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Issues of virtual fashion influencers' reproduced bodies: a qualitative analysis based on body discourse

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Abstract

A recent development in the fashion industry, where digital transformation has accelerated, has been the birth and rise of virtual fashion influencers. With their close imitation of the human body and how active they are on social media, their influence on the fashion industry is gradually growing. The purpose of this study is to explore the trends in the activities of virtual fashion influencers and to determine the main issues in their body representation by identifying the types and current status of their reproduced bodies. One hundred and fifteen virtual fashion influencers who are active in the global fashion industry were selected as the research subjects and observed with a focus on their body reproduction. Our qualitative analysis is based on Rosi Braidotti's theory on posthumans' existence and body of subjectivity formation discourse. Based on the above theories, these reproduced bodies can suggest the following issues related to the risks of modern society: (1) the reproduction of standardized stereotypes, (2) the expression of the male gaze, power, and desire, and (3) colonial gender hierarchy.

Keywords: Virtual fashion influencer, Reproduced body, Virtual human, Digital fashion, Rosi Braidotti

Introduction

The combination of digital media technology development and the unprecedented COVID-19 pandemic catalyzed the virtual world (Lau & Ki, 2021) and, subsequently, virtual humans (Paul et al., 2022; Zaman et al., 2022). After the emergence of Virtual Fashion Influencers (VFIs) such as Lil Miquela, Shudu, and Imma, a large number of virtual humans appeared around the world, becoming crucial figures in both culture and industry, especially the fashion industry. Companies and 3D creators have planned a vast number of Virtual Influencers (VIs) as a part of their marketing (Lee et al, 2021). For instance, the social media company Meta (previously Facebook) is currently the most prominent space for VIs, announcing that VIs are changing the influencer ecosystem and can provide both brands and influencers greater opportunities (Facebook IQ, 2022).

Further, in the fashion industry, numerous high-fashion brands (e.g. Chanel, Louis Vuitton, Dior, and Versace) have used VIs as models in their advertising (Cho & Lim, 2019).

Fashion industry VFIs have garnered much media attention for several years, and interest in them is continuously increasing. In 2018, *Business of Fashion* published an article about computer-generated fashion influencers playing a role, not unlike real influencers in society (Morency, 2018). *Forbes* introduced several VFIs during Fashion Week in Shanghai, Moscow, and Helsinki through virtual online fashion shows. These shows revealed strong expectations for how fashion might evolve in the next generations (Rabimov, 2020) and suggested how VFIs can complement influencer marketing strategies in the metaverse (Bansal & Pruthi, 2023). The metaverse mentioned by *Forbes* refers to “a series of interconnected virtual worlds where users can leverage virtual and augmented reality, navigating these spaces using personal avatars who interact with each other (Giang Barrera & Shah, 2023)”. To this effect, scholars are now interested in studying money, possessions, and ownership in the metaverse (Belk et al., 2022). As metaverses are inching closer to real life, VFIs are expected to be active in this new world as well. Moreover, *The New York Times* introduced VFIs found in advertisements for brands such as Balmain, Calvin Klein, and Prada, and conveyed an expert opinion on how social media is a realm for real humans becoming fakes, but also claimed that computer-generated humans might be the future of storytelling through social media (Hsu, 2019). While these articles expressed positive development potential and expectations for VFI, they also mentioned concerns that may be realized in the future (Jhavar et al., 2023; Robinson, 2020). Mostly, these concerns are from that virtual humans reproduce human bodies and perform similar roles to humans.

Academic interest in VFIs has led to research in various fields and there are several fashion industry research papers on VFI-related cases, analyzing this new phenomenon's meaning in the fashion industry (Brachtendorf, 2022; Cho & Lim, 2019; Kim, 2019). In public relations and marketing, VFI has been introduced as a modern marketing tool, pioneering virtual opportunities through research (Bendon & Danielian, 2019; Kadekova & Holienčinova, 2018; Rossi & Rivetti, 2023). It has also become an analysis target to explore their advantages, disadvantages, and success factors as a marketing strategy (Guthrie, 2020; Huang et al., 2022). Studies based on VFIs activities have influenced a new generation of brands, and social movements in modern society (Block & Lovegrove, 2021). In particular, VFIs are regarded as the most prolific research subjects in information, communication, media, and computer technology, often comparing them to real human influencers (Arsenyan & Mirowska, 2021; Batista da Silva Oliveira & Chimenti, 2021; Guthrie, 2020). Studies have also been conducted from diverse perspectives such as promoting a critical awareness of online misinformation issues (Adriani, 2019), and addressing their emergence on platforms like Instagram from an ontological and ethical perspective (Robinson, 2020).

Currently, VFIs are actively engaged in image-based social media and are garnering much attention, and their designed identity is expressed via the human body. Thus, by communicating with the world through a human-like body, they are comparable to humans. Nevertheless, despite this interest, there is a lack of serious discourses on their reproduced bodies. Consequently, this study attempts to recognize why the modern fashion industry and the public are increasingly interested in VFIs, and to suggest critical body discourses through a qualitative analysis focused on body and fashion reproduction.

Annually, a large number of virtual humans are created globally, and their appearance and personality are planned and produced centered on the market. Since VFIs act, essentially, by reproducing the human body, we should first understand their bodies before considering their activities as a social fashion phenomenon. The attempt to ontologically identify what it means to be 'human' has occurred throughout history, and contemporary body discourse is no exception. Thus, by investigating a virtual human's reproduced body—a new fashion industry phenomenon—we attempted to understand the reproduced body's current state (including fashion) as a discourse issue necessary for sustainability.

This study suggests the following questions.

RQ1. How are VFIs' bodies and appearances currently being reproduced?

RQ2. Per critical modern body discourse, what are the main issues concerning VFIs' reproduced bodies?

Based on the research questions above, the aim of this study is to explore VFIs active on social media and draw discussion points for the balanced and rational development of fashion culture and the fashion industry, focusing on their body representation. By focusing on the digital transformation of the fashion industry, it will be possible to collate various thoughts related to virtual humans and human communities that have newly appeared in our society.

Literature Review

Virtual influencers' social media activity

Virtual Influencers are also referred to as "computer-generated influencers (CGI) or artificial intelligence influencers (AII) with a social media presence" (Guthrie, 2020). They are figures with characteristics, behavior, and actions similar to humans and often their production technology information is not disclosed. They are generally created by 3D artists using Computer-Generated Imagery and motion capture techniques; however, sometimes they are digitally altered versions of real humans, or even digital combinations of CGI heads and real human bodies (Guthrie, 2020). VIs' existence was popularized alongside social media and influencer marketing. Accordingly, their main activity areas are social media "websites and computer programs that allow people to communicate and share information on the internet" (Cambridge Dictionary, n.d.). According to eMarketer, a US research firm, Instagram (the current representative social media platform) reached 1 billion monthly users in 2020 (Haenlein et al., 2020). The COVID-19 pandemic and subsequent normalization of non-face-to-face lifestyles in 2020 facilitated influencer marketing due to the surge in personal social media usage (Lee & Kim, 2021). Instagram, which has now become a major activity area for global influencers, is being actively used as a marketing tool in the fashion industry (Suh, 2020). This expansion and VI's controllability attracted attention especially because VIs complement real influencers' shortcomings. This enables efficient brand management, i.e., planning and managing the overall operation (Lee et al., 2021). In addition, digital technology development has made VI images more sophisticated, real, and lively, enabling its market formation.

