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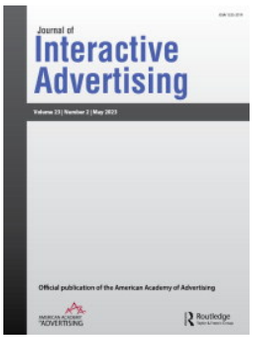


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To cite this article: Kate Jeonghee Byun & Sun Joo (Grace) Ahn (2023): A Systematic Review of Virtual Influencers: Similarities and Differences between Human and Virtual Influencers in Interactive Advertising, Journal of Interactive Advertising, DOI: 10.1080/15252019.2023.2236102

To link to this article: https://doi.org/10.1080/15252019.2023.2236102

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JOURNAL OF INTERACTIVE ADVERTISING
https://doi.org/10.1080/15252019.2023.2236102

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A Systematic Review of Virtual Influencers: Similarities and Differences between Human and Virtual Influencers in Interactive Advertising

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ABSTRACT

Virtual influencers (VIs), computer-generated characters that serve as influencers, offer novel and cost-effective advertising strategies. VIs' roles and appearances are comparable to those of human influencers (HIs) in advertising in that they mimic humans in their behavior. However, novel features of these digital entities allow virtual VIs to engage in unique interactions with audiences. With the rise of successful VIs, academic research on VIs has been growing rapidly. Thus, a systematic comparison of VIs and HIs in the context of interactive advertising is a timely endeavor to better understand the conceptual and operational similarities and differences between them and to guide future research. After analyzing 44 final papers on VIs, the current review suggests that there are many similarities between HIs and VIs and their roles as the source of advertising messages, but also critical differences that determine the limitations and potentials of VIs in interactive advertising.

KEYWORDS

Avatars; human–machine communication; influencer marketing; interactive advertising; virtual influencers

Influencers are social media users who wield a strong impact on consumers' decision making by leveraging their online fame via substantial numbers of followers (Hudders, De Jans, and De Veirman 2021). Fulfilling a number of social, informational, and entertainment functions by expanding their reach via opinion leaders, influencers not only are regarded as a novel type of endorser but also boast wider reach by leveraging highly influential nodes in their social media network (Casaló, Flavián, and Ibáñez-Sánchez 2020; Hudders, De Jans, and De Veirman 2021). Influencer marketing strategically applies the influencers' endorsements on products, brands, or services (De Veirman, Cauberghe, and Hudders 2017) and has become a widely used advertising strategy in the past decade; its market size was estimated to reach 13.8 billion in 2022 (Statistica 2022).

Existing research on human influencers (HIs) indicates that they play a meaningful role in enhancing brand engagement in online environments through their (1) substantial number of connections with other social media users and (2) image as experts in the social media content they produce, while uniquely retaining the qualities of peer relationships, such as approachability and familiarity, compared to celebrities (Hudders, De Jans, and De Veirman 2021; Lin, Bruning, and Swarna 2018; Ye, Hudders, Jans, and Veirman 2021). Influencer marketing leverages HI traits of credibility, expertise, authenticity, popularity, and reputation to spread positive word of mouth regarding goods or services through HIs' social media accounts, which have substantial impact on other users' consumption behaviors (Lin, Bruning, and Swarna 2018; De Veirman, Cauberghe, and Hudders 2017).

With the rapid advancement of interactive and immersive media technologies, virtual influencers (VIs) have become a fast-growing trend in advertising and marketing communication. With sophisticated animating and rendering technologies, such as rigging, blending shapes, and computer-generated images, VIs are generated as anthropomorphized representations that have human bodies with attractive visual features and can play the role of HIs as well as convey nonverbal cues through facial expressions or body gestures (Liu and Lee 2022). Most VIs are created by technology firms, for example, Brud launched the world's first VI product, including Lil Miquela, and ALIZA is

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/15252019.2023.2236102.

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a creator and manager of Binxie, a VI that was recently used to promote an Amazon Prime original series, *Upload* (Rasmussen 2022).

VIs can mimic HIs' content, for example, by posting about parts of their lives that portray their personas, such as traveling, daily activities, or experiences with brands so that consumers perceive authenticity, credibility, and popularity, with the ultimate goal of brand promotion (for a recent review, see da Silva Oliveira and Chimenti 2021). For instance, Lil Miquela, named one of the 25 most influential people on the Internet by *Time* magazine in 2018, is very popular across her social media channels. She had 3 million followers on Instagram and 282,000 followers on YouTube as of August 2022. VIs have been featured as the spokespersons of brands or nonprofit organizations, such as Samsung, Nike, and the World Health Organization, to launch campaigns (Baklanov 2019).

Previous reviews delineated the critical traits of VIs (i.e., anthropomorphism, attractiveness, authenticity, scalability, and controllability), opportunities and threats of VIs from case studies, and how to manage VIs by leveraging their advantages and disadvantages (Conti, Gathani, and Tricomi 2022; da Silva Oliveira and Chimenti 2021; Sands, Ferraro, et al. 2022; Köbis, Bonnefon, and Rahwan 2021). Given the rapid increase of companies integrating VIs as an advertising tool and the ensuing academic interest in them, a systematic comparison of VIs and HIs would be a timely endeavor to better understand the conceptual and operational similarities and differences between VIs and HIs and to guide future research (Moustakas et al. 2020).

Theoretical Distinctions between Human and Virtual Influencer Advertising

Due to its relative nascence, systematic investigations of VIs are a recent phenomenon. Existing scholarly discourse on VIs notes that with technological advancements, VIs are difficult to distinguish from HIs in their social media activities and play a comparable promotional role in advertising (Hofeditz et al. 2022). However, novel computer-generated features are likely to engender unique audience interactions with VIs that may be distinct (Sands, Campbell, et al., 2022). For example, VIs are much more programmatic and consistent than HIs, and their computing powers allow VIs to be active in multiple social media accounts simultaneously. The sheer volume of social media content of consistent quality and interactions with audiences that VIs can produce would be difficult for HIs to match (Sands, Campbell, et al. 2022).

