

What, Was She Not Human? The Mediated Effects of Virtual Influencers' Identity Disclosure Timing on Behavioral Intentions: Focusing on the Moderating Role of Influencer-Brand Fit

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What, Was She Not Human? The Mediated Effects of Virtual Influencers' Identity Disclosure Timing on Behavioral Intentions: Focusing on the Moderating Role of Influencer-Brand Fit

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ABSTRACT

In the current era, numerous human-like virtual influencers (VI) on social media promote brands without immediately revealing their non-human nature, intending for viewers to realize it later. This marketing strategy raises a question regarding their endorsement effectiveness. Grounded in Computers are Social Actors (CASA) paradigm, this online experiment employs a quota sample of Korean adults ($N = 128$) to explore how the timing of VI identity disclosure (before vs. after exposure to sponsored content) affects viewers' attitudes toward the VI and, subsequently, their intentions to purchase the endorsed brand or spread word-of-mouth. Additionally, based on the match-up hypothesis, this study examines how perceived influencer-brand fit impacts these relationships. Moderated mediation analyses reveal that viewer attitudes mediate the relationship between disclosure timing and behavioral intentions, with VI-brand fit significantly moderating this mediation. The findings underscore the negative effects of delayed VI identity disclosure and emphasize the critical importance of a strong influencer-brand match.

KEYWORDS

Virtual influencer; disclosure timing; transparency; purchase intention; word-of-mouth; influencer-brand fit

1. Introduction

Virtual influencers (VIs) are a burgeoning trend in today's social media marketing (Lee & Yuan, 2023). VIs, also known as virtual humans, are computer-generated 2D or 3D personas designed to attract followers on online platforms (Koles et al., 2024). Sometimes they are combinations of computer-generated heads and filmed real human bodies (Guthrie, 2020). In 2020, a popular VI Lil Miquela reportedly made over \$10 million for her creator company Brud through partnerships with various brands, including Dior, Calvin Klein, and Samsung. The global VI market was worth \$10 billion in 2020, and it is expected to reach \$296.9 billion in 2024 and \$527.6 billion in 2030 (Chae, 2022). It is suggested that, as the Computers as Social Actors (CASA) paradigm (Nass et al., 1994; Reeves & Nass, 1996) posits, social media viewers react to VIs as they react to human celebrities in advertising (de Cicco et al., 2024). Research suggests that viewers' desire to be like a media character usually evokes higher involvement with that character (Lim et al., 2020; Tian & Hoffner, 2010).

Despite the rapid growth of the VI industry, widespread ambiguity about VIs persists. Their production process is often not revealed, leaving many unaware of how their images are generated or who manages their social media posts (Shin & Lee, 2023). Some individuals encounter human-like 3D VIs online without recognizing them as

digital creations (Lee & Yuan, 2023; Yeung & Bae, 2022). When Rozy, South Korea's first VI, showcased her flamboyant dancing in a 2021 television commercial (Shinhan Life, 2021), she prompted widespread confusion among viewers who initially mistook her for a new human model (Yoon, 2021). This confusion was partly stemmed from Rozy's management agency, which strategically concealed her virtual identity for three months following her debut, thereby making the eventual revelation a significant talking point. In the YouTube comments on the commercial, some viewers expressed delight upon discovering Rozy's non-human nature, while others expressed displeasure at being deceived by a fictional character.

The literature on VI marketing is still fragmented (Miao et al., 2022) and it is mostly unclear how social media users relate to these digital creations (Stein et al., 2024). Studies have mainly focused on the effects of VI characteristics such as attractiveness (Kim & Park, 2023), authenticity (de Brito Silva et al., 2022), and similarity to humans or viewers (Arsenyan & Mirowska, 2021; Na et al., 2023). Some studies have examined the effects of VIs' sponsorship disclosure (de Cicco et al., 2021) or the disclosure of their virtual identity (Lim & Lee, 2023). However, there remains a lack of comprehensive insights into the implications of the timing of VIs' identity disclosure (i.e., revealing their non-human identity before versus after advertising exposure) on endorsement effects. Some VIs, such as Lil Miquela and

Rozy, begin their social media presence and appear in sponsored content without initially revealing their virtual nature, only disclosing this information once they gain public attention (Block & Lovegrove, 2021; Yeung & Bae, 2022). Companies may delay revealing detailed information about their VIs intending to create a buzz; however, this concealment can lead to consumer disillusionment, negatively impacting their attitudes and behavioral intentions. If viewers mistake a VI as a human influencer in a sponsored content and later discover its artificial nature, it can hinder the effectiveness of VI marketing (Lim & Lee, 2023), even though the VI's agency discloses it later. Despite these concerns, little scholarly attention has been paid to the role of timely identity disclosure, which we define as revealing the VI's virtual identity (i.e., that the VI is a non-human, digital character) before advertising exposure.

Furthermore, the influence of the perceived fit (i.e., match or congruity) between VIs and the brands they endorse warrants further exploration (Franke et al., 2023). According to the match-up hypothesis, the perceived fit between the endorser and the endorsed brand or product influences the effectiveness of the endorsement (Schouten et al., 2020; Till & Busler, 2000). However, only a few studies (e.g., Franke et al., 2023; Kim & Park, 2023) have empirically addressed the endorser-brand fit in the context of VI marketing. As VI marketing advances, whether the match-up hypothesis applies to VI endorsement in the same manner as it does for human influencers requires further scholarly investigation.

Drawing on the CASA paradigm and the match-up hypothesis, the present study seeks to fill in the gap in the literature and contribute to the theories of influencer marketing and disclosure effects. While prior research has found the importance of information disclosure and the perceived transparency that stems from it, this study is among the first to investigate the impact of disclosure timing—rather than disclosure itself—on endorsement effectiveness. Specifically, we examine how the timing of identity disclosure influences viewers' attitudes toward the VI and how these attitudes subsequently affect viewers' intentions to purchase the endorsed brand or share WOM. Using an online experimental methodology, we aim to establish the causal relationships between disclosure timing and viewer responses. We also expect to contribute to the CASA paradigm by applying its principles, primarily developed within the one-on-one human-computer communication literature, to the context of VI marketing on Instagram. To deepen our understanding of VI marketing mechanism, we examine the mediating role of viewer attitudes in the relationship between disclosure timing and behavioral intentions. Additionally, this study aims to extend match-up theory by exploring how perceived VI-brand fit moderates these effects.

2. Conceptual and theoretical background

2.1. Influencer effects on consumer attitudes and behavioral intentions

(Social media) influencers are individuals who have amassed substantial followings on social media platforms by actively

creating and sharing content (Harrigan et al., 2021; Steils et al., 2022). They serve as independent third-party endorsers, shaping public perceptions and attitudes through various social media channels such as blogs, Instagram, YouTube, and TikTok (Freberg et al., 2011; Schouten et al., 2020). As audiences increasingly turn away from traditional mass media and utilize ad-blocking software, influencers play a pivotal role in raising brand awareness and stimulating consumer behaviors. According to a report, 49% of Twitter users rely on influencer recommendations when making purchase decisions (Adabelli, 2023). The global influencer market has experienced significant growth, reaching a value of 21.1 billion U.S. dollars in 2023, with this upward trend anticipated to continue (Statista, 2023). The effectiveness of influencers is closely linked to their perceived credibility and authenticity (Chapple & Cownie, 2017; Kim & Baek, 2023; Lee et al., 2024; Lou & Yuan, 2019; Steils et al., 2022). Social media users tend to assume that influencers provide honest opinions about brands and products after experiencing them as consumers (Eyal, 2018; Schouten et al., 2020). Individuals with positive attitudes toward influencers are more likely to follow their suggestions, thereby shaping their behavioral intentions (Ki & Kim, 2019; Kim et al., 2024). In addition to influencing purchase decisions, influencers play a crucial role as sources of word-of-mouth (WOM), with their followers actively sharing endorsement content across various social media platforms (Bakker, 2018; Dhanesh & Duthler, 2019). Studies have demonstrated that social media users' attitudes towards influencers significantly impact their WOM and purchasing intentions by stimulating a desire to mimic the influencer (Ki & Kim, 2019).