Lil Miquela, Shudu, and Imma are representative VFIs. Miquela has 3 million followers as of 2022 and has modeled for fashion brands such as Prada, Chanel, Louis Vuitton, and Dior (Brachtendorf, 2022). Shudu, the world's first digital supermodel, designed

by British photographer Cameron-james Wilson, has 230,000 followers as of 2022, was in Balmain's Virtual Army campaign in 2018, and modeled for Rihanna's beauty brand Fenty Beauty (Kim, 2019). Imma, designed by the Japanese CG company AWW, has 400,000 followers as of 2022, and has collaborated with several brands such as IKEA, Salvatore Ferragamo, Amazon fashion, SK-II, Magnum, Magazine Grazia, and KFC. Simultaneously, some brands have introduced their own virtual humans—Margot and Zhi in Balmain's Virtual Army campaign, Daisy Yoox of Yoox, Puma's Maya (Ruey & Ismail, 2021), and Prada's virtual muse named after the perfume Candy (Sands et al., 2022).

VFI's growth is also closely related to the need for touchless retail in the era of social distancing and the expansion of the eco-friendly fashion market. In 2020, Burberry clarified the brand's environmental strategy of "making less, more carefully" through developing AI avatars and virtual worlds. Moreover, Joerg Zuber, Noonooori's creator, advocated for the eco-friendly apparel industry and supported a wide range of social issues (e.g. women's equality, animal rights, and Earth Day awareness) by utilizing the influencer's global fandom to deliver important messages (Mrad et al., 2022). As such, the VFI market affects the real world virtually and might be a turning point for real world human behavior. Based on VFIs' quantitative market expansion, and the media's response to them, one can predict their real life significance, thus, eliciting an ethical dilemma. For instance, as already highlighted by Meta, there are concerns about representation, cultural appropriation, expressive liberty, and VI comparable to humans. As such, Meta plans to identify VIs' potential risks and opportunities, establishing an ethical framework led by intellectuals and partners to guide its utilization (Facebook IQ, 2022).

Contemporary discourse on the body and virtual humans

Many researches contemplate the body from the fashion perspective by focusing on body image and decorativeness and by expanding it into socio-cultural and philosophical discourse. The former focuses on the body concerning symbolism and beauty. For example, body image symbolism in modern fashion (Kodžoman, 2019), the beauty of body (Featherstone, 2010), the aesthetic value of body decoration expression (Vonk & Shackelford, 2022), and the fashion communication medium and ideal beauty of body (Kim & Yang, 2002). As for the latter, some studies introduce the gender concept to fashion and body, while focusing on male body image in fashion advertisements (Park & Lim, 2013; Pope et al., 2000), while others attempt to connect body discourse and gender to costume history and the contemporary fashion industry (Entwistle, 2000). Some cases discuss the body within the scope of a specific era, politics, and culture, e.g. analyzing it against Soviet-Russian fashion (Buckley, 1988), or Egypt's hijab fashion (Bouvier, 2016). In particular, regarding body beauty in modern fashion, based on Jacques Lacan's theory of desire, numerous studies contain the visual representation and symbolism of the body (Featherstone, 2010), unconscious aesthetic singularity (Yang & Lee, 2020), and voyeurism in fashion advertisements (Lacan & Sheridan, 2021).

Lacan suggested the concept of unconscious desire expression by distinguishing vision and gaze (Lacan et al., 1977), and built a body discourse that distinguishes the subject of the gaze. He saw the practice of seeing/vision as an important process that forms the

subject where the gaze does not mean seeing itself, but rather looking at relationships in a particular social context. Through studying Visual Pleasure and Narrative Cinema, Mulvey (1975) influenced by Lacan, argued that, in classic Hollywood films, men are active viewers and women are passive objects for men's visual pleasure. This debate gave rise to feminism's structure of identity theory (Sturken & Cartwright, 2001). Mulvey (1975) mentioned that in traditional exhibitionist roles, women are exhibited as sexual objects and exist as strong and erotic codes of appearance, with expressions of women as images and men as messengers of looks, and passive women and active men. Mulvey's heterocentric discourse about the division of labor according to activeness or passiveness is the main theoretical foundation of this study.

Mulvey provided a theory used for numerous visual image studies. For instance, Stefanovic and Parać (2021) analyzed Mulvey's castration anxiety and male gaze concept, applying them to fashion magazines. Some studies also apply these ideas to the virtual world. Sophia (2020) explores the inevitable male gaze and voyeuristic tendencies in virtual photoshoots based on John Berger's and Mulvey's theories. Another study, based on Mulvey's theory, addresses the cinematic technique of objectifying the female body in a live-action role-playing game where the camera acts as the male gaze (Villarreal et al., 2021). Until recently, Mulvey's theory was also used by Sciberras and Tanner (Sciberras & Tanner, 2022) to investigate how feminist sex-positive art on Instagram can reorient the sexualizing gaze.

Posch (1999) suggests the 'maniac cult for a beautiful body', elaborating on current media-related discourse on the body. Accordingly, Posch criticizes the power relations surrounding the body caused by the tyranny of the media, and the social system physically constraining individuals. According to her, the human body functions as a mechanism for individual loss of subjectivity and violent oppression, and the meaning of appearance itself grows thanks to the replicative power of the medium containing it. The media plays a role in justifying, strengthening, and distorting uniform aesthetic body images and unreasonable standards far from objective reality, providing a distorted and partial image that can be mistaken as reality. This discourse argues that the body ultimately belongs to the economic system and exists as a 'body as capital'. It presents the monetization of the capital body and beauty within an exchange economy. Further, in a gender relationship, the body of a specific gender exists as an object of exchange and makes it accustomed to this commercialization. This study uses this theoretical explanatory mechanism concerning the objectified body and colonial body.

In the era of digital transformation, digital media development has accelerated rapidly. Regarding VFIs that emerged according to social change, Rosi Braidotti discusses the existence of posthumans and the body of subjectivity formation. Braidotti proposes the "Nomadic Subjects" concept as a new subject in the posthuman era (Braidotti, 1994, 2013), referring to subjects whose identities are not already determined, but must be constantly created. Nomad does not simply mean homelessness or compulsive displacement but a subject putting distance between fixity. It refers to overthrowing critical consciousness and customs that refuse to settle in the socially coded way of thinking and behaving (Bizzell, 1992). Lee (2019) asserted that today is an era in which new technology that developed

enough to disrupt the existing human concept and the profit-oriented global capitalist market that commercializes everything work together, and new technological others are added to the old others. In addition, she argued that Braidotti is the scholar who searched for the direction and method in which we should proceed in this era. Braidotti (1994) studied subjectivity based on Gilles Deleuze and Félix Guattari's theories, and classified it into two categories: sedentary subjectivity and nomadic subjectivity. Sedentary subjectivity means to internalizes the dominant order of society. While nomadic subjectivity is not fixed to any given state or order along the fighting line of desire, but constantly changes and divides across boundaries and creates new objects and values to become an active subject. Nomadic subjectivity is generated in the process of becoming active minorities. Braidotti emphasized that nomadic subjectivity is currently needed. She indicates the deconstruction of representation condensed into a "Man" or a "Woman" (Lee, 2019). Further, she emphasizes difference by breaking the illusion of "One-ness", that dominates Western history and philosophy, and insists on the principle of "not-One" (Braidotti, 2002). Braidotti is a theoretician in continental and feminist philosophy. She explores interdisciplinary work at the intersection of social and political theory, cultural politics, gender, feminist theory, and postcolonial studies. Braidotti indicates that feminist theory and post/de-colonial and indigenous theories can help overcome times of crisis, particularly in the research comprising the post COVID-19 world. Many of the previous discourses on the body, which began with Lacan, are all necessary theories in the posthuman body discourse proposed by Braidotti. She also emphasized the inclusion of race, age, class, and physical ability, and feminist theory in particular (Braidotti, 2020). Her positive insight sheds light on every individual body with the many differences that are building this world.

