customizations.

Table 1

Descriptive Statistics for Study Measures for both Full and Limited Samples.

	Full sample ($n = 553$)			Limited sample (unemployed removed, $n = 486$)		
	Mean	SD	α	Mean	SD	α
Game item purchase behaviors (adapted from (Guo & Barnes, 2007, 2011))	1.94	0.93	0.69	1.95	0.94	0.69
Zoom fatigue (Fauville, Luo, Queiroz, et al., 2021)	2.35	0.98	0.97	2.37	0.99	0.97
Average Valuation (\$) across Avatar Characteristics (including zero values)	4.77	19.27	0.84	4.95	20.45	0.84
(only positive values)	9.14	26.86	0.94	7.48	24.75	0.93
Time spent on videoconferencing meetings per week	3.32	1.84		4.50	1.85	
Income	6.05	3.51		6.74	3.16	

Note. To measure time spent on videoconferencing meetings per week, participants were asked to answer the following: How much time do you typically spend in videoconference meetings (e.g., Zoom, Microsoft teams) per week? Options: < 30 min, 30–60 min, 60–90 min, 2–4 h, ...8–10 h, 10 + hrs; To measure income level, we used the following item: What is your approximate yearly income? (in \$) Options: not currently employed (most frequent category), < \$10k, \$10k - \$19,999, [8 options in increasing \$10k increments], and \$100k or more. \$30–39k was the second most frequent category. Mean/SD reported here on the 1–12 scale, 6 denotes \$40–49k].

5. Results

We conducted two-tailed correlation tests with predictors. Tables 2 and 3 present the correlation tables for the full sample (Table 2) and for the smaller sample (Table 3) with the exclusion of unemployed participants, respectively.

We then fit our data as a double-hurdle model to the regression analysis. First, we conducted the analysis with the **full sample** (see Table 4). We subjected respondents' zero or above-zero valuations of avatar customization options for the workplace to a generalized linear model as a binomial distribution (i.e., logistic regression). The result showed that game item purchasing behaviors, gender, and race predicted the probability of valuing avatar customization in the workplace above zero (see Table 4). Specifically, there was a greater likelihood of attributing an above-zero valuation to workplace avatar customizations for people who tended to purchase game items more frequently, for women compared to men, for Black participants compared to both White and Asian participants, and for Asian compared to White participants.

We then conducted a similar double-hurdle model regression analysis with the **limited sample**, excluding unemployed participants (see Table 5). The same significant differences as in the larger sample were found except that the difference between Asian and White participants was only marginally significant ($p < 0.10$), which we interpret with caution.

Next, we conducted a linear regression analysis on avatar customization valuation using the full sample, restricted to participants who reported above-zero avatar customization valuation ($n = 356$; $M = \$9.14$; $SD = 26.86$). Results suggested that game item purchase behaviors, VM fatigue, and income predicted avatar customization valuation (see Table 4). Participants who had a greater tendency to purchase game items, who reported greater VM fatigue, and with higher incomes attributed higher valuation to avatar customizations. To determine effect sizes, we conducted a stepwise regression adding each of these variables to the model and used change in model r^2 to calculate r values for game item purchase behaviors ($r = 0.28$, medium/strong effect), VM fatigue ($r = 0.17$, small effect), and income ($r = 0.09$, very small effect).

Finally, we conducted a similar linear regression analysis with the **limited sample**, restricted to participants who reported above-zero avatar customization valuation ($n = 313$; $M = \$7.48$; $SD = 24.75$). The same significant differences as in the larger sample were found except that the effect of income was only marginally significant ($p < 0.10$), which we interpret with caution. Given the similar coefficients, we did not calculate effect sizes with the limited sample.

6. Discussion

The present research extends the study of virtual item purchasing beyond a gaming context. We examined avatar customization valuation for workplace applications within virtual worlds that afford avatar-mediated professional communication, which can be understood as the metaverse workplace (Phadnis et al., 2023; Raveendhran, Fast, & Carnevale, 2020; Watanabe, 2023). Consistent with the contention that offline impression management motivations map to metaverse workplace motivations (Williams, 2010), our survey of people familiar with the concept of the metaverse found that avatar customization valuation was higher for participants who purchase virtual items in video games as well as people who tend to experience more VM fatigue. Women and people of color were more likely to ascribe higher-than-zero dollar avatar customization valuations than men and White participants, respectively. Taken together, these results suggest that metaverse workplace users are likely to value avatar customization, especially gamers as well as people who might be marginalized in the workplace and thus benefit from novel impression management strategies, such as those with higher VM fatigue, people of color, and women. This study contributes to a theoretical understanding of avatar customization valuation, especially in the context of the metaverse workplace, which has practical implications for well-being and equity in the future of work.