Meanwhile, ethical concerns surrounding influencers' practices have become increasingly prominent in recent years (Bogle, 2017; Wellman et al., 2020). A significant portion of mega influencers, those with over a million followers on Instagram, have been implicated in fraudulent activities aimed at inflating their engagement and follower numbers between 2019 and 2021 (Statista, 2023). Although influencers are typically compensated by brands to promote their products through social media, some influencers falsely present these endorsements as independent choices (Ritson, 2018). Transparency is recognized by experts as a critical element in influencer marketing campaigns (Dhanesh & Duthler, 2019), and the lack of transparency undermines the trust between influencers and their followers (de Cicco et al., 2021). When viewers develop a sense of distrust in influencers, they become skeptical of their endorsements (Jang et al., 2021).

Image transfer is a possible mechanism underlying the influencer effect. McCracken's (1989) transfer model proposes that celebrities have a shared cultural significance in the eyes of consumers and that brands borrow the cultural meaning associated with the celebrities when they use them in advertisements. In other words, the meanings celebrities acquire from their public roles transfer to a brand or product they endorse. Similarly, when social media users form positive attitudes toward the influencers they follow, these positive attitudes will transfer to the brands the influencer endorses, particularly when the brands share similar

association sets with the influencer (de Cicco et al., 2021; Kim et al., 2017; Till & Busler, 1998). Trust is another important factor that can be transferred from a reliable source to an unknown target associated with that source (Stewart, 2003). Because social media influencers are trusted by their followers, the brands the influencers endorse are naturally trusted as the trust transfers. This transfer model can explain the mechanism in which an influencer's perceived authenticity and trust impact consumers' behavioral intentions and emotional attachment (Doney & Cannon, 1997; Jarvenpaa et al., 2000; Kim & Baek, 2023). Given these connections, the persuasiveness of influencer endorsements is expected to diminish when people become disappointed with or skeptical about the influencer.

2.2. Emergence of virtual influencers in advertising

VIs have garnered significant attention from marketers as a novel type of influencers (Bringé, 2022). These computer-generated characters have gained popularity across diverse industries such as fashion, entertainment, and lifestyle, by offering advantages such as customizable appearances, cost-effective management, and freedom from personal scandals (Ozdemir et al., 2023; Yeung & Bae, 2022). The presence of VIs also conveys a sense of innovation and technological savvy for the partnering brand (Conti et al., 2022).

According to a 2022 US survey, 58% of respondents followed at least one VI on social media, and 35% of respondents had purchased a product or service advertised by a VI (The Influencer Marketing Factory, 2022). People seem to engage with VIs online as they do with humans (Lou et al., 2022). The consumer-VI interactions can be contextualized within the CASA paradigm. This paradigm posits that individuals tend to treat computers as they treat human beings, applying social heuristics used in human interactions to their interactions with computers (Nass et al., 1994; Reeves & Nass, 1996). It has been found that regions of the human brain that activate during interpersonal communications also activate when dealing with virtual agents (Kramer et al., 2020). As VIs share their opinions and personal lives through social media and interact with viewers via comments, viewers develop emotional attachment to the VIs, which results in positive attitudes and behavioral intentions (Jang et al., 2021; Na et al., 2023). This CASA tendency is amplified when computer programs exhibit human-like appearances and behaviors (Gambino et al., 2020). In light of these findings, it is predicted that popular human-like VIs will exert similar influences on consumers' WOM and purchase intentions as human influencers do.

2.3. Issues with virtual influencer identity disclosure timing

The confusion among viewers about the identity of VIs can be an issue for VI marketing (da Silva Oliveira & Chimenti, 2021). According to a 2022 study on VIs, a quarter of survey respondents did not know such a thing existed (The Influencer Marketing Factory, 2022). Due to the highly

realistic appearances of some VIs, some viewers who stumble upon their social media posts may not initially realize that they are not humans (Block & Lovegrove, 2021). The absence of explicit mention about their identity (i.e., non-human, computer-generated characters) in every post contributes to this confusion. This lack of transparency can lead to negative reactions when viewers eventually discover the true nature of these virtual entities.

Research has shown that VI's identity disclosure, coupled with emotional narratives, significantly increases a VI's credibility through perceived parasocial interaction (Lim & Lee, 2023). Another study indicates that perceived authenticity is significantly related to emotional attachment and WOM (Kim & Baek, 2023). Most companies that initially hid details about their VIs eventually reveal the fact that they are not humans once their faces are known to the public. Yet, the specific relationships between disclosure timing (before vs. after exposure to advertising) and viewer reactions remains an area for further investigation. When viewers develop positive attitudes toward an influencer based on her social media content, discovering that they have been interacting with a non-human entity can elicit feelings of unease. These negative emotions can extend to the brand or product endorsed by the influencer (Kahle & Homer, 1985; Kamins, 1990), resulting in a reduction in purchase and WOM intentions (Kim & Baek, 2023). Thus, the following set of hypotheses is posited.

H1. Disclosure of the virtual influencer's identity before (vs. after) exposure to sponsored content will positively influence viewer attitude toward the virtual influencer.

H2. Disclosure of the virtual influencer's identity before (vs. after) exposure to sponsored content will positively influence viewer intention to purchase the endorsed brand through viewer attitude toward the virtual influencer (mediation).

H3. Disclosure of the virtual influencer's identity before (vs. after) exposure to sponsored content will positively influence viewer intention to spread word of mouth about the endorsed brand through viewer attitude toward the virtual influencer (mediation).

2.4. The endorser-brand fit (match-up) effect

In the endorsement literature, the concept of endorser-brand fit, also known as match-up, refers to the congruence between the endorser and the brand being endorsed (Fleck et al., 2012; Till & Busler, 2000). The match-up hypothesis suggests that the effectiveness of an endorsement is heightened when consumers perceive a good match between the endorser and the brand or product (Breves et al., 2019; Fleck et al., 2012; Kahle & Homer, 1985; Schouten et al., 2020). Image transfer from celebrities to their endorsed brands are also more pronounced when the advertising context is congruent with their personal images (Kim et al., 2017; Rai et al., 2021). If viewers immediately recognize that the endorser is an expert user of the brand/product, this can be seen as a good fit (Rossiter & Smidts, 2012; Schouten et al., 2020). For instance, actresses are often seen as suitable endorsers for beauty products, while athletes are considered appropriate for energy bars (Kamins, 1990; Till & Busler,

2000). A good endorser-brand fit can increase consumers' response to the endorsement such as purchase intentions (Bergkvist et al., 2016; McCormick, 2016). In McCracken's (1989) words, it means that the endorser conveys right meaning to the brand. Furthermore, this perceived fit can positively influence consumers' purchase intentions (Lee & Koo, 2015; Rai et al., 2021; Rossiter & Smidts, 2012). This match-up effect was found even in a match between an unknown endorser (e.g., a model depicted as an athlete) and a seemingly matched brand (e.g., sport-related product) (Till & Busler, 2000; Yoon & Choi, 2005). In contrast, a mismatch between a brand and its endorser can have a neutral or even negative effect on purchase intention (Ilicic & Webster, 2013). Therefore, achieving a strong endorser-brand fit is crucial for maximizing the positive impact of celebrity endorsements on consumer behavior and attitudes.