Feminist theory analyzes "both inequality in gender relations and the constitution of gender" (Rakow, 2012). It explores the shared politics of participation in the system of inequality that pervades our society. Patriarchy, capitalism, colonization, and racism are discussed (Ferguson, 2017; Few-Demo & Allen, 2020). Feminist, post/decolonial, and indigenous theories dominate the study of real societies. Social policy scholar Fiona Williams, for example, examines how ideas from the contemporary struggles for social justice are connected to social policy; she begins with the earliest works on feminist theory and extends this line of enquiry to post/decolonial theory (Ishkanian, 2022). Linked together, they form a larger postcolonial feminism (Lewis & Mills, 2003; Odeh, 1993) and post/decolonial indigenous thought (Steinfeld, 2022).

This post/decolonial theory is "body of thought primarily concerned with accounting for the political, aesthetic, economic, historical, and social impact of European colonial rule around the world in the 18th through the twentieth century" (Elam, 2019). Postcolonial critique allows those who have escaped socio-political and economic domination to regain their sovereignty and negotiate new grounds for equality (Rukundwa & Van Aarde, 2007). We may consider that post/decolonial theory is inevitably linked to indigenous theory for a specific region, where indigenous theory comprises the "scientific studies of local phenomena using local language, local subjects, and locally meaningful constructs, with the aim to build or test theories that can explain and predict the phenomena in their local social and cultural contexts" (Van de Van et al., 2018).

Methods

The temporal scope of this study is from 2016, when Lil Miquela first appeared on Instagram as an early VFI, to 2022. The research method is as follows. First, VFIs active around the world with human appearance were selected as study objects. To collect the maximum amount of research data, the Atlanta-based website Virtual Humans (<https://www.virtualhumans.org/>), which archives information on virtual humans and influencers, was used. The Virtual Humans website includes a category titled “Influencer,” which includes 200 VFIs as of 2022. As animals and object characters are included in the Virtual Humans website, only VFIs that reproduce the human body and were active on Instagram were selected. Objects and animal characters, even if were anthropomorphized and had certified accounts on Instagram, were excluded. For example, VFIs such as basketballs named Mavrello Ballovic (@mavrellob) and bears and penguins named Squeaky and Roy (@squeakyandroy) were excluded. As a result, 115 VFIs designed to communicate with the public on fashion through a virtual human body were selected. Among them, VFIs who received the verified badge issued by Instagram were included first. Although the verified badge is not a symbol of importance, authority, or subject matter expertise (Meta, n.d.), it is issued by the Instagram management based on the four criteria of authentic, unique, complete, and notable (Meta, n.d.), which makes it meaningful for sampling.

Second, the Virtual Humans website provides links to platforms that are active for each VFI, and as mentioned earlier, Instagram is the home of all VFIs’ activities. All posts were visual and included their images. Like most documents online, posts on Instagram may be easily deleted and rearranged according to the will of the operator; hence, only posts existing at the time of observation in 2022 were analyzed, yielding 25,400 in total. This number is a tally of all posts on Instagram. The Virtual Humans website contains many materials for VFIs research; as of 2022, there are 47 “interview” articles with VFIs and creators, and 63 “news” sections are included, introducing the activities of VFIs. In addition, the “research” section contains the contents of an in-depth investigation on the aspects of VFIs in 69 articles, which served as the basis for analyzing their existence in this study.

Third, to establish the database necessary for interpretation, data derived from the search results for the keyword “virtual fashion influencer” were collected using the Google search engine. In particular, 274 data points stored in Google News Archives, accessed when it was necessary to first check the trend of the most important article or a certain topic, were collected for analysis. Considering the characteristics of VIs that are active in the digital space, the activities of digital media images and video contents were also analyzed. In addition to Instagram as social media, the scope and current status of their activities were analyzed through posts from accounts on Facebook, Twitter, and Weibo, and videos from YouTube and TikTok. These platforms are digital media most favored by Generation Z (Tarihoran et al., 2022), the target group of VI. This made specific and timely data research possible.

Fourth, we classified individual VFIs’ various body characteristics into three group types. Based on Braidotti’s research, these groups were selected according to visually categorizable criteria such as race, gender, class, and age (Kim, 2014). These indicators were chosen because Braidotti states that diverse variables such as gender, race, class, age,

Table 1 Overview of 115 VFIs' bodies-related data collection

Category	Overview of data collection
Age	<ul style="list-style-type: none"> · We collected all cases where their exact age was shown through Instagram profiles or interviews, and cases where the age group could be estimated through posted images · In most cases, their age does not change over time, but indicates the persistent age even if their age is disclosed accurately · The influencers were divided based on age groups such as the 10 s, the 20 s, and 30 s, owing to the wide range of age groups from the youngest, a 6-month-old baby, to older figures in their 80 s (currently the death status was also set)
Gender	<ul style="list-style-type: none"> · As there was almost no case where gender was indicated separately on their Instagram profile, gender is judged by body shape and fashion style · However, if the subject was non-binary subject and this was emphasized in their profile or revealed in an interview, gender was classified non-binary · If gender-neutrality was actively oriented regarding fashion style, gender classification was not applied, but gender-neutrality style data was collected as separate information · As for body classifications such as age, gender, and race, gender was the only item in which fashion style indicated both a social sign and a biological basis · Classifications were based on three types: female/male/non-binary
Race	<ul style="list-style-type: none"> · There were no cases of race being indicated on Instagram profiles, so race was judged based on information such as place of origin, face shape, and skin color · Classifications were based on five types: white/black/Asian/Hispanic/mixed race
Region	<ul style="list-style-type: none"> · In most cases, their current activity area or region of origin was indicated through their Instagram profile or an interview · In many cases, the region was indicated in the post · In many cases, both the country and city were specifically indicated · In the case of cities, most of them were large cities with a global reputation · Regions such as Los Angeles, New York, London, Moscow, Tokyo, and Seoul were frequently found · Classifications were based on Europe/ Middle East/ Asia/ Australia/ North America/ Central and South America/ Africa
Others	<ul style="list-style-type: none"> · By profession, many of them were fashion models, "hand models," or "fitness trainers." Most had an "ideal" appearance according to societal standards

able-bodiedness, and lifestyle become the main axis of human identity (Braidotti, 1994, 2020). Table 1 shows an overview of the data collection of this study's target analysis.

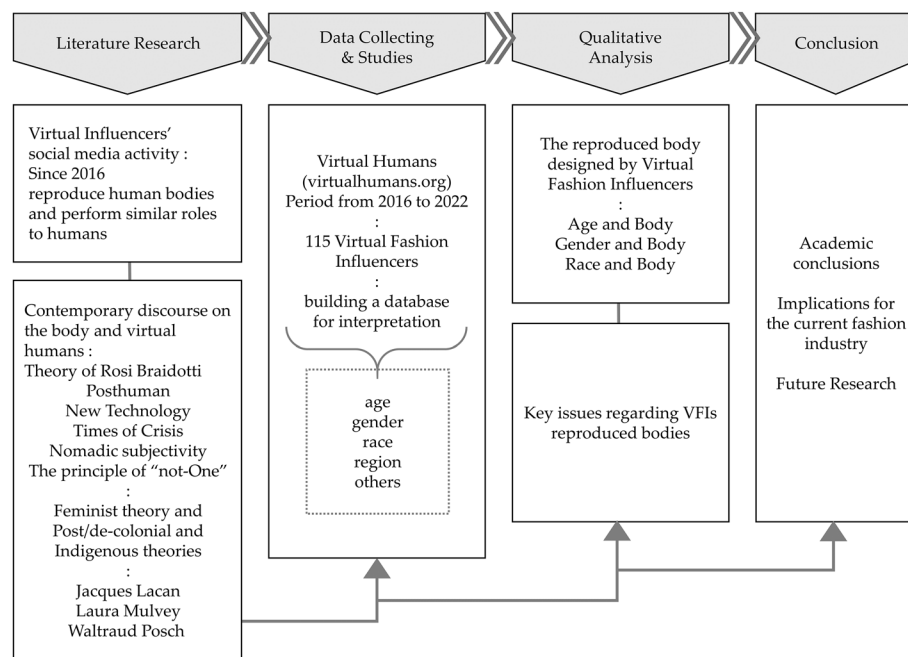
Fifth, we organized the VIs according to individual differences, observed specific targets for each type, and then applied sociocultural theories to each type and analyzed them. Most broadly, Braidotti's posthuman theory was applied, and as Braidotti suggested, body discourse with feminist and post/de-colonial and indigenous theories can be used as the basis for qualitative analysis. Further, Lacan's voyeurism and perversion in desire-gaze theory, Mulvey's male gaze and visual pleasure body discourse, Posch's theory of seeing the body as capital, and cultural research with a wide range of perspectives (e.g. degenderization and postcolonialism), were also applied to critically discuss the reproduced body of virtual fashion influencers.