The findings regarding VM fatigue and valuation of avatar customization in the workplace support the reasoning that avatar customization in the metaverse workplace may afford impression management for workers. As the underlying mechanism of VM fatigue can be partly explained by anxiety about impression management (Ratan et al., 2022; Shockley et al., 2021), those exhausted by looking at self-video may have concerns about how their self-image is shown to others. In this sense, people with higher VM fatigue seem to ascribe greater value to avatar customization as an aid for impression management in the metaverse workplace.

Regarding racial group differences, we found that the likelihood of valuing avatar customization in the workplace is higher for participants of color than for White participants. This suggests that people of color may have increased sensitivity to self-presentation and concerns about impression management in the workplace. The finding is consistent with evidence that Asians tend to be more dissatisfied with their facial appearance than Whites (Frederick, Kelly, Latner, Sandhu, & Tsong, 2016; Mintz & Kashubeck, 1999), which helps explain why Asians experience higher levels of VM fatigue (Ratan et al., 2022). Furthermore, people of color may feel more pressure to conform to the social standard of 'beauty' or physical appearance than White participants. Thus, people of color are likely to ascribe higher avatar customization valuations in part, at least, as a means for strategic self-presentation in the metaverse

Table 2
Pearson correlations for the full sample ($n = 553$).

	1a	1 b	2	3	4	5	6	7
1a. Valuation								
1b. Valuation or not								
2. Income	0.08	−0.01						
3. Race ^d	0.07	0.25 ^c	−0.01					
4. Age	−0.02	−0.07	0.24 ^c	−0.02				
5. Gender ^d	0.01	−0.07	0.16 ^b	−0.02	0.03			
6. VM fatigue	0.11 ^a	0.01	0.06	−0.13 ^b	−0.17 ^c	−0.11 ^a		
7. Game item purchasing behaviors	0.29 ^c	0.30 ^c	0.02	0.17 ^c	−0.14 ^b	0.14 ^c	−0.05	
8. Time videoconferencing	0.02	0.05	0.40 ^c	−0.03	−0.04	−0.04	0.22 ^c	0.08

Note.

^a $< .05$.

^b $< .01$.

^c $< .001$;

^d White = 0, Asian = 1, Black = 2; Women = 1, Men = 2; The "1a" column shows correlation coefficients between valuation values as continuous variables and all the other variables; The "1 b" column shows Point Biserial Correlation coefficients between variables and binary value (zero:0 vs. positive:1).

Table 3

Pearson correlations for the limited sample with unemployed participants excluded (n = 486).

	1a	1 b	2	3	4	5	6	7
1a. Valuation								
1b. Valuation or not								
2. Income	0.08	−0.03						
3. Race ^d	0.07	0.24 ^c	−0.01					
4. Age	−0.03	−0.08	0.21 ^c	−0.04				
5. Gender ^d	0.01	−0.04	0.16 ^b	−0.02	0.02			
6. VM fatigue	0.11 ^a	0.01	0.02	−0.14 ^b	−0.18 ^c	−0.11 ^a		
7. Game item purchasing behaviors	0.30 ^c	0.29 ^c	0.03	0.18 ^c	−0.14 ^b	0.17 ^c	−0.07	
8. Time videoconferencing	0.01	0.04	0.31 ^c	−0.03	−0.07	−0.03	0.23 ^c	0.05

Note.

^a < .05.^b < .01.^c < .001.^d White = 0, Asian = 1, Black = 2; Women = 1, Men = 2; The “1a” column shows correlation coefficients between valuation values as continuous variables and all the other variables; The “1 b” column shows Point Biserical Correlation coefficients between variables and binary value (zero:0 vs. positive:1).**Table 4**

Regression Results of the Double-Hurdle Model on Avatar Customization Valuation with all Cases (n = 553).