On the other hand, social influence, which refers to changes in an individual's thoughts, feelings, attitudes, or behaviors resulting from interacting with others (Cialdini and Goldstein 2004), is complicated and often nuanced. Even when the content is mediated through computers, audiences prefer and are more socially influenced by humans controlling and delivering the content rather than computer algorithms (Fox et al. 2015). Recent communication scholarship also discusses authenticity—or the extent to which a communicative action is perceived to be real and true (Lee 2020)—as a construct that can meaningfully impact audience interactions with mediated messages and their source. Similarly, several recent studies on VIs have posited that the uncanny valley hypothesis (Mori, MacDorman, and Kageki 2012), which is the negative emotional response that audiences might feel when humanlike entities are imperfect in their resemblance to actual humans, may be a point of distinction between VIs and HIs that merits scholarly attention (Arsenyan and Mirowska 2021; Liu and Lee 2022). Given that a precise and accurate definition of the object of study is a prerequisite for theoretical advancement (Shoemaker, Tankard, and Lasorsa 2003), the following research question is posed:

> **RQ1:** How have scholars conceptually defined virtual influencers?

In the HI literature, Hudders, De Jans, and De Veirman (2021) applied the framework of the revised communication model for advertising (Stern 1994) to organize HI scholarship into three traditional areas: source, message, and audience. Stern's model takes into consideration that the communication process is not linear but rather involves interactions between the source and the audience. In their systematic review of HIs, Hudders, De Jans, and De Veirman (2021) adjusted this model to better capture the unique contexts of influencer marketing. To further build on these findings, extend them to the context of interactive advertising, and facilitate a side-by-side conceptual comparison of VIs against how HIs have been viewed in earlier work (Hudders, De Jans, and De Veirman 2021), we apply the framework of revised communication model for advertising to examine VIs and their advertising content through the lens of source, message, and audience.

First, the revised communication model for advertising stipulates that three dimensions comprise the source of the communication in advertising: the sponsor, author, and persona. The sponsor is often the

company or brand with legal and financial responsibility for the advertising. Sponsors are conceptualized similarly in the context of HIs and VIs. The traditional theoretical concept and practical responsibilities of authorship become much more complex for influencer marketing. In traditional advertising, advertising agencies often take on the role of the author with responsibilities regarding the creative process (Stern 1994). Celebrities and spokespersons serve as the persona of the advertising message who communicate the content to audiences. HIs, on the other hand, play a more complex role, often driving the creative direction of the advertising material while functioning as personas and communicators of the message. In this context, advertising agencies serve as intermediaries, bridging the relationship and collaborations between HIs and brands and providing guidance on the creative process. In the context of HI-mediated communication, the sponsor, intermediary (author and bridging partner), and influencer (author and persona) constitute the three dimensions of the source of advertising (Hudders, De Jans, and De Veirman 2021).

Advertising with VIs adds another layer of complexity when considering the unique features brought on by their digital origins as the source of communication. Audiences may see VIs as the author of mediated content, but their operators are the bridging partners and/or strategic decision makers. Most companies behind VIs serve as intermediaries, setting marketing strategies, managing the relationship between sponsors and audiences, and executing the communication (e.g., Alexander 2019). VIs, like HIs, are organically embedded into social media content but cannot take on responsibilities and accountability in the way that HIs can (Sookkaew and Saephoo 2021). Thus, VIs typically have personas only, while HIs can serve as authors with personas. Taken together, we build on the framework of influencer communication proposed by Hudders, De Jans, and De Veirman (2021) by systematically reviewing the literature via three distinctive dimensions of the communication source when advertising with VIs: sponsor, creator (author and bridging partner), and VI (persona).

The second element of the communication process in the revised communication model for advertising involves the message in which content, such as advertising copy, is delivered (Hudders, De Jans, and De Veirman 2021). Advertising content can be presented in various forms, including autobiographical revelation, third-person narrative, and dramatic enactment (Stern 1994), stylized and designed to increase attractiveness, prestige, and information in ways that influence consumer behavior (Ki and Kim 2019). Advertising messages are designed to broadcast the endorser's persona to create a relationship between the persona and the audience (Stern 1994). Hudders, De Jans, and De Veirman (2021) noted that integrating autobiographical revelation in social media advertising is critical for creating authenticity, in addition to the third-person narrative and dramatic enactment related to storytelling.

VIs are computer-driven and lack self-consciousness, but messages may still be designed to deliver a VI's autobiographical revelation (da Silva Oliveira and Chimenti 2021). For instance, Lil Miquela posted this message in 2018: "This has been the hardest week of my life so thank you to everyone who checked in with me." Although this message was clearly written by the firm that created the VI and not by the VI herself, social media users responded favorably to this post with more than 224,000 likes (Block and Lovegrove 2021). To this extent, comparing the content of messages promoted by VIs and HIs will allow us to capture the distinctive strategies respectively leveraged to construct desirable images as an influencer and the different underlying mechanisms that drive their success in endorsing brands and products.

The third and final element of communication in the revised communication model for advertising is the audience, with regard to how users interpret and perceive advertising content. In the interactive media environment, audiences have always held an essential role in the communicative process (Aho and Mackie 1993). In addition, audiences have different reactions to influencer marketing compared to traditional marketing by being more engaged in the advertising process or by perceiving greater credibility toward content posted by HIs (Casaló, Flavián, and Ibáñez-Sánchez 2020; Wang and Huang 2023).