The methodology model of this study is as follows (See Fig. 1).

Results and Discussion

The reproduced body of virtual fashion influencers

As VFIs are mainly active in image-based social media, their planned appearance and expression of fashion through image posts play an important role in forming their identity. Their designed identity sets the visually observable body as the most basic medium. Therefore, we classified individual figures based on common categorizable body characteristics and analyzed them according to age, race, and gender. Table 2 shows a summary of body-related data of 115 VFIs.

**Fig. 1** Research methodology model**Table 2** Body-related data of 115 VFIs

Age	(N)	Gender	(N)	Race	(N)	Region	(N)
Under18	4	<i>Female</i>	99	<i>White</i>	56	<i>Europe</i>	39
18–25	105	Male	13	Black	10	Middle East	2
26–40	5	Non-binary	3	Asian	36	Asia	37
41–80	1			Hispanic	6	Australia	3
				Mixed	7	North America	18
						Central and South America	4
						Africa	4
						Etc	8
Total	115	Total	115	Total	115	Total	115

Italicized cells show the highest number of VFIs

1) Age and body

Regarding age, our first VFI physical characteristic, almost all the virtual humans, including the cases where age can be estimated, were set in the late 10 s to 20 s, so extreme bias results were extracted. This suggests an ideological result where young body image is favored in society, defining the youth group as 15 to 29 years old (Statistics KOREA, n.d.). 105 out of 115 figures have the body of a young man/woman, and it was extremely rare to find a body in their mid-late 30 s or older. Furthermore, since their age is fixed, they can be interpreted as an immortal reproduced body that can overcome the finiteness of the body, unlike human influencers. When asked about the advantages of living as a VFI, Aliona Pole (@aliona_pole), a digital fashion designer and fashion model in Moscow, Russia, answered: "I can live forever and

I never get old (until I choose to)” (Travers, 2020). Thus, most VFIs maintain their initially planned age. In general, young people’s bodies are young, healthy, and well-functioning complete bodies, and this distinction is expressed through the physical medium of skin. Their vivid and soft skin depicts them as having a young body, distinguishing them from the elderly. Furthermore, their youthful bodies are differentiated from children through structural and morphological changes in secondary sexual characteristics that appear differently depending on gender. Accordingly, most VFIs are intentionally depicted as a young and healthy body, omitting from the natural processes of the immaturity or aging that human beings go through in their lifetime.

For instance, Angie (@digital_angie), created by Shenzhen(China)-based CGI animation director Jesse Zhang, is an adorable 18-year-old girl with short dark hair and rosy cheeks (Pinheiro, 2021). Although appearing on social media less than a year ago, she already has hundreds of thousands of fans on Douyin, the Chinese version of TikTok. Angie’s Instagram posts highlight her young and “cute” body, and depict her young body following healthy habits getting nutrients through food: she posts videos of chewing and swallowing apples crunchy, licking ice bars, and eating rice served with toppings.

Exceptions include Elis (@bebiselis) and Ilona (@Ilona) who are set at infant and children’s ages. Elis is a 6-month-old baby VFI who depicts the process of toddlerhood through Instagram posts and Ilona is a virtual singer and influencer designed for children using 3D technology. Another exception is Sylvia [@myfriendsylvia] (2020), who passed away after living to the age of 80 (Fig. 2). As a VFI in a unique age group, Sylvia was designed to reach her death, using Instagram posts (over five months) to depict aging as a real human being would. Her appearance changed as she went through adolescence,



Fig. 2 Sylvia [@myfriendsylvia]. (2020, November 19). *What lifts your spirits up?* [Photograph]. Instagram. <https://www.instagram.com/p/CHws2MNDJqq/>

middle age, and old age, differing from other VFIs characterized by unchanging appearances and bodies.

2) Gender and body

Regarding gender (the second VFI body characteristic) figures designed with a female body accounted for the extreme majority. There were 99 females, 13 males, and three non-binary VFIs. Non-binary means “having a gender identity (the feeling of being a particular gender) that is not simply male or female” (Cambridge Dictionary, n.d.), but is free from the dichotomy of gender and is not fixed or typical.

Female VFIs typically wear women’s fashion and depict other symbols distinguishing them as female. For instance, Alara X (@Iamxalara), a 22-year-old from Istanbul, Türkiye can be seen holding a bunch of Barbie dolls or pink objects in one of her first Instagram posts. Further, female VFIs embody femininity by mimicking typical features of a biologically female body. Often emphasis is placed on body shape through rendering soft curves, and the images are frequently sexual or sexualized. Geneva Numera (@geneva_numera) (2023) of Vale do Lobo, Portugal is a VFI rendered as an entrepreneur who loves motorcycles and wine. Her clothes are mostly tight and revealing, and even while riding her motorcycle, she enjoys showing off her perfectly defined body (Fig. 3). A representative example is Shudu (@shudu.gram) who has global recognition as a VFI. Her first Instagram post depicted a blank face, slightly open mouth, nude body, and a lean and sensual physique. Her hands are clasped over one side of her chest and she is seated in a passive posture with one leg crossed over her body and her thigh on display.



Fig. 3 Geneva Numera (@geneva_numera). (2023, March 24). *Hey #motorcyclelovers!* [Photograph]. Instagram. <https://www.instagram.com/p/CqI8qs1s3RV/>

There is also an image where Shudu's nipples and genitals are slightly hidden using a gold brush stroke effect.

This sexualization is not limited to fashion models like Shudu. For instance, Mia (@mia), an artist born in Medellin, Colombia, and a University of Miami student studying Art History, is always depicted wearing tight outfits and exposing her chest. Amara (@amara_gram) from Ulaanbaatar, Mongolia has many posts in her bra and panties, and some images that depict her crying with smudged black mascara and in her underwear. Another shows her standing in front of a beverage display in a hypermarket, emphasizing the details of her chest. Ruby Gloom (@ruby9100m) from Hong Kong mainly wears revealing clothing that emphasized her chest and hips. She has a baby face and a slightly chubby body. Notably, some female VFIs are designed for adult content. A representative figure is Jedy Vales (@jedyvales) that was designed as a virtual ambassador for the pornography company YouPorn in 2019. In most of her Instagram images, Jedy Vales is seen living her daily life in a bikini, lingerie, or robe that partially covers her nude body. In 2020, she started wearing a pink bodysuit featuring mechanical details typical of bondage fashion. Male VFIs are sometimes also sexualized. For instance, Koffi (@koffi.gram) created by Cameron-James Wilson in 2019, is either naked or in briefs in almost every one of his Instagram images.