Predictors	Logistic regression predicting above-zero valuations		Linear regression predicting positive valuations	
	β (SE)	z value	β (SE)	t value
VM fatigue	0.08 (0.11)	0.71	4.33 ^b (1.31)	3.31 ^b
Gender ¹	−0.49 ^a (0.20)	−2.44 ^a	−1.23 (2.41)	−0.51
Income	−0.01 (0.03)	−0.32	0.77 ^a (0.39)	1.97 ^a
Race ¹ (Asian versus White)	0.57 ^a (0.24)	2.42 ^a	1.35 (3.15)	0.43
Race ¹ (Black versus White)	1.19 ^c (0.25)	4.85 ^c	1.16 (3.04)	0.38
Race ¹ (Black versus Asian)	0.62 ^a (0.26)	2.42 ^a	−0.19 (2.81)	−0.07
Age	0.00 (0.01)	0.05	0.04 (0.11)	0.33
Game item purchase behaviors	0.85 ^c (0.14)	6.27 ^c	7.35 ^c (1.23)	5.96 ^c
Meeting time spent per week	0.05 (0.06)	0.74	−1.04 (0.76)	−1.36
df	544 df of null model: 579		356	
Model fit	AIC: 638.05 AIC of null model: 745.34 χ^2 (35) = 107.29, p < 0.001		F (8, 356) = 6.23, p < 0.001 Adj. R ² = 0.10	

Note.

^a < .05.^b < .01.^c < .001; ¹ Women = 1, Men = 2; White = 0, Asian = 1, Black = 2.

workplace. For instance, people of color may want to adjust aspects of their physical appearance, such as facial characteristics or hairstyles, to avoid racial identity-based discrimination (S. K. Kang et al., 2016). Individuals may also be motivated to purchase avatar customizations, which offer opportunities to tailor marginalized racial groups' physical characteristics.

We found that avatar customization valuation in the workplace was higher for women than men. This supports the reasoning that women are more motivated to adapt their physical appearance as self-presentation tactics than men. Given that women are required to self-present in ways that satisfy workplace appearance demands to a greater extent than men (Tazzyman, 2020), avatar customization may play a more powerful role for women's self-presentation in the metaverse workplace, similar to the role of cosmetics or aesthetic items in the physical workplace. Historically, grooming expectations and self-appearance concerns in the workplace have been gendered (Eagly & Mladinic, 1994), which clarifies why women tend to experience more VM fatigue than men (Ratan et al., 2022), and thus why women may ascribe higher value to avatar

Table 5

Regression Results of the double-Hurdle Model Avatar Customization Valuation with the Exclusion of Unemployed Participants (n = 486).

Predictors	Logistic regression predicting above-zero valuations		Linear regression predicting positive valuations	
	β (SE)	z value	β (SE)	t value
VM fatigue	0.08 (0.11)	0.70	4.73 ^c (1.43)	3.31 ^c
Gender ¹	−0.46 ^b (0.22)	−2.11 ^b	−1.97 (2.71)	−0.73
Income	−0.02 (0.04)	−0.44	0.85 ^a (0.47)	1.80 ^a
Race ¹ (Asian versus White)	0.43 ^a (0.26)	2.42 ^a	0.85 (3.60)	0.24
Race ¹ (Black versus White)	1.11 ^d (0.26)	4.30 ^d	1.10 (3.35)	0.33
Race ¹ (Black versus Asian)	0.69 ^b (0.28)	2.49 ^b	0.25 (3.26)	−0.08
Age	0.00 (0.01)	0.13	0.04 (0.12)	0.35
Game item purchase behaviors	0.83 ^d (0.14)	5.80 ^d	8.11 ^a (1.40)	5.81 ^d
Meeting time spent per week	0.04 (0.06)	0.63	−0.98 (0.84)	−1.17
df	477; df of null model: 493		313	
Model fit	AIC: 565.54 AIC of null model: 631.34 χ^2 (16) = 81.80, p < 0.001		F (8, 313) = 6.88, p < 0.001 Adj. R ² = 0.11	

Note.

^a Denotes marginally significant.^b < .05.^c < .01.^d < .001; ¹ Women = 1, Men = 2; White = 0, Asian = 1, Black = 2.

customization. Our findings suggest avatar-mediated communication may provide psychological buffers that help address concerns about social evaluations in the organization context (Raveendhran et al., 2020). This could positively contribute to organizational culture and workers' well-being (Burris, 2012), particularly for marginalized participants. Together, our findings suggest that self-presentation and impression management in the workplace will be strong motivations for avatar customization in the metaverse workplace. Furthermore, our findings imply that VM fatigue is related to self-presentation concerns.

Further, past behavior of purchasing game-items was the strongest predictor of future non-game metaverse item purchasing compared to other factors. This suggests that although the metaverse workplace is not a game, the biggest consumers in the non-game metaverse, at least in its early days, will be gamers who are comfortable with spending money on virtual game items. This is bolstered by scholarship highlighting that basic building blocks of the metaverse stem from gaming companies, using gaming tools and affiliated norms to make content (e.g., Chia, 2022; Foxman, 2022). On the contrary, however, studies suggest that

non-gamers do have positive virtual shopping experiences (Moon, Kim, Choi, & Sung, 2013), and increasing familiarity with virtual workplace platforms will likely promote wider acceptance, potentially leading to more complex interactions between early users and the metaverse workplace industry.