On one hand, this engagement and perceived credibility may also apply to VIs because of the interactive and reciprocal communication between VIs and the audience that reflects the overlapping characteristics of HIs and VIs (attractiveness, authenticity, controllability). On the other hand, recent findings from a systematic review from the field of information systems suggest that VIs present unique features (e.g., anthropomorphism, scalability) that elicit audience interest and influence their responses (da Silva Oliveira and Chimenti 2021), making it difficult to predict whether earlier findings from HIs are applicable to VIs. With the advent of generative AI technologies that are quickly becoming integrated into the

creation of VIs and related content, content creation is becoming easier and faster than ever before. The ability to rapidly and accurately produce VI content heralds the ability to deploy VIs at scale, integrated into as many services as needed, on demand.

Considering that VIs and HIs are similar but distinctive types of influencers as an advertising tool, this review aims to systematically evaluate the academic research on VIs, guided by a theoretical framework specific to advertising. VIs share a number of similarities with HIs in their ability to mimic the social media content created and shared by their human counterparts. However, because they are computer-driven agents without the ability to provide feedback during the content creation and advertising process, VIs exhibit some unique features and traits. As VIs begin to gain practical and academic interest as an effective advertising tool, we anticipate that a systematic review detailing the state of the science in terms of their similarities and differences from HIs specifically in the context of interactive advertising will provide a clear roadmap for advertising scholars interested in examining the impact of VIs.

To further explore this discussion regarding the similarities and differences between VIs and HIs, we pose a second research question:

> **RQ2:** How are VIs similar to or different from HIs as an advertising source, regarding message content, and regarding interactions with audiences in the context of interactive advertising?

Methods

This review adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 27-item checklist (Moher et al. 2009) to systematically search, identify, and select peer-reviewed articles from the existing body of literature. The authors searched keywords via Scopus, Google Scholar, PsycArticles, EBSCOhost Business Source Ultimate, Science Direct, Emerald, and PubMed on research published until January 2023. We selected these databases to include the most recent publications across multiple disciplines and capture as much VI-related literature as possible. The relative nascence of the topic necessitated a robust search, including literature outside of advertising. The keywords were entered in the database search function with the following command: "virtual influencer*", or "digital influencer*", or "AI influencer*", or "CGI Influencer*", "digital human*" with asterisks (*) to capture alternative forms of words and phrases that may refer to VIs.

From the initial search of 6,807 studies, we narrowed down the search criteria to peer-reviewed journals, conference papers, and conference reviews written in English. Based on our exclusion criteria, we excluded duplicates, editorials, books, notes, and letters, thus eliminating 6,198 papers. Subsequently, we manually reviewed the remaining 609 papers to search for relevant papers in the title, keywords, and abstract. This led to the exclusion of 565 papers that did not focus on VIs (for details, see Supplemental Online Appendix A).

Authors then conducted a quality review using the Effective Practice and Organization of Care (EPOC 2015) risk of bias tool. Drawing on the *Cochrane Handbook* (Higgins et al. 2021), we evaluated the papers on six quality criteria to reduce the risk of bias, considering (1) representative sampling, (2) response rate, (3) validity/reliability, (4) data source, (5) focus on study or content for VIs, and (6) relevance. We marked each as 1 or 0 for individual quality criteria, then summed the total score. Irrelevant items (e.g., conceptual papers, $k = 9$; proposals, $k = 4$; review, $k = 4$) were marked as nonapplicable and were not included in the quality review. We calculated the scores noting strong, moderate, and weak indications of methodological strength. The result was that 70.4% of empirical studies ($k = 19$) were categorized as strong and 29.6% ($k = 8$) were moderate. The final review included 31 articles, 12 conference papers, and one conference review published between 2018 and 2023. After reading the full texts of the finalists, the authors synthesized the findings, identified the research gap, and delineated the implications and future research directions. To facilitate direct comparisons against the Hudder et al. (2021) review of HIs, we categorized our results into the same categories of major elements of the communication process: source ($k = 28$), message ($k = 1$), and audience ($k = 11$).

Results

The studies in our sample demonstrate a notable increase in scholarly interest in VIs: There was one study each in 2018 and 2019, seven in 2020, 13 in 2021, 18 in 2022, and 4 in 2023. Supplemental Online Appendix B lists all 44 studies. Regarding study types, 61.4% were empirical ($k = 27$), 20.5% were conceptual ($k = 9$), 9.1% were reviews ($k = 4$), and 9.1% were proposals ($k = 4$). A total of 6,063 participants took part in experiments, surveys, and interviews in the empirical papers. Table 1 delineates the similarities and differences between HIs in the study by Hudders, De

Table 1. Similarities and differences between human influencers (HIs) and virtual influencers (VIs) in the advertising process.

Area of Comparison	Similarities	Differences
Source	· VIs can generate levels of social influence comparable to HIs in terms of reach, impact, and intimate bond with followers. · Both HIs and VIs develop personas to manifest different characteristics.	· VIs are unconstrained by physical factors (e.g., fatigue, burnout). · Audiences feel that VIs are psychologically distant because intermediaries (i.e., creative agencies) are involved in VI content creation. · VIs have higher controllability for content creation and social media activities. · VIs need large financial and human resources in the early development stage.
Message	· Message content from HIs and VIs aims to strike a balance between authenticity and commercialism.	· The composition of VIs in a message may engender both positive and anxious affective responses from audiences.
Audience	· Audiences are attracted to VIs and HIs with favorable character traits (e.g., trust, expertise, honesty, authenticity, popularity, similarity). · No significant differences in audiences' parasocial responses to HIs or VIs on social media platforms.	· Overall, individuals prefer HIs to VIs; audiences may view all VIs as a single category rather than view them as individuals. · VIs are less powerful when it comes to influencing people. · People may trust VIs less than HIs.