The endorser-brand fit effect can be explained by schema theory, developed by Bartlett and Piaget. Schema refers to mental structures that organize knowledge and guide cognitive processes and behaviors (Michalak, 2019). It enables individuals to interpret and understand the world around them. When information is in harmony with one's schema, it can be processed more efficiently, facilitating the development of cognitive and affective responses (Breves et al., 2019; Kamins, 1989; Schouten et al., 2020). According to this theory, when an influencer endorses a matched brand, the information is processed efficiently, and the affect associated with the endorser is immediately applied to the brand as it is consistent with consumers' expectations (Koernig & Boyd, 2009). However, a mismatch challenges the existing schema, making it difficult to connect the dots. As a result, even if consumers have a positive attitude toward the endorser, their attitude may not fully transfer to their intentions to discuss or purchase the endorsed brand. Research has shown that schema-congruent advertising has stronger effects on consumer behavior compared to schema-incongruent advertising, suggesting that the endorser-brand fit may moderate the effectiveness of endorsements (Fiske, 1982; Misra & Beatty, 1990).

The match-up hypothesis has been applied to social media influencer marketing, demonstrating that the perceived brand-influencer fit influences attitudes and behavioral intentions toward the advertised brand (Breves et al., 2019; Schouten et al., 2020). A recent study found that the influencer-brand fit is also crucial in VI marketing (Kim & Park, 2023). For example, consumers felt digitally created VIs better matched with tech products than beauty products, which affected their behavioral intentions (Franke et al., 2023). Given that, even if consumers find a particular VI likable, their purchase intentions may remain unaffected if the VI does not seem well matched with the brand or product. Therefore, the following hypotheses are proposed.

H4. Perceived fit between the influencer and the brand will moderate the relationship between viewer attitude toward the influencer and purchase intention, such that a lower perceived fit will weaken the positive effect of viewer attitude on purchase intention (moderation).

H5. Perceived fit between the influencer and the brand will moderate the relationship between viewer attitude toward the influencer and WOM intention, such that a lower perceived fit

will weaken the positive effect of viewer attitude on WOM intention (moderation).

H6. Perceived fit between the influencer and the brand will moderate the mediated relationship between the timing of influencer identity disclosure and purchase intention through viewer attitude toward the influencer, such that a lower perceived fit will weaken the positive mediated effect of early disclosure on purchase intention (moderated mediation).

H7. Perceived fit between the influencer and the brand will moderate the mediated relationship between the timing of influencer identity disclosure and word-of-mouth intention through viewer attitude toward the influencer, such that a lower perceived fit will weaken the positive mediated effect of early disclosure on word-of-mouth intention (moderated mediation).

To sum up, the current study examines if (1) the virtual identity disclosure timing (i.e., before vs. after viewers' exposures to ads) makes differences in viewers' attitudes toward the VI and, in turn, their behavioral intentions (i.e., purchase intention and WOM intention), while exploring if (2) viewer attitude mediates the relationship between identity disclosure timing and behavioral intentions, and if (3) the perceived fit between the VI and the endorsed brand moderates above-mentioned effects. Figure 1 visualizes our proposed model.

3. Method

3.1. Materials and procedure

Data were collected through the online panel service managed by Embrain, a representative survey agency in South Korea, between September 30 and October 1, 2022. The target population was South Korean adults; hence, purposive quota sampling method based on age, sex, and location (i.e., 17 major cities and provinces) was employed. Participants were provided with a study description and those who voluntarily opted to participate in the experiment for a small monetary reward received a link to the online experiment. After excluding incomplete or insincere responses, the final sample consisted of 128 respondents. Participants' ages ranged from 21 to 68 years ($M = 44.4$, $SD = 13.32$). There were slightly more females (53%) than males. Education was measured with 7 levels from high school dropout or below (1; 0.7%) to completion of doctoral course or above (7; 0.8%). The mean fell between 3 (2-year college degree or 4-year college dropout; 17.2%) and 4 (4-year college degree; 57.8%), closer to 4 ($M = 3.8$, $SD = 1.1$). Monthly income was measured with 9 levels from 1 (below 1 million Korean Won) to 9 (9 million Korean Won or above). The mean fell between 5 (4 million Won or above, below 5 million Won) and 6 (5 million Won or above, below 6 million Won), closer to 5 ($M = 5.4$, $SD = 2.2$).

The online experiment utilized existing Instagram posts from Lucy, a VI created by a South Korean company. Lucy is depicted as a car designer and part-time fashion model in her late 20s. Her Instagram content portrays her as a young professional leading a vibrant life outside of work, including activities such as drawing car illustrations, attending media art shows, traveling, and enjoying beer with friends in her

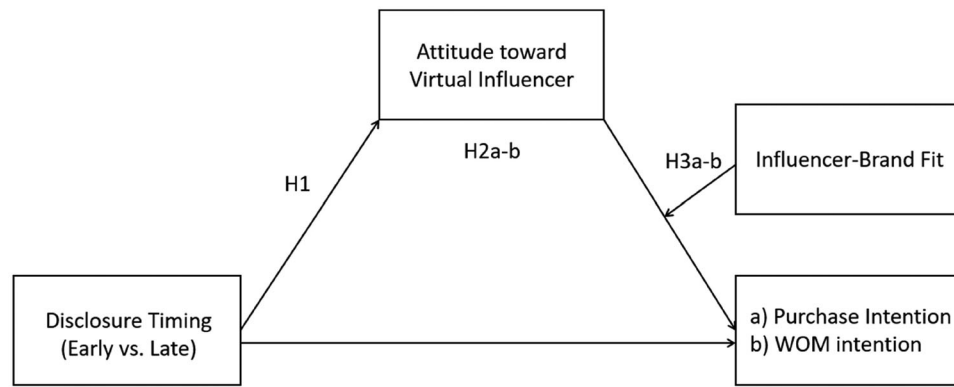


Figure 1. The proposed moderated mediation model.

backyard. Prior to this study, Lucy had endorsed several fashion brands. We selected Lucy for this study due to her realistic, anthropomorphic appearance and the fact that her virtual identity was not disclosed in her profile or posts. At the time of the experiment, Lucy was not widely recognized by the public.

All participants viewed the same three posts from Lucy's Instagram account. The study's experimental manipulation was altering when Lucy's virtual identity was revealed. Participants were randomly assigned to either early ($n=63$) or late disclosure conditions. In the early disclosure condition, participants were initially informed about Lucy ("Lucy is a virtual influencer. She is characterized as a designer in her late 20s...") along with a brief explanation about VI ("Virtual influencer, also known as virtual human, is a digital model..."). Then, they were shown three of Lucy's Instagram posts, including two depicting her "daily life" and a third sponsored post for Zero, a newly launched sugar-free cookie brand (See Figure 2).