Overall, our study suggests that motivations in avatar customization may also be strongly associated with needs for self-presentation among workers. For example, avatar customization allows individuals to both present and affirm positive self-images (H. Kang & Kim, 2020), empowering positive self-perceptions and behaviors in the workplace. Accordingly, we can further our understanding of avatar-mediated communication technology adoption in the organizational context by considering additional precedents (e.g., self-presentation flexibility) beyond those in traditional models of technology adoption (e.g., perceived usefulness and ease of use (Davis, 1989)).

6.1. Implications and concerns

The present research contributes to a broader understanding of the motivation of avatar customization purchase intention in the non-game context, such as the metaverse workplace. These findings imply that the demand for self-presentation in the physical workplace can be extended to a future virtual workplace, which may motivate avatar customization behaviors. As people are likely to utilize avatar customization as a means of self-presentation in the workplace, avatar customization should provide the opportunities to present a variety of selves. This will likely reflect workers' needs for impression management within the organizational context in which they need to present professionalism, competency, credibility, and positive personalities (e.g., friendliness) of constructing desired images to coworkers and managers (Ashforth & Schinoff, 2016; Roberts, 2005). For example, the present feature of background template customization in online videoconferencing meetings helps users represent their personalities while conforming to organizational norms and we can consider this background customization practice as a potential predecessor of avatar customization in the metaverse workplace. Given that there are many facets of self-presentation in the workplace interaction, future studies should consider the workplace context in designing avatar customization to benefit consumers in a way to allow for effective interactions aligned with professional norms. Specifically, as our findings about VM fatigue suggest, avatar customization to modify personal appearance may address the social and emotional burden for constructing desirable self-image. Conversely, this potentially causes other detrimental effects, such as the prevalent standard of idealized appearances. Future work should investigate the role of avatar customization in mental health and well-being of consumers in the workplace setting.

The present research indicates that the metaverse is poised to become a major hub for economic activity. This suggests a strong potential for monetization of this type of metaverse digital good. Anticipating this, businesses are delving into new models of advertising, retail, product development, and consumer experiences through VR and AR technologies (Xi & Hamari, 2021), but the future of the metaverse economy is still unclear. For instance, virtual (game) economies reproduce seemingly rational behavior, the fluctuations of purchases and sales, but are often "more dramatic than are seen normally in a real economy" (Castronova et al., 2009, p. 701). Such issues portend that the metaverse could see similar instability, particularly given that cryptoasset markets have exhibited heavy volatility (Liu & Serletis, 2019). Although the non-gaming metaverse (e.g., the metaverse workplace) will differ from previously studied game economies, the present research suggests that gamers are already comfortable transacting in the metaverse economy and therefore may drive early use, so patterns of fluctuation may persist, particularly in professional environments with users who might be less accustomed to valuing these assets and/or making these digital transactions.

Relatedly, just as game publishers tightly control the virtual goods in

their markets to maximize profit (Nieborg, 2015), companies may also try to restrict economic activities in the metaverse in ways that diminish consumer surplus or harm historically economically marginalized groups (Harris, 2010). Decentralization of the metaverse economy may help to mitigate these issues, but we caution that a decentralized economic organization also brings its own challenges and potential biases. Additionally, there can be inequality issues regarding latitude in self-presentation options in the metaverse workplace. For instance, marginalized people with low incomes may be less likely to benefit from impression management with avatar customization if the cost is not accessible. Although our data did not suggest that income makes a meaningful difference in willingness to pay for avatar customization in the workplace, we speculate that a self-presentation divide may exist and poor mental health may be exacerbated if avatar customization is not affordable for some people, especially marginalized groups. As the metaverse is still in its nascent stage, considering equity in regard to avatar customization options for the metaverse workplace will benefit the growing consumers and the metaverse society.

6.2. Limitations and future directions

Study limitations highlight notable opportunities for future research. Participants were recruited from an online survey platform suggesting they were likely familiar with information technology, so the valuations reported might be higher than the general population. All participants were willing to be paid just a few dollars for completing the 15-min survey, therefore, limiting the socioeconomic diversity of the sample. Further, because the metaverse is still nascent, participants may have had disparate understandings of the concept. Lastly, the stratified sample included US participants from only three races/ethnicities and gender binary (i.e., those sufficiently represented on the survey platform), limiting generalizability to other groups, particularly groups who may represent the most marginalized groups and serve a key insight into this research. Future research could address these concerns by recruiting broader samples, especially including people with actual experience using metaverse technologies, as well as by investigating other racial groups and LGBTQ + gender groups' attitudes and perceptions about avatar customization. Additional qualitative studies with underrepresented populations could also address these challenges with more complex methodologies, which may provide deeper insights into the underlying mechanisms of motivation for avatar customization in non-gaming contexts.