Jans, and De Veirman (2021) and VIs in this review from the perspectives of sources, message, and audience.

How Do Scholars Conceptually Define Virtual Influencers?

Previous literature established that HIs attain fame from bidirectional communication with their audience using social media, gain expertise by demonstrating deep knowledge of their domain (Ye et al. 2021), and disseminate their expertise by leveraging highly influential nodes in their social media network (Hudders, De Jans, and De Veirman 2021). The wide reach and high credibility as a specialist allow HIs to wield a strong influence on their followers' decision-making processes (Hudders, De Jans, and De Veirman 2021), and they often receive monetary incentives and free products, goods, or services by posting sponsored content on their social media accounts (Ye et al. 2021).

The current review indicated that conceptual definitions of VIs in the literature varied from paper to paper. Scholars used multiple labels to refer to VIs: avatars used for marketing communication (Miao et al. 2022), virtual stars (Drenten and Brooks 2020), artificial intelligence (AI) influencers (Sands, Campbell, et al. 2022; Thomas and Fowler 2021), digital influencers (Sookkaew and Saephoo 2021), social robots (Baudier, Boissieu, and Duchemin 2023; Black 2020), digital humans (Loveys et al., 2022; Nah et al. 2022), digital human avatars (Li, Huang, and Li 2023), or computer-generated imagery influencers (Mrad, Ramadan, and Nasr 2022). However, the majority of studies currently reviewed ($k = 28$) used the label *virtual influencer* to refer to the nonhuman endorsers of advertising messages, and we also refer to these entities as VIs.

Conceptually, authors tended to converge on a few elements. First, VIs are digital entities with their own identities generated by computers. Scholars have noted that VIs are "computer-generated images . . . with computer vision-oriented graphic technologies" (Park et al. 2021, 1) and "agents augmented with digital avatars" (Arsenyan and Mirowska 2021, 2). Although similar, VIs are conceptually distinct from avatars because they are not mere representations of users (Weisman and Feña, 2021). They are also different from conversational agents or chatbots as they are not driven solely to fulfill user-oriented tasks (Feine et al. 2019).

Second, despite being computer generated, VIs are typically humanlike in appearance and closely mimic human behaviors on social media, interacting with other human users as if they have a character, a human voice, and a social role. These humanlike traits are evident in how scholars have defined VIs: "anthropomorphic features, such as humanlike appearances, expressions, personalities, and socialness" (Park et al. 2021, 1) and "presenting the same type of content as real human influencers" (Stein, Breves, and Anders 2022, 2).

Finally, despite the likeness to humans, VIs are not (yet) autonomous and need to be controlled by humans or computer algorithms, offering high controllability in designing and determining their content. Scholars have generally perceived this as a unique advantage of VIs for advertisers: "distinctive benefits to brands such as controlled content and flexibility" (Mrad, Ramadan, and Nasr 2022, 3) and "little chance of accidental scandals" (Zhang and Ren 2022, 299) but with potential negative impact on perceptions of trust and credibility for consumers on social media (Sands, Campbell, et al. 2022). Taken together, VIs

may be defined as *digitized entities with anthropomorphized appearances that have human bodies, social roles, and their own identity; they can play the role of HIs by interacting with other humans, controlled either by humans or computer algorithms*. Despite the current consensus in the conceptual definition, advertising scholars should be cognizant that the conceptual definition of VIs may change with the advent of novel technologies, as well as the development of more interactive and immersive forms of social media (e.g., metaverse; Ahn, Kim, et al. 2022).

Sources Effects of Virtual Influencers

VIs as the Source of Social Influence

The first point of comparison in the current review between VIs and HIs is the degree of social influence they have on the users' decision-making processes. We explored the following facets of social influence on social media for further examination: reach, impact, and intimate bond with followers (Hudders, De Jans, and De Veirman 2021).

Reach on social media refers to the number of users who see any content from an ad (King, O'Rourke, and DeLongis 2014). VIs can mimic the appearance and content creation behavior of HIs and produce a level of reach that is comparable to influential HIs (Sands, Campbell, et al. 2022). Both VIs and HIs garner and aim to expand the number of followers through exhibiting shared interests with them (Block and Lovegrove 2021). VIs and HIs attain fame through social media posts (e.g., aspirational content) and interactive communication with social media users (Ye et al. 2021), consequently building an intimate bond with followers (Hudders, De Jans, and De Veirman 2021; Mrad, Ramadan, and Nasr 2022).

In addition, the scalable impact of VIs is not behind that of HIs: VIs' social media content recorded three times more engagement (e.g., likes, comments, and shares) than content from HIs (HypeAuditor 2019). Previous studies identified several factors that contribute to HIs' fame, such as credibility, attractiveness, and power (Breves et al. 2021; De Veirman, Cauberghe, and Hudders 2017), which are also applicable to VIs. For example, VIs try to obtain credibility by portraying more humanlike cues (Miao et al. 2022), featuring physical attractiveness (da Silva Oliveira and Chimenti 2021), and encouraging parasocial interactions with social media users (Jin and Ryu 2020), wherein audiences develop an imaginary interpersonal relationship with a media personality or character (Horton and Wohl 1956).

However, VIs and HIs also have distinct differences as the source of advertising messages. VIs are computer-generated digital humans, thereby cost-effective and timesaving (Park et al. 2021), but also unconstrained by physical factors, such as energy levels or overtime legislation (Sookkaew and Saephoo 2021). They can "travel" anywhere by creating computer-generated virtual environments and show up at any place or event, displaying the exact persona desired by the sponsors and agencies. In addition, VIs are less likely to be involved in personal scandals that negatively affect audience perception and endorsement efficacy, because their creator companies have complete control over the content they post (da Silva Oliveira and Chimenti 2021).