We selected this sponsored post about Zero because it was an actual post by Lucy and provides a compelling case for examining the role of VI-brand fit. Although food is not a typical category for VI marketing, it is relatively common for VIs to endorse food brands in South Korea (de Brito Silva et al., 2022). Lucy's conventionally attractive appearance, including a slim physique, makes her a fitting endorser for sugar-free cookies. Additionally, her running photos suggest a healthy lifestyle. However, since digitally created characters do not require food for survival—let alone sugar-free snacks for weight management—the sponsored content may not align well with viewers' schema.

After viewing the posts, participants completed a questionnaire. Participants in the late disclosure condition were introduced to Lucy without mention of her virtual identity ("Lucy is an influencer. She is a designer in her late 20s..."). The reveal that she was a VI was made only after they had seen all three posts, after which they completed the questionnaire.

3.2. Measures

The main survey items of this study were employed from previous studies and modified to fit this specific context of Lucy endorsing Zero. The three viewer reaction items were

measured on a 7-point Likert scale except for attitude that was measured using a 7-point bipolar scale.

Purchase intention was measured by requesting participants to rate how much they agree with the following three items (e.g., "I want to purchase Zero cookies," "I am interested in trying Zero cookies"; $\alpha = .97$, $M = 4.14$, $SD = 1.48$; Rodgers, 2003).

WOM intention was measured with three items (e.g., "I want to talk about Zero cookies or this post," "I am willing to recommend Zero cookies or this post"; $\alpha = .94$, $M = 3.70$, $SD = 1.44$; Kang et al., 2020).

Influencer-brand fit was measured considering the two dimensions of congruence (Fleck & Quester, 2007): relevancy (e.g., "Lucy goes well with Zero," "Lucy is very appropriate for Zero") and expectancy ("Lucy is very expectable for this ad," "I am not surprised that Lucy endorses Zero"; $\alpha = .94$, $M = 4.66$, $SD = 1.19$).

Attitude toward the VI was measured by asking participants to rate their feelings about Lucy on four 7-point bipolar scales (e.g., good/bad, likable/unlikable; $\alpha = .95$, $M = 4.77$, $SD = 1.18$; Brunner & Hensel, 1992, Lafferty & Goldsmith, 1999).

4. Results

For hypothesis testing, SPSS with the PROCESS macro (Hayes, 2022) was utilized. A manipulation check was conducted by asking participants if they were informed of Lucy's virtual identity prior to being exposed to her posts. In the early disclosure condition, 75% of participants correctly responded "yes," while in the late disclosure condition, 76% correctly responded "no." A chi-square test indicated that the difference between the manipulation groups was significant ($\chi^2(1, N=128) = 34.29$, $p < .001$).

First, a regression analysis found that identity disclosure timing significantly predicted viewer attitude toward the influencer ($b = .46$, $SE = .20$, $t = 2.26$, $p < .05$), thereby supporting H1. Participants who were informed of Lucy's virtual identity before seeing her posts exhibited significantly more favorable attitudes toward her ($M = 4.99$, $SD = 1.09$) compared to those who received the information after viewing her posts ($M = 4.55$, $SD = 1.24$).

H2 and H3 predicted that attitude would mediate the relationship between identity disclosure timing and



Figure 2. The three posts presented to the participants. The first post is about Lucy going out for running and the second post shows her taking photos in a four-cut photo booth. The third post is the sponsored content about zero, the sugar-free cookie brand. All photos are from Lucy's Instagram (@here.me.lucy). Texts are slightly modified from the original posts.

behavioral (i.e., purchase & WOM) intentions. To test the basic mediation models while controlling for demographic variables (i.e., age, sex, education, and income), model 4 of the PROCESS macro (Hayes, 2022) was used to generate 95% bias-corrected bootstrap confidence intervals based on 10,000 bootstrap samples. Attitude predicted by disclosure timing, in turn, significantly predicted purchase intention ($b = .67$, $SE = .10$, $t = 7.01$, 95% $CI = [.482, .861]$) and

WOM intention ($b = .58$, $SE = .10$, $t = 5.84$, 95% $CI = [.385, .780]$). The mediation through attitude was significant for both purchase intention ($b = .31$, Bootstrap $SE = .15$, 95% $CI = [.036, .623]$) and WOM intention ($b = .27$, Bootstrap $SE = .14$, 95% $CI = [.030, .559]$). Thus, H2 and H3 were supported. These results suggest that the effects of identity disclosure timing on purchase intention or WOM intention can be explained by the changes in viewer attitude.

Table 1. The moderated mediation effects of identity disclosure timing on purchase intention/WOM intention.

Conditional indirect effects					
Dependent variable	Moderator value	Effect	Boot SE	Boot LLCI	Boot ULCI
Purchase intention	High (M + 1SD)	.28	.15	.035	.612
	Moderate Fit (M)	.22	.12	.024	.488
	Low (M-1SD)	.15	.10	-.001	.386
Word-of-mouth intention	High (M + 1SD)	.27	.15	.024	.596
	Moderate Fit (M)	.18	.11	.009	.426
	Low (M-1SD)	.09	.09	-.045	.292

Note: Mediator: attitudes toward the influencer; Moderator: influencer-brand fit; LLCI: lower limit confidence interval; ULCI: upper limit confidence interval.

H4 and H5 also proposed that viewer attitude toward the influencer and influencer-brand fit would significantly interact. Furthermore, H6 and H7 predicted that the relationships between disclosure timing and behavioral intention (i.e., purchase intention or WOM intention) mediated through attitude would be moderated by perceived influencer-brand fit. To test these, PROCESS model 14 was used with 10,000 bootstrap samples.

Our first moderation test for H4 found a significant interaction between viewer attitude and the perceived influencer-brand fit in the model predicting purchase intention ($b = .12$, $SE = .05$, $t = 2.30$, 95% $CI = [.017, .225]$). The attitude-purchase intention relationship was stronger as the fit was perceived better. Thus, H4 was supported. To further probe the interaction, the Johnson-Neyman technique was used, revealing that the relationship was significant when the fit was higher than 2.89 on a scale ranging from 1 to 7. When the fit was equal to or lower than 2.89, the relationship between influencer attitude and purchase intention was non-significant.

The moderated mediation test for H6 indicated that the indirect effect of disclosure timing on purchase intention was also significantly influenced by the perceived influencer-brand fit ($b = .06$, Bootstrap $SE = .03$, 95% $CI = [.004, .137]$). The conditional indirect effect was found to be significant when the perceived fit was at the mean level ($b = .22$, Bootstrap $SE = .12$, 95% $CI = [.024, .488]$). When the perceived fit was 1 standard deviation (SD) above the mean, the effect was even stronger ($b = .28$, Bootstrap $SE = .15$, 95% $CI = [.035, .612]$). However, when the fit was perceived to be low (1SD below the mean), the indirect effect became non-significant ($b = .15$, Bootstrap $SE = .10$, 95% $CI = [-.001, .386]$). This result indicated that the mediated relationship between disclosure timing and purchase intention was significantly moderated by the perceived influencer-brand fit. Thus, H6 was supported.

The interaction between viewer attitude and influencer-brand fit (H5) was also significant in the model predicting WOM intention ($b = .17$, $SE = .05$, $t = 3.10$, 95% $CI = [.060, .273]$). The relationship between attitude and WOM intention differed by the level of perceived fit. Thus, H5 was supported. The Johnson-Neyman significance region was when the fit was higher than 3.67. When the fit was equal to or lower than that, the relationship was non-significant.