Ono (@ono.gram) is a non-binary VFI designed by an anonymous individual creator in 2020 (Virtual Humans, n.d.). Although Ono's body appears female in silhouette (chest and pelvis lines), they oppose the social conventions of the gender dichotomy. For instance, he/she has a shaved hairstyle but wears glamorous make-up, has feminine eyelashes, and wears feminine clothing such as A-line dresses. This combination emphasizes his/her gender-fluidity or androgyny. Bangkok naughty boo (@Bangkoknaughtyboo) introduces himself/herself as a 17-year-old creator in Bangkok, Thailand. He/She has a masculine body but identify as non-binary in his/her profile. In the matter of fashion, he/she wears stilettos, skirts, and bras. Ava (@avagram.ai), a 22-year-old VFI in Singapore, has a feminine body, but in an interview with their producer, their gender fluidity was emphasized (Teo, 2020).

In addition to non-binaries like these, there are VFIs with female bodies that strongly advocate a genderless style. Atali, a Japanese digital marketing company, and Arbon and Dodorai, a production company, collaborated to devise Meme (@meme.konichiwa). Meme was designed to show the diversity of beauty, featuring a freckled face and red spots on the left side of their forehead and cheek (Virtual Humans, n.d.). Meme has pictures of her smoking on Instagram, and has armpit hair, to highlight the discrimination against female body hair in Japanese society. Karolin XS (@karolinxs) is a hacker, artist, and scientist from Moscow, Russia on its profile. Their body appears female but she has a very short hair-style, and usually wear gender-neutral clothing. Poka (@poka_pokaka), a VFI designer in Shanghai, China, changed their style since first appearing on Instagram and now depicts a feminine to neutral style, and is often described as a "pretty boy".

3) Race and body

In our sample, the number of whites and Asians was 56 and 36, respectively, accounting for more than half of the total. When considering the main regions of the world, Europe had the highest number of VFIs with 39. Among predominantly white countries, the United States had the most VFIs (13), followed by France (6). Among Asian

countries, Korea had the most (10), followed by Japan (8), and then China (5). VFIs from East Asia accounted for the majority.

Black VFIs accounted for a relatively small number, at 10, but the group had distinct characteristics. The first feature is that many black female VFIs have shaved or close-crop cut hairstyles, as seen in Kim Zulu (@kimzulu_) (2020) (Fig. 4), a VFI from Johannesburg, South Africa, Shudu, and Aba Wils (@abawils). The second characteristic is that all of the plus-size VFIs or VFIs with non-glorified but realistic body shapes are black women's bodies. Most VFI female bodies are portrayed as unrealistically idealized bodies, but Aba Wils, Brenn (@brenn.gram), and KB(@kemiunruly) reproduced realistic body silhouettes akin to ordinary human women. Brenn, a plus-size model has very thick stretch marks on her abdomen. The third characteristic is that cultural elements are prominently expressed on their bodies. Kim Zulu's face is always painted with white lines or figures such as circles, reminiscent of the African tribal custom of painting patterns (Macdonald, 1890) on faces. The necklace in some of Shudu's Instagram posts resembles a tool used by the Karen people, a minority tribe in Myanmar, that decorates the body with a ring that stretches the neck (Han, 2018). Aliza Rex (@alizarexx), a black figure from Los Angeles, USA, has dreadlocks and wears large gold earrings, and a gold bracelet on their wrist.

Regarding VFIs with Asian bodies, they tend to have somewhat similar appearances within the group. VFIs such as Imma (@imma.gram), Ria (@ria_ria_tokyo), Ayayi (@ayayi.iiiiii), Angie (@digital_angie), and Rozy Oh (@rozy.gram) reproduce white skin, a small oval face, a high and narrow nose, and even teeth.



Fig. 4 Kim Zulu (@kimzulu_). (2020, May 1). *Always stay close by...* [Photograph]. Instagram. https://www.instagram.com/p/B_niUp5DuWH/

Key issues regarding VFIs reproduced bodies

1) The reproduction of standardized stereotypes

Regarding VFIs' reproduced bodies, the first issue concerns how the reproduced body enforces standardized stereotypes. At first glance, VFIs' reproduced bodies have various specific personalities emphasizing the differences between each one's existence. Yet, upon further analysis, it seems that standardized types are reinforced and reproduced. As such, two stereotypes are at play. First, the idealized socially formed aesthetic standard stereotype. Numerous VFIs are rendered to uphold the beauty standards of the society or culture they belong to. For example, Asian VFIs tend to have Western appearances and bodies across Chinese, Japanese, and Korean ethnicities. VFIs such as Imma, Ria, Ayayi, Angie, and Rozy Oh reproduce particular aesthetic criteria—satisfying the beauty ideal in Eastern society. This includes white skin, a small oval face, a high and narrow nose, and even teeth. In particular, Ria and Ayayi's highly saturated eye color, fair skin, and long limbs suggest Westernism and a white race preference in East Asia. Amara, who hails from Mongolia and identifies as Asian, displays a westernized style of body imitation. Her body suggests a supermodel-like physique, featuring an unrealistically thin waist, long and slender ankles and wrists, and, simultaneously, large breasts and hips. As a reproduced VFI, her body creates a phenomenon whereby, in photos of her with real women, the public immediately makes harsh comments about the real women's bodies, comparing theirs to Amara's following beauty criteria in Asia. Thus, these body images, which highlight the disparity between virtual and real bodies, entrench unrealistic and idealized body standards.

Looking at it based on Lacan's body discourse and Mulvey's heterocentric discourse, VFIs created to have an Asian female identity are thoroughly sexualized and viewed as beautiful body representations within the context of social structure. The appearance code here is determined by East Asian social and cultural aspects that idolize Western culture and treat it as superior. The similar faces of Asian female VFIs standardize even the shape of their teeth and control even the smallest unit of body components within certain norms. From Lacan's point of view, Asian women do not look at themselves from their own point of view, but rather look at themselves from the perspective of the social context that exists based on the region of Asia. Posch (1999) said that the media reinforces a uniform aesthetic body image that is far from objective reality. Therefore, VFI bodies represented in different ways due to racial differences deny the diversification of women of color in reality, who exist in various forms, and contribute to the reproduction of standardized cultural appearance codes. Mixed-race figures depict a similar phenomenon. Seven out of 115 VFIs' data samples were of mixed race. There were only two mixed-race Asian VFIs: a Japanese-American and a Japanese-British male. This mimics Japan's mixed-race boom, half-discourse on mixed race people, and the commercialization of half images in Japan (Murphy-Shigematsu, 1993). In other words, mixed race VFIs are prolific as being mixed race is highly commercialized.

The reproduction of socially formed idealized aesthetic standards is not confined to Asia. According to a feed that Ai Angelica (@ai_angelica) posted on her Instagram, three stages of her appearance change in a single image; she reviewed what changed in each

of the stages. She gradually enlarged her eyes, her nose became shorter, her chin grew smaller, and her skin became smoother. In addition, her makeup became heavier, her hair color became more saturated, and her eye color became brighter. In the comments from the public, there were many comments that the V1's appearance looked like an "old woman," and the V1's altered appearance was much better. These comments provide insight into the reason why most VFIs are reproduced and developed into bodies of young people.

Strict idealized beauty standards even influenced Meme, a Japanese VFI designed to suggest a different perspective on beauty in our society, to change her appearance as well. Meme uploaded a post confessing to having plastic surgery done at the end of 2021, two and a half years after her first appearance on Instagram. In a captioned photo posted to the platform, she had gauze covering her nose and since the start of 2022 her face shape is slimmer, her features are sharper, while her overall appearance is softer. This can be interpreted by the body and media discourse mentioned by Posch (1999). Appearance codes such as freckles and burn scars, generally regarded as external defects in Eastern culture, were planned as individual characteristics constituting Meme's appearance. However, Meme's body, which exists as the body of capital, demands more followers and likes on social media. Based on this context, it can be seen that in this process, Meme's creator changed Meme's appearance through plastic surgery to the public's preference to gain a more substantial influence. This can be read as an example of the body transformation taking place in the world, regardless of the distinction between virtual and reality, a phenomenon in which the female body is transformed toward idealization in a subtle and specific way.