Future research should also explore the association between workers' concerns about impression management depending on diverse identities (e.g., gender, racial, and cultural) along with the role of avatar-mediated communication in self-presentation strategies in the metaverse workplace by considering the organizational norms that influence avatar customization (Triberti, Durosini, Aschieri, Villani, & Riva, 2017). Additionally, future research should examine how avatar customization in the virtual workplace can help workers represent desirable identities and behaviors within this organizational setting. There is a further potential of customized self-avatars that could eventually augment workers' positive interactions in the virtual workplace (Messinger et al., 2019). However, the current study did not measure implicit needs for different types of self-presentation in the workplace. Hence, future work will benefit from directly connecting the motivations of impression management in the organizational context (e.g., self-enhancement, self-coherence, self-presentation) to the potential of avatar-mediated communication, which could eventually influence workers' behaviors and well-being in the metaverse workplace.

7. Conclusion

Notwithstanding the above-mentioned limitations, this research provides insights into the economic future of the metaverse, though much of this future is still untold. For instance, it is not yet clear how

self-presentational norms from physical workplaces will transfer to metaverse environments. Future research should also explore how people engage in aesthetic labor within the professional context of the metaverse and how this might affect workplace inequalities, such as disparities in job opportunities and promotional equity. We hope that the realm of research on virtual consumerism will continue to grow, helping to guide the development of the metaverse economy toward equitable uses that contribute positively to user outcomes.

CRediT authorship contribution statement

Chaeyun Lim: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Rabindra Ratan:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization. **Maxwell Foxman:** Writing – review & editing, Writing – original draft, Conceptualization. **Dar Meshi:** Writing – review & editing, Writing – original draft, Conceptualization. **Hanjie Liu:** Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **Gabriel E. Hales:** Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **Yiming Skylar Lei:** Writing – review & editing, Writing – original draft, Methodology,

Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Dr. Ratan’s lab received unrestricted (“gift”) funding in 2022 from Meta, Inc. (Facebook, Inc., at the time) without their involvement in any design, data collection, analysis, writing or other research activities.

Data availability

Data will be made available on request.

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Appendix

Table. A.1
Items of VM fatigue, game purchase behaviors, and avatar valuation used in the survey

Concepts	Items
Zoom fatigue (Fauville, Luo, Queiroz, et al., 2021)	How tired do you tend to feel after your Zoom (or other video conferencing) meetings? How exhausted do you tend to feel after your Zoom (or other video conferencing) meetings? How mentally drained do you tend to feel after your Zoom (or other video conferencing) meetings? How blurred does your vision tend to feel after your Zoom (or other video conferencing) meetings? How irritated do your eyes tend to feel after your Zoom (or other video conferencing) meetings? How much do your eyes tend to hurt after your Zoom (or other video conferencing) meetings? How much do you tend to feel like avoiding social situations after your Zoom (or other video conferencing) meetings? How much do you tend to want to be alone after your Zoom (or other video conferencing) meetings? How much time do you tend to need by yourself after your Zoom (or other video conferencing) meetings? How emotionally drained do you tend to feel after your Zoom (or other video conferencing) meetings? How irritable do you tend to feel after your Zoom (or other video conferencing) meetings? How moody do you tend to feel after your Zoom (or other video conferencing) meetings? How much do you tend to dread having to do things after your Zoom (or other video conferencing) meetings? How much do you tend to feel like doing nothing after your Zoom (or other video conferencing) meetings? How much do you tend to feel too tired to do other things after your Zoom (or other video conferencing) meetings?
Game item purchase behavior (adapted from (Guo & Barnes, 2007, 2011))	I often use real money to buy virtual items in video games or virtual worlds I like to play “pay-to-win” games — where purchased items give the player an advantage I like to play games that allow people to use real money to buy virtual items that do NOT give the player an advantage (e.g., skins)
Average Valuation (in dollars) across Avatar Characteristics	Imagine that you regularly attend work meetings in the metaverse (i.e., in virtual environments) using an avatar. How much would you be willing to pay for the following types of only-purchasable (not free) avatar customizations? Please enter a dollar amount without the \$ sign (e.g., 1.50). A. Facial features B. Hairstyle C. Clothing - Top D. Clothing - Bottom E. Shoes F. Accessories (e.g., bag)

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