When the content posted by VIs becomes problematic, the negative impact on the brand may be more difficult to mitigate than problematic content from HIs. For example, one study demonstrated that when a VI commits a transgression that causes devaluation of the endorsed brand, replacing the VI with another VI was not effective because VIs are not considered unique, sovereign entities (Thomas and Fowler 2021). Despite each VI attempting to portray a unique persona as a source of communication, audiences may cognitively group all VIs into a single category of "us" (humans) versus "them" (machines; Tajfel et al. 1979).

Second, VIs are generated by multiple integrated sources, such as creative agencies, high-powered computers, human programmers, and the brand; and audiences recognize each source independently (Koh and Sundar 2010; Liu and Lee 2022). Liu and Lee (2022) applied the concept of source orientation to understand how individuals perceive psychological distance in their interactions with VIs. Source orientation explains and predicts how users psychologically project their interactions with and responses to the technology during human–machine communication (Guzman 2019; Sundar and Nass 2000). The perceived psychological distance can range from proximal to distal and leads to distinctive user reactions. Sources that are perceived to be proximal in psychological distance, due to the relationship closeness between the users and the sources or the users' familiarity with the source (i.e., computers), are conceptualized to be mentally close, thus attracting user interest, frequent interactions, and engagement (Sundar and Nass 2000). Adding additional layers of sources is anticipated to increase the perceived psychological distance between VIs and users, potentially influencing VI-audience interactions and the overall ability of VIs to yield

social influence. Audiences often think that the behind-the-scenes sources (e.g., programmers, creative directors) render VIs as more psychologically distal than HIs, leading to lower engagement and interactions (Liu and Lee 2022). On the other hand, because HIs are perceived to be more humanlike than VIs, audiences consider them to be more proximal (Sands, Campbell, et al. 2022). Psychological distance is germane to the context of influencer marketing because people prefer psychologically proximal and similar objects, while avoiding distal, different, and unfamiliar objects (Liu and Lee 2022). Thus, differences in the source orientation toward HIs and VIs may differentially shape audience interactions.

Third, VIs have higher controllability in terms of the predictability of influencers than HIs (da Silva Oliveira and Chimenti 2021). VIs are computer-generated entities without consciousness, developed based on the creator's predetermined plans (Robinson 2020). Therefore, it is possible for sponsors to have more direct input to control VIs' behaviors and their content so that it aligns with the marketing strategy and delivers a unique message which is not redundant to that of HIs' (Baudier, de Boissieu, and Duchemin 2023). Meanwhile, HIs are authors of their own social media content, with consciousness and self-will. Sponsors and brands have less controllability over HIs' behaviors and social media content; differences in values and personal opinions pose unpredictable risks for the endorsed brands (Robinson 2020; Moustakas et al. 2020).

Understanding VIs' Source Effects from the Perspectives of Sponsors or Creative Agencies

Moustakas et al. (2020) suggested three issues to consider for sponsors who are interested in VI-integrated advertising. First, consumers may lose interest in VIs; thus, sustaining audience interest would be the primary success factor for VIs. Second, the huge investment necessary in the early development stage of VIs (i.e., designing and constructing the newly created VI identity, managing the teams that operate and maintain the VI and produce its content, and promoting the new VI) may be challenging for many sponsors. In addition to the financial barrier, creative visions are imperative to develop successful VIs, which includes well-constructed personalities, engaging storytelling, and implementation strategies to build emotional bonds with audiences. Finally, despite a lack of consensus regarding the appropriate degree of anthropomorphism necessary in VIs to influence audience perceptions or behaviors (Ahn, Cho, and Tsai 2022; Arsenyan and Mirowska 2021; Nowak and Rauh 2005), well-designed virtual characters with flawless execution are important for VIs' success whether the VIs are humanized or animated. Anthropomorphism attributes human traits to artificial beings (Miao et al. 2022), and studies have demonstrated that the degree of anthropomorphism of digital beings influences audience responses (Nowak and Rauh 2005). Virtual characters that present anthropomorphic cues engender high social influence via credibility and competence (Miao et al. 2022) and remind audiences of social norms, such as politeness, to respond in comparable emotional and cognitive ways as they would to human interactants (Breves et al. 2021).

Block and Lovegrove (2021) argued that Lil Miquela represents an oxymoronic phenomenon of honest-fakery, referring to her humanlike appearance and anthropomorphic qualities despite her transparency regarding her digital origins. The paradoxical relationship between her humanlike qualities and her honesty regarding her digital identity is thought to make her imperfections as a VI seem more appealing (Block and Lovegrove 2021). The authors argued that this relationship is strengthened by parasocial interactions. For example, Lil Miquela has built parasocial relations[1] by eliciting cognitive, emotional, and behavioral responses from her audiences as well as referring to them affectionately as "Miqaliens."

Message Effects of Virtual Influencers

Content of Virtual influencers' Social Media Posts

Among the various forms of advertising content, autobiographical revelation, third-person narrative, and dramatic enactment are considered important vehicles of influencer marketing to deliver authenticity and intimacy (Hudders, De Jans, and De Veirman 2021). For instance, HIs develop intimacy with their audiences through portraying ordinariness and a next-door neighbor appeal as they describe their hobbies and interests and express their opinions toward brands or products (Ye et al. 2021). Both HIs and VIs can also strategically formulate the narrative presented in their social media posts by striking a careful balance between authenticity and commercialism; in these posts, they deliver both insights about products and justify the promotional message by revealing the reason they are posting the endorsed products (da Silva Oliveira and Chimenti 2021; Wang and Huang 2023).