The second stereotype is the depiction of a reproduced body that emphasizes femininity and masculinity according to gender. For example, female VFIs' silhouettes emphasize a large chest and pelvis, and male VFIs' tend to have broad shoulders and muscular silhouettes, thus reproducing a binary gender image and gender consciousness. Thus, Gender was discerned based on biological traits like body shape and social indicators fashion sense. For instance, Phoenix McEwan (@phoenixmcewan) is a British male VFI who is a race car driver that enjoys speed. In his daily posts, he can be seen cricketing in the park, among other things, with a very natural body and bare feet. These male stereotypes can also be seen in Diego Martinez (@dm_diego_martinez), a male VFI from South America. Diego Martinez identifies as a nerd character and shares such as mountain biking. In contrast, female VFIs are often surrounded by a pink color palette and are dressed in specific outfits regardless of location. Take Aliona Pole (@aliona_pole), a Russian VFI with the androgynous image and short hair. She can be seen admiring contemporary design works while sitting on a pink blanket. Ella Stoller (@itsellastoller), a 21-year-old fashion model from Tel Aviv, Israel, appeared in the fall of 2019. She has pink or blonde hair, and recently posted an image of herself sitting in a bathtub while wearing a luxurious dress with cubic details and her breasts exposed. Binxie (@itsbinxie), an LA-based VFI produced by Neon Productions, also posed lying in a bathtub with her thighs exposed under pink lighting, which seems to be a very typical pose for femininity representation.

The nature of the body images of male and female VFIs was very different in terms of posture. Women showed many postures such as closing the eyes, lying down or

crouching, twisting the body, or emphasizing the curves of the body. It was common to take a passive and frail posture that seemed to cover the body. The postures of female VFIs can be linked to the characteristics of typical female images that have been critically mentioned in the analysis of fashion photography, namely, feminine touch, ritualization of subordination, and objectification (Lee & Shin, 2016). Men, in contrast, took a posture that proudly occupies space by exposing his body wide. This illustrates how the reproduced body differs based on gender.

Most VFIs' bodies, apart from the few non-binary ones such as Ono, Ava, and Bangkok naughty boo, are fixed in two genders (female and male). This is seen especially in beauty standards, clothing, and behavior. That being said, the existence of some VFIs who resist gender-related stereotypes and who do not disclose their sexual identity, illustrates inclusivity and the progress recently made by the fashion industry. Still, it is significant that typical beauty standards and polarized gender norms made up the majority of this data, indicating that overall the fashion industry's progress is merely incremental.

2) The expression of the male gaze, power, and desire

The second key issue concerning VFI body discourse is that of the male gaze, power, and desire targeted at the reproduced body. This corresponds to the problem of reconsidering the typical relationship between the creator and the production object formed by the unbalanced production system, just as Mulvey (1975) did. Therefore, first, it is necessary to discuss the problem of establishing the body of female VFIs as an object to be seen, that is, an object of observation. Most VFIs are female and were created by male designers and directors. In other words, they were recreated from the male gaze, targeted at those who internalize it. This replaces their bodies with objects of desire. Mulvey argued that in the world of sexual imbalance, the male gaze projects a fantasy onto the female body, and the female body is decorated accordingly, and VFIs are no exception. However, although the fact that Mulvey's view is too dichotomy (Rodowick, 1991) is different from Braidotti's academic attitude that this study aims for, her theory is both useful for and important to interpreting culture from a feminist perspective.

VFIs' genders and ages are clearly imbalanced, and those who share their physical activities and daily lives have mostly female bodies and are in their 10 s and 20 s. These female-bodied VFIs are easily targeted as objects of observation through their passive postures, expressions, and even the camera location and angle. Zoe Dvir (@zoedvir), a VFI fashion and beauty blogger based in Tel Aviv, Israel can be seen being observed through a window even when sitting in a bookshop. In a post she made, complaining of aches and pains and hoping to avoid coronavirus, she is wearing a miniskirt and her thighs are exposed. Thus, directing the viewer's gaze to her flawless thigh. The image in the feed is focused on Zoe Dvir's body as if the aperture of a camera has been adjusted, while the environment surrounding her is slightly blurry. In this way, there are cases that more directly show that there is a separate camera gaze observing the body of young female VFIs. Aba Wils posted a video on Instagram with the caption, "his everyday crush." A man enjoys seeing Aba Wils in a very short mini-dress. His gaze starts from the tips of Wills's toes and continues to look at her legs, which are enlarged to fill the screen. Ayayi posted on Instagram about her day in a hotel room she found to escape the noisy

neighbor's house refurbishment. With the comment that it is comfortable like home, the picture of the feed, which writes down the daily life of reading a newspaper in comfy clothes, shows the composition of peeping through a round hole. Secretly filming Ayayi's everyday life also appears in another Instagram feed, where Ayayi posts her thoughts by stopping at a store that sells newspapers and magazines. Ayayi's face is not in the camera frame, but the camera lens captures her torso as she touches newspaper from across the store's product shelf.

These cases allow us to face the phenomenon in which the gaze of observation and voyeuristic tendencies extend to virtual space. In particular, as pointed out by Villarreal, et al. (2021), the phenomenon of the power of voyeurism in action is seen in the virtual space as well by the camera composition borrowing the male gaze. Men are recaptured as active viewers by Mulvey's language, and the female body remains as a passive object for the male audience's visual satisfaction. The main issue here is that the power of the hierarchical relationship established according to gender in reality transcends space. The theories dealing with the relationship between the gaze and the object discussed by many researchers have laid the groundwork for explaining the fact that the virtual human body works as a tool for capital due to the huge flow of capital located on the border of gender and power.

Further, even if the VFI's profile is not sexually emphasized, she is still an object of appreciation. Imma, is a Japanese VFI who complexly represents the desires of the male-dominated Japanese society. Imma's trademark is a short pink hairstyle (Japanese anime female protagonists often have pink hair), thus she can be classified as a lewd character comprising sexual fantasy elements. Significantly, there is a word for lewd pink in Japanese (いんらんピンク) (Nico Nico Pedia, n.d.), and the concept that pink-haired characters are erotic is widespread online. In September 2020, Imma spent three days as a campaign model for the IKEA Harajuku branch, where her daily life was displayed through the store's windows and LED screens. At Harajuku Station, where a floating population of 110,000 passes every day, Imma could be seen in her pajamas, behaving as though the viewer's gaze did not exist for the majority of the time (Natividad, 2020). This campaign facilitated the internalization of viewers' voyeuristic psychological perversion targeted at a specific gender. While simultaneously inducing psychological stimulation through the "sneaky gaze" (Lacan & Sheridan, 2021). Thus, the Imma X IKEA campaign comprised the "the looking subject" and a young female VFI as the "visible object".

Second, female VFIs, as visible objects, are drawn as objects of desire through posing by covering only the key body parts or intentionally emphasizing parts of them. Cameron-James Wilson, who is Shudu Gram's creator, also planned a young black female virtual influencer named Brenn (@brenn.gram). In three of Brenn's early five Instagram posts, the fact that she wore a halter-neck bikini or strap-detailed swimsuit with highlighted chest lines shows she was drawn from a sexualized gaze. In the images, Brenn looks at the camera softly, her eyes down, and her lips are plumped and emphasized. She poses with her finger on her cheek or touching her body. This is an act of representing the feminine touch, what sociologist Erving Goffman calls the "gender display" that reproduces the conceptual female image. Gender display is a culturally formed, conventionalized description of sex (Goffman, 1976), and feminine touch is a delicate expression using fingers, such as capturing the moment a woman touches her body or clothes

(Lee & Shin, 2016). Brenn makes her body a sexualized one by subtly touching body parts such as the jaw, head, and collarbone.