Furthermore, the final moderated mediation test (H7) revealed that the indirect effect of disclosure timing on

WOM intention was significantly moderated by the perceived influencer-brand fit ($b = .08$, Bootstrap $SE = .04$, 95% $CI = [.007, .176]$). The mediation was significant when the perceived fit was at the mean ($b = .18$, Bootstrap $SE = .11$, 95% $CI = [.009, .426]$). The effect was even stronger when the fit was 1SD above the mean ($b = .27$, Bootstrap $SE = .15$, 95% $CI = [.024, .596]$). However, the indirect effect became non-significant when the fit was 1SD below the mean ($b = .09$, Bootstrap $SE = .09$, 95% $CI = [-.045, .292]$; See Table 1). Thus, H7 was supported.

5. Discussion

In this study, we presented a model that examined the impact of VI identity disclosure timing on viewers' purchase intentions and WOM intentions toward the VI-endorsed brand, which was mediated through viewer attitudes toward the VI. Additionally, we investigated the moderating role of perceived influencer-brand fit. The results of our analyses supported the proposed model for both outcome variables. Belated disclosure of virtual identity significantly lowered viewer attitudes toward the VI, as well as behavioral intentions, and the indirect effect of disclosure timing on behavioral intentions mediated through attitudes was altered by the influencer-brand match.

6. Theoretical contributions

This study makes a theoretical contribution to the influencer endorsement literature by elucidating the significance of identity disclosure timing. Recent research has advanced our understanding of disclosure effects by comparing the outcomes under conditions of disclosed versus undisclosed VI identity. In this study, we revealed the VI's identity to all viewers but varied the timing of this disclosure, uncovering significant differences in viewers' reactions. These findings suggest that it is not only essential to disclose a VI's virtual identity but also to do so at an appropriate time. In an era where consumers are increasingly vigilant about deceptive influencer marketing practices, transparency is crucial for effective influencer marketing (Steils et al., 2022). Our findings indicate that post-exposure disclosure may be insufficient to establish the perceived transparency of the VI or the agency, suggesting a boundary condition for the disclosure effect. As posited by the image transfer model, ambiguity regarding an endorser's identity may adversely impact the perceived integrity of the promoted brand.

Moreover, this study contributes to the expansion of the CASA paradigm by highlighting the critical role of transparency not only for human influencers but also for VIs. The late disclosure negatively affected viewers' behavioral intentions by hurting their feelings toward the VI. This finding that viewers reacted to VIs as they reacted to humans indicates that CASA can apply to the context of VIs. While CASA has mainly been studied in the one-on-one interaction contexts (Arsenyan & Mirowska, 2021), our study demonstrates its applicability in the context of VIs—public figures who engage with audiences in a “masspersonal”

manner on social media platforms (O'Sullivan & Carr, 2018; Lee, 2015).

By examining the mediating role of viewer attitudes, this study also sheds light on the mechanism through which delayed identity disclosure reduces consumers' behavioral intentions. While prior research has predominantly focused on behavioral intentions to gauge viewer reactions, the importance of viewer attitudes toward influencers has often been overlooked (Ki et al., 2023). Expanding on the CASA literature, this study emphasizes the role of viewer attitudes and demonstrates that, despite their non-human nature, viewers form emotional connections with VIs, which significantly influence their behavioral intentions. Contrary to concerns about the uncanny valley effect associated with anthropomorphic VIs, our data reveal a generally favorable viewer attitude toward Lucy, with mean scores of 4.99 in the early disclosure condition and 4.55 in the late disclosure condition on a 7-point scale. This suggests that, on average, viewers respond positively to this emerging category of digital influencers, and this sentiment is further enhanced when their artificial identity is disclosed upfront. These findings underscore the pivotal role of immediate attitudes toward VIs in the effectiveness of social media marketing campaigns.

In terms of behavioral intentions, we examined both purchase intentions and WOM intentions. In addition to focus on purchase intention, a common outcome variable, this study also paid attention to WOM intention as a critical outcome. While purchase intention serves as a more direct predictor of sales, WOM intention has garnered significant attention as an indicator of viral marketing potential (Chang et al., 2015; Huang et al., 2011). This study provides a unique context for observing the influences of VI marketing on WOM intentions, which has not been rigorously tested in existing literature. Given that VI content on social media represents an emerging form of marketing, exposure to VI advertising is likely to provoke discussion among viewers about the content, VI, or the promoted brands, irrespective of their actual purchase intentions. According to our results, timely disclosure of influencer information positively affected WOM intentions in the context of VIs, which is an expansion of WOM literature. Overall, purchase intention and WOM intention showed similar patterns as outcome variables in our model, suggesting that the latter may function as an indicator of consumer behavior, similar to the former.

Finally, this study highlights the significant role of perceived VI-brand fit, thereby supporting the match-up hypothesis. It expands the theory by applying it into the less-explored context of VI marketing. Through moderated mediation analyses, we discovered that the perception of VI-brand fit crucially influenced endorsement effectiveness. Notably, the positive impact of disclosure timing on purchase and WOM intentions, mediated by viewer attitudes, was pronounced only under conditions of perceived adequate fit. In instances where the VI appeared misaligned with the brand, favorable attitudes elicited by early disclosure of the VI's virtual identity failed to enhance purchase or

WOM intentions. By shedding light on the influences of identity disclosure timing and VI-brand fit, this study intends to offer scholarly insights.

7. Practical implications

The findings of this study carry practical implications for marketers. First, our results highlight the necessity for timely disclosure of VIs' artificial identity to enhance endorsement effects. Revealing a VI's non-human identity after (vs. before) viewers had already encountered her sponsored post negatively impacted their willingness to purchase the endorsed brand or share the post, primarily due to negative shifts in attitudes toward the VI. In contrast, upfront disclosure elicited more positive reactions. While marketers often aim to create a surprise effect, this finding suggests that it is imperative for marketers to avoid misleading consumers by withholding essential details to preclude potential backlash at a later stage.

Similar patterns were observed with WOM intentions. One might anticipate that late disclosure could surprise viewers, potentially increasing WOM intentions. However, our findings indicate the opposite. Early disclosure was more effective for increasing WOM intentions as well as purchase intentions. WOM intentions did not show markedly different patterns from purchase intentions in this context. The result that timely disclosure enhances WOM intentions suggests that VI advertising can stimulate WOM, especially when the VI's identity is disclosed before the advertisement is presented. Marketers should therefore prioritize the optimal timing of VI identity disclosure, not only to boost sales but also to generate WOM.

Our moderating role of the endorser-brand fit also provides managerial implications for VI marketing. When consumers recognized that a social media influencer was not a real person and thus had no personal concerns about weight or dietary choices, it might seem incongruous for her to endorse cookies as both delicious and non-fattening. This result is in line with previous research about schema theory and the match-up hypothesis, which suggests that people struggle to process incongruent information that does not fit their schema. In cases of poor fit, how much people liked the influencer did not translate into behavioral intentions. The thresholds were 2.89 and 3.67 for purchase and WOM intentions, respectively. Even when a marketing campaign clearly reveals all the secrets about a VI in advance, it may not increase consumers' purchase/WOM intentions if they think the match is not good enough. Therefore, marketers seeking to leverage VIs in their advertising campaigns should ensure a harmonious VI-brand relationship to convert positive viewer attitudes into tangible consumer actions.