The research on the content and strategy of VI's messages takes up the smallest part in our reviewed studies. The focus of research in the studies in this

category is distinct from HI studies in that VI research tends to examine the impact of visual factors, such as how VIs are integrated in social media posts. Park et al. (2021) demonstrated that the composition of social actors (i.e., multiple VIs with humans versus multiple VIs without humans) in the post can complicate users' sentimental responses regarding the message. Users responded with more positive but also anxious words when they were shown VIs and humans together in the same message, compared to messages with only VIs. One possible explanation may be that some users may not have been able to clearly distinguish HIs from VIs and may have felt that VIs were physically attractive, whereas other users may have been able to perceive subtle nuances of unnaturalness in the VIs, which caused them to feel anxious. Prior research on VIs has focused on the identification of VIs as the source of social influence, as evidenced by the scarcity of papers examining their impact as elements of the advertising message. Findings from the current review demonstrate that further research and a more robust academic discourse are necessary to better understand the importance of VIs as message elements in the context of influencer marketing.

Audience Effects of Virtual Influencers

Appealing Nature of VIs

From the perspective of the audience, research has demonstrated that HIs are perceived to be attractive as endorsers because they communicate a host of favorable character traits to audiences, including trust, expertise, honesty, authenticity, popularity, and similarity (Ye et al. 2021). Studies demonstrate that these traits can also be expressed through VIs (Mrad, Ramadan, and Nasr 2022); findings show that the VIs' qualities of "novelty, information, entertainment, surveillance, esthetics, and integration and social interaction" can motivate audiences to have engagement with VIs (Lou et al. 2022, 13). In addition, audiences endorse influencers based on their social capital (Wang and Huang 2023), authenticity, interactivity, creativity, and consonance between endorsed product and influencer persona (Thomas and Fowler 2021).

In general, previous research has argued that audiences tend to prefer HIs over VIs: audiences perceive homophily in other humans and harbor antipathy toward algorithms (Franke, Groeppel-Klein, and Müller 2023). HIs are preferred over VIs regardless of whether the VIs are controlled by humans or AI, as audiences intuitively categorize VIs as out-group members and dehumanized objects (Seymour et al. 2021). This is true even for the negative influence of VIs on audiences; even their ability to corrupt their audiences (e.g., promoting the spread of misinformation) does not exceed that of HIs (Köbis, Bonnefon, and Rahwan 2021).

Some studies focused on the specific conditions in which audiences consider VIs to be attractive as endorsers. Pearson, Geden, and Mayhorn (2019) compared audience trust toward human versus virtual advisors by asking participants to choose the safest path for a military convoy in a digital environment. Results indicated that human advisors were generally better trusted than virtual advisors when human and virtual advisors were presented to have similar levels of expertise; however, virtual advisors were better trusted over human advisors when individuals believed that the virtual advisors had more expertise than human advisors (Pearson, Geden, and Mayhorn 2019). Another study demonstrated that audiences were more engaged with VIs when the VIs used nonverbal expressions, including visual and aural cues (Nah et al. 2022). These findings imply that high perceived expertise or rich layers of nonverbal communication cues may be critical for VIs to obtain credibility and to have social influence over audiences.

Audience Perception of VIs

In influencer marketing, consumers are active participants in the advertising process, partaking in the construction of meaning by actively interacting with the source of the advertisement message (e.g., HIs) and decoding the message (Hudders, De Jans, and De Veirman 2021). For instance, audiences desire unique experiences, which suggests that interactions with VIs may be more appealing than interactions with HIs even when audiences are aware that VIs are driven by computers (Sands, Campbell, et al. 2022). VI-related advertising is still a relatively recent phenomenon, and studies investigating audience perception or response toward VIs show mixed results (Stein, Linda Breves, and Anders 2022).

Stein, Linda Breves, and Anders (2022) revealed that there are no significant differences in audiences' parasocial responses when exposed to social media content featuring either HIs or VIs, including cognitive (e.g., "I was observing closely how the streamer behaved"), affective (e.g., "I liked the streamer"), and behavioral items (e.g., "I often felt compelled to tell the streamer my opinion"). Their findings also posed critical questions for future VI research: analyses of direct effects revealed that audiences are intrigued by

VIs and want to interact with them, but a mediation analysis revealed that the desire to interact with VIs may subside when audiences perceive low anthropomorphism and high dissimilarity, resulting in less parasocial interactions with VIs than HIs. Jayles et al. (2020) showed that incorrect information offered by VIs may not be harmful to the accuracy of individual or group decision-making processes in consumers because audiences were able to rely on collective intelligence of groups and were not propagated by false information from VIs. These findings suggested that interpersonal interactions among audiences on social media may serve as a buffer against the harmful impact of disinformation or misinformation from VIs, with human users helping one another to correct inaccuracies discovered during human–VI interactions.

Ongoing Research Agendas for Virtual Influencers

Four out of 12 conference papers were proposals without empirical results. As the proposals for research in progress reflect the current research interests among advertising scholars, we examined the themes in these conference papers. Two proposals aimed to study the source effects of VIs, looking at how anthropomorphism influences audience attitudes (i.e., advertising effectiveness, purchase intentions) (Dabiran, Wang, and Farivar 2022; Zhang and Ren 2022). The other two proposals aimed to study the audience effects of VIs, examining the impact of VIs' expression of empathy during their interactions with audiences (Loveys et al. 2022) or the factors that encourage audience engagement with VIs (Xie-Carson, Benckendorff, and Hughes 2021).