It is not the first time that such critical remarks on the male-dominated production system of existing industries have been made. On the Instagram account of synthia (@synthia_insta), a virtual influencer reproduced as a female robot's body, related critical posts were uploaded to the Story page. Synthia posted images of female robots dancing on her Instagram account's Story page, asking the question "Why do people over-sexualize robots?" and posting some of the answers from various followers to the question. Synthia's feed included concerns that in many cases male creators control robots reproduced as women.

Ana Tobor (@ana.tobor), a female VFI fashion model and fashion designer from Bucharest, Romania, proudly showed a long diagonal scar on her left cheek. However, she also has a post that exposes her thighs by sitting up on the back of a chair in a miniskirt. This type of image is seen in multiple VFIs' posts. Further still, as an object of observation, female VFIs sometimes show extreme body parts. Serah Reikka (@serahreikka), a French VFI fashion model currently working in Los Angeles, USA, shows off her lean arms and legs and voluptuous breasts in particularly uncomfortable poses. Notably, her breasts have gradually grown bigger since the end of 2021, other body parts became leaner, and her face became more "baby-faced". In March 2022, she debuted a "New me" by posting a look that included pink cat ears and a tail, announcing she would take part in various activities in the metaverse. YouPorn's Jedy Vales is a clear expression of the male gaze and power in that she is a female virtual human designed for men, the main customer base of the pornography industry. Most of Jedy Vales's Instagram images show her posing while covering or intentionally emphasizing only key body parts. The camera angle is often voyeuristic, allowing her viewers to consume her body as a porn object. However, although Jedy Vales is a virtual ambassador for a pornography company, her body expression is not unlike many other female VFIs who are also overly sexual. Their bodies are overly curved, and their clothing is either too tight or revealing. In other words, these female VFIs are also pornographic objects although they were not explicitly designed as such.

There is also a case where a young female VFI reveals the reality of being consumed as an object of desire and declares that it will not remain silent about it. Anelie Godar (@aneliegodar), a 19-year-old VFI girl from Moscow who works as a model and artist, has a picture of her with a somewhat lethargic expression on Instagram. She is wearing an off-the-shoulder top, and a large shadow of another person's hand is placed over her chest. She posted these pictures, referring to the situation where she had to constantly read through her DMs with all sorts of vicious and vulgar suggestions and comments of a sexual nature. This case directly conveys the discourse issues behind the development of the virtual industry related to the emergence of current VFIs. Accordingly, it is possible to recall the remarks of Villarreal et al. (2021) that the demand for action raised by Mulvey (1975) has resonated throughout the field of recent game research.

3) Colonial gender hierarchy

The third reproduced body issue concerning VFI body discourse is colonial gender hierarchy in virtual space. Braidotti (2002) opposes a single identity linked to Eurocentric

and normative humanistic ideals. This rejection includes not speaking about indigenous people and other marginal subjects with a unified voice, and hierarchy is refused (Braidotti, 2013). In this sense, the coexistence of white, black, Hispanic, Asian, and mixed-race female VFIs cannot be interpreted merely positively as diversity and inclusivity.

First, the fact that the body expressions of female VFIs in regions with a past colonial history are past-oriented and relatively primitive suggests the need for discussion. Although they are VFIs who meet the general public of universal sensibility online, female VFIs in Africa tend to be expressed as pursuing the primitive beauty of the past. Black female VFIs paint their bodies in African cultural styles or decorate them with natural objects and traditional materials. From Braidotti's point of view, the tendency of many imaginary subjects that could be represented in various ways to give up diversity and become unified by accepting the cultural code of a particular race is captured. In addition, their unique cultural body decoration is directly related to the appeal of sexual attraction of primitive nature.

As a representative example, Shudu is designed by a white male creator and was designed to express the beauty and diversity of models of color. However, a black woman's beauty reproduced from the perspective of a white male producer from the First World is a rather discriminatory gaze. In other words, the esthetic creation of a black woman in her 20 s by a white middle-class man in his 20 s creates a multi-dimensional gendered hierarchical relationship. In fact, one of Shudu's first Instagram posts is a nude, with only her main parts covered; this emphasizes the importance of this body discourse. Shudu covers her nude body and hides certain body parts, thus expressing the male creator's sexual desires and voyeuristic fantasies. Further, she wears bold earrings and several ring necklaces reminiscent of African cultures or indigenous tribes. In addition, Shudu was inspired by a Barbie doll playing the role of a South African princess (Sobande, 2021). All of which indicates that she is a projection of the colonial fantasy.

Considering Shudu in terms of labor, in reality, Shudu's sexually objectified reproduced body functions as a working black woman, while the resultant economic income is taken by her white male creator. In other words, the dynamic of the historical discrimination of black slaves, exploited by white slave owners, is being recreated in the virtual world. This indicates that, even in the virtual space, Third World women will be degraded for the privileged class of First World men. Thus, this space becomes a hierarchy of racial and gender power that transcends reality.

The body and situation depicted in the post of Ivaany (@ivaany.h), a VFI from Paris, is not much different from that of Shudu. On her Instagram profile, she is described as "Créole Doll." Ivaany is a black woman who reveals her ethnic identity through emojis of Haitian, Guiana, and Brazilian flags and the description "Black in Tech" in her Instagram bio. The three countries, established as countries of Ivaany's origin, have a history of colonial rule by the great Western empires of France and Portugal. Based on this background, her body, which is depicted emphasizing the feminine body silhouette, exists as a forum for colonization and genderization discourse. Ivaany also had colonial figures on her face. Her eye makeup with a series of white circles and a blue brush touch across her chin and face is the case. In the case of hairstyles, straight styles were often observed despite her black identity, which may be seen as representing the colonialist cultural tangents (Patton, 2006) that embraced white mainstream hairstyles and expressed antipathy

to African hairstyles. There were some images on her Instagram post that appeared with a black male figure. In these images, the man is portrayed as authoritative and powerful, and Ivaany as a woman shows a submissive female body, such as touching her body while leaning on the man.

New York-based VFI, J-Nice Prempelli (@opalslutuniverse), is also a young black woman from Ghana who expresses her nationality through a Ghanaian flag emoji on her Instagram bio. Ghana was previously colonized by the British Empire; thus, Prempelli's body exists as a colonized female body in this context. J-Nice Prempelli can be seen wearing a glitter-textured bikini or partially covering her body with flowers and fruits. She wears gold rings around her wrists and ankles, giving her a "primitive" look. Her Instagram feeds are characterized by bold body exposure and sex appeal; even her Instagram ID means Opal prostitute universe, combining Opal, Slut, and universe. Prempelli reproduces body images where she targets herself in a sexualized way. In particular, she is often seen wearing only nipple patches and thongs. Food such as strawberries and whipped cream are placed on her breast and her lower body parts as a means to suggestively cover them. This connection between sexual desire and appetite, a primitive human desire, makes viewers crave her body. The images of touching herself with her legs open or holding up a vibrator and sticking out her tongue seem to relate her as a black woman to pornography. From Shudu to J-Nice Prempelli, their tactile bodies that make viewers want to touch them are arranged with gold, flowers, and fruits, reminding us of Lacan and Mulvey's gaze theory. Sophia (2020), who studied Virtual Photoshoot, especially mentioned the part that connects women to pleasure in seeing or loving to look at an object in Mulvey's theory, and the connection is seen in the body expressions of these young African female VFIs. These methods of bodily representation are worth discussing as a current and vivid issue of post-colonial feminism.