8. Limitations and conclusions

The present study acknowledges several limitations that warrant attention. First, the experiment was conducted using a single stimulus, specifically Lucy promoting sugar-free cookie brand in her post. While this choice aimed to utilize

a real-world example, it restricted the generalizability of the findings. Future research would benefit from replicating the study with different VIs and brands.

Another limitation pertains to the artificial nature of the experimental setting. To ensure control over confounding variables and isolate the effects of the manipulation, we utilized edited screenshots of Instagram posts instead of an active Instagram page. Although we tried to give participants an opportunity to get to know Lucy a little bit more by additionally presenting two previous photos, this screenshot approach limited the inclusion of additional information that could influence viewer reactions such as the number of followers, likes, and comments on the posts. Viewer responses may differ in a real social media setting where such information is available. In addition, in the late disclosure condition, Lucy's virtual identity was revealed immediately after participants were exposed to the ad. Participants' reaction could be different if they had interacted with Lucy over time, building a parasocial relationship, and discovered his or her virtual identity at a later stage. Nonetheless, we found significant effects even with the slight delay in time. Future studies could consider incorporating more realistic social media environments and exploring the impact of more delayed identity disclosure.

Q2 Disclosure statement

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

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References

- Adabelli, M. (2023). How much do firms spend on influencer marketing in 2023? *TechJury*. Retrieved July 7, 2023, from <https://techjury.net/blog/influencer-marketing-spend/#gref/>
- Arsenyan, J., & Mirowska, A. (2021). Almost human? A comparative case study on the social media presence of virtual influencers. *International Journal of Human-Computer Studies*, 155, 102694. <https://doi.org/10.1016/j.ijhcs.2021.102694>
- Bakker, D. (2018). Conceptualising influencer marketing. *Journal of Emerging Trends in Marketing and Management*, 1(1), 79–87.
- Bergkvist, L., Hjalmarson, H., & Mägi, A. W. (2016). A new model of how celebrity endorsements work: attitude toward the endorsement as a mediator of celebrity source and endorsement effects. *International Journal of Advertising*, 35(2), 171–184. <https://doi.org/10.1080/02650487.2015.1024384>
- Block, E., & Lovegrove, R. (2021). Discordant storytelling, 'honest fakery', identity peddling: How uncanny CGI characters are jamming public relations and influencer practices. *Public Relations Inquiry*, 10(3), 265–293. <https://doi.org/10.1177/2046147X211026936>
- Bogle, A. (2017). Social media influencers, it's time to be truthful about your #ads. Mashable. Retrieved July 7, 2023, from <https://mashable.com/2017/03/02/australia-advertising-instagram-influencers/>
- Breves, P. L., Liebers, N., Abt, M., & Kunze, A. (2019). The perceived fit between instagram influencers and the endorsed brand: How influencer-brand fit affects source credibility and persuasive effectiveness. *Journal of Advertising Research*, 59(4), 440–454. <https://doi.org/10.1080/02650487.2008.11073052>
- Bringé, A. (2022). The rise of virtual influencers and what it means for brands. *Forbes*. Retrieved July 7, 2023, from <https://www.forbes.com/sites/forbescommunicationscouncil/2022/10/18/the-rise-of-virtual-influencers-and-what-it-means-for-brands/?sh=bcc90b26b56c/>
- Brunner, G. C., II, & Hensel, P. J. (1992). *Marketing scales handbook: A compilation of multi-item measures*. American Marketing Association.
- Chae, S. (2022). Virtual humans run the world: Virtual influencers big bang [written in Korean]. *Fortune Korea*. Retrieved July 7, 2023, from <http://www.fortunekorea.co.kr/news/articleView.html?idxno=22705/>
- Chang, Y.-T., Yu, H., & Lu, H.-P. (2015). Persuasive messages, popularity cohesion, and market diffusion in social media marketing. *Journal of Business Research*, 68(4), 777–782. <https://doi.org/10.1016/j.jbusres.2014.11.027>
- Chapple, C., & Cownie, F. (2017). An investigation into viewers' trust in and response towards disclosed paid-for endorsements by YouTube lifestyle vloggers. *Journal of Promotional Communications*, 5(2), 110–136.
- Conti, M., Gathani, J., & Tricomi, P. P. (2022). Virtual influencers in online social media. *IEEE Communications Magazine*, 60(8), 86–91. <https://doi.org/10.1080/10641734.2018.1521113>
- da Silva Oliveira, A. B., & Chimenti, P. (2021). "Humanized robots": A proposition of categories to understand virtual influencers. *Australasian Journal of Information Systems*, 25. <https://doi.org/10.3127/ajis.v25i0.3223>
- de Brito Silva, M. J., de Oliveira Ramos Delfino, L., Alves Cerqueira, K., & de Oliveira Campos, P. (2022). Avatar marketing: A study on the engagement and authenticity of virtual influencers on Instagram. *Social Network Analysis and Mining*, 12(1), 130. <https://doi.org/10.1007/s13278-022-00966-w>
- de Cicco, R., Iacobucci, S., Cannito, L., Onesti, G., Ceccato, I., & Palumbo, R. (2024). Virtual vs. human influencer: Effects on users' perceptions and brand outcomes. *Technology in Society*, 77, 102488. <https://doi.org/10.1016/j.techsoc.2024.102488>
- de Cicco, R., Iacobucci, S., & Pagliaro, S. (2021). The effect of influencer-product fit on advertising recognition and the role of an enhanced disclosure in increasing sponsorship transparency. *International Journal of Advertising*, 40(5), 733–759. <https://doi.org/10.1080/02650487.2020.1801198>
- Dhanesh, G. S., & Duthler, G. (2019). Relationship management through social media influencers: Effects of followers' awareness of paid endorsement. *Public Relations Review*, 45(3), 101765. <https://doi.org/10.1016/j.pubrev.2019.03.002>
- Doney, P. M., & Cannon, J. P. (1997). An examination of the nature of trust in buyer-seller relationships. *Journal of Marketing*, 61(2), 35–51. <https://doi.org/10.2307/1251829>
- Eyal, G. (2018). Why influencers fail to disclose commercial relationships and the brands that enable them. *Adweek*. Retrieved July 7, 2023, from <https://www.adweek.com/performance-marketing/why-influencers-fail-to-disclose-commercial-relationships-and-the-brands-that-enable-them/>
- Fiske, S. T. (1982). Schema-triggered affect: Applications to social perception. In Clark, M. S., & Fiske, S. T. (Eds.), *Affect and cognition: The seventeenth annual Carnegie symposium on cognition* (pp. 55–78). Lawrence Erlbaum Associates.
- Fleck, N. M., Korchia, M., & Le Roy, I. (2012). Celebrities in advertising: Looking for congruence or likability? *Psychology & Marketing*, 29(9), 651–662. <https://doi.org/10.1002/mar.20551>
- Fleck, N. D., & Quester, P. (2007). Birds of a feather flock together ... definition, role and measure of congruence: An application to sponsorship. *Psychology & Marketing*, 24(11), 975–1000. <https://doi.org/10.1002/mar.20192>
- Franke, C., Groeppel-Klein, A., & Müller, K. (2023). Consumers' responses to virtual influencers as advertising endorsers: novel and effective or uncanny and deceiving? *Journal of Advertising*, 52(4), 523–539.
- Freberg, K., Graham, K., McGaughey, K., & Freberg, L. A. (2011). Who are the social media influencers? A study of public perceptions of personality. *Public Relations Review*, 37(1), 90–92. <https://doi.org/10.1016/j.pubrev.2010.11.001>