Discussion

With a growing number of VIs beginning to outperform HIs in the reach and revenue generated through their sponsored content, one question of interest for advertising scholars and practitioners has been whether VIs will replace or complement HIs (Sookkaew and Saephoo 2021). This interest is reflected in the trend of current scholarship, with the bulk of existing research focusing on the source effects of VIs. As a source of advertising messages, VIs and HIs can be rivals, wherein VIs may gradually replace HIs; or they may serve as benchmarks to complement each other's shortcomings. Therefore, comparing VIs' and HIs' similarities and differences in their orientation toward influencer marketing, strategic message construction, and audience responses would yield useful insights toward designing and employing next-generation VIs and expand our theoretical understanding of persuasive technologies.

Source: The Unexpected Familiarity of VIs

Our findings indicated that VIs can mimic their human counterparts closely and be as effective as or even more effective than HIs as endorsers in terms of strategic content creation and media planning (Thomas and Fowler 2021) and post aspirational content on social media and interact with audiences, yielding similar or even superior levels of social influence among their audiences compared to HIs (Sands, Campbell, et al. 2022). As a result of these similarities to HIs in their roles as the source of advertising messages, VIs are able to elicit audience responses comparable to HIs in brand and advertising outcomes or parasocial interaction (Sands, Campbell, et al. 2022; Stein, Linda Breves, and Anders 2022; Thomas and Fowler 2021). Our findings further revealed that both HIs and VIs pursue similar goals of gaining authenticity and intimacy with audiences, which requires consistent message strategies designed to build trust, reliability, and transparency (da Silva Oliveira and Chimenti, 2021). In addition, VIs' anthropomorphism, attractiveness, authenticity, and controllability can influence an audience's advertising attitudes, brand attitudes, and purchase intentions (Moustakas et al. 2020; Robinson 2020).

VIs have several advantages over HIs that render them a more cost-effective approach to influencer marketing due to VIs' seemingly limitless physical capacity and high controllability of message content. Furthermore, the rapid advancement of AI technology implies that VIs may soon become indistinguishable from HIs both in appearance and behaviors (Hofeditz et al. 2022). Accordingly, studies that test the uncanny valley hypothesis to predict human users' attitudes regarding highly anthropomorphized VIs may become more relevant than ever.

Studies on the uncanny valley hypothesis have traditionally focused on the negative aspects of hyperrealism (Arsenyan and Mirowska 2021; Mori, MacDorman, and Kageki 2012). However, current findings indicate that hyperrealism is a multifaceted domain, not based solely on appearance. Some scholars argued that highly anthropomorphized VIs can be more authentic as endorsers (da Silva Oliveira and Chimenti 2021; Yang et al. 2023), whereas others scholars explained that a well-constructed persona is

more essential for VIs than their anthropomorphism for VIs to wield social influence (Moustakas et al. 2020). Stein, Linda Breves, and Anders (2022) demonstrated that visual similarities between VIs and HIs are less important in promoting parasocial interactions between VIs and audiences than the perception that VIs share cognitive and affective similarities (e.g., have a personality). Rather than focus on appearance-centered similarities between VIs and HIs, future advertising studies could explore various persuasive and advertising techniques that could "lift" VIs out of the uncanny valley.

Extending the earlier findings from Lil Miquela (Block and Lovegrove 2021), VIs may find better success with transparency in disclosing their digital origins but providing utility to audiences as a responsive and informed endorser who can address audience questions or concerns about the brand with consistency and immediacy. According to Franke, Groeppel-Klein, and Müller (2023)'s study, respondents felt a strong uncanniness when VIs were not labeled as such and respondents had difficulty identifying VIs or mistook them for HIs. Earlier communication studies have demonstrated that interpersonal communication is successful when the feedback quality is consistent and immediate (Miao et al. 2022). Therefore, combining transparent communication about its virtuality (versus having them pose as HIs) while providing consumers with fast, accurate, and consistent information about brands and products in a way that would not be possible with HIs may be the best way to leverage VIs' competitive advantages (Lou et al. 2022).

Message: Building the Strategic Message Construction for Virtual Influencers

Though the goals of serving as endorsers are similar, followers perceive VIs distinctively from HIs, harboring mixed feelings toward the digital entities (Park et al. 2021). In some ways, followers are puzzled when it is difficult to distinguish between VIs and HIs based solely on their social media content. Simultaneously, followers may be intrigued by VI appearance or identity. This suggests that audience responses may be inconsistent or even contradictory toward VIs, wherein the initial familiarity of the social media content is met favorably but the cognitive dissonance in feeling familiarity toward a digital entity may negate the initial positive reaction.

The relative paucity of existing studies on message elements both for HIs and VIs (Hudders, De Jans, and De Veirman 2021) merits further research examining the impact of advertising message strategies on the complex relationship between VIs and their followers. First, examining the congruence between VIs and various types of brands/products would offer insights for practical implementations. For example, Franke, Groeppel-Klein, and Müller (2023) revealed that VIs are better associated with technical or new products rather than products for the human skin (i.e., cosmetics). However, research on the applicability of VIs to wider product categories, such as food and fast-moving goods, would be helpful to enhance VIs' messaging strategy. Second, different types of message cues that incur varying cognitive and affective responses, or comparing message strategies across different media platforms or channels (e.g., image, video) may be relevant in discovering optimal message strategies for VIs. Finally, examining whether the disclosure of the sponsor or agency for VIs positively or negatively influences consumers' perception of VI messages is thought to be a fruitful area of future research (Vrontis et al. 2021).

Audience: Expectations toward VIs

The complex relationship between VIs and audiences is reflected in the audience expectations of VIs as endorsers. Though audiences tend to feel greater affinity toward HIs over VIs, studies have demonstrated that audiences are attracted to similar traits in influencers, whether virtual or human, when the influencer exhibits credibility or attractive physical features (Franke, Groeppel-Klein, and Müller 2023; Lou and Yuan 2019; Mrad, Ramadan, and Nasr 2022). However, findings also suggest that audiences expect some additional qualities from VIs, such as expertise, consistency, or novelty.