Second, female VFIs in regions with a colonial history are characterized by being in a desolate space as well as primitive fashion in the Instagram feed. Rather than directing the various lives and spaces in which they exist, an empty space with nothing as a background, or sometimes an underdeveloped area or a desolate environment is depicted. This can lead to stereotypes about these regions. Like Barbie dolls, Shudu and Koffi, who show the perfect appearance of this era, often appear in somewhat abstract spaces. Koffi's muscles and skin are expressed more realistically and vividly than any other VFI, but the background he appears in is nothing in it, or if something appears, it is only water and the shadow of trees. In particular, Koffi's Instagram feed, which appeared with Shudu, has a strong primordial feel as they sit together in an empty space without wearing anything.

Aba Wils is frequently shown dancing on her Instagram feed, often with black and empty backgrounds. Aba Wils, dressed only in a swimsuit, displays her body by changing her posture, sometimes lying on her floor in a dark space with no background setting. She sweeps her leg up with her hand, then lies down and sweeps her arm across her black floor to make her circle. She is also captured dancing and walking against a dark sky with fierce rain falling. Sometimes lightning flashes behind her as she is drenched in the shower, wearing only a top and shorts that cover only part of her body. As a black female VFI, it is also clear that Kim Zulu's body is being reproduced from a colonial gaze. The backgrounds of Kim Zulu's first three Instagram posts are a barren desert with dry

Table 3 Summary of the key issues regarding VFIs reproduced bodies

Key issues	Reproduction of standardized stereotypes	Expression of the male gaze, power, and desire	Colonial gender hierarchy
Outline	VFIs' bodies are standardized types, and accordingly reinforced and reproduced. This makes the reproduced bodies cement standardized stereotypes further	VFIs are recreated from the perspective of specific gender, targeted at those who internalize it This issue concerns replacing VFIs' bodies with objects of the expression of the male gaze, power, and desire	VFIs' bodies reproduce a single identity linked to Eurocentric and normative humanistic ideals This issue concerns colonial gender hierarchy in virtual space
Sub-issues	<ul style="list-style-type: none"> Reinforcing the idealized socially formed esthetic standard stereotype Emphasizing femininity and masculinity according to gender 	<ul style="list-style-type: none"> Bodies targeted as objects of observation. Voyeuristic psychological perversion targeted at a specific gender Posing while covering or intentionally emphasizing only key body parts 	<ul style="list-style-type: none"> Body expressions reminiscent of African cultures or indigenous tribes Desolate spatial representation that entrenches social prejudice in the African region

bent tree branches, fixing the social prejudice and convention of the African region. Kim Zulu is also often naked with her nipples covered, and her eyes closed. Simultaneously, the outline of her breasts can be seen thus turning her into a sexual object. Moreover, Kim Zulu's fashion posts are also representative of colonial expression. The posts often solidify African women's ideology in a complicated manner, through figures with faces painted reminiscent of African tribes, geometric patterns on clothes, and items reminiscent of hijabs. As a result, black female VFIs uphold the ideo-logical colonial image framed as primitive objects that have not undergone Western modernization while embodying the fantasy of White men. In sum, their reproduced bodies are complex and multi-layered forms of discrimination designed for White creators or the White masses, and they function as colonial bodies in the fashion industry.

Table 3 summarizes the main contents of key issues regarding VFIs reproduced bodies.

Conclusions

This study's research questions on VFIs' reproduced bodies were addressed and the academic conclusions obtained through the analysis are summarized as follows. First, as a result of examining VFIs' development scale and their activities in the fashion industry, their explosive growth since 2016 was confirmed. This growth corresponds to the qualitative problem of sophisticated planning and implementation. Quantitatively, this large number of virtual humans are developed by region globally, as figures that promote branding, support products, and underpin society's development.

Second, Braidotti's insights emphasized our new perception of VFIs by examining their physical and appearance characteristics on social media. This served as an appropriate foundation for a comprehensive theory. Since she recommends feminist theory insights and post-colonial theory, especially prevalent after COVID-19, relevant body discourses were applied to our analysis.

Third, VFIs' physical characteristics were classified by age, gender, and race based on human characteristics. (1) As for age, VFIs set in the late 10 s and 20 s accounted for most of our data, and as an exception, there were a few figures who were set as infants and children, and even fewer that showed aging. (2) In the case of gender, most figures

were planned as females, and there were very few non-binary beings. VFIs with female bodies were portrayed in a typical female image and, in many cases, a sexual body image. (3) As for race, whites and Asians altogether accounted for more than half of the total, and blacks were a relative minority. However, the latter's common appearance features differed from those of whites and Asians, such as shaved hairstyles, a body that is relatively closer to reality, and decorative elements reminiscent of primitivist culture.

Lastly, as a result of a detailed analysis of VFIs reproduced body types, issues related to the body include (1) the reproduction of standardized stereotypes, (2) the expression of the male gaze, power, and desire, and (3) the colonial gender hierarchy in a virtual space; issues directly related to the risks of modern society were emphasized.

As the virtual world reflects reality, our exploration suggests implications for the current fashion industry. First, VFIs are developed by 3D or computer-generated imaging artists; they are often part of a management agency or a specific company. VFIs thus constitute a "job" with proper role in the fashion industry. They contribute to actual fashion advertisements and fashion events, and generate profits, begging the question: Do they warrant the rights and duties of humans working in the actual fashion industry? Second, VFIs' significance in the fashion industry and society is emphasized. Imitating human beings and behaving realistically in a specific region using a reproduced human body goes beyond mere product promotion, perpetuating intentional and unintentional messaging, respectively. Third, coexistence with VFIs is recognized in the fixed world centered on humans. This connects to Braidotti's attitude that humans should consider the posthuman era. In other words, the modern world, which was completely human-centered, has passed and a new era has come. For example, some of the VFIs are composites of real living human body images. When it is difficult to distinguish between the virtual and the real, thinking deeply about the coexistence of VFIs and humans in the fashion industry is necessary.

Through VFIs reproduced bodies, we analyzed how the fashion industry has pursued and produced images. Accordingly, we found that, because we are dealing with a virtual space, social and cultural responsibilities are cleverly concealed. Yet, the fashion industry, including the virtual world, is expected to provide a system that contributes to society's positive development, and an appropriate level of awareness. Our analysis of VFIs' reproduced bodies is a emergent subject in the contemporary fashion industry.

Through this study, we targeted VFIs within a limited period, from 2016 to 2022. While we attempted to collect as many VFIs with human bodies as possible, our sample is still not comprehensive. New VFIs are regularly being planned and released, rapidly changing the landscape of the fashion industry. At the same time, we did not discriminate between VFIs with low versus high followers, which prevents us from truly gaging their power and influence in the industry. However, our focus was specifically on the planning of body reproduction of VFIs than their full influence.

Further, as content on Instagram feed can be easily deleted and reconstructed online, only images that existed at the time of data collection could be observed. This is an unavoidable limitation in conducting research on online social media data. We also focused on VFIs that reproduced the human body. Future studies can expand our theoretical approach to all animate and inanimate subjects. As new figures will continue to appear

in the future, going beyond the existing categories, we propose continuous observation and analysis of their appearance and activities.

Abbreviations

VI(s) Virtual influencer(s)
VFI(s) Virtual fashion influencer(s)

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Authors' contributions

YS came up with the idea, carried out the research, and wrote the first draft of the article. SL advised the process and interpreted the results. At the initial stage of this study, the authors made a presentation of a draft summary that will become part of this article at the spring academic conference of the Korean Society of Fashion Design 2022. Both authors contributed to the formatting and editing of the manuscript. Both authors have read and approved the final manuscript.

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