- Gambino, A., Fox, J., & Ratan, R. A. (2020). *Building a stronger CASA: Extending the computers are social actors paradigm*. *Human-Machine Communication*, 1, 71–86. <https://doi.org/10.30658/hmc.1.5>
- Guthrie, S. (2020). Virtual influencers: More human than humans. In *Influencer Marketing* (pp. 271–285). Routledge.
- Harrigan, P., Timothy, M. D., Coussement, K., Lee, J. A., & Soutar, G. N. U. (2021). Evers. Identifying influencers on social media. *International Journal of Information Management*, 56, 102246. <https://doi.org/10.1016/j.ijinfomgt.2020.102246>
- Hayes, A. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). The Guilford Press.
- Huang, M., Cai, F., Tsang, A. S. L., & Zhou, N. (2011). Making your online voice loud: the critical role of WOM information. *European Journal of Marketing*, 45, 1277–1297.
- Ilicic, J., & Webster, C. M. (2013). Celebrity co-branding partners as irrelevant brand information in advertisements. *Journal of Business Research*, 66(7), 941–947. <https://doi.org/10.1016/j.jbusres.2011.12.014>
- Jang, W., Kim, J., Kim, S., & Chun, J. W. (2021). The role of engagement in travel influencer marketing: The perspectives of dual process theory and the source credibility model. *Current Issues in Tourism*, 24(17), 2416–2420. <https://doi.org/10.1080/13683500.2020.1845126>
- Jarvenpaa, S. L., Tractinsky, N., & Vitale, M. (2000). Consumer trust in an Internet store. *Information Technology and Management*, 1, 45–71. <https://doi.org/10.1023/A:1019104520776>
- Kahle, L. R., & Homer, P. H. (1985). Physical attractiveness of the celebrity endorser: A social adaptation perspective. *Journal of Consumer Research*, 11(4), 954–961. <https://doi.org/10.1086/209029>
- Kamins, M. A. (1989). Celebrity and non-celebrity advertising in a two-sided context. *Journal of Advertising Research*, 29(3), 34–42. <https://doi.org/10.1080/00913367.1989.10673146>
- Kamins, M. A. (1990). An investigation into the “Match-up” hypothesis in celebrity advertising: When beauty may be only skin deep. *Journal of Advertising*, 19(1), 4–13. <https://doi.org/10.1080/00913367.1990.10673175>
- Kang, J. A., Hong, S., & Hubbard, G. T. (2020). The role of storytelling in advertising: Consumer emotion, narrative engagement level, and word-of-mouth intention. *Journal of Consumer Behaviour*, 19(1), 47–56. <https://doi.org/10.1002/cb.1793>
- Ki, C. W., Chow, T. C., & Li, C. (2023). Bridging the trust gap in influencer marketing: Ways to sustain consumers’ trust and assuage their distrust in the social media influencer landscape. *International Journal of Human-Computer Interaction*, 39(17), 3445–3460. <https://doi.org/10.1080/10447318.2022.2097785>
- Ki, C. W. C., & Kim, Y. K. (2019). The mechanism by which social media influencers persuade consumers: The role of consumers’ desire to mimic. *Psychology & Marketing*, 36(10), 905–922. <https://doi.org/10.1002/mar.21244>
- Kim, M., & Baek, T. H. (2023). Are virtual influencers friends or foes? Uncovering the perceived creepiness and authenticity of virtual influencers in social media marketing in the United States. *International Journal of Human-Computer Interaction*, 1–14. <https://doi.org/10.1080/10447318.2023.2233125>
- Kim, J., Kim, M., & Lee, S. M. (2024). Unlocking trust dynamics: An exploration of playfulness, expertise, and consumer behavior in virtual influencer marketing. *International Journal of Human-Computer Interaction*, Published online ahead of print. <https://doi.org/10.1080/10447318.2023.2300018>
- Kim, H., & Park, M. (2023). Virtual influencers’ attractiveness effect on purchase intention: A moderated mediation model of the Product-Endorser fit with the brand. *Computers in Human Behavior*, 143, 107703.
- Kim, T., Seo, H. M., & Chang, K. (2017). The impact of celebrity-advertising context congruence on the effectiveness of brand image transfer. *International Journal of Sports Marketing and Sponsorship*, 18(3), 246–262. <https://doi.org/10.1108/IJSM-08-2017-095>
- Koernig, S. K., & Boyd, T. C. (2009). To catch a tiger or let him go: The match-up effect and athlete endorsers for sport and non-sport brands. *Sport Marketing Quarterly*, 18(1).
- Koles, B., Audrezet, A., Moulard, J. G., Ameen, N., & McKenna, B. (2024). The authentic virtual influencer: Authenticity manifestations in the metaverse. *Journal of Business Research*, 170, 114325. <https://doi.org/10.1016/j.jbusres.2023.114325>
- Kramer, L. L., Ter Stal, S., Mulder, B. C., de Vet, E., & van Velsen, L. (2020). Developing embodied conversational agents for coaching people in a healthy lifestyle: Scoping review. *Journal of Medical Internet Research*, 22(2), e14058.
- Lafferty, B. A., & Goldsmith, R. E. (1999). Corporate credibility’s role in consumers’ attitudes and purchase intentions when a high versus a low credibility endorser is used in the ad. *Journal of Business Research*, 44(2), 109–116. [https://doi.org/10.1016/S0148-2963\(98\)00002-2](https://doi.org/10.1016/S0148-2963(98)00002-2)
- Lee, J. (2015). The double-edged sword: The effects of journalists’ social media activities on audience perceptions of journalists and their news products. *Journal of Computer-Mediated Communication*, 20(3), 312–329. <https://doi.org/10.1111/jcc4.12113>
- Lee, Y., & Koo, J. (2015). Athlete endorsement, attitudes, and purchase intention: The interaction effect between athlete endorser-product congruence and endorser credibility. *Journal of Sport Management*, 29(5), 523–538. <https://doi.org/10.1123/jsm.2014-0195>
- Lee, H., Shin, M., Yang, J., & Chock, T. M. (2024). Virtual influencers vs. human influencers in the context of influencer marketing: The moderating role of machine heuristic on perceived authenticity of influencers. *International Journal of Human-Computer Interaction*, <https://doi.org/10.1080/10447318.2024.2374100>
- Lee, Y. H., & Yuan, C. W. T. (2023). I’m not a puppet, I’m a real boy! Gender presentations by virtual influencers and how they are received. *Computers in Human Behavior*, 107927. <https://doi.org/10.1016/j.chb.2023.107927>
- Lim, J. S., Choe, M. J., Zhang, J., & Noh, G. Y. (2020). The role of wishful identification, emotional engagement, and parasocial relationships in repeated viewing of live-streaming games: A social cognitive theory perspective. *Computers in Human Behavior*, 108. <https://doi.org/10.1016/j.chb.2020.106327>
- Lim, R. E., & Lee, S. Y. (2023). “You are a virtual influencer!”: Understanding the impact of origin disclosure and emotional narratives on parasocial relationships and virtual influencer credibility. *Computers in Human Behavior*, 148. <https://doi.org/10.1016/j.chb.2023.107897>
- Lou, C., Kang, H., & Tse, C. H. (2022). Bots vs. humans: How schema congruity, contingency-based interactivity, and sympathy influence consumer perceptions and patronage intentions. *International Journal of Advertising*, 41(4), 655–684. <https://doi.org/10.1016/j.jretconser.2023.103560>
- Lou, C., & Yuan, S. (2019). Influencer marketing: How message value and credibility affect consumer trust of branded content on social media. *Journal of Interactive Advertising*, 19(1), 58–73. <https://doi.org/10.1080/15252019.2018.1533501>
- McCormick, K. (2016). Celebrity endorsements: Influence of a product-endorser match on Millennials attitudes and purchase intentions. *Journal of Retailing and Consumer Services*, 32, 39–45. <https://doi.org/10.1016/j.jretconser.2016.05.012>
- Miao, F., Kozlenkova, I. V., Wang, H., Xie, T., & Palmatier, R. W. (2022). An emerging theory of avatar marketing. *Journal of Marketing*, 86(1), 67–90. <https://doi.org/10.1177/0022242921996646>
- Michalak, K. (2019). “Schema”. *Encyclopedia Britannica*. Retrieved July 7, 2023, from <https://www.britannica.com/science/schema-cognitive/>
- Misra, S., & Beatty, S. E. (1990). Celebrity spokesperson and brand congruence: An assessment of recall and affect. *Journal of Business Research*, 21(2), 159–173. [https://doi.org/10.1016/0148-2963\(90\)90050-N](https://doi.org/10.1016/0148-2963(90)90050-N)
- Na, Y., Kim, Y., & Lee, D. (2023). Investigating the effect of self-congruity on attitudes toward virtual influencers: mediating the effect of emotional attachment. *International Journal of Human-Computer Interaction*, 1–14. <https://doi.org/10.1080/10447318.2023.2238365>
- Nass, C., Steuer, J., & Tauber, E. R. (1994). Computers are social actors. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 72–78).
- O’Sullivan, P. B., & Carr, C. T. (2018). Masspersonal communication: A model bridging the mass-interpersonal divide. *New Media & Society*, 20(3), 1161–1180. <https://doi.org/10.1177/1461444816686104>