Findings suggest that audiences hold VIs up to a higher standard for trust than HIs, for example, trusting VIs over HIs only when the VIs are able to demonstrate higher expertise (Pearson, Geden, and Mayhorn 2019). An online survey also demonstrated that even when audiences are generally unable to distinguish VIs from HIs, they still believed that HIs are somehow more trustworthy and more 'human-like' than VIs (Hofeditz et al. 2022). Audiences also gave HIs more credit for the successful endorsement of products than VIs due to psychological closeness perceived with HIs (Liu and Lee 2022). Taken together, audiences prefer the anthropomorphic and humanlike qualities of VIs (Stein, Linda Breves, and Anders 2022) but tend to trust HIs more (Hofeditz et al. 2022). Therefore, qualities that go over and beyond

average HIs may be expected of VIs to receive comparable levels of trust from audiences.

Parasocial interactions are critical in influencer marketing (Ye et al. 2021) as audiences enjoy interacting with influencers, have deeper engagement with the influencer's content, and fulfill their desire to be connected with others (Moustakas et al. 2020). Even though audiences can engage in parasocial interactions with VIs, which lead to positive attitudes toward the endorsed brand, when audiences notice lower likeness to humans in VIs, parasocial responses toward VIs may become more negative than responses toward HIs (Stein, Linda Breves, and Anders 2022). As audiences' understanding of VIs evolves, parasocial interactions between VIs and audiences will also shift over time. The current findings show that there are many underexplored factors on parasocial interactions between VIs and audiences.

First, future studies should explore with whom audiences have parasocial interactions; audiences build different relationships with VIs versus the human controller behind the VI (Arsenyan and Mirowska 2021). Second, considering the heterogeneity of audiences' age, gender, cultural background, and individual differences in cognitive or affective tendencies would provide insights on how parasocial interactions with VIs are initiated and maintained among various audience segments (Park et al. 2021; Stein, Linda Breves, and Anders 2022). For example, consumers looking for differentiation from others prefer innovative or atypical products, and younger consumers exhibit high acceptance of social media usage (Lou and Yuan 2019; Sands, Campbell, et al. 2022). Thus, future studies should investigate these individual traits to shed light on the novel relationship between VIs and audiences. Third, how audiences respond when VIs engage in traditional human activities that require emotion or a sense of morality, such as performing arts, pro bono activities, or political commentaries, would inform us whether VIs can serve as genuine opinion leaders who can influence audiences beyond gaining followers on social media (Arsenyan and Mirowska 2021). Finally, ethical issues related to VIs merit further research as VIs can produce the similar level of social influence that HIs elicit (Robinson 2020; Thomas and Fowler 2021). Because consumers may not regard VIs as humans despite their human-like qualities, VIs can serve as enablers of unethical behavior, and yet, allow audiences to feel less guilt because VIs are not considered human (Thomas and Fowler 2021; Köbis, Bonnefon, and Rahwan 2021). Thus, further research on moral intuitions toward VIs and what consumers should do to reduce the negative persuasive impact would be meaningful.

Given the fast-growing potential for the economic impact of VIs, future studies should move beyond the ontology of VIs to examine factors that encourage audiences to become interested or disinterested in VIs and investigate how audience interactions with VIs lead to their efficacy as an advertising tool. In addition, identifying the underlying mechanisms that shape different audience responses between VIs and HIs and gauging the threshold of these responses would be helpful in explicating the tangled expectations that audiences have toward VIs.

Limitations and Future Directions

Most of the studies included in this systematic review (79.5%, $k = 35$) were published in the from 2021 to 2023, and research on VIs is still on the rise. Given the nascency, this review has a number of limitations to consider that may qualify current findings. First, the studies included in this review provide limited information about message effects due to the underdeveloped scholarship in this area, making it difficult for scholars to reproduce or verify findings. Further research in this area may require an expanded systematic review in the future. Second, this review was based on PRISMA 27-item checklist using EPOC for quality review, whereas research on emerging technology is often presented at conferences. Therefore, some relevant work may not have passed the quality criteria established for the current review. Although we believe that our thorough analyses and the vast range of electronic databases included in the review allowed us to obtain a comprehensive selection of articles as an accurate representation of the state of the science on VIs, the rapid pace of new developments in this area of work merits consideration of a wider net cast to capture all related work. Striking a balance between quality reviews to evaluate scientific rigor and capturing the evolving research is critical for the future wave of review studies on VIs.

Conclusion

Rapid technological advancement and increased reliance on influencers to promote products and goods on social media have propelled a dramatic rise in the use of VIs. The number of VIs actively engaging in advertising activities has increased from only nine in 2015 to more than 200 in 2022 (Hiort 2022). Despite the surging academic and practical interest in VIs, whether and how VIs compare and contrast against HIs has been underexplored. This study systematically

reviewed extant studies on VIs by applying a theoretical framework used to analyze the advertising impact of HIs to allow for a direct side-by-side comparison of the two related yet distinct forms of interactive advertising. Our findings present the most up-to-date conceptual definition of VIs and note the similarities and critical differences between VIs and HIs to establish further conceptual clarity. We hope that the findings of the current systematic review offer insights for practical implementations of VIs and serve as stepping stones for future advertising research.

Note

1. Parasocial interactions involve audiences developing an imaginary interpersonal relationship with a media personality or character (Horton and Wohl 1956). These interactions, over time, evolve into a parasocial relationship (Chung and Cho 2017) after repeated exposure to the media persona.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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