- Ozdemir, O., Kolfal, B., Messinger, P. R., & Rizvi, S. (2023). Human or virtual: How influencer type shapes brand attitudes. *Computers in Human Behavior*, 145(C), 107771. <https://doi.org/10.1016/j.chb.2023.107771>
- Rai, J. S., Yousaf, A., Itani, M. N., & Singh, A. (2021). Sports celebrity personality and purchase intention: the role of endorser-brand congruence, brand credibility and brand image transfer. *Sport, Business and Management. An International Journal*, 11(3), 340–361. <https://doi.org/10.1108/SBM-06-2020-0062>
- Reeves, B., & Nass, C. I. (1996). *The media equation: How people treat computers, television, and new media like real people and places*. Center for the Study of Language and Information; Cambridge University Press. [Database].
- Ritson, M. (2018). How ‘influencers’ made my arse a work of art. *Marketing Week*. Retrieved July 7, 2023, from <https://www.marketingweek.com/mark-ritson-influencers/>
- Robinson, B. (2020). Towards an ontology and ethics of virtual influencers. *Australasian Journal of Information Systems*, 24. <https://doi.org/10.3127/ajis.v24i0.2807>
- Rodgers, S. (2003). The effects of sponsor relevance on consumer reactions to internet sponsorships. *Journal of Advertising*, 32(4), 67–76. <https://doi.org/10.1080/00913367.2003.10639141>
- Rossiter, J. R., & Smidts, A. (2012). Print advertising: Celebrity presenters. *Journal of Business Research*, 65(6), 874–879. <https://doi.org/10.1016/j.jbusres.2011.01.010>
- Schouten, A. P., Janssen, L., & Verspaget, M. (2020). Celebrity vs. influencer endorsements in advertising: The role of identification, credibility, and product-endorser fit. *International Journal of Advertising*, 39(2), 258–281. <https://doi.org/10.1080/02650487.2019.1634898>
- Schouten, A. P., Janssen, L., & Verspaget, M. (2021). Celebrity vs. Influencer endorsements in advertising: The role of identification, credibility, and product-endorser fit. In *Leveraged marketing communications* (pp. 208–231). Routledge.
- Shin, Y., & Lee, S. (2023). Issues of virtual fashion influencers’ reproduced bodies: a qualitative analysis based on body discourse. *Fashion and Textiles*, 10(1), 30. <https://doi.org/10.1186/s40691-023-00349-5>
- Shinhan Life (2021). *Adding fun to life*. [Vidoe]. YouTube. July 1. https://www.youtube.com/watch?v=y8v_UXdBQtw
- Statista (2023). Influencer marketing in the U.S. - Statistics & facts. Retrieved March 1, 2024, from <https://www.statista.com/topics/2496/influence-marketing/#topicOverview>
- Steils, N., Martin, A., & Toti, J. F. (2022). Managing the transparency paradox of social-media influencer disclosures: How to improve authenticity and engagement when disclosing influencer–sponsor relationships. *Journal of Advertising Research*, 62(2), 148–166. <https://doi.org/10.2501/JAR-2022-008>
- Stein, J. P., Linda Breves, P., & Anders, N. (2024). Parasocial interactions with real and virtual influencers: The role of perceived similarity and human-likeness. *New Media & Society*, 26(6), 3433–3453.
- Stewart, K. J. (2003). Trust transfer on the world wide web. *Organization Science*, 14(1), 5–17. <https://doi.org/10.1287/orsc.14.1.5.12810>
- The Influencer Marketing Factory. (2022). Virtual influencers survey + infographic. September 1. Retrieved July 7, 2023, from https://theinfluencermarketingfactory.com/virtual-influencers-survey-infographic/?utm_source=media&utm_medium=email&utm_campaign=virtual-influencers-survey/
- Tian, Q., & Hoffner, C. A. (2010). Parasocial interaction with liked, neutral, and disliked characters on a popular TV series. *Mass Communication & Society*, 13(3), 250–269. <https://doi.org/10.1080/15205430903296051>
- Till, B. D., & Busler, M. (1998). Matching products with endorsers: Attractiveness versus expertise. *Journal of Consumer Marketing*, 15(6), 576–586. <https://doi.org/10.1108/07363769810241445>
- Till, B. D., & Busler, M. (2000). The match-up hypothesis: Physical attractiveness, expertise, and the role of fit on brand attitude, purchase intent and brand beliefs. *Journal of Advertising*, 29(1), 1–13. <https://doi.org/10.1080/00913367.2000.10673613>
- Wellman, M. L., Stoldt, R., Tully, M., & Ekdale, B. (2020). Ethics of authenticity: Social media influencers and the production of sponsored content. *Journal of Media Ethics*, 35(2), 68–82. <https://doi.org/10.1080/23736992.2020.1736078>
- Yeung, J., Bae, G. (2022). Forever young, beautiful and scandal-free: The rise of South Korea’s virtual influencers. CNN. August 16. Retrieved July 7, 2023, from <https://edition.cnn.com/style/article/south-korea-virtual-influencers-beauty-social-media-intl-hnk-dst/index.html/>
- Yoon, S., & Choi, Y. (2005). Determinants of successful sports advertisements: The effects of advertisement type, product type and sports model. *Journal of Brand Management*, 12, 191–205. <https://doi.org/10.1057/palgrave.bm.2540215>
- Yoon, H. (2021). *Lifelike virtual humans dominate Korean marketing industry*. Korea.net. September 3. <https://www.korea.net/NewsFocus/Culture/view?articleId=203388>

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